CDM Smith
6001 Indian School Road NE, Suite 310
Albuquerque, New Mexico 87110
tel: 505-243-3200
fax: 505-243-2700

November 29, 2021

Kirby Olson, Manager
Major Source Program
Permitting Section
Air quality Bureau
New Mexico Environment Department
525 Camino de los Marquez, Suite 1
Santa Fe, NM 87505-1816

Subject: Title V Renewal Application
Clovis Regional Solid Waste Facility Landfill, Clovis, NM
Title V Permit No. P199L-R3

Dear Ms. Olson:

On behalf of the City of Clovis, CDM Smith Inc. is pleased to provide this Title V Renewal Application for the Clovis Regional Solid Waste Facility (CRSWF) Landfill in Clovis, New Mexico.

Please contact CDM Smith at (505) 243-3200 with any questions regarding the attached application or any other inquiries related to the CRSWF Landfill.

Sincerely,

Dacia Tucholke

Dacia R. Tucholke
Project Manager
CDM Smith Inc.

Robert A. Fowlie

Robert Fowlie, P.E.
Associate, Client Service Leader
CDM Smith Inc.

Enclosure

cc: Justin Howalt, City Manager, City of Clovis
Christopher Campbell, CDM Smith
File

Section 1: General Facility Information

Mail Application To:		For Department use only:
New Mexico Environment Department Air Quality Bureau Permits Section 525 Camino de los Marquez, Suite 1 Santa Fe, New Mexico, 87505 Phone: (505) 476-4300 Fax: (505) 476-4375 www.env.nm.gov/aqb		AIRS No.:

Universal Air Quality Permit Application

Use this application for NOI, NSR, or Title V sources.

Use this application for: the initial application, modifications, technical revisions, and renewals. For technical revisions, complete Sections, 1-A, 1-B, 2-E, 3, 9 and any other sections that are relevant to the requested action; coordination with the Air Quality Bureau permit staff prior to submittal is encouraged to clarify submittal requirements and to determine if more or less than these sections of the application are needed. Use this application for streamline permits as well. See Section 1-I for submittal instructions for other permits.

This application is submitted as (check all that apply)**:** ☐ Request for a No Permit Required Determination (no fee)
☐ **Updating** an application currently under NMED review. Include this page and all pages that are being updated (no fee required).
Construction Status: ☐ Not Constructed ☒ Existing Permitted (or NOI) Facility ☐ Existing Non-permitted (or NOI) Facility
Minor Source: ☐ a NOI 20.2.73 NMAC ☐ 20.2.72 NMAC application or revision ☐ 20.2.72.300 NMAC Streamline application
Title V Source: ☐ Title V (new) ☒ Title V renewal ☐ TV minor mod. ☐ TV significant mod. TV Acid Rain: ☐ New ☐ Renewal
PSD Major Source: ☐ PSD major source (new) ☐ minor modification to a PSD source ☐ a PSD major modification

Acknowledgements:

☒ I acknowledge that a pre-application meeting is available to me upon request. ☐ Title V Operating, Title IV Acid Rain, and NPR applications have no fees.
☐ $500 NSR application Filing Fee enclosed OR ☐ The full permit fee associated with 10 fee points (required w/ streamline applications).
☐ Check No.: ____ in the amount of ____ **N/A (Fee not required for Title V)**
☒ I acknowledge the required submittal format for the hard copy application is printed double sided 'head-to-toe', 2-hole punched (except the Sect. 2 landscape tables is printed 'head-to-head'), numbered tab separators. Incl. a copy of the check on a separate page.
☐ I acknowledge there is an annual fee for permits in addition to the permit review fee: www.env.nm.gov/air-quality/permit-fees-2/.
☐ This facility qualifies for the small business fee reduction per 20.2.75.11.C. NMAC. The full $500.00 filing fee is included with this application and I understand the fee reduction will be calculated in the balance due invoice. The Small Business Certification Form has been previously submitted or is included with this application. (Small Business Environmental Assistance Program Information: www.env.nm.gov/air-quality/small-biz-eap-2/.)

Citation: Please provide the **low level citation** under which this application is being submitted: **20.2.70.200.B NMAC**
(e.g. application for a new minor source would be 20.2.72.200.A NMAC, one example for a Technical Permit Revision is 20.2.72.219.B.1.b NMAC, a Title V acid rain application would be: 20.2.70.200.C NMAC)

Section 1 – Facility Information

Section 1-A: Company Information

		AI # if known (see 1st 3 to 5 #s of permit IDEA ID No.): **111**	Updating Permit/NOI #: **P199L-R3**
1	Facility Name: **Clovis Regional Solid Waste Facility Landfill (CRSWF)**	Plant primary SIC Code (4 digits): **4953**	
		Plant NAIC code (6 digits): **562212**	
a	Facility Street Address (If no facility street address, provide directions from a prominent landmark): **801 South Norris Street, Clovis, NM 88101**		
2	Plant Operator Company Name: **City of Clovis**	Phone/Fax: **575-769-2376 / 575-769-2378**	
a	Plant Operator Address: **801 South Norris Street, Clovis, NM 88101**		

b	Plant Operator's New Mexico Corporate ID or Tax ID: **01-508131-00-1**	
3	Plant Owner(s) name(s): **City of Clovis**	Phone/Fax: **575-769-2376 / 575-769-2378**
a	Plant Owner(s) Mailing Address(s): **801 South Norris Street, Clovis, NM 88101**	
4	Bill To (Company): **City of Clovis**	Phone/Fax: **575-769-2376 / 575-769-2378**
a	Mailing Address: **801 South Norris Street, Clovis, NM 88101**	E-mail: **jhowalt@cityofclovis.org**
5	☐ Preparer: ☒ Consultant: **CDM Smith, Inc.**	Phone/Fax: **505-243-3200 / 505-243-2700**
a	Mailing Address: 6001 Indian School Road NE, Suite 310. Albuquerque, NM 87110	E-mail: tucholkedr@cdmsmith.com
6	Plant Operator Contact: **Oscar Macias, CRSWF Superintendent**	Phone/Fax: **575-693-6484 / 575-769-2378**
a	Address: **801 South Norris Street, Clovis, NM 88101**	E-mail: **omacias@cityofclovis.org**
7	Air Permit Contact: **Justin Howalt**	Title: **City Manager**
a	E-mail: **jhowalt@cityofclovis.org**	Phone/Fax: **(575) 763-9650 / 575-763-9316**
b	Mailing Address: **801 South Norris Street, Clovis, NM 88101**	
c	The designated Air permit Contact will receive all official correspondence (i.e. letters, permits) from the Air Quality Bureau.	

Section 1-B: Current Facility Status

1.a	Has this facility already been constructed? ☒ Yes ☐ No	1.b If yes to question 1.a, is it currently operating in New Mexico? ☒ Yes ☐ No
2	If yes to question 1.a, was the existing facility subject to a Notice of Intent (NOI) (20.2.73 NMAC) before submittal of this application? ☐ Yes ☒ No	If yes to question 1.a, was the existing facility subject to a construction permit (20.2.72 NMAC) before submittal of this application? ☐ Yes ☒ No
3	Is the facility currently shut down? ☐ Yes ☒ No	If yes, give month and year of shut down (MM/YY): N/A
4	Was this facility constructed before 8/31/1972 and continuously operated since 1972? ☒ Yes ☐ No	
5	If Yes to question 3, has this facility been modified (see 20.2.72.7.P NMAC) or the capacity increased since 8/31/1972? ☒ Yes ☐No ☐N/A	
6	Does this facility have a Title V operating permit (20.2.70 NMAC)? ☒ Yes ☐ No	If yes, the permit No. is: **P199L-R3**
7	Has this facility been issued a No Permit Required (NPR)? ☐ Yes ☒ No	If yes, the NPR No. is: **N/A**
8	Has this facility been issued a Notice of Intent (NOI)? ☐ Yes ☒ No	If yes, the NOI No. is: **N/A**
9	Does this facility have a construction permit (20.2.72/20.2.74 NMAC)? ☐ Yes ☒ No	If yes, the permit No. is: **N/A**
10	Is this facility registered under a General permit (GCP-1, GCP-2, etc.)? ☐ Yes ☒ No	If yes, the register No. is: **N/A**

Section 1-C: Facility Input Capacity & Production Rate (N/A per Section 21)

1	What is the facility's maximum input capacity, specify units (reference here and list capacities in Section 20, if more room is required)			
a	Current	Hourly:	Daily:	Annually:
b	Proposed	Hourly:	Daily:	Annually:
2	What is the facility's maximum production rate, specify units (reference here and list capacities in Section 20, if more room is required)			
a	Current	Hourly:	Daily:	Annually:

b	Proposed	Hourly:	Daily:	Annually:

Section 1-D: Facility Location Information

1	Section: **21**	Range: **36 East**	Township: **2 North**	County: **Curry**	Elevation (ft): **4210**
2	UTM Zone: ☐ 12 or ☒ 13			Datum: ☐ NAD 27 ☒ NAD 83 ☐ WGS 84	
a	UTM E (in meters, to nearest 10 meters): **668,240**			UTM N (in meters, to nearest 10 meters): **3,806,130**	
b	**AND** Latitude (deg., min., sec.): **$34^0$22'58.44" N**			Longitude (deg., min., sec.): **-$103^0$10'12.19" W**	
3	Name and zip code of nearest New Mexico town: **Clovis, NM 88101**				
4	Detailed Driving Instructions from nearest NM town (attach a road map if necessary): **Landfill entrance is ½ mile east of the intersection of Norris/Brady on Brady Ave.**				
5	The facility is **2.5 miles southeast of Clovis**.				
6	Status of land at facility (check one): ☐ Private ☐ Indian/Pueblo ☐ Federal BLM ☐ Federal Forest Service ☒ Other **(City of Clovis owns the landfill and surrounding land totaling 964 acres)**				
7	List all municipalities, Indian tribes, and counties within a ten (10) mile radius (20.2.72.203.B.2 NMAC) of the property on which the facility is proposed to be constructed or operated: **City of Clovis, Curry County, and Pamer County (Texas) - 7 miles**				
8	**20.2.72** NMAC applications **only**: Will the property on which the facility is proposed to be constructed or operated be closer than 50 km (31 miles) to other states, Bernalillo County, or a Class I area (see www.env.nm.gov/aqb/modeling/class1areas.html)? ☐ Yes ☐ No (20.2.72.206.A.7 NMAC) If yes, list all with corresponding distances in kilometers: **N/A**				
9	Name nearest Class I area: **Salt Creek Wilderness**				
10	Shortest distance (in km) from facility boundary to the boundary of the nearest Class I area (to the nearest 10 meters): **140 kilometers**				
11	Distance (meters) from the perimeter of the Area of Operations (AO is defined as the plant site inclusive of all disturbed lands, including mining overburden removal areas) to nearest residence, school or occupied structure: **50 meters**				
12	Method(s) used to delineate the Restricted Area: **The entire perimeter of the landfill is fenced to secure the site and maintain access control.** "**Restricted Area**" is an area to which public entry is effectively precluded. Effective barriers include continuous fencing, continuous walls, or other continuous barriers approved by the Department, such as rugged physical terrain with steep grade that would require special equipment to traverse. If a large property is completely enclosed by fencing, a restricted area within the property may be identified with signage only. Public roads cannot be part of a Restricted Area.				
13	Does the owner/operator intend to operate this source as a portable stationary source as defined in 20.2.72.7.X NMAC? ☐ Yes ☒ No A portable stationary source is not a mobile source, such as an automobile, but a source that can be installed permanently at one location or that can be re-installed at various locations, such as a hot mix asphalt plant that is moved to different job sites.				
14	Will this facility operate in conjunction with other air regulated parties on the same property? ☒ No ☐ Yes If yes, what is the name and permit number (if known) of the other facility?				

Section 1-E: Proposed Operating Schedule (The 1-E.1 & 1-E.2 operating schedules may become conditions in the permit.)

(N/A per Section 21)

1	Facility **maximum** operating ($\frac{hours}{day}$):	($\frac{days}{week}$):	($\frac{weeks}{year}$):		($\frac{hours}{year}$):	
2	Facility's maximum daily operating schedule (if less than 24 $\frac{hours}{day}$)?	Start:	☐AM ☐PM		End:	☐AM ☐PM
3	Month and year of anticipated start of construction:					
4	Month and year of anticipated construction completion:					
5	Month and year of anticipated startup of new or modified facility:					

6	Will this facility operate at this site for more than one year? ☐ Yes ☐ No

Section 1-F: Other Facility Information

1	Are there any current Notice of Violations (NOV), compliance orders, or any other compliance or enforcement issues related to this facility? ☐ Yes ☒ No If yes, specify: **N/A**		
a	If yes, NOV date or description of issue: **N/A**		NOV Tracking No: **N/A**
b	Is this application in response to any issue listed in 1-F, 1 or 1a above? ☐ Yes ☒ No If Yes, provide the 1c & 1d info below:		
c	Document Title: **N/A**	Date: **N/A**	Requirement # (or page # and paragraph #): **N/A**
d	Provide the required text to be inserted in this permit: **N/A**		
2	Is air quality dispersion modeling or modeling waiver being submitted with this application? ☒ Yes ☐ No		
3	Does this facility require an “Air Toxics” permit under 20.2.72.400 NMAC & 20.2.72.502, Tables A and/or B? ☐ Yes ☒ No		
4	Will this facility be a source of federal Hazardous Air Pollutants (HAP)? ☒ Yes ☐ No		
a	If Yes, what type of source? ☐ **Major** (☐ ≥10 tpy of any single HAP **OR** ☐ ≥25 tpy of any combination of HAPS) **OR** ☒ **Minor** (☐ <10 tpy of any single HAP **AND** ☐ <25 tpy of any combination of HAPS)		
5	Is any unit exempt under 20.2.72.202.B.3 NMAC? ☐ Yes ☒ No		
a	If yes, include the name of company providing commercial electric power to the facility: _________________________ Commercial power is purchased from a commercial utility company, which specifically does not include power generated on site for the sole purpose of the user.		

Section 1-G: Streamline Application **(This section applies to 20.2.72.300 NMAC Streamline applications only)**

1	☐ I have filled out Section 18, “Addendum for Streamline Applications.” ☒ N/A (This is not a Streamline application.)

Section 1-H: Current Title V Information - Required for all applications from TV Sources

(Title V-source required information for all applications submitted pursuant to 20.2.72 NMAC (Minor Construction Permits), or 20.2.74/20.2.79 NMAC (Major PSD/NNSR applications), and/or 20.2.70 NMAC (Title V))

1	Responsible Official (R.O.) (20.2.70.300.D.2 NMAC): **Justin Howalt**	Phone: **(575) 763-9650**
a	R.O. Title: **City Manager**	R.O. e-mail: **jhowalt@cityofclovis.org**
b	R. O. Address: **801 South Norris Street, Clovis, NM 88101**	
2	Alternate Responsible Official: **Bill Kshir** (20.2.70.300.D.2 NMAC)	Phone: **575-769-2376**
a	A. R.O. Title: **Assistant Director, Public Works**	A. R.O. e-mail: **bkshir@cityofclovis.org**
b	A. R. O. Address: **801 South Norris Street, Clovis, NM 88101**	
3	Company's Corporate or Partnership Relationship to any other Air Quality Permittee (List the names of any companies that have operating (20.2.70 NMAC) permits and with whom the applicant for this permit has a corporate or partnership relationship): **N/A**	
4	Name of Parent Company ("Parent Company" means the primary name of the organization that owns the company to be permitted wholly or in part.): **City of Clovis**	
a	Address of Parent Company: **801 South Norris Street, Clovis, NM 88101**	
5	Names of Subsidiary Companies ("Subsidiary Companies" means organizations, branches, divisions or subsidiaries, which are owned, wholly or in part, by the company to be permitted.): **N/A**	
6	Telephone numbers & names of the owners’ agents and site contacts familiar with plant operations: **Oscar Macias. 575-693-6484**	

7	Affected Programs to include Other States, local air pollution control programs (i.e. Bernalillo) and Indian tribes: Will the property on which the facility is proposed to be constructed or operated be closer than 80 km (50 miles) from other states, local pollution control programs, and Indian tribes and pueblos (20.2.70.402.A.2 and 20.2.70.7.B)? If yes, state which ones and provide the distances in kilometers: **State of Texas – 11 km**

Section 1-I – Submittal Requirements

Each 20.2.73 NMAC (**NOI**), a 20.2.70 NMAC (**Title V**), a 20.2.72 NMAC (**NSR** minor source), or 20.2.74 NMAC (**PSD**) application package shall consist of the following:

Hard Copy Submittal Requirements:

1) One hard copy **original signed and notarized application package** **printed double sided** **'head-to-toe'** **2-hole punched** as we bind the document on top, not on the side; except Section 2 (landscape tables), which should be head-to-head. Please use **numbered tab separators** in the hard copy submittal(s) as this facilitates the review process. For NOI submittals only, hard copies of UA1, Tables 2A, 2D & 2F, Section 3 and the signed Certification Page are required. Please include a copy of the check on a separate page.

2) If the application is for a minor NSR, PSD, NNSR, or Title V application, include one working hard **copy** for Department use. This copy should be printed in book form, 3-hole punched, and **must be double sided**. Note that this is in addition to the head-to-to 2-hole punched copy required in 1) above. Minor NSR Technical Permit revisions (20.2.72.219.B NMAC) only need to fill out Sections 1-A, 1-B, 3, and should fill out those portions of other Section(s) relevant to the technical permit revision. TV Minor Modifications need only fill out Sections 1-A, 1-B, 1-H, 3, and those portions of other Section(s) relevant to the minor modification. NMED may require additional portions of the application to be submitted, as needed.

3) The entire NOI or Permit application package, including the full modeling study, should be submitted electronically. Electronic files for applications for NOIs, any type of General Construction Permit (GCP), or technical revisions to NSRs must be submitted with compact disk (CD) or digital versatile disc (DVD). For these permit application submittals, two CD copies are required (in sleeves, not crystal cases, please), with additional CD copies as specified below. NOI applications require only a single CD submittal. Electronic files for other New Source Review (construction) permits/permit modifications or Title V permits/permit modifications can be submitted on CD/DVD or sent through AQB's secure file transfer service.

Electronic files sent by (check one):

☐ CD/DVD attached to paper application

X secure electronic transfer. Air Permit Contact Name___**Chris Campbell**____________

Email__**campbellcl@cdmsmith.com**______________

Phone number ____ **512-652-5337**_______________

a. If the file transfer service is chosen by the applicant, after receipt of the application, the Bureau will email the applicant with instructions for submitting the electronic files through a secure file transfer service. Submission of the electronic files through the file transfer service needs to be completed within 3 business days after the invitation is received, so the applicant should ensure that the files are ready when sending the hard copy of the application. The applicant will not need a password to complete the transfer. **Do not use the file transfer service for NOIs, any type of GCP, or technical revisions to NSR permits.**

4) Optionally, the applicant may submit the files with the application on compact disk (CD) or digital versatile disc (DVD) following the instructions above and the instructions in 5 for applications subject to PSD review.

5) If **air dispersion modeling** is required by the application type, include the **NMED Modeling Waiver** and/or electronic air dispersion modeling report, input, and output files. The dispersion modeling ***summary report only*** should be submitted as hard copy(ies) unless otherwise indicated by the Bureau.

6) If the applicant submits the electronic files on CD and the application is subject to PSD review under 20.2.74 NMAC (PSD) or NNSR under 20.2.79 NMC include,
   a. one additional CD copy for US EPA,
   b. one additional CD copy for each federal land manager affected (NPS, USFS, FWS, USDI) and,
   c. one additional CD copy for each affected regulatory agency other than the Air Quality Bureau.

   If the application is submitted electronically through the secure file transfer service, these extra CDs do not need to be submitted.

Electronic Submittal Requirements [in addition to the required hard copy(ies)]:

1) All required electronic documents shall be submitted as 2 separate CDs or submitted through the AQB secure file transfer service. Submit a single PDF document of the entire application as submitted and the individual documents comprising the application.

2) The documents should also be submitted in Microsoft Office compatible file format (Word, Excel, etc.) allowing us to access the text and formulas in the documents (copy & paste). Any documents that cannot be submitted in a Microsoft Office compatible

format shall be saved as a PDF file from within the electronic document that created the file. If you are unable to provide Microsoft office compatible electronic files or internally generated PDF files of files (items that were not created electronically: i.e. brochures, maps, graphics, etc,), submit these items in hard copy format. We must be able to review the formulas and inputs that calculated the emissions.

3) It is preferred that this application form be submitted as 4 electronic files (3 MSWord docs: Universal Application section 1 [UA1], Universal Application section 3-19 [UA3], and Universal Application 4, the modeling report [UA4]) and 1 Excel file of the tables (Universal Application section 2 [UA2]). Please include as many of the 3-19 Sections as practical in a single MS Word electronic document. Create separate electronic file(s) if a single file becomes too large or if portions must be saved in a file format other than MS Word.

4) The electronic file names shall be a maximum of 25 characters long (including spaces, if any). The format of the electronic Universal Application shall be in the format: "A-3423-FacilityName". The "A" distinguishes the file as an application submittal, as opposed to other documents the Department itself puts into the database. Thus, all electronic application submittals should begin with "A-". Modifications to existing facilities should use the core permit number (i.e. '3423') the Department assigned to the facility as the next 4 digits. Use 'XXXX' for new facility applications. The format of any separate electronic submittals (additional submittals such as non-Word attachments, re-submittals, application updates) and Section document shall be in the format: "A-3423-9-description", where "9" stands for the section # (in this case Section 9-Public Notice). Please refrain, as much as possible, from submitting any scanned documents as this file format is extremely large, which uses up too much storage capacity in our database. Please take the time to fill out the header information throughout all submittals as this will identify any loose pages, including the Application Date (date submitted) & Revision number (0 for original, 1, 2, etc.; which will help keep track of subsequent partial update(s) to the original submittal. Do not use special symbols (#, @, etc.) in file names. The footer information should not be modified by the applicant.

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Section 2: Tables

Table 2-A: Regulated Emission Sources

Unit and stack numbering must correspond throughout the application package. If applying for a NOI under 20.2.73 NMAC, equipment exemptions under 2.72.202 NMAC do not apply.

Unit Number[1]	Source Description	Manufacturer	Model #	Serial #	Maximum or Rated Capacity[3] (Specify Units)	Requested Permitted Capacity[3] (Specify Units)	Date of Manufacture or Reconstruction[2] Date of Installation /Construction[2]	Controlled by Unit # Emissions vented to Stack #	Source Classi-fication Code (SCC)	For Each Piece of Equipment, Check One	RICE Compression Type (CI, SI, 4SLB, 4SRB, 2SLB)[4]	Replacing Unit No.
1	Borrow Pit Operations	N/A	N/A	N/A	N/A	N/A	 2000	 N/A		■ Existing (unchanged) □ To be Removed □ New/Additional □ Replacement Unit □ To Be Modified □ To be Replaced		
2	Roads	N/A	N/A	N/A	N/A	N/A	 2000	 N/A		■ Existing (unchanged) □ To be Removed □ New/Additional □ Replacement Unit □ To Be Modified □ To be Replaced		
3	Working Face Operations	N/A	N/A	N/A	N/A	N/A	 2000	 N/A		■ Existing (unchanged) □ To be Removed □ New/Additional □ Replacement Unit □ To Be Modified □ To be Replaced		
4	Landfill Gas	N/A	N/A	N/A	17,730,027 cubic meters (LF Waste design capacity)	17,730,027 cubic meters (LF Waste design capacity)	 2000	 N/A		■ Existing (unchanged) □ To be Removed □ New/Additional □ Replacement Unit □ To Be Modified □ To be Replaced		
5	Petroleum Contaminated Soil	N/A	N/A	N/A	N/A	N/A	 2016	 N/A		□ Existing (unchanged) □ To be Removed ■ New/Additional □ Replacement Unit □ To Be Modified □ To be Replaced		
										□ Existing (unchanged) □ To be Removed □ New/Additional □ Replacement Unit □ To Be Modified □ To be Replaced		
										□ Existing (unchanged) □ To be Removed □ New/Additional □ Replacement Unit □ To Be Modified □ To be Replaced		
										□ Existing (unchanged) □ To be Removed □ New/Additional □ Replacement Unit □ To Be Modified □ To be Replaced		
										□ Existing (unchanged) □ To be Removed □ New/Additional □ Replacement Unit □ To Be Modified □ To be Replaced		
										□ Existing (unchanged) □ To be Removed □ New/Additional □ Replacement Unit □ To Be Modified □ To be Replaced		
										□ Existing (unchanged) □ To be Removed □ New/Additional □ Replacement Unit □ To Be Modified □ To be Replaced		
										□ Existing (unchanged) □ To be Removed □ New/Additional □ Replacement Unit □ To Be Modified □ To be Replaced		
										□ Existing (unchanged) □ To be Removed □ New/Additional □ Replacement Unit □ To Be Modified □ To be Replaced		
										□ Existing (unchanged) □ To be Removed □ New/Additional □ Replacement Unit □ To Be Modified □ To be Replaced		

[1] Unit numbers must correspond to unit numbers in the previous permit unless a complete cross reference table of all units in both permits is provided.
[2] Specify dates required to determine regulatory applicability.
[3] To properly account for power conversion efficiencies, generator set rated capacity shall be reported as the rated capacity of the engine in horsepower, not the kilowatt capacity of the generator set.
[4] "4SLB" means four stroke lean burn engine, "4SRB" means four stroke rich burn engine, "2SLB" means two stroke lean burn engine, "CI" means compression ignition, and "SI" means spark ignition

Table 2-B: Insignificant Activities[1] (20.2.70 NMAC) OR Exempted Equipment (20.2.72 NMAC)

All 20.2.70 NMAC (Title V) applications must list all Insignificant Activities in this table. All 20.2.72 NMAC applications must list Exempted Equipment in this table. If equipment listed on this table is exempt under 20.2.72.202.B.5, include emissions calculations and emissions totals for 202.B.5 "similar functions" units, operations, and activities in Section 6, Calculations. Equipment and activities exempted under 20.2.72.202 NMAC may not necessarily be Insignificant under 20.2.70 NMAC (and vice versa). Unit & stack numbering must be consistent throughout the application package. Per Exemptions Policy 02-012.00 (see http://www.env.nm.gov/aqb/permit/aqb_pol.html), 20.2.72.202.B NMAC Exemptions do not apply, but 20.2.72.202.A NMAC exemptions do apply to NOI facilities under 20.2.73 NMAC. List 20.2.72.301.D.4 NMAC Auxiliary Equipment for Streamline applications in Table 2-A. The List of Insignificant Activities (for TV) can be found online at https://www.env.nm.gov/wp-content/uploads/sites/2/2017/10/InsignificantListTitleV.pdf. TV sources may elect to enter both TV Insignificant Activities and Part 72 Exemptions on this form.

Unit Number	Source Description	Manufacturer	Model No.	Max Capacity	List Specific 20.2.72.202 NMAC Exemption (e.g. 20.2.72.202.B.5)	Date of Manufacture /Reconstruction[2]	For Each Piece of Equipment, Check Onc
			Serial No.	Capacity Units	Insignificant Activity citation (e.g. IA List Item #1.a)	Date of Installation /Construction[2]	
N/A	Portable Generator	Trailblazer	325	24.8		N/A	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			N/A	HP	IA #6	N/A	
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced

[1] Insignificant activities exempted due to size or production rate are defined in 20.2.70.300.D.6, 20.2.70.7.Q NMAC, and the NMED/AQB List of Insignificant Activities, dated September 15, 2008. Emissions from these insignificant activities do not need to be reported, unless specifically requested.

[2] Specify date(s) required to determine regulatory applicability.

Table 2-C: Emissions Control Equipment

Unit and stack numbering must correspond throughout the application package. Only list control equipment for TAPs if the TAP's maximum uncontrolled emissions rate is over its respective threshold as listed in 20.2.72 NMAC, Subpart V, Tables A and B. In accordance with 20.2.72.203.A(3) and (8) NMAC, 20.2.70.300.D(5)(b) and (e) NMAC, and 20.2.73.200.B(7) NMAC, the permittee shall report all control devices and list each pollutant controlled by the control device regardless if the applicant takes credit for the reduction in emissions.

Control Equipment Unit No.	Control Equipment Description	Date Installed	Controlled Pollutant(s)	Controlling Emissions for Unit Number(s)[1]	Efficiency (% Control by Weight)	Method used to Estimate Efficiency
N/A						

[1] List each control device on a separate line. For each control device, list all emission units controlled by the control device.

Table 2-D: Maximum Emissions (under normal operating conditions)

☐ **This Table was intentionally left blank because it would be identical to Table 2-E.**

Maximum Emissions are the emissions at maximum capacity and prior to (in the absence of) pollution control, emission-reducing process equipment, or any other emission reduction. Calculate the hourly emissions using the worst case hourly emissions for each pollutant. For each pollutant, calculate the annual emissions as if the facility were operating at maximum plant capacity without pollution controls for 8760 hours per year, unless otherwise approved by the Department. List Hazardous Air Pollutants (HAP) & Toxic Air Pollutants (TAPs) in Table 2-I. Unit & stack numbering must be consistent throughout the application package. Fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or 1.41E-4).

Unit No.	NOx		CO		VOC		SOx		TSP[2]		PM10[2]		PM2.5[2]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1									1.94	4.54	1.59	2.98	0.17	0.31				
2									21.72	36.13	5.52	8.97	0.76	1.27				
3									5.46	5.75	1.27	1.21	0.51	0.56				
4					1.20	5.25									0.14	0.61		
5					0.43	1.90												
Totals					1.63	7.15			29.12	46.42	8.38	13.16	1.43	2.14	0.14	0.61		

[1]**Condensable Particulate Matter:** Include condensable particulate matter emissions for PM10 and PM2.5 if the source is a combustion source. Do not include condensable particulate matter for PM unless PM is set equal to PM10 and

Table 2-E: Requested Allowable Emissions

Unit & stack numbering must be consistent throughout the application package. Fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or $1.41E^{-4}$).

Unit No.	NOx		CO		VOC		SOx		TSP[2]		PM10[2]		PM2.5[2]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
N/A																		
Totals																		

[1] **Condensable Particulate Matter:** Include condensable particulate matter emissions for PM10 and PM2.5 if the source is a combustion source. Do not include condensable particulate matter for PM unless PM is set equal to PM10 and PM2.5. Particulate matter (PM) is not subject to an ambient air quality standard, but it is a regulated air pollutant under PSD (20.2.74 NMAC) and Title V (20.2.70 NMAC).

Table 2-F: Additional Emissions during Startup, Shutdown, and Routine Maintenance (SSM)

☐ This table is intentionally left blank since all emissions at this facility due to routine or predictable startup, shutdown, or scehduled maintenance are no higher than those listed in Table 2-E and a malfunction emission limit is not already permitted or requested. If you are required to report GHG emissions as described in Section 6a, include any GHG emissions during Startup, Shutdown, and/or Scheduled Maintenance (SSM) in Table

All applications for facilities that have emissions during routine our predictable startup, shutdown or scheduled maintenance (SSM)[1], including NOI applications, must include in this table the Maximum Emissions during routine or predictable startup, shutdown and scheduled maintenance (20.2.7 NMAC, 20.2.72.203.A.3 NMAC, 20.2.73.200.D.2 NMAC). In Section 6 and 6a, provide emissions calculations for all SSM emissions reported in this table. Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (https://www.env.nm.gov/aqb/permit/aqb_pol.html) for more detailed instructions. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or 1.41E-4).

Unit No.	NOx		CO		VOC		SOx		TSP[2]		PM10[2]		PM2.5[2]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
N/A																		
Totals																		

[1] **For instance**, if the short term steady-state Table 2-E emissions are 5 lb/hr and the SSM rate is 12 lb/hr, enter 7 lb/hr in this table. If the annual steady-state Table 2-E emissions are 21.9 TPY, and the number of scheduled SSM events result in annual emissions of 31.9 TPY, enter 10.0 TPY in the table below.

Table 2-G: Stack Exit and Fugitive Emission Rates for Special Stacks

☐ I have elected to leave this table blank because this facility does not have any stacks/vents that split emissions from a single source or combine emissions from more than one source listed in table 2-A. Additionally, the emission rates of all stacks match the Requested allowable emission rates stated in Table 2-E.

Use this table to list stack emissions (requested allowable) from split and combined stacks. List Toxic Air Pollutants (TAPs) and Hazardous Air Pollutants (HAPs) in Table 2-I. List all fugitives that are associated with the normal, routine, and non-emergency operation of the facility. Unit and stack numbering must correspond throughout the application package. Refer to Table 2-E for instructions on use of the “-“ symbol and on significant figures.

Stack No.	Serving Unit Number(s) from Table 2-A	NOx		CO		VOC		SOx		TSP		PM10		PM2.5		☐ H_2S or ☐ Lead	
		lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
N/A																	
Totals:																	

Table 2-H: Stack Exit Conditions

Unit and stack numbering must correspond throughout the application package. Include the stack exit conditions for each operating scenario, including blowdown venting parameters.

Stack Number	Serving Unit Number(s) from Table 2-A	Orientation (H-Horizontal V=Vertical)	Rain Caps (Yes or No)	Height Above Ground (ft)	Temp. (F)	Flow Rate		Moisture by Volume (%)	Velocity (ft/sec)	Inside Diameter or L x W (ft)
						(acfs)	(dscfs)			
N/A										

Table 2-I: Stack Exit and Fugitive Emission Rates for HAPs and TAPs

In the table below, report the Potential to Emit for each HAP from each regulated emission unit listed in Table 2-A, only if the entire facility emits the HAP at a rate greater than or equal to one (1) ton per year For each such emission unit, HAPs shall be reported to the nearest 0.1 tpy. Each facility-wide Individual HAP total and the facility-wide Total HAPs shall be the sum of all HAP sources calculated to the nearest 0.1 ton per year. Per 20.2.72.403.A.1 NMAC, facilities not exempt [see 20.2.72.402.C NMAC] from TAP permitting shall report each TAP that has an uncontrolled emission rate in excess of its pounds per hour screening level specified in 20.2.72.502 NMAC. TAPs shall be reported using one more significant figure than the number of significant figures shown in the pound per hour threshold corresponding to the substance. Use the HAP nomenclature as it appears in Section 112 (b) of the 1990 CAAA and the TAP nomenclature as it listed in 20.2.72.502 NMAC. Include tank-flashing emissions estimates of HAPs in this table. For each HAP or TAP listed, fill all cells in this table with the emission numbers or a "-" symbol. A “-” symbol indicates that emissions of this pollutant are not expected or the pollutant is emitted in a quantity less than the threshold amounts described above.

Stack No.	Unit No.(s)	Total HAPs		Toluene ☑ HAP or ☐ TAP		Xylenes ☑ HAP or ☐ TAP		Dichloromethane ☑ HAP or ☐ TAP		Perchloroethylene ☑ HAP or ☐ TAP		Hexane ☑ HAP or ☐ TAP		Methyl Ethyl Ketone ☑ HAP or ☐ TAP		Ethylbenzene ☑ HAP or ☐ TAP		Vinyl chloride ☑ HAP or ☐ TAP	
		lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
Fugitive	4	1.2	5.2	0.4	1.8	0.1	0.6	0.1	0.6	0.1	0.3	0.1	0.3	0.1	0.3	0.1	0.2	0.1	0.2
Fugitive[1]	5	0.4	1.9																
Totals:		1.6	7.1	0.4	1.8	0.1	0.6	0.1	0.6	0.1	0.3	0.1	0.3	0.1	0.3	0.1	0.2	0.1	0.2

Table 2-J: Fuel

Specify fuel characteristics and usage. Unit and stack numbering must correspond throughout the application package.

Unit No.	Fuel Type (No. 2 Diesel, Natural Gas, Coal, …)	Specify Units				
		Lower Heating Value	Hourly Usage	Annual Usage	% Sulfur	% Ash
N/A						

Table 2-K: Liquid Data for Tanks Listed in Table 2-L

For each tank, list the liquid(s) to be stored in each tank. If it is expected that a tank may store a variety of hydrocarbon liquids, enter "mixed hydrocarbons" in the Composition column for that tank and enter the corresponding data of the most volatile liquid to be stored in the tank. If tank is to be used for storage of different materials, list all the materials in the "All Calculations" attachment, run the newest version of TANKS on each, and use the material with the highest emission rate to determine maximum uncontrolled and requested allowable emissions rate. The permit will specify the most volatile category of liquids that may be stored in each tank. Include appropriate tank-flashing modeling input data. Use additional sheets if necessary. Unit and stack numbering must correspond throughout the application package.

Tank No.	SCC Code	Material Name	Composition	Liquid Density (lb/gal)	Vapor Molecular Weight (lb/lb*mol)	Average Storage Conditions		Max Storage Conditions	
						Temperature (°F)	True Vapor Pressure (psia)	Temperature (°F)	True Vapor Pressure (psia)
N/A									

Table 2-L: Tank Data

Include appropriate tank-flashing modeling input data. Use an addendum to this table for unlisted data categories. Unit and stack numbering must correspond throughout the application package. Use additional sheets if necessary. See reference Table 2-L2. Note: 1.00 bbl = 10.159 M3 = 42.0 gal

Tank No.	Date Installed	Materials Stored	Seal Type (refer to Table 2-LR below)	Roof Type (refer to Table 2-LR below)	Capacity		Diameter (M)	Vapor Space (M)	Color (from Table VI-C)		Paint Condition (from Table VI-C)	Annual Throughput (gal/yr)	Turn-overs (per year)
					(bbl)	(M^3)			Roof	Shell			
N/A													

Table 2-L2: Liquid Storage Tank Data Codes Reference Table

Roof Type	Seal Type, Welded Tank Seal Type		Seal Type, Riveted Tank Seal Type		Roof, Shell Color	Paint Condition
FX: Fixed Roof	**Mechanical Shoe Seal**	**Liquid-mounted resilient seal**	**Vapor-mounted resilient seal**	**Seal Type**	**WH**: White	Good
IF: Internal Floating Roof	**A**: Primary only	**A**: Primary only	**A**: Primary only	**A**: Mechanical shoe, primary only	**AS**: Aluminum (specular)	Poor
EF: External Floating Roof	**B**: Shoe-mounted secondary	**B**: Weather shield	**B**: Weather shield	**B**: Shoe-mounted secondary	**AD**: Aluminum (diffuse)	
P: Pressure	**C**: Rim-mounted secondary	**C**: Rim-mounted secondary	**C**: Rim-mounted secondary	**C**: Rim-mounted secondary	**LG**: Light Gray	
					MG: Medium Gray	
					BL: Black	
					OT: Other (specify)	

Note: 1.00 bbl = 0.159 M^3 = 42.0 gal

Table 2-M: Materials Processed and Produced (Use additional sheets as necessary.)

Material Processed				Material Produced			
Description	**Chemical Composition**	**Phase (Gas, Liquid, or Solid)**	**Quantity (specify units)**	**Description**	**Chemical Composition**	**Phase**	**Quantity (specify units)**
N/A							

Table 2-N: CEM Equipment

Enter Continuous Emissions Measurement (CEM) Data in this table. If CEM data will be used as part of a federally enforceable permit condition, or used to satisfy the requirements of a state or federal regulation, include a copy of the CEM's manufacturer specification sheet in the Information Used to Determine Emissions attachment. Unit and stack numbering must correspond throughout the application package. Use additional sheets if necessary.

Stack No.	Pollutant(s)	Manufacturer	Model No.	Serial No.	Sample Frequency	Averaging Time	Range	Sensitivity	Accuracy
N/A									

Table 2-O: Parametric Emissions Measurement Equipment

Unit and stack numbering must correspond throughout the application package. Use additional sheets if necessary.

Unit No.	Parameter/Pollutant Measured	Location of Measurement	Unit of Measure	Acceptable Range	Frequency of Maintenance	Nature of Maintenance	Method of Recording	Averaging Time
N/A								

Table 2-P: Greenhouse Gas Emissions

Applications submitted under 20.2.70, 20.2.72, & 20.2.74 NMAC are required to complete this Table. Power plants, Title V major sources, and PSD major sources must report and calculate all GHG emissions for each unit. Applicants must report potential emission rates in short tons per year (see Section 6.a for assistance). Include GHG emissions during Startup, Shutdown, and Scheduled Maintenance in this table. For minor source facilities that are not power plants, are not Title V, or are not PSD, there are three options for reporting GHGs 1) report GHGs for each individual piece of equipment; 2) report all GHGs from a group of unit types, for example report all combustion source GHGs as a single unit and all venting GHG as a second separate unit; OR 3) check the following box ☐ By checking this box, the applicant acknowledges the total CO2e emissions are less than 75,000 tons per year.

		CO_2 ton/yr	N_2O ton/yr	CH_4 ton/yr	SF_6 ton/yr	Chlorodifluoromethane (HCFC) ton/yr[2]	Dichlorodifluoromethane (CFC) ton/yr[2]	Dichlorofluoromethane (HCFC) ton/yr[2]	Fluorotrichloromethane (CFC) ton/yr[2]						Total GHG Mass Basis ton/yr[4]	Total CO_2e ton/yr[5]
Unit No.	**GWPs [1]**	**1**	**298**	**25**	**22,800**	**3700**	**3700**	**3700**	**3700**							
4 (Fugitive)	**mass GHG**	10,911		3,977		0.06	0.96	0.13	0.05						14,889	
	CO_2e	10,911		99,420		206	3,548	491	191							114,767
	mass GHG															
	CO_2e															
	mass GHG															
	CO_2e															
	mass GHG															
	CO_2e															
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	mass GHG															
	CO_2e															
	mass GHG															
	CO_2e															
	mass GHG															
	CO2e															
Total	**mass GHG**	10,911	0	3,977	0	0	1	0	0							
	CO_2e	10,911	0	99,420	0	206	3,548	491	191							

[1] **GWP** (Global Warming Potential): Applicants must use the most current GWPs codified in Table A-1 of 40 CFR part 98. GWPs are subject to change, therefore, applicants need to check 40 CFR 98 to confirm GWP values.

[2] For **HFCs** or **PFCs** describe the specific HFC or PFC compound and use a separate column for each individual compound.

[3] For each new compound, enter the appropriate GWP for each HFC or PFC compound from Table A-1 in 40 CFR 98.

[4] Green house gas emissions on a **mass basis** is the ton per year green house gas emission before adjustment with its GWP.

[5] **CO_2e** means Carbon Dioxide Equivalent and is calculated by multiplying the TPY mass emissions of the green house gas by its GWP.

Section 6: All Calculations

SECTION 6

Calculations

Section 6 is a specific section in NMED AQB's Universal Application Form 3 for a Construction Permit that requires emission calculations. In support of Section 6, this section describes the methods used to estimate potential emissions of TSP, PM10, PM2.5, NMOC, VOCs and HAPs from certain activities and processes at the CRSWF . The section also provides the emission factor equations/calculations, and summarizes emission rates. Note that the Landfill is not a major source of HAPs.

Pollutants potentially emitted at the CRSWF include:

- Total Suspended Particulates (TSP)
- Particulate matter less than 10 microns (PM10)
- Particulate matter less than 2.5 microns (PM2.5)
- Non-methane organic compounds (NMOCs)
- Volatile organic compounds (VOCs)
- Hazardous air pollutants (HAPs)

Emission Unit 1 includes PM10, PM2.5 and TSP from the borrow material area,
Emission Unit 2 includes PM10, PM2.5 and TSP from the paved and unpaved roads, Emission Unit 3 includes PM10, PM2.5 and TSP from the landfill working face,
Emission Unit 4 includes NMOC, H2S, GHG and HAPs from the degrading waste and Emission Unit 5 includes VOCs/HAPs from petroleum contaminated soil areas.

CRSWF Emissions Summary

Emissions Source	TSP		PM10		PM2.5		Landfill Gas		VOCs from PCS	
	ton/yr	*lb/hr*	*ton/yr*	*lb/hr*	*ton/yr*	*lb/hr*	*ton/yr*	*lb/hr*	*ton/yr*	*lb/hr*
EMISSION UNIT NO. 1 - Borrow Pit Operations										
Scraper Operations										
Topsoil Removal (Borrow Area 1)	2.26	1.42	2.26	1.42	0.24	0.15				
Wind Erosion - Disturbed Areas										
Soil Borrow Pit Areas	2.28	0.52	0.72	0.16	0.07	0.02				
EMISSION UNIT NO. 2 - Roads (Paved and Unpaved)										
Paved Roads										
Facility Entrance to Parking Area	2.73	1.61	0.55	0.32	0.13	0.08				
Parking to Asbestos Monofill (1)	5.77	3.40	1.15	0.68	0.28	0.17				
Asbestos Monofill to Cell 5 (1)	3.51	2.07	0.70	0.41	0.17	0.10				
Parking to Asbestos Monofill (2)	0.61	0.36	0.12	0.07	0.03	0.02				
Asbestos Monofill to Cell 5 (2)	0.38	0.22	0.08	0.04	0.02	0.01				
Unpaved Roads										
Cell 5 to Working Face (1)	2.35	1.39	0.63	0.37	0.06	0.04				
Haul Road To Asbestos Monofill	0.07	0.04	0.02	0.01	1.80E-03	1.06E-03				
Borrow Area 1 to Cell 5 Working Face	18.95	11.18	5.11	3.02	0.51	0.30				
Borrow Area 1 to Asbestos Working Face	0.08	0.050	0.02	0.014	0.002	0.001				
Cell 5 to Working Face (2)	0.72	0.42	0.19	0.11	0.02	0.01				
Grader Operations on Unpaved Road										
Motor Grader (CAT 140 M3 AW)	0.47	0.86	0.23	0.42	0.01	0.03				
Wind Erosion - Disturbed Areas										
Unpaved Roads	0.50	0.11	0.16	0.04	0.02	3.61E-03				
EMISSION UNIT NO. 3 - Working Face Operations2										
Working Face Landfilling Activity (Cell No. 5 only)										
Dozer (CAT/D8T)	1.67	2.3	0.31	0.42	0.17	0.24				
Compactors (CAT 836K/826G Cat/81K)	3.54	2.3	0.65	0.42	0.37	0.24				
Scraper Operations (Cell No. 5 only)										
Topsoil Unloading	0.02	0.01	0.01	5.50E-03	1.33E-03	8.34E-04				
Grader Operations on Tipping Area by Working Face (Cell No. 5 only)										
Motor Grader (CAT 120 H)	0.47	0.86	0.23	0.42	0.01	0.03				
Wind Erosion - Disturbed Areas										
Working Face (disposal areas)	0.05	0.01	0.02	3.84E-03	1.68E-03	3.84E-04				
EMISSION UNIT NO. 4 - Landfill Gas										
Degrading Waste										
NMOC							18.0	4.1		
HAP/VOCs							5.25	1.20		
GHGs (CO2e)							114,767	13.10		
H2S							0.6	0.139		
EMISSION UNIT NO. 5 - Petroleum Contaminated Soil (PCS)										
Landfill PCS										
Petroleum Contaminated Soils									1.90	0.43

Total Estimated Emissions:

Annual TSP Emissions =	**46.4**	*ton/yr*
Annual PM10 Emissions =	**13.2**	*ton/yr*
Annual PM2.5 Emissions =	**2.1**	*ton/yr*
Annual (peak) NMOC Emissions =	**18.0**	ton/yr
Annual HAP Emissions =	**5.2**	ton/yr
Annual VOC Emissions (from PCS) =	**1.90**	ton/yr

Landfill Operating Hours

Mon	10	(7 am to 5 pm)
Tue	10	(7 am to 5 pm)
Wed	10	(7 am to 5 pm)
Thu	10	(7 am to 5 pm)
Fri	10	(7 am to 5 pm)
Sat	10	(7 am to 5 pm)
Sun	5	(12 pm to 5 pm)

Paved Roads Emissions Calculations:

1 Determine the emission factors for the Paved Roads at landfill from AP-42, Chapter 13.2.1

$E = k(sL)^{0.91}(W)^{1.02}$ AP-42, 13.2.1 Equation (1)

$E_{ext} = [k(sL)^{0.91}(W)^{1.02}](1-P/4N)$ AP-42, 13.2.1 Equation (2)

Where:

E = particulate emission factor (lb/VMT)
Eext = annual size-specific emission factor extrapolated for natural mitigation (lb/VMT)
k = particle size multiplier for particle size range and units of interest (lb/VMT) - AP-42 Table 13.2-1.1
sL = road surface silt loading (g/m^2) - AP-42 Table 13.2.1-3
W = average weight (tons) of the vehicles traveling the road - Route Specific
P = number of "wet" days with at least 0.01 in of precipitation during the averaging period - AP-42 Figure 13.2.1-2
N = number of days in the averaging period (365 d/yr)

Route:	Facility Entrance to Parking Area			Parking to Asbestos Monofill (1)			Asbestos Monofill to Cell 5 (1)			Parking to Asbestos Monofill (2)			Asbestos Monofill to Cell 5 (2)		
Parameter	TSP	PM10	PM2.5	TSP	PM10	PM2.5	TSP	PM10	PM2.5	TSP	PM10	PM2.5	TSP	PM10	PM2.5
k =	0.011	0.0022	0.00054	0.011	0.0022	0.00054	0.011	0.0022	0.00054	0.011	0.0022	0.00054	0.011	0.0022	0.00054
sL =	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
W =	22.3	22.3	22.3	22.9	22.9	22.9	22.9	22.9	22.9	3.7	3.7	3.7	3.7	3.7	3.7
P =	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
E =	1.62	0.32	0.08	1.66	0.33	0.08	1.66	0.33	0.08	0.26	0.05	0.01	0.26	0.05	0.01
E_{ext} =	**1.55**	**0.31**	**0.08**	**1.59**	**0.32**	**0.08**	**1.59**	**0.32**	**0.08**	**0.25**	**0.05**	**0.01**	**0.25**	**0.05**	**0.01**

2 Compute Paved Road Emissions

TSP/PM10/PM2.5/ Emissions (lbs) = (Eext) x (VMT)

Where:

Eext = annual size-specific emission factor extrapolated for natural mitigation (lb/VMT)
VMT = Vehicle Miles Travelled (miles) *refer to 'Appendix A - VMT'*

Route:	Facility Entrance to Parking Area			Parking to Asbestos Monofill (1)			Asbestos Monofill to Cell 5 (1)			Parking to Asbestos Monofill (2)			Asbestos Monofill to Cell 5 (2)		
Parameter	TSP	PM10	PM2.5	TSP	PM10	PM2.5	TSP	PM10	PM2.5	TSP	PM10	PM2.5	TSP	PM10	PM2.5
Eext =	1.55	0.31	0.08	1.59	0.32	0.08	1.59	0.32	0.08	0.25	0.05	0.01	0.25	0.05	0.01
VMT =	67.72	67.72	67.72	139.47	139.47	139.47	84.90	84.90	84.90	94.37	94.37	94.37	58.8	58.8	58.8
Total Emissions (lbs/week) =	**104.96**	**20.99**	**5.15**	**221.75**	**44.35**	**10.89**	**134.98**	**27.00**	**6.63**	**23.44**	**4.69**	**1.15**	**14.60**	**2.92**	**0.72**
Total Emissions (tons/yr) =	**2.73**	**0.55**	**0.13**	**5.77**	**1.15**	**0.28**	**3.51**	**0.70**	**0.17**	**0.61**	**0.12**	**0.03**	**0.38**	**0.08**	**0.02**

Unpaved Roads Emissions Calculations:

1 Determine the emission factors for the Unpaved Roads at landfill from AP-42, Chapter 13.2.2

$E = k(s/12)^a (W/3)^b$ AP-42, 13.2.2 Equation (1a)

$E_{ext} = E[(365-P)/365]$ AP-42, 13.2.2 Equation (2)

Where:

E = size specific emission factor (lb/VMT)

Eext = annual size-specific emission factor extrapolated for natural mitigation (lb/VMT)

s = surface material silt content (%) - Table 13.2.2-1

k = constant (lb/VMT) - AP-42 Table 13.2.2-2

a = constant (dimensionless) - AP-42 Table 13.2.2-2 = 0.7 (TSP); = 0.9 (PM10/2.5)

b = constant (dimensionless) - AP-42 Table 13.2.2-2 = 0.45

W = mean vehicle weight (tons) - Site Specific

P = number of days in the year at least 0.01 in of precipitation - AP-42 Figure 13.2.2-1

Route:	Cell 5 to Working Face (1)			Haul Road To Asbestos Monofill			Borrow Area 1 to Cell 5 Working Face			Borrow Area 1 to Asbestos Working Face			Cell 5 to Working Face (2)		
Parameter	TSP	PM10	PM2.5	TSP	PM10	PM2.5	TSP	PM10	PM2.5	TSP	PM10	PM2.5	TSP	PM10	PM2.5
k =	4.90	1.50	0.15	4.90	1.50	0.15	4.90	1.50	0.15	4.90	1.50	0.15	4.90	1.50	0.15
s =	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4	6.4
W =	22.9	22.9	22.9	22.9	22.9	22.9	38.4	38.4	38.4	38.4	38.4	38.4	3.7	3.7	3.7
P =	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
E =	7.88	2.13	0.21	7.88	2.13	0.21	9.94	2.68	0.27	9.94	2.68	0.27	3.47	0.94	0.09
Eext =	**2.57**	**0.69**	**0.07**	**2.57**	**0.69**	**0.07**	**3.24**	**0.87**	**0.09**	**3.24**	**0.87**	**0.09**	**1.13**	**0.31**	**0.03**

2 Compute unpaved Road Emissions

TSP/PM10/PM2.5/ Emissions (lbs) = (Eext) x (VMT)

Where:

Eext = annual size-specific emission factor extrapolated for natural mitigation (lb/VMT)

VMT = Vehicle Miles Travelled (miles) *refer to 'Appendix A - VMT'*

Route:	Cell 5 to Working Face (1)			Haul Road To Asbestos Monofill			Borrow Area 1 to Cell 5 Working Face			Borrow Area 1 to Asbestos Working Face			Cell 5 to Working Face (2)		
Parameter	TSP	PM10	PM2.5	TSP	PM10	PM2.5	TSP	PM10	PM2.5	TSP	PM10	PM2.5	TSP	PM10	PM2.5
Eext =	2.57	0.69	0.07	2.57	0.69	0.07	3.24	0.87	0.09	3.24	0.87	0.09	1.13	0.31	0.03
VMT =	35	35	35	1	1	1	225	225	225	1	1	1	24	24	24
Total Emissions (lbs/week) =	**90.5**	**24.4**	**2.4**	**2.6**	**0.7**	**0.1**	**728.7**	**196.7**	**19.7**	**3.2**	**0.9**	**0.1**	**27.6**	**7.5**	**0.7**
Total Emissions (tons/yr) =	**2.35**	**0.63**	**0.06**	**0.07**	**0.02**	**0.00**	**18.95**	**5.11**	**0.51**	**0.08**	**0.02**	**0.002**	**0.72**	**0.19**	**0.02**

Working Face Operations

Bulldozing / Compaction Activity Emissions Calculations:

1 Determine emission factors from Table 11.9-1 of AP-42, Chapter 11.9

$E_{TSP} = [5.7\ (s)^{1.2}\ ] / (M)^{1.3}$ lb/hr

$E_{PM10} = 0.75\ [1.0\ (s)^{1.5}\ ] / (M)^{1.4}$ lb/hr

$E_{PM2.5} = 0.105\ [5.7\ (s)^{1.2}\ ] / (M)^{1.3}$ lb/hr

Where:

E = Emission factor, lb/hr (TSP, PM10 or PM2.5)

s = Material silt content, % = 6.9 (Geometric mean for overburden, Table 11.9-3)

M = Material moisture content, % = 12 (Mean value for MSW landfill cover, Table 13.2.4-1)

E_{TSP} = 2.29 lb/hr

E_{PM10} = 0.42 lb/hr

$E_{PM2.5}$ = 0.24 lb/hr

2 Compute dozer/compactor activity emissions

Equipment	No.		TSP		PM10		PM2.5	
		hrs/day*	(lb/day)	(ton/yr)	(lb/day)	(ton/yr)	(lb/day)	(ton/yr)
Dozer (CAT/D8T)	1	4.0	9.15	1.67	1.68	0.31	0.96	0.17
Compactors (CAT 836K/826G Cat/81K)	1	8.5	19.45	3.54	3.56	0.65	2.04	0.37
Total =				**5.21**		**0.95**		**0.55**

**Three Compactors on site; only one used - 9.5 hours M-F; 8 hours Sat; 4 hours Sun*

**Two dozers on site; only one used - Total 6 days a week @ 4 hours a day*

Motor Grader Activity Emissions Calculations:

1 Determine emission factors from Table 11.9-1 of AP-42, Chapter 11.9

$E_{TSP} = 0.040\ (S)^{2.5}$ lb/VMT

$E_{PM10} = 0.6(0.051)(S)^{2.0}$ lb/VMT

$E_{PM2.5} = 0.031(0.040)(S)^{2.5}$ lb/VMT

Where:

E = Emission factor, lb/hr (TSP, PM10 or PM2.5)

S = Mean Vehicle Speed, mph = 2.4 Based on 1st gear speed of similar equipment specs

E_{TSP} = 0.36 lb/VMT

E_{PM10} = 0.18 lb/VMT

$E_{PM2.5}$ = 0.01 lb/VMT

2 Compute motor grader activity emissions

Equipment	No.		TSP		PM10		PM2.5	
		hrs/day*	(lb/day)	(ton/yr)	(lb/day)	(ton/yr)	(lb/day)	(ton/yr)
Motor Grader (CAT 120 H)	1	3.0	2.57	0.47	1.27	0.23	0.08	0.014
Motor Grader (CAT 140 M3 AW)	1	3.0	2.57	0.47	1.27	0.23	0.08	0.014
Total =				**0.94**		**0.46**		**0.03**

**Cat 120 H used on the tipping area by the working face for 3 hrs/day, 7 days/week*

**Cat 140 M3 used on unpaved haul road for 3 hrs/day, 7 days/week*

Scraper Emissions Calculations:

1 Determine emission factors for scraper top soil removal from Table 11.9-4 of AP-42

Topsoil Removed by Scraper

E_{TSP} =	0.058	lb/ton	*AP-42 Table 11.9-4 for "Topsoil removal by scraper"*
E_{PM10} =	0.058	lb/ton	
$E_{PM2.5}$ =	$0.105(E_{TSP})$	lb/ton	*Assumed conservative scaling factor used for bulldozing operations (overburden)*

Note: There are no PM10 emission factors or scaling factors provided in AP-42 for this type of activity. PM10 is assumed to be equivalent to TSP emissions in order to provide a conservative emissions estimate.

Where:
E = Emission factor, lb/hr (TSP, PM10 or PM2.5)

2 Determine emission factors for scraper unloading (batch drop) from 13.2.4 of AP-42

Scraper Unloading

$E = k(0.0032)[(U/5)^{1.3}/(M/2)^{1.4}]$ AP-42, 13.2.4 Equation (1)

Where:
E = particulate emission factor (lb/ton)
k = particle size multiplier (dimensionless) - AP-42 13.2.4 Aerodynamic Particle Size Multiplier
U = mean wind speed, meters per second (m/s) (miles per hour [mph]) - Source: Weather Underground
M = material moisture content (%) - AP-42 Table 13.2.4-1

PM10/PM2.5/TSP Emissions = E x (Annual Amount Stored) *Reference*

ıual Amount Stored/Removed (tons/year) = 78,000 *Borrow Area 1* *Provided by CRSWF staff based on 2020 data*

Parameter	TSP	PM10	PM2.5
k =	0.74	0.35	0.053
U* =	10.0	10.0	10.0
M =	12.0	12.0	12.0
E =	0.0005	0.0002	0.00003

**Average wind speeds from January through December 2015*

3 Compute scraper activity emissions

Scraper Operation	Topsoil	Operation	TSP		PM10		PM2.5	
	ton/yr	hrs/day	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)
Topsoil Removal (Borrow Area 1)	78,000	8.7	2.26	1.42	2.26	1.42	0.24	0.15
Topsoil Unloading	78,000	8.7	0.019	0.012	0.009	0.006	0.0013	0.0008
Total =			**2.28**		**2.27**		**0.24**	

Non-Methane Organic Compund (NMOC) Emissions

TOTAL NMOC EMISSION RATE

$$M_{NMOC} = \sum_{i=1}^{n} 2kL_oM_i\left(e^{-kt_i}\right)\left(C_{NMOC}\right)\left(3.6\times10^{-9}\right)$$

M_{NMOC} = Total NMOC emission rate from the landfill, megagrams per year

L_o = methane generation potential, cubic meters per megagram solid waste

Mi = mass of solid waste in the ith section, megagrams

k = Methane generation rate constant (yr) 40 CFR 60.754(a)(1) for landfills located in geographical areas with a thirty year annual average precipitation of less than 25 inches.

ti = age of the ith section, years

C_{NMOC} = Concentration of NMOC (ppm as hexane), 251 ppmv as hexane from Tier II NMOC Emission Rate Report, determined per 40 CFR 60.754(a)(3); Method 25C, Section 8.4.1; and 3C, Section 6.1.

3.6×10^{-9} = Conversion factor (dimensionless)

LandGEM model (Version 3.02) was used to calculate the total NMOC emission rate from the landfill

NMOC Emission Rate for year 2021 =	**11.16**	Mg/Yr	
Peak NMOC Emission Rate =	**16.29**	Mg/Yr	*(Year 2075)*

Hazardous Air Pollutants (HAPs) Emissions

HAPS EMISSIONS

Landfill Gas Flow Rate =	727	Av ft^3/Min *Occurs in year 2075, per LandGEM model*

Ideal gas law: PV=nRT

Gas constant	R	0.73 ft^3 * atm/(R * lbmol)	
Pressure	P	1 atm	
Temperature	T	68 F	528 R
Molar volume	V/n	385.2 ft^3/mol	

Gas/Pollutant	Concentration*	Molecular Weight*	*Emission Rate* Short Tons/Year	Lb/hr
1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41	0.0317	0.007
1,1,2,2-Tetrachloroethane - HAP/VOC	1.10	167.85	0.092	0.021
1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.40	98.97	0.118	0.027
1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94	0.010	0.002
1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96	0.020	0.005
1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99	0.010	0.002
Acrylonitrile - HAP/VOC	6.30	53.06	0.166	0.038
Benzene - No or Unknown Co-disposal - HAP/VOC**	1.90	78.11	0.074	0.017
Carbon disulfide - HAP/VOC	0.58	76.13	0.022	0.005
Carbon tetrachloride - HAP/VOC	0.004	153.840	0.000	0.000
Carbonyl sulfide - HAP/VOC	0.49	60.07	0.015	0.003
Chlorobenzene - HAP/VOC	0.25	112.56	0.014	0.003
Chloroethane (ethyl chloride) - HAP/VOC	1.30	64.52	0.042	0.009
Chloroform - HAP/VOC	0.03	119.39	0.002	0.000
Chloromethane - VOC (HAP according to EPA)	1.20	50.49	0.030	0.007
Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147.00	0.015	0.003
Dichloromethane (methylene chloride) - HAP	14.0	84.9	0.589	0.135
Ethylbenzene - HAP/VOC	4.6	106.2	0.242	0.055
Ethylene dibromide - HAP/VOC	0.001	187.880	0.000	0.000
Hexane - HAP/VOC	6.60	86.18	0.282	0.064
Mercury (total) - HAP	0.0003	200.6100	0.000	0.000
Methyl ethyl ketone - HAP/VOC	7.1	72.1	0.254	0.058
Methyl isobutyl ketone - HAP/VOC	1.9	100.2	0.094	0.022
Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.8	0.304	0.069
Toluene - No or Unknown Co-disposal - HAP/VOC**	39.0	92.1	1.781	0.407
Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.4	0.182	0.042
Vinyl chloride - HAP/VOC	7.3	62.5	0.226	0.052
Xylenes - HAP/VOC	12.0	106.2	0.631	0.144
Total			***5.25***	***1.20***

**Based on LandGEM Model*

***Benzene and Toluene were calculated using the "No or Unknown Co-disposal" concentration in LandGEM instead of the "Co-disposal" concentration since the landfill is only accepting non-hazardous wastes.*

Estimate of VOCs from Petroleum Contaminated Soils

Table 1 Projected PCS Waste Quantities

Year	PCS (tons/yr)*
2021	300
2022	300
2023	300
2024	300
2025	300
2026	300

*Based on estimates provided by CRSWF staff

Maximum PCS annual acceptance rate during the Title V permit term = 300 tons/yr

VOC Emissions from Landfilled PCS

Assume 70% of PCS accepted meets threshold requirements & is disposed in landfill

Threshold Limits for PCS disposed in landfill:

Benzene = 10 mg/Kg
TPH = 1,000 mg/Kg
BTEX = 500 mg/Kg

PCS Quantity Landfilled (or used as Alternate Cover) = 210 tons/yr *70% of annual tonnage*

Estimate of Potential VOC Emissions = TPH (expressed as mg/Kg) x 10^{-6} x tons of soil

= **0.21** **tons/yr**

VOC Emissions from Landfarming (Future)

Assume 30% of PCS requires remediation (exceeds thresholds)

PCS Quantity treated by Landfarming in the future (and then disposed in landfill) = 90 tons/yr *30% of annual tonnage*

Average concentration of TPH in contaminated soils (that exceed threshold limits) = 18,809 mg/Kg *Average concentration for all soil types*

Table 2 Maximum Hydrocarbon Concentrations for Soil Contamination

(source: EPA, Monitored Natural Attenuation of Petroleum Hydrocarbons)

Exhibit IX-5
Maximum Hydrocarbon Concentrations For Soil-Only Contamination

Soil Type	Residual Hydrocarbon Saturation	Bulk Density[a] (kg/m³)	Porosity[b]	Concentration		
				mg/kg	kg/m³	gal/m³
silty clay	0.05 to 0.25	1,350	0.36	10,000 to 49,000	13 to 66	5 to 24
sandy silt	0.03 to 0.20	1,650	0.41	5,000 to 36,000	9 to 60	3 to 22
coarse sand	0.01 to 0.10	1,850	0.43	2,000 to 17,000	3 to 31	1 to 11

Sources: [a] Boulding (1994), p.3-37. [b] Carsell and Parrish (1988)

Estimate of Potential VOC Emissions from Future Landfarming = TPH (expressed as mg/Kg) x 10^{-6} x tons of soil

= **1.69** **tons/yr**

Total VOC emissions from PCS operations = **1.90** **tons/yr**

= **0.43** **lbs/hr**

SUMMARY OF WIND EROSION EMISSIONS

Potential uncontrolled and controlled fugitive dust emissions due to wind erosion from actively disturbed areas at the Landfill.

Disturbed Area	Area	Emission Factor, E_{TSP}	Emission Factor, E_{PM10}	Emission Factor, $E_{PM2.5}$	Control Efficiency	TSP Emissions		PM10 Emissions		PM2.5 Emissions	
	(acres)	tons/acre/yr			%	tons/yr	lbs/hr	tons/yr	lbs/hr	tons/yr	lbs/hr
Soil Borrow Pit Areas	6.00	0.38	0.12	0.012	0%	2.28	0.52	0.72	0.16	0.07	0.02
Working Face (disposal areas)	0.14	0.38	0.12	0.012	0%	0.05	0.01	0.02	0.004	0.002	0.0004
Unpaved Roads	3.38	0.38	0.12	0.012	61%	0.50	0.11	0.16	0.04	0.02	0.004
					Total (tons/yr) =	2.83		0.90		0.09	

1. Water is applied to the borrow area to reduce emissions; however, a conservative control efficiency of zero is assumed

2. Per Operations Plan, the maximum area of active working face (at any instant) is 6000 ft ^{2}

3. The Clovis Landfill's operations plan requires that for normal operations the Landfill use a water truck to control its dust emissions.

Unpaved roads watered 3 times a day; Watering 3 times a day yields a control efficiency of 61% (Ref: (South Coast Air Quality Management District (SCAQMD), 2007. "Overview - Fugitive Dust Mitigation Measure Tables.":http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust))

4. TSP emissions due to wind erosion are estimated through application of the emission factor presented in AP-42, Section 11.9 (Table 11.9-4) and Section 13.2.2.2:

5. The emission factors for PM10 and PM2.5 are calculated by applying ratios of the PM10, PM2.5 and TSP particle size multiplier (k) values (obtained from AP-42, Section 13.2.2, Table 13.2.2-2) to the TSP emission factor (ETSP) of 0.38 tons/acre/yr:

6. Areas provided by CRSWF staff

$K_{TSP} = 4.9$

$K_{PM10} = 1.5$

$K_{PM2.5} = 0.15$

$E_{PM10} = (K_{PM10}/K_{TSP})*E_{TSP} =$ 0.12 tons/acre/yr

$E_{PM2.5} = (K_{PM2.5}/K_{TSP})*E_{TSP} =$ 0.012 tons/acre/yr

H2S LandGEM Modeling Results

Max H2S Emissions

Year of Occurrence	Mg/Year	lb/Hr
2075	**0.552**	**0.1389**

Conversion Factors **1 Ton = 0.907 Megagrams**

Year	Hydrogen Sulfide (Mg/year)		
	OLD LANDFILL	NEW LANDFILL	TOTAL
1935	0.000E+00		0.000E+00
1936	4.275E-03		4.275E-03
1937	8.466E-03		8.466E-03
1938	1.257E-02		1.257E-02
1939	1.660E-02		1.660E-02
1940	2.055E-02		2.055E-02
1941	2.441E-02		2.441E-02
1942	2.821E-02		2.821E-02
1943	3.192E-02		3.192E-02
1944	3.557E-02		3.557E-02
1945	3.914E-02		3.914E-02
1946	4.264E-02		4.264E-02
1947	4.607E-02		4.607E-02
1948	4.943E-02		4.943E-02
1949	5.273E-02		5.273E-02
1950	5.596E-02		5.596E-02
1951	5.913E-02		5.913E-02
1952	6.223E-02		6.223E-02
1953	6.527E-02		6.527E-02
1954	6.826E-02		6.826E-02
1955	7.118E-02		7.118E-02
1956	7.405E-02		7.405E-02
1957	7.686E-02		7.686E-02
1958	7.961E-02		7.961E-02
1959	8.231E-02		8.231E-02
1960	8.495E-02		8.495E-02
1961	8.755E-02		8.755E-02
1962	9.009E-02		9.009E-02
1963	9.258E-02		9.258E-02
1964	9.502E-02		9.502E-02
1965	9.741E-02		9.741E-02
1966	9.976E-02		9.976E-02
1967	1.021E-01		1.021E-01
1968	1.043E-01		1.043E-01
1969	1.065E-01		1.065E-01
1970	1.087E-01		1.087E-01
1971	1.108E-01		1.108E-01
1972	1.129E-01		1.129E-01
1973	1.149E-01		1.149E-01
1974	1.169E-01		1.169E-01
1975	1.189E-01		1.189E-01
1976	1.208E-01		1.208E-01
1977	1.227E-01		1.227E-01
1978	1.245E-01		1.245E-01
1979	1.264E-01		1.264E-01
1980	1.281E-01		1.281E-01
1981	1.299E-01		1.299E-01
1982	1.316E-01		1.316E-01
1983	1.332E-01		1.332E-01
1984	1.349E-01		1.349E-01
1985	1.365E-01		1.365E-01
1986	1.381E-01		1.381E-01
1987	1.396E-01		1.396E-01
1988	1.411E-01		1.411E-01
1989	1.426E-01		1.426E-01

Year	Hydrogen Sulfide (Mg/year)		
	OLD LANDFILL	***NEW LANDFILL***	***TOTAL***
1990	1.440E-01		1.440E-01
1991	1.455E-01		1.455E-01
1992	1.469E-01		1.469E-01
1993	1.482E-01		1.482E-01
1994	1.496E-01		1.496E-01
1995	1.509E-01		1.509E-01
1996	1.620E-01		1.620E-01
1997	1.741E-01		1.741E-01
1998	1.855E-01		1.855E-01
1999	1.971E-01	0.000E+00	1.971E-01
2000	1.983E-01	7.155E-03	2.055E-01
2001	1.944E-01	1.915E-02	2.135E-01
2002	1.905E-01	3.366E-02	2.242E-01
2003	1.867E-01	4.973E-02	2.365E-01
2004	1.831E-01	6.308E-02	2.461E-01
2005	1.794E-01	7.749E-02	2.569E-01
2006	1.759E-01	9.147E-02	2.673E-01
2007	1.724E-01	1.044E-01	2.768E-01
2008	1.690E-01	1.196E-01	2.886E-01
2009	1.656E-01	1.326E-01	2.982E-01
2010	1.624E-01	1.453E-01	3.076E-01
2011	1.591E-01	1.623E-01	3.215E-01
2012	1.560E-01	1.742E-01	3.302E-01
2013	1.529E-01	1.856E-01	3.385E-01
2014	1.499E-01	1.979E-01	3.478E-01
2015	1.469E-01	2.095E-01	3.564E-01
2016	1.440E-01	2.242E-01	3.682E-01
2017	1.411E-01	2.343E-01	3.754E-01
2018	1.383E-01	2.432E-01	3.815E-01
2019	1.356E-01	2.516E-01	3.872E-01
2020	1.329E-01	2.593E-01	3.923E-01
2021	1.303E-01	2.667E-01	3.970E-01
2022	1.277E-01	2.739E-01	4.016E-01
2023	1.252E-01	2.810E-01	4.062E-01
2024	1.227E-01	2.879E-01	4.106E-01
2025	1.203E-01	2.947E-01	4.150E-01
2026	1.179E-01	3.014E-01	4.193E-01
2027	1.156E-01	3.079E-01	4.235E-01
2028	1.133E-01	3.143E-01	4.276E-01
2029	1.110E-01	3.206E-01	4.316E-01
2030	1.088E-01	3.268E-01	4.356E-01
2031	1.067E-01	3.328E-01	4.395E-01
2032	1.046E-01	3.387E-01	4.433E-01
2033	1.025E-01	3.445E-01	4.470E-01
2034	1.005E-01	3.502E-01	4.507E-01
2035	9.847E-02	3.558E-01	4.542E-01
2036	9.652E-02	3.612E-01	4.577E-01
2037	9.461E-02	3.666E-01	4.612E-01
2038	9.274E-02	3.718E-01	4.646E-01
2039	9.090E-02	3.770E-01	4.679E-01
2040	8.910E-02	3.820E-01	4.711E-01
2041	8.734E-02	3.869E-01	4.743E-01
2042	8.561E-02	3.918E-01	4.774E-01
2043	8.391E-02	3.965E-01	4.804E-01
2044	8.225E-02	4.012E-01	4.834E-01
2045	8.062E-02	4.057E-01	4.863E-01
2046	7.902E-02	4.102E-01	4.892E-01
2047	7.746E-02	4.146E-01	4.920E-01
2048	7.593E-02	4.189E-01	4.948E-01
2049	7.442E-02	4.231E-01	4.975E-01
2050	7.295E-02	4.272E-01	5.001E-01
2051	7.150E-02	4.312E-01	5.027E-01
2052	7.009E-02	4.352E-01	5.053E-01
2053	6.870E-02	4.391E-01	5.078E-01
2054	6.734E-02	4.429E-01	5.102E-01
2055	6.601E-02	4.466E-01	5.126E-01
2056	6.470E-02	4.503E-01	5.150E-01
2057	6.342E-02	4.539E-01	5.173E-01
2058	6.216E-02	4.574E-01	5.195E-01
2059	6.093E-02	4.608E-01	5.218E-01
2060	5.973E-02	4.642E-01	5.239E-01
2061	5.854E-02	4.675E-01	5.261E-01
2062	5.738E-02	4.708E-01	5.281E-01
2063	5.625E-02	4.739E-01	5.302E-01
2064	5.513E-02	4.771E-01	5.322E-01
2065	5.404E-02	4.801E-01	5.342E-01
2066	5.297E-02	4.831E-01	5.361E-01
2067	5.192E-02	4.860E-01	5.380E-01
2068	5.089E-02	4.889E-01	5.398E-01
2069	4.989E-02	4.917E-01	5.416E-01
2070	4.890E-02	4.945E-01	5.434E-01

Year	Hydrogen Sulfide (Mg/year)		
	OLD LANDFILL	***NEW LANDFILL***	***TOTAL***
2071	4.793E-02	4.972E-01	5.452E-01
2072	4.698E-02	4.999E-01	5.469E-01
2073	4.605E-02	5.025E-01	5.485E-01
2074	4.514E-02	5.050E-01	5.502E-01
2075	4.425E-02	5.075E-01	5.518E-01
2076		5.100E-01	5.100E-01
2077		5.124E-01	5.124E-01
2078		5.147E-01	5.147E-01
2079		5.171E-01	5.171E-01
2080		5.068E-01	5.068E-01
2081		4.968E-01	4.968E-01
2082		4.869E-01	4.869E-01
2083		4.773E-01	4.773E-01
2084		4.679E-01	4.679E-01
2085		4.586E-01	4.586E-01
2086		4.495E-01	4.495E-01
2087		4.406E-01	4.406E-01
2088		4.319E-01	4.319E-01
2089		4.233E-01	4.233E-01
2090		4.149E-01	4.149E-01
2091		4.067E-01	4.067E-01
2092		3.987E-01	3.987E-01
2093		3.908E-01	3.908E-01
2094		3.830E-01	3.830E-01
2095		3.755E-01	3.755E-01
2096		3.680E-01	3.680E-01
2097		3.607E-01	3.607E-01
2098		3.536E-01	3.536E-01
2099		3.466E-01	3.466E-01
2100		3.397E-01	3.397E-01
2101		3.330E-01	3.330E-01
2102		3.264E-01	3.264E-01
2103		3.199E-01	3.199E-01
2104		3.136E-01	3.136E-01
2105		3.074E-01	3.074E-01
2106		3.013E-01	3.013E-01
2107		2.953E-01	2.953E-01
2108		2.895E-01	2.895E-01
2109		2.838E-01	2.838E-01
2110		2.781E-01	2.781E-01
2111		2.726E-01	2.726E-01
2112		2.672E-01	2.672E-01
2113		2.619E-01	2.619E-01
2114		2.568E-01	2.568E-01
2115		2.517E-01	2.517E-01
2116		2.467E-01	2.467E-01
2117		2.418E-01	2.418E-01
2118		2.370E-01	2.370E-01
2119		2.323E-01	2.323E-01
2120		2.277E-01	2.277E-01
2121		2.232E-01	2.232E-01
2122		2.188E-01	2.188E-01
2123		2.145E-01	2.145E-01
2124		2.102E-01	2.102E-01
2125		2.061E-01	2.061E-01
2126		2.020E-01	2.020E-01
2127		1.980E-01	1.980E-01
2128		1.941E-01	1.941E-01
2129		1.902E-01	1.902E-01
2130		1.864E-01	1.864E-01
2131		1.828E-01	1.828E-01
2132		1.791E-01	1.791E-01
2133		1.756E-01	1.756E-01
2134		1.721E-01	1.721E-01
2135		1.687E-01	1.687E-01
2136		1.654E-01	1.654E-01
2137		1.621E-01	1.621E-01
2138		1.589E-01	1.589E-01
2139		1.557E-01	1.557E-01

GHG Emissions

Calculating GHG Emissions:

1. Calculate the ton per year (tpy) GHG mass emissions and GHG CO_2e emissions from your facility.
2. GHG mass emissions are the sum of the total annual tons of greenhouse gases without adjusting with the global warming potentials (GWPs). GHG CO_2e emissions are the sum of the mass emissions of each individual GHG multiplied by its GWP found in Table A-1 in 40 CFR 98 Mandatory Greenhouse Gas Reporting.
3. Emissions from routine or predictable start up, shut down, and maintenance must be included.
4. Report GHG mass and GHG CO_2e emissions in Table 2-P of this application. Emissions are reported in **short** tons per year and represent each emission unit's Potential to Emit (PTE).
5. All Title V major sources, PSD major sources, and all power plants, whether major or not, must calculate and report GHG mass and CO2e emissions for each unit in Table 2-P.
6. For minor source facilities that are not power plants, are not Title V, and are not PSD there are three options for reporting GHGs in Table 2-P and include 1) reporting GHGs for each individual piece of equipment; 2) reporting all GHGs from a group of unit types, for example report all combustion source GHGs as a single unit and all venting GHGs as a second separate unit; 3) or may check the following ☐ By checking this box, the applicant acknowledges the total CO2e emissions are less than 75,000 tons per year.

GHG Emissions

Landfill Gas Flow Rate =	727	Av ft^3/Min	*Occurs in year 2075, per LandGEM model*

Ideal gas law: PV=nRT

Gas constant	R	0.73 ft^3 * atm/(R * lbmol)	
Pressure	P	1 atm	
Temperature	T	68 F	528 R
Molar volume	V/n	385.2 ft^3/mol	

Gas/Pollutant	***Concentration****	***Molecular Weight****	***GWP*****	***Emission Rate (tpy)*** Mass GHG	***Emission Rate (tpy)*** CO2e
Carbon dioxide			1	10,911	10,911
Methane			25	3,977	99,420
Chlorodifluoromethane	1.30	86.47	3,700	0.1	206
Dichlorodifluoromethane	16.00	120.91	3,700	1.0	3,548
Dichlorofluoromethane	2.60	102.92	3,700	0.1	491
Fluorotrichloromethane	0.76	137.38	3,700	0.1	191
Total					***114,767***

**Based on LandGEM Model*
***Table A-1 in 40 CFR 98*

Vehicle Miles Travelled (VMT) and Vehicle Haul Weight Summary*

Operation(s)	Route	Paved (or) Unpaved	Distance, miles	Mean (weighted) Vehicle Haul Weight, tons	Trips/Week	VMT/Week	VMT/Year
Solid Waste Hauling	Facility Entrance to Parking Area	Paved	0.15	22.3	224	68	3522
	Parking to Asbestos Monofill (1)	Paved	0.32	22.9	217	139	7253
	Asbestos Monofill to Cell 5 (1)	Paved	0.20	22.9	212	85	4415
	Cell 5 to Working Face (1)	Unpaved	0.08	22.9	212	35	1832
	Haul Road To Asbestos Monofill	Unpaved	0.10	22.9	5	1	52
Cover Material Transport	Borrow Area 1 to Cell 5 Working Face	Unpaved	0.75	38.4	150	225	11700
	Borrow Area 1 to Asbestos Working Face	Unpaved	0.10	38.4	5	1	52
Transport for LF Staff	Parking to Asbestos Monofill (2)	Paved	0.32	3.7	147	94	4907
	Asbestos Monofill to Cell 5 (2)	Paved	0.20	3.7	147	59	3058
	Cell 5 to Working Face (2)	Unpaved	0.08	3.7	147	24	1269

Vehicular Traffic at CRSWF (Solid Waste Hauling, LF Operations, Transportation of Landfill Staff)*

Vehicle Type	Source	Capacity, CY	Average Haul Weight (GVW), lbs	Average Haul Weight, Tons	No. of Vehicles	Frequency to LF	Average No. of travel days to LF (Mon to Sun)	Average Trips/Vehicle	Total No. of Trips per Week
ROUTE (SOLID WASTE HAULING): FACILITY ENTRANCE ==> PARKING AREA ==> CELL 4 ==> CELL 5 WORKING FACE									
Side Loader	City of Clovis	15	33,000	16.5	1	Daily	6	1	6
Side Loader		20	35,000	17.5	2	Daily	6	1	12
Side Loader		25	41,000	20.5	10	Daily	6	1	60
Side Loader		32	52,000	26.0	1	Daily	6	1	6
Side Loader		33	60,000	30.0	2	Daily	6	1	12
Side Loader		34	65,000	32.5	2	Daily	6	1	12
Rolloff		-	66,000	33.0	1	Daily	6	1	6
Side Loader	Republic	33	60,000	30.0	2	Daily	6	1	12
Rolloff		-	66,840	33.4	2	Daily	6	1	12
Rolloff	SOS	-	64,000	32.0	2	Daily	6	1	12
Side Loader		13	28,020	14.0	1	Weekly	1	1	1
Rolloff	B&B	-	48,000	24.0	2	Weekly	1	1	2
Side Loader	Perry	25	45,000	22.5	1	Daily	6	1	6
Side Loader		30	50,000	25.0	1	Daily	6	1	6
Side Loader		40	65,000	32.5	1	Daily	6	1	6
Side Loader	ENMU	15	49,000	24.5	1	Weekly	1	1	1
Side Loader	Melrose	20	35,000	17.5	1	Weekly	1	1	1
Side Loader		30	50,000	25.0	1	Weekly	1	1	1
Side Loader	De Baca	33	64,000	32.0	1	Weekly	1	1	1
Side Loader	Portales	33	54,700	27.4	1	Daily	6	1	6
Side Loader	Elida	25	36,180	18.1	1	Monthly	0.2	1	0.2
Flatbed	Clovis Sanitation Division	-	6,000	3.0	3	Daily	6	1	18
Poly Cart		-	46,000	23.0	1	Weekly	1	1	1
Rear Loader		-	152,000	76.0	2	Weekly	1	1	2
Pickup		-	6,000	3.0	1	Annually	0.02	1	0
Front Loader		-	20,000	10.0	2	Weekly	1	1	2
Side Loader		-	4,000	2.0	8	Weekly	1	1	8
Pickup w/ Trailer (HHW & GW)	To convenience center	-	8,000	4.0	1	Daily	7	1	7
Rolloff (to asbestos monofill)	Various	-	48,000	24.0	1	Weekly	5	1	5
ROUTE: BORROW AREA ==> WORKING FACE									
Scraper (transport of cover material)	Landfill Operations	23	79,830	39.9	1	Daily	7	20	140
Front End Loader w/ Box		-	30,800	15.4	1	Weekly	1	2	2
Rolloff		-	35,000	17.5	1	Monthly	2	4	8
Scraper (transport of cover material)	Landfill Operations	23	79,830	39.9	1	Daily	5	1	5
ROUTE (TRANSPORT FOR LF OPERATIONS STAFF): PARKING AREA ==> CELL 4 ==> CELL 5 WORKING FACE									
4x4 Pickup Truck	Landfill Operations	-	7,421	3.7	7	Daily	7	3	147

** Vehicle traffic information confirmed with Clovis landfill staff via conference call on 7/27/2021*

Watering Control Efficiency:

1 Estimate control efficiency of unpaved road watering using empirical equation 3-2

$$C = 100-(0.8 \times p \times d \times t)/i$$

Mean Annual Class A PAN Evaporation =	105	inches	*Figure 3-2*
Daily average water application rate =	27,469	gallons/day	
Frequency of watering =	3	times/day	
Water volume per application =	34,657	liters	
Total length of unpaved roads =	134	meters	
Average road width =	12	meters	
Total unpaved road area =	1,614	sq.m	
Average operating hours per day =	10	hr/day	
p =	0.683	mm/h	*summer conditions*
d =	10	hr^{-1}	
i =	21	L/m2	
t =	3	hr	
Average Control Efficiency, C =	99	%	

2 Alternate Approach

Watering 3 x per day yields an approximate control efficiency of = 61% Ref: (SCAQMD 2007)

South Coast Air Quality Management District (SCAQMD), 2007. "Overview - Fugitive Dust Mitigation Measure Tables."

http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/mitigation-measures-and-control-efficiencies/fugitive-dust

Watering is done >3 times per day at the landfill. Use a control efficiency of 61% for unpaved roads dust control by water application

3.3.3 Surface Treatments

3.3.3.1 Watering. The control efficiency of unpaved road watering depends upon (a) the amount of water applied per unit area of road surface, (b) the time between reapplications, (c) traffic volume during that period, and (d) prevailing meteorological conditions during the period. While several investigations have estimated or studied watering efficiencies, few have specified all the factors listed above.

An empirical model for the performance of watering as a control technique has been developed.[8] The supporting data base consists of 14 tests performed in four states during five different summer and fall months. The model is:

$$C = 100 - \frac{0.8\ p\ d\ t}{i} \qquad (3\text{-}2)$$

where: C = average control efficiency, percent
P = potential average hourly daytime evaporation rate, mm/h
d = average hourly daytime traffic rate, (h^{-1})
i = application intensity, L/m^2
t = time between applications, h

Estimates of the potential average hourly daytime evaporation rate may be obtained from

$$p = \begin{matrix} 0.0049 \times \text{(value in Figure 3-2) for annual conditions} \\ 0.0065 \times \text{(value in Figure 3-2) for summer conditions} \end{matrix}$$

Source: Control of Open Fugitive Dust Sources (USEPA, 1988)

3-13

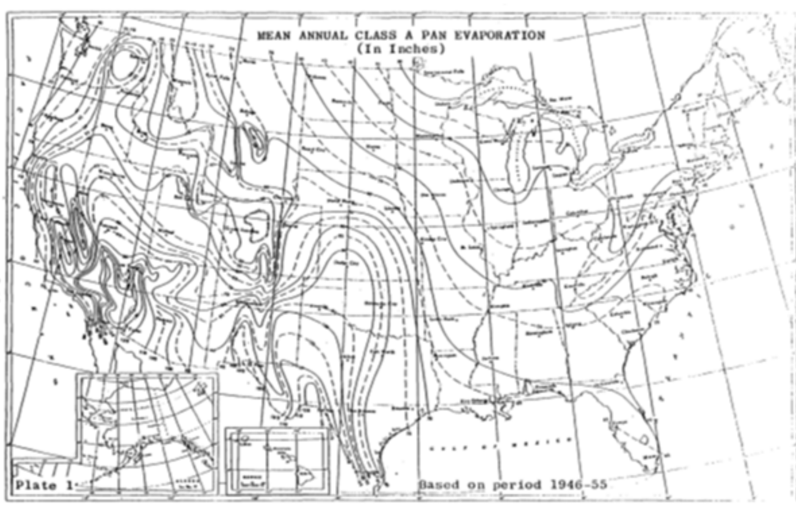


Figure 3-2. Annual evaporation data.

Landfill Unpaved Roads Dust Control Watering Logs

Month**	No.of loads of water used	Gallons*
Aug-18	75	600,000
Aug-18	82	656,000
Sep-18	74	592,000
Oct-18	78	624,000
Nov-18	78	624,000
Dec-18	60	480,000
Jan-19	141	1,128,000
Feb-19	121	968,000
Mar-19	80	640,000
Apr-19	154	1,232,000
May-19	113	904,000
Jun-19	103	824,000
Jul-19	153	1,224,000

*Oct-18 assumed to be the same as Nov-18

Month	No.of loads of water used	Gallons*
Aug-19	166	1,328,000
Sep-19	154	1,232,000
Oct-19	62	496,000
Nov-19	73	584,000
Dec-19	104	832,000
Jan-20	73	584,000
Feb-20	48	384,000
Mar-20	100	800,000
Apr-20	116	928,000
May-20	126	1,008,000
Jun-20	167	1,336,000
Jul-20	110	880,000
	Monthly Average =	**835,520**
	Daily Average =	**27,469**

* 1 load = 8,000 gallons

Summary Report

Landfill Name or Identifier: CRSWF Active Landfill Permit No. P199LR2

Date: Thursday, September 30, 2021

Description/Comments:

About LandGEM:

First-Order Decomposition Rate Equation:

$$Q_{CH_4} = \sum_{i=1}^{n} \sum_{j=0.1}^{1} k L_o \left(\frac{M_i}{10}\right) e^{-k t_{ij}}$$

Where,

Q_{CH4} = annual methane generation in the year of the calculation (m^3*/year*)

i = 1-year time increment

n = (year of the calculation) - (initial year of waste acceptance)

j = 0.1-year time increment

k = methane generation rate (*year*$^{-1}$)

L_o = potential methane generation capacity (m^3*/Mg*)

M_i = mass of waste accepted in the i^{th} year (*Mg*)

t_{ij} = age of the j^{th} section of waste mass M_i accepted in the i^{th} year (*decimal years*, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at http://www.epa.gov/ttnatw01/landfill/landflpg.html.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for convential landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

LANDFILL CHARACTERISTICS			
Landfill Open Year	**1999**		
Landfill Closure Year (with 80-year limit)	**2078**	**Landfill Closure Year entered exceeds the 80-year waste acceptance limit. See Section 2.6 of the User's Manual.**	
Actual Closure Year (without limit)	***2102***		
Have Model Calculate Closure Year?	**No**		
Waste Design Capacity	**8,320,000**	*megagrams*	
MODEL PARAMETERS			
Methane Generation Rate, k	**0.020**	*year*$^{-1}$	AP-42, Inventory Default
Potential Methane Generation Capacity, L_o	**100**	m^3*/Mg*	AP-42, Inventory Default
NMOC Concentration	**251**	*ppmv as hexane*	
Methane Content	**50**	*% by volume*	

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1:	**Total landfill gas**
Gas / Pollutant #2:	**Methane**
Gas / Pollutant #3:	**Carbon dioxide**
Gas / Pollutant #4:	**Hydrogen sulfide**

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
1999	35,370	38,907	0	0
2000	59,980	65,978	35,370	38,907
2001	73,602	80,963	95,350	104,885
2002	82,769	91,046	168,952	185,848
2003	70,852	77,937	251,721	276,894
2004	77,409	85,150	322,573	354,831
2005	76,699	84,369	399,982	439,981
2006	72,944	80,238	476,681	524,350
2007	85,322	93,854	549,625	604,588
2008	75,728	83,301	634,947	698,442
2009	75,747	83,321	710,675	781,742
2010	98,638	108,501	786,421	865,064
2011	74,647	82,112	885,059	973,565
2012	73,466	80,813	959,706	1,055,676
2013	79,012	86,913	1,033,172	1,136,489
2014	76,627	84,290	1,112,184	1,223,402
2015	92,966	102,263	1,188,811	1,307,692
2016	71,935	79,128	1,281,777	1,409,955
2017	66,962	73,658	1,353,712	1,489,083
2018	65,154	71,669	1,420,674	1,562,741
2019	63,055	69,360	1,485,827	1,634,410
2020	61,802	67,982	1,548,882	1,703,770
2021	61,802	67,982	1,610,684	1,771,752
2022	61,802	67,982	1,672,486	1,839,735
2023	61,802	67,982	1,734,288	1,907,717
2024	61,802	67,982	1,796,090	1,975,699
2025	61,802	67,982	1,857,892	2,043,681
2026	61,802	67,982	1,919,694	2,111,664
2027	61,802	67,982	1,981,496	2,179,646
2028	61,802	67,982	2,043,299	2,247,628
2029	61,802	67,982	2,105,101	2,315,611
2030	61,802	67,982	2,166,903	2,383,593
2031	61,802	67,982	2,228,705	2,451,575
2032	61,802	67,982	2,290,507	2,519,558
2033	61,802	67,982	2,352,309	2,587,540
2034	61,802	67,982	2,414,111	2,655,522
2035	61,802	67,982	2,475,913	2,723,504
2036	61,802	67,982	2,537,715	2,791,487
2037	61,802	67,982	2,599,517	2,859,469
2038	61,802	67,982	2,661,319	2,927,451
2039	61,802	67,982	2,723,122	2,995,434
2040	61,802	67,982	2,784,924	3,063,416
2041	61,802	67,982	2,846,726	3,131,398
2042	61,802	67,982	2,908,528	3,199,381
2043	61,802	67,982	2,970,330	3,267,363
2044	61,802	67,982	3,032,132	3,335,345
2045	61,802	67,982	3,093,934	3,403,327
2046	61,802	67,982	3,155,736	3,471,310
2047	61,802	67,982	3,217,538	3,539,292
2048	61,802	67,982	3,279,340	3,607,274
2049	61,802	67,982	3,341,142	3,675,257
2050	61,802	67,982	3,402,945	3,743,239
2051	61,802	67,982	3,464,747	3,811,221
2052	61,802	67,982	3,526,549	3,879,204
2053	61,802	67,982	3,588,351	3,947,186
2054	61,802	67,982	3,650,153	4,015,168
2055	61,802	67,982	3,711,955	4,083,150
2056	61,802	67,982	3,773,757	4,151,133
2057	61,802	67,982	3,835,559	4,219,115
2058	61,802	67,982	3,897,361	4,287,097
2059	61,802	67,982	3,959,163	4,355,080
2060	61,802	67,982	4,020,965	4,423,062
2061	61,802	67,982	4,082,768	4,491,044
2062	61,802	67,982	4,144,570	4,559,027
2063	61,802	67,982	4,206,372	4,627,009
2064	61,802	67,982	4,268,174	4,694,991
2065	61,802	67,982	4,329,976	4,762,973
2066	61,802	67,982	4,391,778	4,830,956
2067	61,802	67,982	4,453,580	4,898,938
2068	61,802	67,982	4,515,382	4,966,920
2069	61,802	67,982	4,577,184	5,034,903
2070	61,802	67,982	4,638,986	5,102,885
2071	61,802	67,982	4,700,788	5,170,867
2072	61,802	67,982	4,762,591	5,238,850
2073	61,802	67,982	4,824,393	5,306,832
2074	61,802	67,982	4,886,195	5,374,814
2075	61,802	67,982	4,947,997	5,442,796
2076	61,802	67,982	5,009,799	5,510,779
2077	61,802	67,982	5,071,601	5,578,761
2078	61,802	67,982	5,133,403	5,646,743

Pollutant Parameters

	Gas / Pollutant Default Parameters:			User-specified Pollutant Parameters:	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

Pollutant Parameters (Continued)

	Gas / Pollutant Default Parameters:			User-specified Pollutant Parameters:	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		

Results

Year	Total landfill gas			Methane		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
1999	0	0	0	0	0	0
2000	1.751E+02	1.402E+05	9.421E+00	4.677E+01	7.011E+04	4.711E+00
2001	4.686E+02	3.752E+05	2.521E+01	1.252E+02	1.876E+05	1.261E+01
2002	8.237E+02	6.596E+05	4.432E+01	2.200E+02	3.298E+05	2.216E+01
2003	1.217E+03	9.746E+05	6.548E+01	3.251E+02	4.873E+05	3.274E+01
2004	1.544E+03	1.236E+06	8.306E+01	4.124E+02	6.181E+05	4.153E+01
2005	1.896E+03	1.519E+06	1.020E+02	5.066E+02	7.593E+05	5.102E+01
2006	2.239E+03	1.793E+06	1.204E+02	5.980E+02	8.963E+05	6.022E+01
2007	2.555E+03	2.046E+06	1.375E+02	6.826E+02	1.023E+06	6.874E+01
2008	2.927E+03	2.344E+06	1.575E+02	7.819E+02	1.172E+06	7.874E+01
2009	3.244E+03	2.598E+06	1.745E+02	8.665E+02	1.299E+06	8.727E+01
2010	3.555E+03	2.847E+06	1.913E+02	9.495E+02	1.423E+06	9.563E+01
2011	3.973E+03	3.181E+06	2.137E+02	1.061E+03	1.591E+06	1.069E+02
2012	4.264E+03	3.414E+06	2.294E+02	1.139E+03	1.707E+06	1.147E+02
2013	4.543E+03	3.638E+06	2.444E+02	1.213E+03	1.819E+06	1.222E+02
2014	4.844E+03	3.879E+06	2.606E+02	1.294E+03	1.939E+06	1.303E+02
2015	5.128E+03	4.106E+06	2.759E+02	1.370E+03	2.053E+06	1.379E+02
2016	5.486E+03	4.393E+06	2.952E+02	1.465E+03	2.197E+06	1.476E+02
2017	5.734E+03	4.591E+06	3.085E+02	1.532E+03	2.296E+06	1.542E+02
2018	5.952E+03	4.766E+06	3.202E+02	1.590E+03	2.383E+06	1.601E+02
2019	6.156E+03	4.930E+06	3.312E+02	1.644E+03	2.465E+06	1.656E+02
2020	6.347E+03	5.082E+06	3.415E+02	1.695E+03	2.541E+06	1.707E+02
2021	6.527E+03	5.227E+06	3.512E+02	1.743E+03	2.613E+06	1.756E+02
2022	6.704E+03	5.368E+06	3.607E+02	1.791E+03	2.684E+06	1.803E+02
2023	6.877E+03	5.507E+06	3.700E+02	1.837E+03	2.753E+06	1.850E+02
2024	7.047E+03	5.643E+06	3.791E+02	1.882E+03	2.821E+06	1.896E+02
2025	7.213E+03	5.776E+06	3.881E+02	1.927E+03	2.888E+06	1.940E+02
2026	7.376E+03	5.907E+06	3.969E+02	1.970E+03	2.953E+06	1.984E+02
2027	7.536E+03	6.035E+06	4.055E+02	2.013E+03	3.017E+06	2.027E+02
2028	7.693E+03	6.160E+06	4.139E+02	2.055E+03	3.080E+06	2.069E+02
2029	7.847E+03	6.283E+06	4.222E+02	2.096E+03	3.142E+06	2.111E+02
2030	7.997E+03	6.404E+06	4.303E+02	2.136E+03	3.202E+06	2.151E+02
2031	8.145E+03	6.522E+06	4.382E+02	2.176E+03	3.261E+06	2.191E+02
2032	8.289E+03	6.638E+06	4.460E+02	2.214E+03	3.319E+06	2.230E+02
2033	8.431E+03	6.751E+06	4.536E+02	2.252E+03	3.376E+06	2.268E+02
2034	8.570E+03	6.863E+06	4.611E+02	2.289E+03	3.431E+06	2.305E+02
2035	8.706E+03	6.972E+06	4.684E+02	2.326E+03	3.486E+06	2.342E+02
2036	8.840E+03	7.079E+06	4.756E+02	2.361E+03	3.539E+06	2.378E+02
2037	8.971E+03	7.184E+06	4.827E+02	2.396E+03	3.592E+06	2.413E+02
2038	9.099E+03	7.286E+06	4.896E+02	2.431E+03	3.643E+06	2.448E+02
2039	9.225E+03	7.387E+06	4.963E+02	2.464E+03	3.693E+06	2.482E+02
2040	9.348E+03	7.486E+06	5.030E+02	2.497E+03	3.743E+06	2.515E+02
2041	9.469E+03	7.582E+06	5.095E+02	2.529E+03	3.791E+06	2.547E+02
2042	9.588E+03	7.677E+06	5.158E+02	2.561E+03	3.839E+06	2.579E+02
2043	9.704E+03	7.770E+06	5.221E+02	2.592E+03	3.885E+06	2.610E+02
2044	9.818E+03	7.861E+06	5.282E+02	2.622E+03	3.931E+06	2.641E+02
2045	9.929E+03	7.951E+06	5.342E+02	2.652E+03	3.975E+06	2.671E+02
2046	1.004E+04	8.038E+06	5.401E+02	2.681E+03	4.019E+06	2.700E+02
2047	1.015E+04	8.124E+06	5.459E+02	2.710E+03	4.062E+06	2.729E+02
2048	1.025E+04	8.208E+06	5.515E+02	2.738E+03	4.104E+06	2.758E+02
2049	1.035E+04	8.291E+06	5.571E+02	2.766E+03	4.145E+06	2.785E+02
2050	1.045E+04	8.372E+06	5.625E+02	2.793E+03	4.186E+06	2.812E+02
2051	1.055E+04	8.451E+06	5.678E+02	2.819E+03	4.225E+06	2.839E+02
2052	1.065E+04	8.528E+06	5.730E+02	2.845E+03	4.264E+06	2.865E+02
2053	1.075E+04	8.605E+06	5.781E+02	2.870E+03	4.302E+06	2.891E+02
2054	1.084E+04	8.679E+06	5.832E+02	2.895E+03	4.340E+06	2.916E+02
2055	1.093E+04	8.752E+06	5.881E+02	2.920E+03	4.376E+06	2.940E+02
2056	1.102E+04	8.824E+06	5.929E+02	2.943E+03	4.412E+06	2.964E+02
2057	1.111E+04	8.894E+06	5.976E+02	2.967E+03	4.447E+06	2.988E+02
2058	1.119E+04	8.963E+06	6.022E+02	2.990E+03	4.482E+06	3.011E+02
2059	1.128E+04	9.031E+06	6.068E+02	3.012E+03	4.515E+06	3.034E+02
2060	1.136E+04	9.097E+06	6.112E+02	3.034E+03	4.548E+06	3.056E+02
2061	1.144E+04	9.162E+06	6.156E+02	3.056E+03	4.581E+06	3.078E+02
2062	1.152E+04	9.225E+06	6.198E+02	3.077E+03	4.613E+06	3.099E+02
2063	1.160E+04	9.288E+06	6.240E+02	3.098E+03	4.644E+06	3.120E+02
2064	1.167E+04	9.349E+06	6.281E+02	3.119E+03	4.674E+06	3.141E+02
2065	1.175E+04	9.409E+06	6.322E+02	3.138E+03	4.704E+06	3.161E+02
2066	1.182E+04	9.467E+06	6.361E+02	3.158E+03	4.734E+06	3.181E+02
2067	1.189E+04	9.525E+06	6.400E+02	3.177E+03	4.762E+06	3.200E+02
2068	1.197E+04	9.581E+06	6.438E+02	3.196E+03	4.791E+06	3.219E+02
2069	1.203E+04	9.637E+06	6.475E+02	3.214E+03	4.818E+06	3.237E+02
2070	1.210E+04	9.691E+06	6.511E+02	3.233E+03	4.845E+06	3.256E+02
2071	1.217E+04	9.744E+06	6.547E+02	3.250E+03	4.872E+06	3.273E+02
2072	1.223E+04	9.796E+06	6.582E+02	3.268E+03	4.898E+06	3.291E+02
2073	1.230E+04	9.847E+06	6.616E+02	3.285E+03	4.923E+06	3.308E+02
2074	1.236E+04	9.897E+06	6.650E+02	3.301E+03	4.948E+06	3.325E+02
2075	1.242E+04	9.946E+06	6.683E+02	3.318E+03	4.973E+06	3.341E+02
2076	1.248E+04	9.994E+06	6.715E+02	3.334E+03	4.997E+06	3.357E+02
2077	1.254E+04	1.004E+07	6.747E+02	3.349E+03	5.021E+06	3.373E+02
2078	1.260E+04	1.009E+07	6.778E+02	3.365E+03	5.044E+06	3.389E+02
2079	1.265E+04	1.013E+07	6.808E+02	3.380E+03	5.066E+06	3.404E+02
2080	1.240E+04	9.932E+06	6.673E+02	3.313E+03	4.966E+06	3.337E+02
2081	1.216E+04	9.735E+06	6.541E+02	3.247E+03	4.868E+06	3.271E+02

2082	1.192E+04	9.542E+06	6.412E+02	3.183E+03	4.771E+06	3.206E+02
2083	1.168E+04	9.353E+06	6.285E+02	3.120E+03	4.677E+06	3.142E+02
2084	1.145E+04	9.168E+06	6.160E+02	3.058E+03	4.584E+06	3.080E+02
2085	1.122E+04	8.987E+06	6.038E+02	2.998E+03	4.493E+06	3.019E+02
2086	1.100E+04	8.809E+06	5.919E+02	2.938E+03	4.404E+06	2.959E+02
2087	1.078E+04	8.634E+06	5.801E+02	2.880E+03	4.317E+06	2.901E+02
2088	1.057E+04	8.463E+06	5.687E+02	2.823E+03	4.232E+06	2.843E+02
2089	1.036E+04	8.296E+06	5.574E+02	2.767E+03	4.148E+06	2.787E+02
2090	1.015E+04	8.132E+06	5.464E+02	2.712E+03	4.066E+06	2.732E+02
2091	9.954E+03	7.971E+06	5.355E+02	2.659E+03	3.985E+06	2.678E+02
2092	9.757E+03	7.813E+06	5.249E+02	2.606E+03	3.906E+06	2.625E+02
2093	9.563E+03	7.658E+06	5.145E+02	2.555E+03	3.829E+06	2.573E+02
2094	9.374E+03	7.506E+06	5.044E+02	2.504E+03	3.753E+06	2.522E+02
2095	9.188E+03	7.358E+06	4.944E+02	2.454E+03	3.679E+06	2.472E+02
2096	9.007E+03	7.212E+06	4.846E+02	2.406E+03	3.606E+06	2.423E+02
2097	8.828E+03	7.069E+06	4.750E+02	2.358E+03	3.535E+06	2.375E+02
2098	8.653E+03	6.929E+06	4.656E+02	2.311E+03	3.465E+06	2.328E+02
2099	8.482E+03	6.792E+06	4.564E+02	2.266E+03	3.396E+06	2.282E+02
2100	8.314E+03	6.658E+06	4.473E+02	2.221E+03	3.329E+06	2.237E+02
2101	8.149E+03	6.526E+06	4.385E+02	2.177E+03	3.263E+06	2.192E+02
2102	7.988E+03	6.396E+06	4.298E+02	2.134E+03	3.198E+06	2.149E+02
2103	7.830E+03	6.270E+06	4.213E+02	2.091E+03	3.135E+06	2.106E+02
2104	7.675E+03	6.146E+06	4.129E+02	2.050E+03	3.073E+06	2.065E+02
2105	7.523E+03	6.024E+06	4.048E+02	2.009E+03	3.012E+06	2.024E+02
2106	7.374E+03	5.905E+06	3.967E+02	1.970E+03	2.952E+06	1.984E+02
2107	7.228E+03	5.788E+06	3.889E+02	1.931E+03	2.894E+06	1.944E+02
2108	7.085E+03	5.673E+06	3.812E+02	1.892E+03	2.837E+06	1.906E+02
2109	6.945E+03	5.561E+06	3.736E+02	1.855E+03	2.780E+06	1.868E+02
2110	6.807E+03	5.451E+06	3.662E+02	1.818E+03	2.725E+06	1.831E+02
2111	6.672E+03	5.343E+06	3.590E+02	1.782E+03	2.671E+06	1.795E+02
2112	6.540E+03	5.237E+06	3.519E+02	1.747E+03	2.619E+06	1.759E+02
2113	6.411E+03	5.133E+06	3.449E+02	1.712E+03	2.567E+06	1.725E+02
2114	6.284E+03	5.032E+06	3.381E+02	1.678E+03	2.516E+06	1.690E+02
2115	6.159E+03	4.932E+06	3.314E+02	1.645E+03	2.466E+06	1.657E+02
2116	6.037E+03	4.834E+06	3.248E+02	1.613E+03	2.417E+06	1.624E+02
2117	5.918E+03	4.739E+06	3.184E+02	1.581E+03	2.369E+06	1.592E+02
2118	5.801E+03	4.645E+06	3.121E+02	1.549E+03	2.322E+06	1.560E+02
2119	5.686E+03	4.553E+06	3.059E+02	1.519E+03	2.276E+06	1.530E+02
2120	5.573E+03	4.463E+06	2.998E+02	1.489E+03	2.231E+06	1.499E+02
2121	5.463E+03	4.374E+06	2.939E+02	1.459E+03	2.187E+06	1.470E+02
2122	5.355E+03	4.288E+06	2.881E+02	1.430E+03	2.144E+06	1.440E+02
2123	5.249E+03	4.203E+06	2.824E+02	1.402E+03	2.101E+06	1.412E+02
2124	5.145E+03	4.120E+06	2.768E+02	1.374E+03	2.060E+06	1.384E+02
2125	5.043E+03	4.038E+06	2.713E+02	1.347E+03	2.019E+06	1.357E+02
2126	4.943E+03	3.958E+06	2.659E+02	1.320E+03	1.979E+06	1.330E+02
2127	4.845E+03	3.880E+06	2.607E+02	1.294E+03	1.940E+06	1.303E+02
2128	4.749E+03	3.803E+06	2.555E+02	1.269E+03	1.901E+06	1.278E+02
2129	4.655E+03	3.728E+06	2.505E+02	1.243E+03	1.864E+06	1.252E+02
2130	4.563E+03	3.654E+06	2.455E+02	1.219E+03	1.827E+06	1.227E+02
2131	4.473E+03	3.581E+06	2.406E+02	1.195E+03	1.791E+06	1.203E+02
2132	4.384E+03	3.510E+06	2.359E+02	1.171E+03	1.755E+06	1.179E+02
2133	4.297E+03	3.441E+06	2.312E+02	1.148E+03	1.720E+06	1.156E+02
2134	4.212E+03	3.373E+06	2.266E+02	1.125E+03	1.686E+06	1.133E+02
2135	4.129E+03	3.306E+06	2.221E+02	1.103E+03	1.653E+06	1.111E+02
2136	4.047E+03	3.241E+06	2.177E+02	1.081E+03	1.620E+06	1.089E+02
2137	3.967E+03	3.176E+06	2.134E+02	1.060E+03	1.588E+06	1.067E+02
2138	3.888E+03	3.114E+06	2.092E+02	1.039E+03	1.557E+06	1.046E+02
2139	3.811E+03	3.052E+06	2.051E+02	1.018E+03	1.526E+06	1.025E+02

Results (Continued)

Year	Carbon dioxide			Hydrogen sulfide		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
1999	0	0	0	0	0	0
2000	1.283E+02	7.011E+04	4.711E+00	7.155E-03	5.048E+00	3.392E-04
2001	3.434E+02	1.876E+05	1.261E+01	1.915E-02	1.351E+01	9.076E-04
2002	6.037E+02	3.298E+05	2.216E+01	3.366E-02	2.374E+01	1.595E-03
2003	8.920E+02	4.873E+05	3.274E+01	4.973E-02	3.509E+01	2.357E-03
2004	1.131E+03	6.181E+05	4.153E+01	6.308E-02	4.450E+01	2.990E-03
2005	1.390E+03	7.593E+05	5.102E+01	7.749E-02	5.467E+01	3.673E-03
2006	1.641E+03	8.963E+05	6.022E+01	9.147E-02	6.453E+01	4.336E-03
2007	1.873E+03	1.023E+06	6.874E+01	1.044E-01	7.366E+01	4.949E-03
2008	2.145E+03	1.172E+06	7.874E+01	1.196E-01	8.438E+01	5.670E-03
2009	2.378E+03	1.299E+06	8.727E+01	1.326E-01	9.352E+01	6.283E-03
2010	2.605E+03	1.423E+06	9.563E+01	1.453E-01	1.025E+02	6.885E-03
2011	2.912E+03	1.591E+06	1.069E+02	1.623E-01	1.145E+02	7.695E-03
2012	3.125E+03	1.707E+06	1.147E+02	1.742E-01	1.229E+02	8.258E-03
2013	3.329E+03	1.819E+06	1.222E+02	1.856E-01	1.310E+02	8.799E-03
2014	3.550E+03	1.939E+06	1.303E+02	1.979E-01	1.396E+02	9.383E-03
2015	3.758E+03	2.053E+06	1.379E+02	2.095E-01	1.478E+02	9.932E-03
2016	4.021E+03	2.197E+06	1.476E+02	2.242E-01	1.582E+02	1.063E-02
2017	4.202E+03	2.296E+06	1.542E+02	2.343E-01	1.653E+02	1.111E-02
2018	4.362E+03	2.383E+06	1.601E+02	2.432E-01	1.716E+02	1.153E-02
2019	4.512E+03	2.465E+06	1.656E+02	2.516E-01	1.775E+02	1.192E-02
2020	4.651E+03	2.541E+06	1.707E+02	2.593E-01	1.830E+02	1.229E-02
2021	4.784E+03	2.613E+06	1.756E+02	2.667E-01	1.882E+02	1.264E-02
2022	4.913E+03	2.684E+06	1.803E+02	2.739E-01	1.932E+02	1.298E-02
2023	5.040E+03	2.753E+06	1.850E+02	2.810E-01	1.982E+02	1.332E-02
2024	5.164E+03	2.821E+06	1.896E+02	2.879E-01	2.031E+02	1.365E-02
2025	5.286E+03	2.888E+06	1.940E+02	2.947E-01	2.079E+02	1.397E-02
2026	5.406E+03	2.953E+06	1.984E+02	3.014E-01	2.126E+02	1.429E-02
2027	5.523E+03	3.017E+06	2.027E+02	3.079E-01	2.172E+02	1.460E-02
2028	5.638E+03	3.080E+06	2.069E+02	3.143E-01	2.218E+02	1.490E-02
2029	5.751E+03	3.142E+06	2.111E+02	3.206E-01	2.262E+02	1.520E-02
2030	5.861E+03	3.202E+06	2.151E+02	3.268E-01	2.305E+02	1.549E-02
2031	5.969E+03	3.261E+06	2.191E+02	3.328E-01	2.348E+02	1.578E-02
2032	6.075E+03	3.319E+06	2.230E+02	3.387E-01	2.390E+02	1.606E-02
2033	6.179E+03	3.376E+06	2.268E+02	3.445E-01	2.430E+02	1.633E-02
2034	6.281E+03	3.431E+06	2.305E+02	3.502E-01	2.471E+02	1.660E-02
2035	6.381E+03	3.486E+06	2.342E+02	3.558E-01	2.510E+02	1.686E-02
2036	6.479E+03	3.539E+06	2.378E+02	3.612E-01	2.548E+02	1.712E-02
2037	6.575E+03	3.592E+06	2.413E+02	3.666E-01	2.586E+02	1.738E-02
2038	6.669E+03	3.643E+06	2.448E+02	3.718E-01	2.623E+02	1.762E-02
2039	6.761E+03	3.693E+06	2.482E+02	3.770E-01	2.659E+02	1.787E-02
2040	6.851E+03	3.743E+06	2.515E+02	3.820E-01	2.695E+02	1.811E-02
2041	6.940E+03	3.791E+06	2.547E+02	3.869E-01	2.730E+02	1.834E-02
2042	7.027E+03	3.839E+06	2.579E+02	3.918E-01	2.764E+02	1.857E-02
2043	7.112E+03	3.885E+06	2.610E+02	3.965E-01	2.797E+02	1.880E-02
2044	7.195E+03	3.931E+06	2.641E+02	4.012E-01	2.830E+02	1.902E-02
2045	7.277E+03	3.975E+06	2.671E+02	4.057E-01	2.862E+02	1.923E-02
2046	7.357E+03	4.019E+06	2.700E+02	4.102E-01	2.894E+02	1.944E-02
2047	7.436E+03	4.062E+06	2.729E+02	4.146E-01	2.925E+02	1.965E-02
2048	7.513E+03	4.104E+06	2.758E+02	4.189E-01	2.955E+02	1.985E-02
2049	7.588E+03	4.145E+06	2.785E+02	4.231E-01	2.985E+02	2.005E-02
2050	7.662E+03	4.186E+06	2.812E+02	4.272E-01	3.014E+02	2.025E-02
2051	7.735E+03	4.225E+06	2.839E+02	4.312E-01	3.042E+02	2.044E-02
2052	7.806E+03	4.264E+06	2.865E+02	4.352E-01	3.070E+02	2.063E-02
2053	7.875E+03	4.302E+06	2.891E+02	4.391E-01	3.098E+02	2.081E-02
2054	7.944E+03	4.340E+06	2.916E+02	4.429E-01	3.125E+02	2.099E-02
2055	8.011E+03	4.376E+06	2.940E+02	4.466E-01	3.151E+02	2.117E-02
2056	8.076E+03	4.412E+06	2.964E+02	4.503E-01	3.177E+02	2.134E-02
2057	8.141E+03	4.447E+06	2.988E+02	4.539E-01	3.202E+02	2.151E-02
2058	8.204E+03	4.482E+06	3.011E+02	4.574E-01	3.227E+02	2.168E-02
2059	8.265E+03	4.515E+06	3.034E+02	4.608E-01	3.251E+02	2.184E-02
2060	8.326E+03	4.548E+06	3.056E+02	4.642E-01	3.275E+02	2.200E-02
2061	8.385E+03	4.581E+06	3.078E+02	4.675E-01	3.298E+02	2.216E-02
2062	8.443E+03	4.613E+06	3.099E+02	4.708E-01	3.321E+02	2.231E-02
2063	8.501E+03	4.644E+06	3.120E+02	4.739E-01	3.344E+02	2.247E-02
2064	8.556E+03	4.674E+06	3.141E+02	4.771E-01	3.366E+02	2.261E-02
2065	8.611E+03	4.704E+06	3.161E+02	4.801E-01	3.387E+02	2.276E-02
2066	8.665E+03	4.734E+06	3.181E+02	4.831E-01	3.408E+02	2.290E-02
2067	8.718E+03	4.762E+06	3.200E+02	4.860E-01	3.429E+02	2.304E-02
2068	8.769E+03	4.791E+06	3.219E+02	4.889E-01	3.449E+02	2.318E-02
2069	8.820E+03	4.818E+06	3.237E+02	4.917E-01	3.469E+02	2.331E-02
2070	8.869E+03	4.845E+06	3.256E+02	4.945E-01	3.489E+02	2.344E-02
2071	8.918E+03	4.872E+06	3.273E+02	4.972E-01	3.508E+02	2.357E-02
2072	8.966E+03	4.898E+06	3.291E+02	4.999E-01	3.527E+02	2.369E-02
2073	9.012E+03	4.923E+06	3.308E+02	5.025E-01	3.545E+02	2.382E-02
2074	9.058E+03	4.948E+06	3.325E+02	5.050E-01	3.563E+02	2.394E-02
2075	9.103E+03	4.973E+06	3.341E+02	5.075E-01	3.581E+02	2.406E-02
2076	9.147E+03	4.997E+06	3.357E+02	5.100E-01	3.598E+02	2.417E-02
2077	9.190E+03	5.021E+06	3.373E+02	5.124E-01	3.615E+02	2.429E-02
2078	9.232E+03	5.044E+06	3.389E+02	5.147E-01	3.631E+02	2.440E-02
2079	9.274E+03	5.066E+06	3.404E+02	5.171E-01	3.648E+02	2.451E-02
2080	9.090E+03	4.966E+06	3.337E+02	5.068E-01	3.575E+02	2.402E-02

2081	8.910E+03	4.868E+06	3.271E+02	4.968E-01	3.505E+02	2.355E-02
2082	8.734E+03	4.771E+06	3.206E+02	4.869E-01	3.435E+02	2.308E-02
2083	8.561E+03	4.677E+06	3.142E+02	4.773E-01	3.367E+02	2.262E-02
2084	8.391E+03	4.584E+06	3.080E+02	4.679E-01	3.301E+02	2.218E-02
2085	8.225E+03	4.493E+06	3.019E+02	4.586E-01	3.235E+02	2.174E-02
2086	8.062E+03	4.404E+06	2.959E+02	4.495E-01	3.171E+02	2.131E-02
2087	7.903E+03	4.317E+06	2.901E+02	4.406E-01	3.108E+02	2.089E-02
2088	7.746E+03	4.232E+06	2.843E+02	4.319E-01	3.047E+02	2.047E-02
2089	7.593E+03	4.148E+06	2.787E+02	4.233E-01	2.986E+02	2.007E-02
2090	7.442E+03	4.066E+06	2.732E+02	4.149E-01	2.927E+02	1.967E-02
2091	7.295E+03	3.985E+06	2.678E+02	4.067E-01	2.869E+02	1.928E-02
2092	7.151E+03	3.906E+06	2.625E+02	3.987E-01	2.813E+02	1.890E-02
2093	7.009E+03	3.829E+06	2.573E+02	3.908E-01	2.757E+02	1.852E-02
2094	6.870E+03	3.753E+06	2.522E+02	3.830E-01	2.702E+02	1.816E-02
2095	6.734E+03	3.679E+06	2.472E+02	3.755E-01	2.649E+02	1.780E-02
2096	6.601E+03	3.606E+06	2.423E+02	3.680E-01	2.596E+02	1.744E-02
2097	6.470E+03	3.535E+06	2.375E+02	3.607E-01	2.545E+02	1.710E-02
2098	6.342E+03	3.465E+06	2.328E+02	3.536E-01	2.495E+02	1.676E-02
2099	6.216E+03	3.396E+06	2.282E+02	3.466E-01	2.445E+02	1.643E-02
2100	6.093E+03	3.329E+06	2.237E+02	3.397E-01	2.397E+02	1.610E-02
2101	5.973E+03	3.263E+06	2.192E+02	3.330E-01	2.349E+02	1.578E-02
2102	5.854E+03	3.198E+06	2.149E+02	3.264E-01	2.303E+02	1.547E-02
2103	5.738E+03	3.135E+06	2.106E+02	3.199E-01	2.257E+02	1.517E-02
2104	5.625E+03	3.073E+06	2.065E+02	3.136E-01	2.212E+02	1.487E-02
2105	5.513E+03	3.012E+06	2.024E+02	3.074E-01	2.169E+02	1.457E-02
2106	5.404E+03	2.952E+06	1.984E+02	3.013E-01	2.126E+02	1.428E-02
2107	5.297E+03	2.894E+06	1.944E+02	2.953E-01	2.084E+02	1.400E-02
2108	5.192E+03	2.837E+06	1.906E+02	2.895E-01	2.042E+02	1.372E-02
2109	5.090E+03	2.780E+06	1.868E+02	2.838E-01	2.002E+02	1.345E-02
2110	4.989E+03	2.725E+06	1.831E+02	2.781E-01	1.962E+02	1.318E-02
2111	4.890E+03	2.671E+06	1.795E+02	2.726E-01	1.923E+02	1.292E-02
2112	4.793E+03	2.619E+06	1.759E+02	2.672E-01	1.885E+02	1.267E-02
2113	4.698E+03	2.567E+06	1.725E+02	2.619E-01	1.848E+02	1.242E-02
2114	4.605E+03	2.516E+06	1.690E+02	2.568E-01	1.811E+02	1.217E-02
2115	4.514E+03	2.466E+06	1.657E+02	2.517E-01	1.776E+02	1.193E-02
2116	4.425E+03	2.417E+06	1.624E+02	2.467E-01	1.740E+02	1.169E-02
2117	4.337E+03	2.369E+06	1.592E+02	2.418E-01	1.706E+02	1.146E-02
2118	4.251E+03	2.322E+06	1.560E+02	2.370E-01	1.672E+02	1.124E-02
2119	4.167E+03	2.276E+06	1.530E+02	2.323E-01	1.639E+02	1.101E-02
2120	4.084E+03	2.231E+06	1.499E+02	2.277E-01	1.607E+02	1.079E-02
2121	4.004E+03	2.187E+06	1.470E+02	2.232E-01	1.575E+02	1.058E-02
2122	3.924E+03	2.144E+06	1.440E+02	2.188E-01	1.544E+02	1.037E-02
2123	3.847E+03	2.101E+06	1.412E+02	2.145E-01	1.513E+02	1.017E-02
2124	3.770E+03	2.060E+06	1.384E+02	2.102E-01	1.483E+02	9.965E-03
2125	3.696E+03	2.019E+06	1.357E+02	2.061E-01	1.454E+02	9.767E-03
2126	3.623E+03	1.979E+06	1.330E+02	2.020E-01	1.425E+02	9.574E-03
2127	3.551E+03	1.940E+06	1.303E+02	1.980E-01	1.397E+02	9.384E-03
2128	3.481E+03	1.901E+06	1.278E+02	1.941E-01	1.369E+02	9.198E-03
2129	3.412E+03	1.864E+06	1.252E+02	1.902E-01	1.342E+02	9.016E-03
2130	3.344E+03	1.827E+06	1.227E+02	1.864E-01	1.315E+02	8.838E-03
2131	3.278E+03	1.791E+06	1.203E+02	1.828E-01	1.289E+02	8.663E-03
2132	3.213E+03	1.755E+06	1.179E+02	1.791E-01	1.264E+02	8.491E-03
2133	3.149E+03	1.720E+06	1.156E+02	1.756E-01	1.239E+02	8.323E-03
2134	3.087E+03	1.686E+06	1.133E+02	1.721E-01	1.214E+02	8.158E-03
2135	3.026E+03	1.653E+06	1.111E+02	1.687E-01	1.190E+02	7.997E-03
2136	2.966E+03	1.620E+06	1.089E+02	1.654E-01	1.167E+02	7.838E-03
2137	2.907E+03	1.588E+06	1.067E+02	1.621E-01	1.144E+02	7.683E-03
2138	2.850E+03	1.557E+06	1.046E+02	1.589E-01	1.121E+02	7.531E-03
2139	2.793E+03	1.526E+06	1.025E+02	1.557E-01	1.099E+02	7.382E-03

Summary Report

Landfill Name or Identifier: CRSWF Old Landfill

Date: Thursday, September 30, 2021

Description/Comments:

About LandGEM:

First-Order Decomposition Rate Equation:

$$Q_{CH_4} = \sum_{i=1}^{n} \sum_{j=0.1}^{1} k L_o \left(\frac{M_i}{10} \right) e^{-kt_{ij}}$$

Where,

Q_{CH4} = annual methane generation in the year of the calculation *(m^3/year)*
i = 1-year time increment
n = (year of the calculation) - (initial year of waste acceptance)
j = 0.1-year time increment
k = methane generation rate (*$year^{-1}$*)
L_o = potential methane generation capacity (*m^3/Mg*)

M_i = mass of waste accepted in the i^{th} year (*Mg*)
t_{ij} = age of the j^{th} section of waste mass M_i accepted in the i^{th} year (*decimal years*, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at http://www.epa.gov/ttnatw01/landfill/landflpg.html.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for convential landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

LANDFILL CHARACTERISTICS

Landfill Open Year	**1935**	
Landfill Closure Year (with 80-year limit)	**1999**	
Actual Closure Year (without limit)	***1999***	
Have Model Calculate Closure Year?	**No**	
Waste Design Capacity	**1,587,570**	*megagrams*

MODEL PARAMETERS

Methane Generation Rate, k	**0.020**	*$year^{-1}$*	AP-42, Inventory Default
Potential Methane Generation Capacity, L_o	**100**	*m^3/Mg*	AP-42, Inventory Default
NMOC Concentration	**251**	*ppmv as hexane*	
Methane Content	**50**	*% by volume*	

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1:	**Total landfill gas**
Gas / Pollutant #2:	**Methane**
Gas / Pollutant #3:	**Carbon dioxide**
Gas / Pollutant #4:	**Hydrogen sulfide**

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	(short tons/year)	(Mg)	(short tons)
1935	21,134	23,247	0	0
1936	21,134	23,247	21,134	23,247
1937	21,134	23,247	42,268	46,495
1938	21,134	23,247	63,402	69,742
1939	21,134	23,247	84,536	92,990
1940	21,134	23,247	105,670	116,237
1941	21,134	23,247	126,804	139,485
1942	21,134	23,247	147,938	162,732
1943	21,134	23,247	169,072	185,980
1944	21,134	23,247	190,206	209,227
1945	21,134	23,247	211,340	232,475
1946	21,134	23,247	232,475	255,722
1947	21,134	23,247	253,609	278,969
1948	21,134	23,247	274,743	302,217
1949	21,134	23,247	295,877	325,464
1950	21,134	23,247	317,011	348,712
1951	21,134	23,247	338,145	371,959
1952	21,134	23,247	359,279	395,207
1953	21,134	23,247	380,413	418,454
1954	21,134	23,247	401,547	441,702
1955	21,134	23,247	422,681	464,949
1956	21,134	23,247	443,815	488,197
1957	21,134	23,247	464,949	511,444
1958	21,134	23,247	486,083	534,691
1959	21,134	23,247	507,217	557,939
1960	21,134	23,247	528,351	581,186
1961	21,134	23,247	549,485	604,434
1962	21,134	23,247	570,619	627,681
1963	21,134	23,247	591,753	650,929
1964	21,134	23,247	612,887	674,176
1965	21,134	23,247	634,021	697,424
1966	21,134	23,247	655,156	720,671
1967	21,134	23,247	676,290	743,919
1968	21,134	23,247	697,424	767,166
1969	21,134	23,247	718,558	790,413
1970	21,134	23,247	739,692	813,661
1971	21,134	23,247	760,826	836,908
1972	21,134	23,247	781,960	860,156
1973	21,134	23,247	803,094	883,403
1974	21,134	23,247	824,228	906,651
1975	21,134	23,247	845,362	929,898
1976	21,134	23,247	866,496	953,146
1977	21,134	23,247	887,630	976,393
1978	21,134	23,247	908,764	999,641
1979	21,134	23,247	929,898	1,022,888
1980	21,134	23,247	951,032	1,046,135
1981	21,134	23,247	972,166	1,069,383
1982	21,134	23,247	993,300	1,092,630
1983	21,134	23,247	1,014,434	1,115,878
1984	21,134	23,247	1,035,568	1,139,125
1985	21,134	23,247	1,056,702	1,162,373
1986	21,134	23,247	1,077,837	1,185,620
1987	21,134	23,247	1,098,971	1,208,868
1988	21,134	23,247	1,120,105	1,232,115
1989	21,134	23,247	1,141,239	1,255,363
1990	21,134	23,247	1,162,373	1,278,610
1991	21,134	23,247	1,183,507	1,301,857
1992	21,134	23,247	1,204,641	1,325,105
1993	21,134	23,247	1,225,775	1,348,352
1994	21,134	23,247	1,246,909	1,371,600
1995	69,514	76,465	1,268,043	1,394,847
1996	75,714	83,285	1,337,557	1,471,312
1997	73,641	81,005	1,413,270	1,554,597
1998	75,443	82,987	1,486,911	1,635,602
1999	25,211	27,732	1,562,354	1,718,589
2000	0	0	1,587,565	1,746,321
2001	0	0	1,587,565	1,746,321
2002	0	0	1,587,565	1,746,321
2003	0	0	1,587,565	1,746,321
2004	0	0	1,587,565	1,746,321
2005	0	0	1,587,565	1,746,321
2006	0	0	1,587,565	1,746,321
2007	0	0	1,587,565	1,746,321
2008	0	0	1,587,565	1,746,321
2009	0	0	1,587,565	1,746,321
2010	0	0	1,587,565	1,746,321
2011	0	0	1,587,565	1,746,321
2012	0	0	1,587,565	1,746,321
2013	0	0	1,587,565	1,746,321
2014	0	0	1,587,565	1,746,321

Pollutant Parameters

Gas / Pollutant Default Parameters: | *User-specified Pollutant Parameters:*

	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

Pollutant Parameters (Continued)

	Gas / Pollutant Default Parameters:			User-specified Pollutant Parameters:	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		

Results

Year	Total landfill gas (Mg/year)	Total landfill gas (m^3/year)	Total landfill gas (av ft^3/min)	Methane (Mg/year)	Methane (m^3/year)	Methane (av ft^3/min)
1935	0	0	0	0	0	0
1936	1.046E+02	8.378E+04	5.629E+00	2.795E+01	4.189E+04	2.815E+00
1937	2.072E+02	1.659E+05	1.115E+01	5.534E+01	8.295E+04	5.573E+00
1938	3.077E+02	2.464E+05	1.656E+01	8.219E+01	1.232E+05	8.278E+00
1939	4.062E+02	3.253E+05	2.186E+01	1.085E+02	1.626E+05	1.093E+01
1940	5.028E+02	4.026E+05	2.705E+01	1.343E+02	2.013E+05	1.353E+01
1941	5.975E+02	4.784E+05	3.215E+01	1.596E+02	2.392E+05	1.607E+01
1942	6.903E+02	5.528E+05	3.714E+01	1.844E+02	2.764E+05	1.857E+01
1943	7.812E+02	6.256E+05	4.203E+01	2.087E+02	3.128E+05	2.102E+01
1944	8.704E+02	6.970E+05	4.683E+01	2.325E+02	3.485E+05	2.341E+01
1945	9.578E+02	7.670E+05	5.153E+01	2.558E+02	3.835E+05	2.577E+01
1946	1.043E+03	8.356E+05	5.614E+01	2.787E+02	4.178E+05	2.807E+01
1947	1.127E+03	9.028E+05	6.066E+01	3.011E+02	4.514E+05	3.033E+01
1948	1.210E+03	9.687E+05	6.509E+01	3.231E+02	4.843E+05	3.254E+01
1949	1.290E+03	1.033E+06	6.943E+01	3.447E+02	5.166E+05	3.471E+01
1950	1.369E+03	1.097E+06	7.368E+01	3.658E+02	5.483E+05	3.684E+01
1951	1.447E+03	1.159E+06	7.785E+01	3.865E+02	5.793E+05	3.893E+01
1952	1.523E+03	1.220E+06	8.194E+01	4.068E+02	6.098E+05	4.097E+01
1953	1.597E+03	1.279E+06	8.595E+01	4.267E+02	6.396E+05	4.297E+01
1954	1.670E+03	1.338E+06	8.987E+01	4.462E+02	6.688E+05	4.494E+01
1955	1.742E+03	1.395E+06	9.372E+01	4.653E+02	6.974E+05	4.686E+01
1956	1.812E+03	1.451E+06	9.750E+01	4.840E+02	7.255E+05	4.875E+01
1957	1.881E+03	1.506E+06	1.012E+02	5.024E+02	7.530E+05	5.060E+01
1958	1.948E+03	1.560E+06	1.048E+02	5.204E+02	7.800E+05	5.241E+01
1959	2.014E+03	1.613E+06	1.084E+02	5.380E+02	8.065E+05	5.419E+01
1960	2.079E+03	1.665E+06	1.119E+02	5.553E+02	8.324E+05	5.593E+01
1961	2.142E+03	1.716E+06	1.153E+02	5.723E+02	8.578E+05	5.764E+01
1962	2.205E+03	1.765E+06	1.186E+02	5.889E+02	8.827E+05	5.931E+01
1963	2.266E+03	1.814E+06	1.219E+02	6.052E+02	9.071E+05	6.095E+01
1964	2.325E+03	1.862E+06	1.251E+02	6.211E+02	9.310E+05	6.256E+01
1965	2.384E+03	1.909E+06	1.283E+02	6.368E+02	9.545E+05	6.413E+01
1966	2.441E+03	1.955E+06	1.314E+02	6.521E+02	9.775E+05	6.568E+01
1967	2.498E+03	2.000E+06	1.344E+02	6.672E+02	1.000E+06	6.719E+01
1968	2.553E+03	2.044E+06	1.374E+02	6.819E+02	1.022E+06	6.868E+01
1969	2.607E+03	2.088E+06	1.403E+02	6.963E+02	1.044E+06	7.013E+01
1970	2.660E+03	2.130E+06	1.431E+02	7.105E+02	1.065E+06	7.156E+01
1971	2.712E+03	2.172E+06	1.459E+02	7.244E+02	1.086E+06	7.295E+01
1972	2.763E+03	2.212E+06	1.486E+02	7.380E+02	1.106E+06	7.432E+01
1973	2.813E+03	2.252E+06	1.513E+02	7.513E+02	1.126E+06	7.567E+01
1974	2.862E+03	2.292E+06	1.540E+02	7.644E+02	1.146E+06	7.698E+01
1975	2.910E+03	2.330E+06	1.565E+02	7.772E+02	1.165E+06	7.827E+01
1976	2.957E+03	2.368E+06	1.591E+02	7.898E+02	1.184E+06	7.954E+01
1977	3.003E+03	2.404E+06	1.616E+02	8.021E+02	1.202E+06	8.078E+01
1978	3.048E+03	2.441E+06	1.640E+02	8.141E+02	1.220E+06	8.199E+01
1979	3.092E+03	2.476E+06	1.664E+02	8.260E+02	1.238E+06	8.318E+01
1980	3.136E+03	2.511E+06	1.687E+02	8.375E+02	1.255E+06	8.435E+01
1981	3.178E+03	2.545E+06	1.710E+02	8.489E+02	1.272E+06	8.550E+01
1982	3.220E+03	2.578E+06	1.732E+02	8.600E+02	1.289E+06	8.662E+01
1983	3.261E+03	2.611E+06	1.754E+02	8.710E+02	1.306E+06	8.772E+01
1984	3.301E+03	2.643E+06	1.776E+02	8.817E+02	1.322E+06	8.879E+01
1985	3.340E+03	2.675E+06	1.797E+02	8.922E+02	1.337E+06	8.985E+01
1986	3.379E+03	2.705E+06	1.818E+02	9.024E+02	1.353E+06	9.089E+01
1987	3.416E+03	2.736E+06	1.838E+02	9.125E+02	1.368E+06	9.190E+01
1988	3.453E+03	2.765E+06	1.858E+02	9.224E+02	1.383E+06	9.290E+01
1989	3.489E+03	2.794E+06	1.877E+02	9.321E+02	1.397E+06	9.387E+01
1990	3.525E+03	2.823E+06	1.897E+02	9.416E+02	1.411E+06	9.483E+01
1991	3.560E+03	2.851E+06	1.915E+02	9.509E+02	1.425E+06	9.576E+01
1992	3.594E+03	2.878E+06	1.934E+02	9.600E+02	1.439E+06	9.668E+01
1993	3.627E+03	2.905E+06	1.952E+02	9.689E+02	1.452E+06	9.758E+01
1994	3.660E+03	2.931E+06	1.969E+02	9.777E+02	1.465E+06	9.846E+01
1995	3.692E+03	2.957E+06	1.987E+02	9.863E+02	1.478E+06	9.933E+01
1996	3.963E+03	3.174E+06	2.132E+02	1.059E+03	1.587E+06	1.066E+02
1997	4.260E+03	3.411E+06	2.292E+02	1.138E+03	1.705E+06	1.146E+02
1998	4.540E+03	3.635E+06	2.443E+02	1.213E+03	1.818E+06	1.221E+02
1999	4.824E+03	3.862E+06	2.595E+02	1.288E+03	1.931E+06	1.298E+02
2000	4.853E+03	3.886E+06	2.611E+02	1.296E+03	1.943E+06	1.305E+02
2001	4.757E+03	3.809E+06	2.559E+02	1.271E+03	1.904E+06	1.280E+02
2002	4.663E+03	3.734E+06	2.509E+02	1.245E+03	1.867E+06	1.254E+02
2003	4.570E+03	3.660E+06	2.459E+02	1.221E+03	1.830E+06	1.229E+02
2004	4.480E+03	3.587E+06	2.410E+02	1.197E+03	1.794E+06	1.205E+02
2005	4.391E+03	3.516E+06	2.362E+02	1.173E+03	1.758E+06	1.181E+02
2006	4.304E+03	3.447E+06	2.316E+02	1.150E+03	1.723E+06	1.158E+02
2007	4.219E+03	3.378E+06	2.270E+02	1.127E+03	1.689E+06	1.135E+02
2008	4.135E+03	3.311E+06	2.225E+02	1.105E+03	1.656E+06	1.112E+02
2009	4.053E+03	3.246E+06	2.181E+02	1.083E+03	1.623E+06	1.090E+02
2010	3.973E+03	3.182E+06	2.138E+02	1.061E+03	1.591E+06	1.069E+02
2011	3.894E+03	3.119E+06	2.095E+02	1.040E+03	1.559E+06	1.048E+02
2012	3.817E+03	3.057E+06	2.054E+02	1.020E+03	1.528E+06	1.027E+02
2013	3.742E+03	2.996E+06	2.013E+02	9.995E+02	1.498E+06	1.007E+02
2014	3.668E+03	2.937E+06	1.973E+02	9.797E+02	1.468E+06	9.867E+01
2015	3.595E+03	2.879E+06	1.934E+02	9.603E+02	1.439E+06	9.671E+01
2016	3.524E+03	2.822E+06	1.896E+02	9.413E+02	1.411E+06	9.480E+01
2017	3.454E+03	2.766E+06	1.858E+02	9.226E+02	1.383E+06	9.292E+01

2018	3.386E+03	2.711E+06	1.822E+02	9.044E+02	1.356E+06	9.108E+01
2019	3.319E+03	2.657E+06	1.786E+02	8.865E+02	1.329E+06	8.928E+01
2020	3.253E+03	2.605E+06	1.750E+02	8.689E+02	1.302E+06	8.751E+01
2021	3.189E+03	2.553E+06	1.716E+02	8.517E+02	1.277E+06	8.578E+01
2022	3.125E+03	2.503E+06	1.682E+02	8.348E+02	1.251E+06	8.408E+01
2023	3.064E+03	2.453E+06	1.648E+02	8.183E+02	1.227E+06	8.241E+01
2024	3.003E+03	2.405E+06	1.616E+02	8.021E+02	1.202E+06	8.078E+01
2025	2.943E+03	2.357E+06	1.584E+02	7.862E+02	1.178E+06	7.918E+01
2026	2.885E+03	2.310E+06	1.552E+02	7.706E+02	1.155E+06	7.761E+01
2027	2.828E+03	2.265E+06	1.522E+02	7.554E+02	1.132E+06	7.608E+01
2028	2.772E+03	2.220E+06	1.491E+02	7.404E+02	1.110E+06	7.457E+01
2029	2.717E+03	2.176E+06	1.462E+02	7.258E+02	1.088E+06	7.309E+01
2030	2.663E+03	2.133E+06	1.433E+02	7.114E+02	1.066E+06	7.165E+01
2031	2.611E+03	2.090E+06	1.405E+02	6.973E+02	1.045E+06	7.023E+01
2032	2.559E+03	2.049E+06	1.377E+02	6.835E+02	1.025E+06	6.884E+01
2033	2.508E+03	2.008E+06	1.349E+02	6.700E+02	1.004E+06	6.747E+01
2034	2.459E+03	1.969E+06	1.323E+02	6.567E+02	9.843E+05	6.614E+01
2035	2.410E+03	1.930E+06	1.297E+02	6.437E+02	9.648E+05	6.483E+01
2036	2.362E+03	1.891E+06	1.271E+02	6.310E+02	9.457E+05	6.354E+01
2037	2.315E+03	1.854E+06	1.246E+02	6.185E+02	9.270E+05	6.229E+01
2038	2.270E+03	1.817E+06	1.221E+02	6.062E+02	9.087E+05	6.105E+01
2039	2.225E+03	1.781E+06	1.197E+02	5.942E+02	8.907E+05	5.984E+01
2040	2.181E+03	1.746E+06	1.173E+02	5.824E+02	8.730E+05	5.866E+01
2041	2.137E+03	1.711E+06	1.150E+02	5.709E+02	8.557E+05	5.750E+01
2042	2.095E+03	1.678E+06	1.127E+02	5.596E+02	8.388E+05	5.636E+01
2043	2.054E+03	1.644E+06	1.105E+02	5.485E+02	8.222E+05	5.524E+01
2044	2.013E+03	1.612E+06	1.083E+02	5.377E+02	8.059E+05	5.415E+01
2045	1.973E+03	1.580E+06	1.062E+02	5.270E+02	7.900E+05	5.308E+01
2046	1.934E+03	1.549E+06	1.041E+02	5.166E+02	7.743E+05	5.203E+01
2047	1.896E+03	1.518E+06	1.020E+02	5.063E+02	7.590E+05	5.100E+01
2048	1.858E+03	1.488E+06	9.997E+01	4.963E+02	7.439E+05	4.999E+01
2049	1.821E+03	1.458E+06	9.799E+01	4.865E+02	7.292E+05	4.900E+01
2050	1.785E+03	1.430E+06	9.605E+01	4.769E+02	7.148E+05	4.803E+01
2051	1.750E+03	1.401E+06	9.415E+01	4.674E+02	7.006E+05	4.707E+01
2052	1.715E+03	1.374E+06	9.229E+01	4.582E+02	6.868E+05	4.614E+01
2053	1.681E+03	1.346E+06	9.046E+01	4.491E+02	6.732E+05	4.523E+01
2054	1.648E+03	1.320E+06	8.867E+01	4.402E+02	6.598E+05	4.433E+01
2055	1.615E+03	1.294E+06	8.691E+01	4.315E+02	6.468E+05	4.346E+01
2056	1.583E+03	1.268E+06	8.519E+01	4.229E+02	6.340E+05	4.260E+01
2057	1.552E+03	1.243E+06	8.350E+01	4.146E+02	6.214E+05	4.175E+01
2058	1.521E+03	1.218E+06	8.185E+01	4.064E+02	6.091E+05	4.092E+01
2059	1.491E+03	1.194E+06	8.023E+01	3.983E+02	5.970E+05	4.011E+01
2060	1.462E+03	1.170E+06	7.864E+01	3.904E+02	5.852E+05	3.932E+01
2061	1.433E+03	1.147E+06	7.708E+01	3.827E+02	5.736E+05	3.854E+01
2062	1.404E+03	1.125E+06	7.556E+01	3.751E+02	5.623E+05	3.778E+01
2063	1.377E+03	1.102E+06	7.406E+01	3.677E+02	5.511E+05	3.703E+01
2064	1.349E+03	1.080E+06	7.259E+01	3.604E+02	5.402E+05	3.630E+01
2065	1.323E+03	1.059E+06	7.116E+01	3.533E+02	5.295E+05	3.558E+01
2066	1.296E+03	1.038E+06	6.975E+01	3.463E+02	5.190E+05	3.487E+01
2067	1.271E+03	1.018E+06	6.837E+01	3.394E+02	5.088E+05	3.418E+01
2068	1.246E+03	9.974E+05	6.701E+01	3.327E+02	4.987E+05	3.351E+01
2069	1.221E+03	9.776E+05	6.569E+01	3.261E+02	4.888E+05	3.284E+01
2070	1.197E+03	9.583E+05	6.439E+01	3.197E+02	4.791E+05	3.219E+01
2071	1.173E+03	9.393E+05	6.311E+01	3.133E+02	4.696E+05	3.156E+01
2072	1.150E+03	9.207E+05	6.186E+01	3.071E+02	4.603E+05	3.093E+01
2073	1.127E+03	9.025E+05	6.064E+01	3.010E+02	4.512E+05	3.032E+01
2074	1.105E+03	8.846E+05	5.944E+01	2.951E+02	4.423E+05	2.972E+01
2075	1.083E+03	8.671E+05	5.826E+01	2.892E+02	4.335E+05	2.913E+01

Results (Continued)

Year	Carbon dioxide			Hydrogen sulfide		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
1935	0	0	0	0	0	0
1936	7.668E+01	4.189E+04	2.815E+00	4.275E-03	3.016E+00	2.027E-04
1937	1.518E+02	8.295E+04	5.573E+00	8.466E-03	5.972E+00	4.013E-04
1938	2.255E+02	1.232E+05	8.278E+00	1.257E-02	8.870E+00	5.960E-04
1939	2.977E+02	1.626E+05	1.093E+01	1.660E-02	1.171E+01	7.868E-04
1940	3.685E+02	2.013E+05	1.353E+01	2.055E-02	1.449E+01	9.739E-04
1941	4.379E+02	2.392E+05	1.607E+01	2.441E-02	1.722E+01	1.157E-03
1942	5.059E+02	2.764E+05	1.857E+01	2.821E-02	1.990E+01	1.337E-03
1943	5.726E+02	3.128E+05	2.102E+01	3.192E-02	2.252E+01	1.513E-03
1944	6.379E+02	3.485E+05	2.341E+01	3.557E-02	2.509E+01	1.686E-03
1945	7.020E+02	3.835E+05	2.577E+01	3.914E-02	2.761E+01	1.855E-03
1946	7.647E+02	4.178E+05	2.807E+01	4.264E-02	3.008E+01	2.021E-03
1947	8.263E+02	4.514E+05	3.033E+01	4.607E-02	3.250E+01	2.184E-03
1948	8.866E+02	4.843E+05	3.254E+01	4.943E-02	3.487E+01	2.343E-03
1949	9.457E+02	5.166E+05	3.471E+01	5.273E-02	3.720E+01	2.499E-03
1950	1.004E+03	5.483E+05	3.684E+01	5.596E-02	3.948E+01	2.653E-03
1951	1.060E+03	5.793E+05	3.893E+01	5.913E-02	4.171E+01	2.803E-03
1952	1.116E+03	6.098E+05	4.097E+01	6.223E-02	4.390E+01	2.950E-03
1953	1.171E+03	6.396E+05	4.297E+01	6.527E-02	4.605E+01	3.094E-03
1954	1.224E+03	6.688E+05	4.494E+01	6.826E-02	4.815E+01	3.235E-03
1955	1.277E+03	6.974E+05	4.686E+01	7.118E-02	5.022E+01	3.374E-03
1956	1.328E+03	7.255E+05	4.875E+01	7.405E-02	5.224E+01	3.510E-03
1957	1.378E+03	7.530E+05	5.060E+01	7.686E-02	5.422E+01	3.643E-03
1958	1.428E+03	7.800E+05	5.241E+01	7.961E-02	5.616E+01	3.774E-03
1959	1.476E+03	8.065E+05	5.419E+01	8.231E-02	5.807E+01	3.901E-03
1960	1.524E+03	8.324E+05	5.593E+01	8.495E-02	5.993E+01	4.027E-03
1961	1.570E+03	8.578E+05	5.764E+01	8.755E-02	6.176E+01	4.150E-03
1962	1.616E+03	8.827E+05	5.931E+01	9.009E-02	6.355E+01	4.270E-03
1963	1.660E+03	9.071E+05	6.095E+01	9.258E-02	6.531E+01	4.388E-03
1964	1.704E+03	9.310E+05	6.256E+01	9.502E-02	6.704E+01	4.504E-03
1965	1.747E+03	9.545E+05	6.413E+01	9.741E-02	6.872E+01	4.618E-03
1966	1.789E+03	9.775E+05	6.568E+01	9.976E-02	7.038E+01	4.729E-03
1967	1.831E+03	1.000E+06	6.719E+01	1.021E-01	7.200E+01	4.838E-03
1968	1.871E+03	1.022E+06	6.868E+01	1.043E-01	7.359E+01	4.945E-03
1969	1.911E+03	1.044E+06	7.013E+01	1.065E-01	7.515E+01	5.049E-03
1970	1.949E+03	1.065E+06	7.156E+01	1.087E-01	7.668E+01	5.152E-03
1971	1.988E+03	1.086E+06	7.295E+01	1.108E-01	7.818E+01	5.253E-03
1972	2.025E+03	1.106E+06	7.432E+01	1.129E-01	7.964E+01	5.351E-03
1973	2.061E+03	1.126E+06	7.567E+01	1.149E-01	8.108E+01	5.448E-03
1974	2.097E+03	1.146E+06	7.698E+01	1.169E-01	8.249E+01	5.543E-03
1975	2.132E+03	1.165E+06	7.827E+01	1.189E-01	8.388E+01	5.636E-03
1976	2.167E+03	1.184E+06	7.954E+01	1.208E-01	8.523E+01	5.727E-03
1977	2.201E+03	1.202E+06	8.078E+01	1.227E-01	8.656E+01	5.816E-03
1978	2.234E+03	1.220E+06	8.199E+01	1.245E-01	8.786E+01	5.903E-03
1979	2.266E+03	1.238E+06	8.318E+01	1.264E-01	8.914E+01	5.989E-03
1980	2.298E+03	1.255E+06	8.435E+01	1.281E-01	9.039E+01	6.073E-03
1981	2.329E+03	1.272E+06	8.550E+01	1.299E-01	9.162E+01	6.156E-03
1982	2.360E+03	1.289E+06	8.662E+01	1.316E-01	9.282E+01	6.236E-03
1983	2.390E+03	1.306E+06	8.772E+01	1.332E-01	9.400E+01	6.316E-03
1984	2.419E+03	1.322E+06	8.879E+01	1.349E-01	9.515E+01	6.393E-03
1985	2.448E+03	1.337E+06	8.985E+01	1.365E-01	9.628E+01	6.469E-03
1986	2.476E+03	1.353E+06	9.089E+01	1.381E-01	9.739E+01	6.544E-03
1987	2.504E+03	1.368E+06	9.190E+01	1.396E-01	9.848E+01	6.617E-03
1988	2.531E+03	1.383E+06	9.290E+01	1.411E-01	9.955E+01	6.688E-03
1989	2.557E+03	1.397E+06	9.387E+01	1.426E-01	1.006E+02	6.759E-03
1990	2.583E+03	1.411E+06	9.483E+01	1.440E-01	1.016E+02	6.828E-03
1991	2.609E+03	1.425E+06	9.576E+01	1.455E-01	1.026E+02	6.895E-03
1992	2.634E+03	1.439E+06	9.668E+01	1.469E-01	1.036E+02	6.961E-03
1993	2.658E+03	1.452E+06	9.758E+01	1.482E-01	1.046E+02	7.026E-03
1994	2.683E+03	1.465E+06	9.846E+01	1.496E-01	1.055E+02	7.089E-03
1995	2.706E+03	1.478E+06	9.933E+01	1.509E-01	1.064E+02	7.152E-03
1996	2.905E+03	1.587E+06	1.066E+02	1.620E-01	1.143E+02	7.677E-03
1997	3.122E+03	1.705E+06	1.146E+02	1.741E-01	1.228E+02	8.251E-03
1998	3.327E+03	1.818E+06	1.221E+02	1.855E-01	1.309E+02	8.793E-03
1999	3.535E+03	1.931E+06	1.298E+02	1.971E-01	1.390E+02	9.343E-03
2000	3.557E+03	1.943E+06	1.305E+02	1.983E-01	1.399E+02	9.399E-03
2001	3.486E+03	1.904E+06	1.280E+02	1.944E-01	1.371E+02	9.213E-03
2002	3.417E+03	1.867E+06	1.254E+02	1.905E-01	1.344E+02	9.031E-03
2003	3.349E+03	1.830E+06	1.229E+02	1.867E-01	1.317E+02	8.852E-03
2004	3.283E+03	1.794E+06	1.205E+02	1.831E-01	1.291E+02	8.677E-03
2005	3.218E+03	1.758E+06	1.181E+02	1.794E-01	1.266E+02	8.505E-03
2006	3.154E+03	1.723E+06	1.158E+02	1.759E-01	1.241E+02	8.337E-03
2007	3.092E+03	1.689E+06	1.135E+02	1.724E-01	1.216E+02	8.171E-03
2008	3.031E+03	1.656E+06	1.112E+02	1.690E-01	1.192E+02	8.010E-03
2009	2.971E+03	1.623E+06	1.090E+02	1.656E-01	1.168E+02	7.851E-03
2010	2.912E+03	1.591E+06	1.069E+02	1.624E-01	1.145E+02	7.696E-03
2011	2.854E+03	1.559E+06	1.048E+02	1.591E-01	1.123E+02	7.543E-03
2012	2.798E+03	1.528E+06	1.027E+02	1.560E-01	1.100E+02	7.394E-03
2013	2.742E+03	1.498E+06	1.007E+02	1.529E-01	1.079E+02	7.247E-03
2014	2.688E+03	1.468E+06	9.867E+01	1.499E-01	1.057E+02	7.104E-03
2015	2.635E+03	1.439E+06	9.671E+01	1.469E-01	1.036E+02	6.963E-03
2016	2.583E+03	1.411E+06	9.480E+01	1.440E-01	1.016E+02	6.825E-03

2017	2.531E+03	1.383E+06	9.292E+01	1.411E-01	9.957E+01	6.690E-03
2018	2.481E+03	1.356E+06	9.108E+01	1.383E-01	9.760E+01	6.558E-03
2019	2.432E+03	1.329E+06	8.928E+01	1.356E-01	9.567E+01	6.428E-03
2020	2.384E+03	1.302E+06	8.751E+01	1.329E-01	9.377E+01	6.301E-03
2021	2.337E+03	1.277E+06	8.578E+01	1.303E-01	9.192E+01	6.176E-03
2022	2.291E+03	1.251E+06	8.408E+01	1.277E-01	9.010E+01	6.054E-03
2023	2.245E+03	1.227E+06	8.241E+01	1.252E-01	8.831E+01	5.934E-03
2024	2.201E+03	1.202E+06	8.078E+01	1.227E-01	8.656E+01	5.816E-03
2025	2.157E+03	1.178E+06	7.918E+01	1.203E-01	8.485E+01	5.701E-03
2026	2.114E+03	1.155E+06	7.761E+01	1.179E-01	8.317E+01	5.588E-03
2027	2.073E+03	1.132E+06	7.608E+01	1.156E-01	8.152E+01	5.478E-03
2028	2.032E+03	1.110E+06	7.457E+01	1.133E-01	7.991E+01	5.369E-03
2029	1.991E+03	1.088E+06	7.309E+01	1.110E-01	7.833E+01	5.263E-03
2030	1.952E+03	1.066E+06	7.165E+01	1.088E-01	7.678E+01	5.159E-03
2031	1.913E+03	1.045E+06	7.023E+01	1.067E-01	7.525E+01	5.056E-03
2032	1.875E+03	1.025E+06	6.884E+01	1.046E-01	7.376E+01	4.956E-03
2033	1.838E+03	1.004E+06	6.747E+01	1.025E-01	7.230E+01	4.858E-03
2034	1.802E+03	9.843E+05	6.614E+01	1.005E-01	7.087E+01	4.762E-03
2035	1.766E+03	9.648E+05	6.483E+01	9.847E-02	6.947E+01	4.668E-03
2036	1.731E+03	9.457E+05	6.354E+01	9.652E-02	6.809E+01	4.575E-03
2037	1.697E+03	9.270E+05	6.229E+01	9.461E-02	6.675E+01	4.485E-03
2038	1.663E+03	9.087E+05	6.105E+01	9.274E-02	6.542E+01	4.396E-03
2039	1.630E+03	8.907E+05	5.984E+01	9.090E-02	6.413E+01	4.309E-03
2040	1.598E+03	8.730E+05	5.866E+01	8.910E-02	6.286E+01	4.223E-03
2041	1.566E+03	8.557E+05	5.750E+01	8.734E-02	6.161E+01	4.140E-03
2042	1.535E+03	8.388E+05	5.636E+01	8.561E-02	6.039E+01	4.058E-03
2043	1.505E+03	8.222E+05	5.524E+01	8.391E-02	5.920E+01	3.977E-03
2044	1.475E+03	8.059E+05	5.415E+01	8.225E-02	5.803E+01	3.899E-03
2045	1.446E+03	7.900E+05	5.308E+01	8.062E-02	5.688E+01	3.822E-03
2046	1.417E+03	7.743E+05	5.203E+01	7.902E-02	5.575E+01	3.746E-03
2047	1.389E+03	7.590E+05	5.100E+01	7.746E-02	5.465E+01	3.672E-03
2048	1.362E+03	7.439E+05	4.999E+01	7.593E-02	5.356E+01	3.599E-03
2049	1.335E+03	7.292E+05	4.900E+01	7.442E-02	5.250E+01	3.528E-03
2050	1.308E+03	7.148E+05	4.803E+01	7.295E-02	5.146E+01	3.458E-03
2051	1.282E+03	7.006E+05	4.707E+01	7.150E-02	5.044E+01	3.389E-03
2052	1.257E+03	6.868E+05	4.614E+01	7.009E-02	4.945E+01	3.322E-03
2053	1.232E+03	6.732E+05	4.523E+01	6.870E-02	4.847E+01	3.256E-03
2054	1.208E+03	6.598E+05	4.433E+01	6.734E-02	4.751E+01	3.192E-03
2055	1.184E+03	6.468E+05	4.346E+01	6.601E-02	4.657E+01	3.129E-03
2056	1.160E+03	6.340E+05	4.260E+01	6.470E-02	4.564E+01	3.067E-03
2057	1.137E+03	6.214E+05	4.175E+01	6.342E-02	4.474E+01	3.006E-03
2058	1.115E+03	6.091E+05	4.092E+01	6.216E-02	4.385E+01	2.947E-03
2059	1.093E+03	5.970E+05	4.011E+01	6.093E-02	4.299E+01	2.888E-03
2060	1.071E+03	5.852E+05	3.932E+01	5.973E-02	4.214E+01	2.831E-03
2061	1.050E+03	5.736E+05	3.854E+01	5.854E-02	4.130E+01	2.775E-03
2062	1.029E+03	5.623E+05	3.778E+01	5.738E-02	4.048E+01	2.720E-03
2063	1.009E+03	5.511E+05	3.703E+01	5.625E-02	3.968E+01	2.666E-03
2064	9.889E+02	5.402E+05	3.630E+01	5.513E-02	3.890E+01	2.613E-03
2065	9.693E+02	5.295E+05	3.558E+01	5.404E-02	3.813E+01	2.562E-03
2066	9.501E+02	5.190E+05	3.487E+01	5.297E-02	3.737E+01	2.511E-03
2067	9.313E+02	5.088E+05	3.418E+01	5.192E-02	3.663E+01	2.461E-03
2068	9.128E+02	4.987E+05	3.351E+01	5.089E-02	3.591E+01	2.412E-03
2069	8.948E+02	4.888E+05	3.284E+01	4.989E-02	3.519E+01	2.365E-03
2070	8.770E+02	4.791E+05	3.219E+01	4.890E-02	3.450E+01	2.318E-03
2071	8.597E+02	4.696E+05	3.156E+01	4.793E-02	3.381E+01	2.272E-03
2072	8.427E+02	4.603E+05	3.093E+01	4.698E-02	3.314E+01	2.227E-03
2073	8.260E+02	4.512E+05	3.032E+01	4.605E-02	3.249E+01	2.183E-03
2074	8.096E+02	4.423E+05	2.972E+01	4.514E-02	3.185E+01	2.140E-03
2075	7.936E+02	4.335E+05	2.913E+01	4.425E-02	3.121E+01	2.097E-03

Summary Report

Landfill Name or Identifier: CRSWF Active Landfill Permit No. P199LR2

Date: Thursday, September 30, 2021

Description/Comments:

About LandGEM:

First-Order Decomposition Rate Equation:

$$Q_{CH_4} = \sum_{i=1}^{n} \sum_{j=0.1}^{1} kL_o \left(\frac{M_i}{10} \right) e^{-kt_{ij}}$$

Where,

Q_{CH4} = annual methane generation in the year of the calculation (*m^3/year*)
i = 1-year time increment
n = (year of the calculation) - (initial year of waste acceptance)
j = 0.1-year time increment
k = methane generation rate (*$year^{-1}$*)
L_o = potential methane generation capacity (*m^3/Mg*)

M_i = mass of waste accepted in the i^{th} year (*Mg*)
t_{ij} = age of the j^{th} section of waste mass M_i accepted in the i^{th} year (*decimal years*, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at http://www.epa.gov/ttnatw01/landfill/landflpg.html.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for convential landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

LANDFILL CHARACTERISTICS

Landfill Open Year	**1999**	
Landfill Closure Year (with 80-year limit)	**2078**	**Landfill Closure Year entered exceeds the 80-year waste acceptance limit. See Section 2.6 of the User's Manual.**
Actual Closure Year (without limit)	***2102***	
Have Model Calculate Closure Year?	**No**	
Waste Design Capacity	**8,320,000**	*megagrams*

MODEL PARAMETERS

Methane Generation Rate, k	**0.020**	*year^{-1}*	Default for 40 CFR 60 NMOC Calculation (Arid Area)
Potential Methane Generation Capacity, L_o	**170**	*m^3/Mg*	Default for 40 CFR 60 NMOC Calculation (Arid Area)
NMOC Concentration	**251**	*ppmv as hexane*	
Methane Content	**50**	*% by volume*	

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1:	**Total landfill gas**
Gas / Pollutant #2:	**NMOC**
Gas / Pollutant #3:	
Gas / Pollutant #4:	

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
1999	35,370	38,907	0	0
2000	59,980	65,978	35,370	38,907
2001	73,602	80,963	95,350	104,885
2002	82,769	91,046	168,952	185,848
2003	70,852	77,937	251,721	276,894
2004	77,409	85,150	322,573	354,831
2005	76,699	84,369	399,982	439,981
2006	72,944	80,238	476,681	524,350
2007	85,322	93,854	549,625	604,588
2008	75,728	83,301	634,947	698,442
2009	75,747	83,321	710,675	781,742
2010	98,638	108,501	786,421	865,064
2011	74,647	82,112	885,059	973,565
2012	73,466	80,813	959,706	1,055,676
2013	79,012	86,913	1,033,172	1,136,489
2014	76,627	84,290	1,112,184	1,223,402
2015	92,966	102,263	1,188,811	1,307,692
2016	71,935	79,128	1,281,777	1,409,955
2017	66,962	73,658	1,353,712	1,489,083
2018	65,154	71,669	1,420,674	1,562,741
2019	63,055	69,360	1,485,827	1,634,410
2020	61,802	67,982	1,548,882	1,703,770
2021	61,802	67,982	1,610,684	1,771,752
2022	61,802	67,982	1,672,486	1,839,735
2023	61,802	67,982	1,734,288	1,907,717
2024	61,802	67,982	1,796,090	1,975,699
2025	61,802	67,982	1,857,892	2,043,681
2026	61,802	67,982	1,919,694	2,111,664
2027	61,802	67,982	1,981,496	2,179,646
2028	61,802	67,982	2,043,299	2,247,628
2029	61,802	67,982	2,105,101	2,315,611
2030	61,802	67,982	2,166,903	2,383,593
2031	61,802	67,982	2,228,705	2,451,575
2032	61,802	67,982	2,290,507	2,519,558
2033	61,802	67,982	2,352,309	2,587,540
2034	61,802	67,982	2,414,111	2,655,522
2035	61,802	67,982	2,475,913	2,723,504
2036	61,802	67,982	2,537,715	2,791,487
2037	61,802	67,982	2,599,517	2,859,469
2038	61,802	67,982	2,661,319	2,927,451

WASTE ACCEPTANCE RATES (Continued)

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	(short tons/year)	(Mg)	(short tons)
2039	61,802	67,982	2,723,122	2,995,434
2040	61,802	67,982	2,784,924	3,063,416
2041	61,802	67,982	2,846,726	3,131,398
2042	61,802	67,982	2,908,528	3,199,381
2043	61,802	67,982	2,970,330	3,267,363
2044	61,802	67,982	3,032,132	3,335,345
2045	61,802	67,982	3,093,934	3,403,327
2046	61,802	67,982	3,155,736	3,471,310
2047	61,802	67,982	3,217,538	3,539,292
2048	61,802	67,982	3,279,340	3,607,274
2049	61,802	67,982	3,341,142	3,675,257
2050	61,802	67,982	3,402,945	3,743,239
2051	61,802	67,982	3,464,747	3,811,221
2052	61,802	67,982	3,526,549	3,879,204
2053	61,802	67,982	3,588,351	3,947,186
2054	61,802	67,982	3,650,153	4,015,168
2055	61,802	67,982	3,711,955	4,083,150
2056	61,802	67,982	3,773,757	4,151,133
2057	61,802	67,982	3,835,559	4,219,115
2058	61,802	67,982	3,897,361	4,287,097
2059	61,802	67,982	3,959,163	4,355,080
2060	61,802	67,982	4,020,965	4,423,062
2061	61,802	67,982	4,082,768	4,491,044
2062	61,802	67,982	4,144,570	4,559,027
2063	61,802	67,982	4,206,372	4,627,009
2064	61,802	67,982	4,268,174	4,694,991
2065	61,802	67,982	4,329,976	4,762,973
2066	61,802	67,982	4,391,778	4,830,956
2067	61,802	67,982	4,453,580	4,898,938
2068	61,802	67,982	4,515,382	4,966,920
2069	61,802	67,982	4,577,184	5,034,903
2070	61,802	67,982	4,638,986	5,102,885
2071	61,802	67,982	4,700,788	5,170,867
2072	61,802	67,982	4,762,591	5,238,850
2073	61,802	67,982	4,824,393	5,306,832
2074	61,802	67,982	4,886,195	5,374,814
2075	61,802	67,982	4,947,997	5,442,796
2076	61,802	67,982	5,009,799	5,510,779
2077	61,802	67,982	5,071,601	5,578,761
2078	61,802	67,982	5,133,403	5,646,743

Pollutant Parameters

	Compound	Gas / Pollutant Default Parameters: Concentration (*ppmv*)	Molecular Weight	User-specified Pollutant Parameters: Concentration (*ppmv*)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

Pollutant Parameters (Continued)

	Gas / Pollutant Default Parameters:			User-specified Pollutant Parameters:	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		

Results

Year	Total landfill gas			NMOC		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
1999	0	0	0	0	0	0
2000	2.977E+02	2.384E+05	1.602E+01	2.145E-01	5.983E+01	4.020E-03
2001	7.966E+02	6.379E+05	4.286E+01	5.739E-01	1.601E+02	1.076E-02
2002	1.400E+03	1.121E+06	7.534E+01	1.009E+00	2.814E+02	1.891E-02
2003	2.069E+03	1.657E+06	1.113E+02	1.491E+00	4.159E+02	2.794E-02
2004	2.624E+03	2.102E+06	1.412E+02	1.891E+00	5.275E+02	3.544E-02
2005	3.224E+03	2.582E+06	1.735E+02	2.323E+00	6.480E+02	4.354E-02
2006	3.806E+03	3.047E+06	2.048E+02	2.742E+00	7.649E+02	5.139E-02
2007	4.344E+03	3.479E+06	2.337E+02	3.130E+00	8.731E+02	5.867E-02
2008	4.976E+03	3.985E+06	2.677E+02	3.585E+00	1.000E+03	6.720E-02
2009	5.515E+03	4.416E+06	2.967E+02	3.973E+00	1.108E+03	7.448E-02
2010	6.043E+03	4.839E+06	3.251E+02	4.354E+00	1.215E+03	8.161E-02
2011	6.754E+03	5.408E+06	3.634E+02	4.866E+00	1.357E+03	9.121E-02
2012	7.248E+03	5.804E+06	3.900E+02	5.222E+00	1.457E+03	9.788E-02
2013	7.723E+03	6.184E+06	4.155E+02	5.564E+00	1.552E+03	1.043E-01
2014	8.235E+03	6.594E+06	4.431E+02	5.933E+00	1.655E+03	1.112E-01
2015	8.717E+03	6.980E+06	4.690E+02	6.280E+00	1.752E+03	1.177E-01
2016	9.327E+03	7.468E+06	5.018E+02	6.719E+00	1.875E+03	1.260E-01
2017	9.747E+03	7.805E+06	5.244E+02	7.022E+00	1.959E+03	1.316E-01
2018	1.012E+04	8.102E+06	5.444E+02	7.289E+00	2.034E+03	1.366E-01
2019	1.047E+04	8.381E+06	5.631E+02	7.540E+00	2.104E+03	1.413E-01
2020	1.079E+04	8.640E+06	5.805E+02	7.773E+00	2.169E+03	1.457E-01
2021	1.110E+04	8.885E+06	5.970E+02	7.994E+00	2.230E+03	1.498E-01
2022	1.140E+04	9.126E+06	6.131E+02	8.210E+00	2.291E+03	1.539E-01
2023	1.169E+04	9.361E+06	6.290E+02	8.422E+00	2.350E+03	1.579E-01
2024	1.198E+04	9.593E+06	6.445E+02	8.630E+00	2.408E+03	1.618E-01
2025	1.226E+04	9.819E+06	6.597E+02	8.834E+00	2.465E+03	1.656E-01
2026	1.254E+04	1.004E+07	6.747E+02	9.034E+00	2.520E+03	1.693E-01
2027	1.281E+04	1.026E+07	6.893E+02	9.230E+00	2.575E+03	1.730E-01
2028	1.308E+04	1.047E+07	7.036E+02	9.422E+00	2.629E+03	1.766E-01
2029	1.334E+04	1.068E+07	7.177E+02	9.610E+00	2.681E+03	1.801E-01
2030	1.360E+04	1.089E+07	7.314E+02	9.794E+00	2.732E+03	1.836E-01
2031	1.385E+04	1.109E+07	7.450E+02	9.975E+00	2.783E+03	1.870E-01
2032	1.409E+04	1.128E+07	7.582E+02	1.015E+01	2.832E+03	1.903E-01
2033	1.433E+04	1.148E+07	7.712E+02	1.033E+01	2.881E+03	1.936E-01
2034	1.457E+04	1.167E+07	7.839E+02	1.050E+01	2.928E+03	1.968E-01
2035	1.480E+04	1.185E+07	7.963E+02	1.066E+01	2.975E+03	1.999E-01
2036	1.503E+04	1.203E+07	8.085E+02	1.083E+01	3.020E+03	2.029E-01
2037	1.525E+04	1.221E+07	8.205E+02	1.099E+01	3.065E+03	2.060E-01
2038	1.547E+04	1.239E+07	8.323E+02	1.114E+01	3.109E+03	2.089E-01
2039	1.568E+04	1.256E+07	8.438E+02	1.130E+01	3.152E+03	2.118E-01
2040	1.589E+04	1.273E+07	8.550E+02	1.145E+01	3.194E+03	2.146E-01
2041	1.610E+04	1.289E+07	8.661E+02	1.160E+01	3.235E+03	2.174E-01
2042	1.630E+04	1.305E+07	8.769E+02	1.174E+01	3.276E+03	2.201E-01
2043	1.650E+04	1.321E+07	8.875E+02	1.188E+01	3.316E+03	2.228E-01
2044	1.669E+04	1.336E+07	8.980E+02	1.202E+01	3.354E+03	2.254E-01
2045	1.688E+04	1.352E+07	9.082E+02	1.216E+01	3.393E+03	2.279E-01
2046	1.707E+04	1.367E+07	9.182E+02	1.229E+01	3.430E+03	2.305E-01
2047	1.725E+04	1.381E+07	9.280E+02	1.243E+01	3.467E+03	2.329E-01
2048	1.743E+04	1.395E+07	9.376E+02	1.255E+01	3.502E+03	2.353E-01
2049	1.760E+04	1.409E+07	9.470E+02	1.268E+01	3.538E+03	2.377E-01
2050	1.777E+04	1.423E+07	9.562E+02	1.280E+01	3.572E+03	2.400E-01
2051	1.794E+04	1.437E+07	9.653E+02	1.293E+01	3.606E+03	2.423E-01
2052	1.811E+04	1.450E+07	9.741E+02	1.304E+01	3.639E+03	2.445E-01
2053	1.827E+04	1.463E+07	9.828E+02	1.316E+01	3.672E+03	2.467E-01
2054	1.843E+04	1.475E+07	9.914E+02	1.327E+01	3.703E+03	2.488E-01
2055	1.858E+04	1.488E+07	9.997E+02	1.339E+01	3.735E+03	2.509E-01
2056	1.873E+04	1.500E+07	1.008E+03	1.350E+01	3.765E+03	2.530E-01
2057	1.888E+04	1.512E+07	1.016E+03	1.360E+01	3.795E+03	2.550E-01
2058	1.903E+04	1.524E+07	1.024E+03	1.371E+01	3.825E+03	2.570E-01
2059	1.917E+04	1.535E+07	1.032E+03	1.381E+01	3.853E+03	2.589E-01
2060	1.931E+04	1.546E+07	1.039E+03	1.391E+01	3.882E+03	2.608E-01
2061	1.945E+04	1.557E+07	1.046E+03	1.401E+01	3.909E+03	2.627E-01
2062	1.959E+04	1.568E+07	1.054E+03	1.411E+01	3.936E+03	2.645E-01
2063	1.972E+04	1.579E+07	1.061E+03	1.421E+01	3.963E+03	2.663E-01
2064	1.985E+04	1.589E+07	1.068E+03	1.430E+01	3.989E+03	2.680E-01
2065	1.997E+04	1.599E+07	1.075E+03	1.439E+01	4.015E+03	2.697E-01
2066	2.010E+04	1.609E+07	1.081E+03	1.448E+01	4.040E+03	2.714E-01
2067	2.022E+04	1.619E+07	1.088E+03	1.457E+01	4.064E+03	2.731E-01
2068	2.034E+04	1.629E+07	1.094E+03	1.465E+01	4.088E+03	2.747E-01
2069	2.046E+04	1.638E+07	1.101E+03	1.474E+01	4.112E+03	2.763E-01
2070	2.057E+04	1.647E+07	1.107E+03	1.482E+01	4.135E+03	2.778E-01
2071	2.069E+04	1.656E+07	1.113E+03	1.490E+01	4.158E+03	2.794E-01
2072	2.080E+04	1.665E+07	1.119E+03	1.498E+01	4.180E+03	2.808E-01
2073	2.090E+04	1.674E+07	1.125E+03	1.506E+01	4.202E+03	2.823E-01
2074	2.101E+04	1.682E+07	1.130E+03	1.514E+01	4.223E+03	2.837E-01
2075	2.112E+04	1.691E+07	1.136E+03	1.521E+01	4.244E+03	2.851E-01
2076	2.122E+04	1.699E+07	1.142E+03	1.529E+01	4.264E+03	2.865E-01
2077	2.132E+04	1.707E+07	1.147E+03	1.536E+01	4.285E+03	2.879E-01
2078	2.142E+04	1.715E+07	1.152E+03	1.543E+01	4.304E+03	2.892E-01

2079	2.151E+04	1.723E+07	1.157E+03	1.550E+01	4.324E+03	2.905E-01
2080	2.109E+04	1.688E+07	1.134E+03	1.519E+01	4.238E+03	2.847E-01
2081	2.067E+04	1.655E+07	1.112E+03	1.489E+01	4.154E+03	2.791E-01
2082	2.026E+04	1.622E+07	1.090E+03	1.460E+01	4.072E+03	2.736E-01
2083	1.986E+04	1.590E+07	1.068E+03	1.431E+01	3.991E+03	2.682E-01
2084	1.946E+04	1.559E+07	1.047E+03	1.402E+01	3.912E+03	2.629E-01
2085	1.908E+04	1.528E+07	1.026E+03	1.375E+01	3.835E+03	2.576E-01
2086	1.870E+04	1.497E+07	1.006E+03	1.347E+01	3.759E+03	2.525E-01
2087	1.833E+04	1.468E+07	9.862E+02	1.321E+01	3.684E+03	2.475E-01
2088	1.797E+04	1.439E+07	9.667E+02	1.294E+01	3.611E+03	2.426E-01
2089	1.761E+04	1.410E+07	9.476E+02	1.269E+01	3.540E+03	2.378E-01
2090	1.726E+04	1.382E+07	9.288E+02	1.244E+01	3.470E+03	2.331E-01
2091	1.692E+04	1.355E+07	9.104E+02	1.219E+01	3.401E+03	2.285E-01
2092	1.659E+04	1.328E+07	8.924E+02	1.195E+01	3.334E+03	2.240E-01
2093	1.626E+04	1.302E+07	8.747E+02	1.171E+01	3.268E+03	2.196E-01
2094	1.594E+04	1.276E+07	8.574E+02	1.148E+01	3.203E+03	2.152E-01
2095	1.562E+04	1.251E+07	8.404E+02	1.125E+01	3.140E+03	2.109E-01
2096	1.531E+04	1.226E+07	8.238E+02	1.103E+01	3.077E+03	2.068E-01
2097	1.501E+04	1.202E+07	8.075E+02	1.081E+01	3.016E+03	2.027E-01
2098	1.471E+04	1.178E+07	7.915E+02	1.060E+01	2.957E+03	1.987E-01
2099	1.442E+04	1.155E+07	7.758E+02	1.039E+01	2.898E+03	1.947E-01
2100	1.413E+04	1.132E+07	7.604E+02	1.018E+01	2.841E+03	1.909E-01
2101	1.385E+04	1.109E+07	7.454E+02	9.981E+00	2.785E+03	1.871E-01
2102	1.358E+04	1.087E+07	7.306E+02	9.783E+00	2.729E+03	1.834E-01
2103	1.331E+04	1.066E+07	7.162E+02	9.590E+00	2.675E+03	1.798E-01
2104	1.305E+04	1.045E+07	7.020E+02	9.400E+00	2.622E+03	1.762E-01
2105	1.279E+04	1.024E+07	6.881E+02	9.214E+00	2.570E+03	1.727E-01
2106	1.254E+04	1.004E+07	6.745E+02	9.031E+00	2.520E+03	1.693E-01
2107	1.229E+04	9.839E+06	6.611E+02	8.852E+00	2.470E+03	1.659E-01
2108	1.204E+04	9.644E+06	6.480E+02	8.677E+00	2.421E+03	1.626E-01
2109	1.181E+04	9.453E+06	6.352E+02	8.505E+00	2.373E+03	1.594E-01
2110	1.157E+04	9.266E+06	6.226E+02	8.337E+00	2.326E+03	1.563E-01
2111	1.134E+04	9.083E+06	6.103E+02	8.172E+00	2.280E+03	1.532E-01
2112	1.112E+04	8.903E+06	5.982E+02	8.010E+00	2.235E+03	1.501E-01
2113	1.090E+04	8.727E+06	5.863E+02	7.851E+00	2.190E+03	1.472E-01
2114	1.068E+04	8.554E+06	5.747E+02	7.696E+00	2.147E+03	1.443E-01
2115	1.047E+04	8.384E+06	5.634E+02	7.543E+00	2.104E+03	1.414E-01
2116	1.026E+04	8.218E+06	5.522E+02	7.394E+00	2.063E+03	1.386E-01
2117	1.006E+04	8.056E+06	5.413E+02	7.248E+00	2.022E+03	1.359E-01
2118	9.861E+03	7.896E+06	5.305E+02	7.104E+00	1.982E+03	1.332E-01
2119	9.666E+03	7.740E+06	5.200E+02	6.964E+00	1.943E+03	1.305E-01
2120	9.474E+03	7.587E+06	5.097E+02	6.826E+00	1.904E+03	1.279E-01
2121	9.287E+03	7.436E+06	4.996E+02	6.690E+00	1.867E+03	1.254E-01
2122	9.103E+03	7.289E+06	4.898E+02	6.558E+00	1.830E+03	1.229E-01
2123	8.923E+03	7.145E+06	4.801E+02	6.428E+00	1.793E+03	1.205E-01
2124	8.746E+03	7.003E+06	4.705E+02	6.301E+00	1.758E+03	1.181E-01
2125	8.573E+03	6.865E+06	4.612E+02	6.176E+00	1.723E+03	1.158E-01
2126	8.403E+03	6.729E+06	4.521E+02	6.054E+00	1.689E+03	1.135E-01
2127	8.237E+03	6.595E+06	4.431E+02	5.934E+00	1.655E+03	1.112E-01
2128	8.073E+03	6.465E+06	4.344E+02	5.816E+00	1.623E+03	1.090E-01
2129	7.914E+03	6.337E+06	4.258E+02	5.701E+00	1.591E+03	1.069E-01
2130	7.757E+03	6.211E+06	4.173E+02	5.588E+00	1.559E+03	1.048E-01
2131	7.603E+03	6.088E+06	4.091E+02	5.478E+00	1.528E+03	1.027E-01
2132	7.453E+03	5.968E+06	4.010E+02	5.369E+00	1.498E+03	1.006E-01
2133	7.305E+03	5.850E+06	3.930E+02	5.263E+00	1.468E+03	9.865E-02
2134	7.161E+03	5.734E+06	3.853E+02	5.159E+00	1.439E+03	9.670E-02
2135	7.019E+03	5.620E+06	3.776E+02	5.057E+00	1.411E+03	9.478E-02
2136	6.880E+03	5.509E+06	3.701E+02	4.956E+00	1.383E+03	9.291E-02
2137	6.744E+03	5.400E+06	3.628E+02	4.858E+00	1.355E+03	9.107E-02
2138	6.610E+03	5.293E+06	3.556E+02	4.762E+00	1.329E+03	8.926E-02
2139	6.479E+03	5.188E+06	3.486E+02	4.668E+00	1.302E+03	8.750E-02

Summary Report

Landfill Name or Identifier: CRSWF Old Landfill

Date: Thursday, September 30, 2021

Description/Comments:

About LandGEM:

First-Order Decomposition Rate Equation:

$$Q_{CH_4} = \sum_{i=1}^{n} \sum_{j=0.1}^{1} k L_o \left(\frac{M_i}{10}\right) e^{-k t_{ij}}$$

Where,

Q_{CH4} = annual methane generation in the year of the calculation (*m^3/year*)

i = 1-year time increment

n = (year of the calculation) - (initial year of waste acceptance)

j = 0.1-year time increment

k = methane generation rate (*$year^{-1}$*)

L_o = potential methane generation capacity (*m^3/Mg*)

M_i = mass of waste accepted in the i^{th} year (*Mg*)

t_{ij} = age of the j^{th} section of waste mass M_i accepted in the i^{th} year (*decimal years*, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at http://www.epa.gov/ttnatw01/landfill/landflpg.html.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for convential landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

LANDFILL CHARACTERISTICS		
Landfill Open Year	**1935**	
Landfill Closure Year (with 80-year limit)	**1999**	
Actual Closure Year (without limit)	***1999***	
Have Model Calculate Closure Year?	**No**	
Waste Design Capacity	**1,587,570**	*megagrams*

MODEL PARAMETERS

Methane Generation Rate, k	**0.020**	*year^{-1}*	Default for 40 CFR 60 NMOC Calculation (Arid Area)
Potential Methane Generation Capacity, L_o	**170**	*m^3/Mg*	Default for 40 CFR 60 NMOC Calculation (Arid Area)
NMOC Concentration	**251**	*ppmv as hexane*	
Methane Content	**50**	*% by volume*	

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1:	**Total landfill gas**
Gas / Pollutant #2:	**NMOC**
Gas / Pollutant #3:	
Gas / Pollutant #4:	

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
1935	24,424	26,867	0	0
1936	24,424	26,867	24,424	26,867
1937	24,424	26,867	48,849	53,734
1938	24,424	26,867	73,273	80,601
1939	24,424	26,867	97,698	107,468
1940	24,424	26,867	122,122	134,335
1941	24,424	26,867	146,547	161,201
1942	24,424	26,867	170,971	188,068
1943	24,424	26,867	195,396	214,935
1944	24,424	26,867	219,820	241,802
1945	24,424	26,867	244,245	268,669
1946	24,424	26,867	268,669	295,536
1947	24,424	26,867	293,094	322,403
1948	24,424	26,867	317,518	349,270
1949	24,424	26,867	341,942	376,137
1950	24,424	26,867	366,367	403,004
1951	24,424	26,867	390,791	429,870
1952	24,424	26,867	415,216	456,737
1953	24,424	26,867	439,640	483,604
1954	24,424	26,867	464,065	510,471
1955	24,424	26,867	488,489	537,338
1956	24,424	26,867	512,914	564,205
1957	24,424	26,867	537,338	591,072
1958	24,424	26,867	561,763	617,939
1959	24,424	26,867	586,187	644,806
1960	24,424	26,867	610,612	671,673
1961	24,424	26,867	635,036	698,540
1962	24,424	26,867	659,460	725,406
1963	24,424	26,867	683,885	752,273
1964	24,424	26,867	708,309	779,140
1965	24,424	26,867	732,734	806,007
1966	24,424	26,867	757,158	832,874
1967	24,424	26,867	781,583	859,741
1968	24,424	26,867	806,007	886,608
1969	24,424	26,867	830,432	913,475
1970	24,424	26,867	854,856	940,342
1971	24,424	26,867	879,281	967,209
1972	24,424	26,867	903,705	994,076
1973	24,424	26,867	928,129	1,020,942
1974	24,424	26,867	952,554	1,047,809

WASTE ACCEPTANCE RATES (Continued)

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	(short tons/year)	(Mg)	(short tons)
1975	24,424	26,867	976,978	1,074,676
1976	24,424	26,867	1,001,403	1,101,543
1977	24,424	26,867	1,025,827	1,128,410
1978	24,424	26,867	1,050,252	1,155,277
1979	24,424	26,867	1,074,676	1,182,144
1980	24,424	26,867	1,099,101	1,209,011
1981	24,424	26,867	1,123,525	1,235,878
1982	24,424	26,867	1,147,950	1,262,745
1983	24,424	26,867	1,172,374	1,289,611
1984	24,424	26,867	1,196,799	1,316,478
1985	24,424	26,867	1,221,223	1,343,345
1986	24,424	26,867	1,245,647	1,370,212
1987	24,424	26,867	1,270,072	1,397,079
1988	24,424	26,867	1,294,496	1,423,946
1989	24,424	26,867	1,318,921	1,450,813
1990	24,424	26,867	1,343,345	1,477,680
1991	24,424	26,867	1,367,770	1,504,547
1992	24,424	26,867	1,392,194	1,531,414
1993	24,424	26,867	1,416,619	1,558,281
1994	24,424	26,867	1,441,043	1,585,147
1995	24,424	26,867	1,465,468	1,612,014
1996	24,424	26,867	1,489,892	1,638,881
1997	24,424	26,867	1,514,317	1,665,748
1998	24,424	26,867	1,538,741	1,692,615
1999	24,424	26,867	1,563,165	1,719,482
2000	0	0	1,587,590	1,746,349
2001	0	0	1,587,590	1,746,349
2002	0	0	1,587,590	1,746,349
2003	0	0	1,587,590	1,746,349
2004	0	0	1,587,590	1,746,349
2005	0	0	1,587,590	1,746,349
2006	0	0	1,587,590	1,746,349
2007	0	0	1,587,590	1,746,349
2008	0	0	1,587,590	1,746,349
2009	0	0	1,587,590	1,746,349
2010	0	0	1,587,590	1,746,349
2011	0	0	1,587,590	1,746,349
2012	0	0	1,587,590	1,746,349
2013	0	0	1,587,590	1,746,349
2014	0	0	1,587,590	1,746,349

Pollutant Parameters

		Gas / Pollutant Default Parameters:		*User-specified Pollutant Parameters:*	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

Pollutant Parameters (Continued)

	Gas / Pollutant Default Parameters:			User-specified Pollutant Parameters:	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		

Results

Year	Total landfill gas			NMOC		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
1935	0	0	0	0	0	0
1936	2.056E+02	1.646E+05	1.106E+01	1.312E-01	3.659E+01	2.459E-03
1937	4.070E+02	3.259E+05	2.190E+01	2.597E-01	7.246E+01	4.868E-03
1938	6.045E+02	4.841E+05	3.253E+01	3.857E-01	1.076E+02	7.231E-03
1939	7.981E+02	6.391E+05	4.294E+01	5.093E-01	1.421E+02	9.546E-03
1940	9.879E+02	7.911E+05	5.315E+01	6.303E-01	1.759E+02	1.182E-02
1941	1.174E+03	9.400E+05	6.316E+01	7.490E-01	2.090E+02	1.404E-02
1942	1.356E+03	1.086E+06	7.297E+01	8.653E-01	2.414E+02	1.622E-02
1943	1.535E+03	1.229E+06	8.258E+01	9.794E-01	2.732E+02	1.836E-02
1944	1.710E+03	1.369E+06	9.201E+01	1.091E+00	3.044E+02	2.045E-02
1945	1.882E+03	1.507E+06	1.012E+02	1.201E+00	3.350E+02	2.251E-02
1946	2.050E+03	1.642E+06	1.103E+02	1.308E+00	3.649E+02	2.452E-02
1947	2.215E+03	1.774E+06	1.192E+02	1.413E+00	3.943E+02	2.649E-02
1948	2.377E+03	1.903E+06	1.279E+02	1.516E+00	4.231E+02	2.843E-02
1949	2.535E+03	2.030E+06	1.364E+02	1.618E+00	4.513E+02	3.032E-02
1950	2.691E+03	2.154E+06	1.448E+02	1.717E+00	4.789E+02	3.218E-02
1951	2.843E+03	2.276E+06	1.530E+02	1.814E+00	5.060E+02	3.400E-02
1952	2.992E+03	2.396E+06	1.610E+02	1.909E+00	5.326E+02	3.579E-02
1953	3.138E+03	2.513E+06	1.689E+02	2.003E+00	5.587E+02	3.754E-02
1954	3.282E+03	2.628E+06	1.766E+02	2.094E+00	5.842E+02	3.925E-02
1955	3.422E+03	2.741E+06	1.841E+02	2.184E+00	6.092E+02	4.093E-02
1956	3.560E+03	2.851E+06	1.915E+02	2.272E+00	6.337E+02	4.258E-02
1957	3.695E+03	2.959E+06	1.988E+02	2.358E+00	6.578E+02	4.420E-02
1958	3.828E+03	3.065E+06	2.059E+02	2.442E+00	6.813E+02	4.578E-02
1959	3.957E+03	3.169E+06	2.129E+02	2.525E+00	7.044E+02	4.733E-02
1960	4.085E+03	3.271E+06	2.198E+02	2.606E+00	7.271E+02	4.885E-02
1961	4.209E+03	3.371E+06	2.265E+02	2.686E+00	7.493E+02	5.034E-02
1962	4.331E+03	3.468E+06	2.330E+02	2.764E+00	7.710E+02	5.181E-02
1963	4.451E+03	3.564E+06	2.395E+02	2.840E+00	7.924E+02	5.324E-02
1964	4.569E+03	3.658E+06	2.458E+02	2.915E+00	8.133E+02	5.464E-02
1965	4.684E+03	3.751E+06	2.520E+02	2.989E+00	8.337E+02	5.602E-02
1966	4.797E+03	3.841E+06	2.581E+02	3.061E+00	8.538E+02	5.737E-02
1967	4.907E+03	3.929E+06	2.640E+02	3.131E+00	8.735E+02	5.869E-02
1968	5.016E+03	4.016E+06	2.699E+02	3.200E+00	8.928E+02	5.999E-02
1969	5.122E+03	4.101E+06	2.756E+02	3.268E+00	9.117E+02	6.126E-02
1970	5.226E+03	4.185E+06	2.812E+02	3.334E+00	9.303E+02	6.250E-02
1971	5.328E+03	4.266E+06	2.867E+02	3.400E+00	9.484E+02	6.372E-02
1972	5.428E+03	4.347E+06	2.920E+02	3.463E+00	9.662E+02	6.492E-02
1973	5.526E+03	4.425E+06	2.973E+02	3.526E+00	9.837E+02	6.609E-02
1974	5.622E+03	4.502E+06	3.025E+02	3.587E+00	1.001E+03	6.724E-02
1975	5.717E+03	4.578E+06	3.076E+02	3.647E+00	1.018E+03	6.837E-02
1976	5.809E+03	4.651E+06	3.125E+02	3.706E+00	1.034E+03	6.948E-02
1977	5.899E+03	4.724E+06	3.174E+02	3.764E+00	1.050E+03	7.056E-02
1978	5.988E+03	4.795E+06	3.222E+02	3.821E+00	1.066E+03	7.162E-02
1979	6.075E+03	4.865E+06	3.269E+02	3.876E+00	1.081E+03	7.266E-02
1980	6.160E+03	4.933E+06	3.314E+02	3.931E+00	1.097E+03	7.368E-02
1981	6.244E+03	5.000E+06	3.359E+02	3.984E+00	1.111E+03	7.468E-02
1982	6.326E+03	5.065E+06	3.403E+02	4.036E+00	1.126E+03	7.566E-02
1983	6.406E+03	5.130E+06	3.447E+02	4.088E+00	1.140E+03	7.662E-02
1984	6.485E+03	5.193E+06	3.489E+02	4.138E+00	1.154E+03	7.756E-02
1985	6.562E+03	5.255E+06	3.531E+02	4.187E+00	1.168E+03	7.848E-02
1986	6.638E+03	5.315E+06	3.571E+02	4.235E+00	1.182E+03	7.939E-02
1987	6.712E+03	5.374E+06	3.611E+02	4.283E+00	1.195E+03	8.028E-02
1988	6.784E+03	5.433E+06	3.650E+02	4.329E+00	1.208E+03	8.114E-02
1989	6.856E+03	5.490E+06	3.689E+02	4.374E+00	1.220E+03	8.200E-02
1990	6.925E+03	5.546E+06	3.726E+02	4.419E+00	1.233E+03	8.283E-02
1991	6.994E+03	5.600E+06	3.763E+02	4.463E+00	1.245E+03	8.365E-02
1992	7.061E+03	5.654E+06	3.799E+02	4.505E+00	1.257E+03	8.445E-02
1993	7.127E+03	5.707E+06	3.834E+02	4.547E+00	1.269E+03	8.524E-02
1994	7.191E+03	5.758E+06	3.869E+02	4.588E+00	1.280E+03	8.601E-02
1995	7.254E+03	5.809E+06	3.903E+02	4.629E+00	1.291E+03	8.676E-02
1996	7.316E+03	5.858E+06	3.936E+02	4.668E+00	1.302E+03	8.750E-02
1997	7.377E+03	5.907E+06	3.969E+02	4.707E+00	1.313E+03	8.823E-02
1998	7.436E+03	5.955E+06	4.001E+02	4.745E+00	1.324E+03	8.894E-02
1999	7.495E+03	6.001E+06	4.032E+02	4.782E+00	1.334E+03	8.964E-02
2000	7.552E+03	6.047E+06	4.063E+02	4.819E+00	1.344E+03	9.032E-02
2001	7.402E+03	5.927E+06	3.983E+02	4.723E+00	1.318E+03	8.853E-02
2002	7.256E+03	5.810E+06	3.904E+02	4.630E+00	1.292E+03	8.678E-02
2003	7.112E+03	5.695E+06	3.826E+02	4.538E+00	1.266E+03	8.506E-02
2004	6.971E+03	5.582E+06	3.751E+02	4.448E+00	1.241E+03	8.338E-02
2005	6.833E+03	5.472E+06	3.676E+02	4.360E+00	1.216E+03	8.173E-02
2006	6.698E+03	5.363E+06	3.604E+02	4.274E+00	1.192E+03	8.011E-02
2007	6.565E+03	5.257E+06	3.532E+02	4.189E+00	1.169E+03	7.852E-02
2008	6.435E+03	5.153E+06	3.462E+02	4.106E+00	1.146E+03	7.697E-02
2009	6.308E+03	5.051E+06	3.394E+02	4.025E+00	1.123E+03	7.544E-02
2010	6.183E+03	4.951E+06	3.327E+02	3.945E+00	1.101E+03	7.395E-02
2011	6.060E+03	4.853E+06	3.261E+02	3.867E+00	1.079E+03	7.249E-02
2012	5.940E+03	4.757E+06	3.196E+02	3.790E+00	1.057E+03	7.105E-02
2013	5.823E+03	4.663E+06	3.133E+02	3.715E+00	1.037E+03	6.964E-02
2014	5.708E+03	4.570E+06	3.071E+02	3.642E+00	1.016E+03	6.826E-02

2015	5.595E+03	4.480E+06	3.010E+02	3.570E+00	9.959E+02	6.691E-02
2016	5.484E+03	4.391E+06	2.950E+02	3.499E+00	9.762E+02	6.559E-02
2017	5.375E+03	4.304E+06	2.892E+02	3.430E+00	9.568E+02	6.429E-02
2018	5.269E+03	4.219E+06	2.835E+02	3.362E+00	9.379E+02	6.302E-02
2019	5.164E+03	4.135E+06	2.779E+02	3.295E+00	9.193E+02	6.177E-02
2020	5.062E+03	4.054E+06	2.724E+02	3.230E+00	9.011E+02	6.054E-02
2021	4.962E+03	3.973E+06	2.670E+02	3.166E+00	8.833E+02	5.935E-02
2022	4.864E+03	3.895E+06	2.617E+02	3.103E+00	8.658E+02	5.817E-02
2023	4.767E+03	3.817E+06	2.565E+02	3.042E+00	8.486E+02	5.702E-02
2024	4.673E+03	3.742E+06	2.514E+02	2.982E+00	8.318E+02	5.589E-02
2025	4.580E+03	3.668E+06	2.464E+02	2.923E+00	8.154E+02	5.478E-02
2026	4.490E+03	3.595E+06	2.416E+02	2.865E+00	7.992E+02	5.370E-02
2027	4.401E+03	3.524E+06	2.368E+02	2.808E+00	7.834E+02	5.264E-02
2028	4.314E+03	3.454E+06	2.321E+02	2.752E+00	7.679E+02	5.159E-02
2029	4.228E+03	3.386E+06	2.275E+02	2.698E+00	7.527E+02	5.057E-02
2030	4.145E+03	3.319E+06	2.230E+02	2.644E+00	7.378E+02	4.957E-02
2031	4.062E+03	3.253E+06	2.186E+02	2.592E+00	7.232E+02	4.859E-02
2032	3.982E+03	3.189E+06	2.142E+02	2.541E+00	7.088E+02	4.763E-02
2033	3.903E+03	3.125E+06	2.100E+02	2.490E+00	6.948E+02	4.668E-02
2034	3.826E+03	3.064E+06	2.058E+02	2.441E+00	6.810E+02	4.576E-02
2035	3.750E+03	3.003E+06	2.018E+02	2.393E+00	6.676E+02	4.485E-02
2036	3.676E+03	2.943E+06	1.978E+02	2.345E+00	6.543E+02	4.396E-02
2037	3.603E+03	2.885E+06	1.939E+02	2.299E+00	6.414E+02	4.309E-02
2038	3.532E+03	2.828E+06	1.900E+02	2.253E+00	6.287E+02	4.224E-02
2039	3.462E+03	2.772E+06	1.863E+02	2.209E+00	6.162E+02	4.140E-02
2040	3.393E+03	2.717E+06	1.826E+02	2.165E+00	6.040E+02	4.058E-02
2041	3.326E+03	2.663E+06	1.790E+02	2.122E+00	5.921E+02	3.978E-02
2042	3.260E+03	2.611E+06	1.754E+02	2.080E+00	5.803E+02	3.899E-02
2043	3.196E+03	2.559E+06	1.719E+02	2.039E+00	5.689E+02	3.822E-02
2044	3.132E+03	2.508E+06	1.685E+02	1.999E+00	5.576E+02	3.746E-02
2045	3.070E+03	2.459E+06	1.652E+02	1.959E+00	5.465E+02	3.672E-02
2046	3.010E+03	2.410E+06	1.619E+02	1.920E+00	5.357E+02	3.600E-02
2047	2.950E+03	2.362E+06	1.587E+02	1.882E+00	5.251E+02	3.528E-02
2048	2.892E+03	2.315E+06	1.556E+02	1.845E+00	5.147E+02	3.458E-02
2049	2.834E+03	2.270E+06	1.525E+02	1.808E+00	5.045E+02	3.390E-02
2050	2.778E+03	2.225E+06	1.495E+02	1.773E+00	4.945E+02	3.323E-02
2051	2.723E+03	2.181E+06	1.465E+02	1.738E+00	4.847E+02	3.257E-02
2052	2.669E+03	2.137E+06	1.436E+02	1.703E+00	4.751E+02	3.192E-02
2053	2.616E+03	2.095E+06	1.408E+02	1.669E+00	4.657E+02	3.129E-02
2054	2.565E+03	2.054E+06	1.380E+02	1.636E+00	4.565E+02	3.067E-02
2055	2.514E+03	2.013E+06	1.352E+02	1.604E+00	4.475E+02	3.007E-02
2056	2.464E+03	1.973E+06	1.326E+02	1.572E+00	4.386E+02	2.947E-02
2057	2.415E+03	1.934E+06	1.299E+02	1.541E+00	4.299E+02	2.889E-02
2058	2.367E+03	1.896E+06	1.274E+02	1.511E+00	4.214E+02	2.831E-02
2059	2.321E+03	1.858E+06	1.248E+02	1.481E+00	4.131E+02	2.775E-02
2060	2.275E+03	1.821E+06	1.224E+02	1.451E+00	4.049E+02	2.720E-02
2061	2.230E+03	1.785E+06	1.200E+02	1.423E+00	3.969E+02	2.667E-02
2062	2.185E+03	1.750E+06	1.176E+02	1.394E+00	3.890E+02	2.614E-02
2063	2.142E+03	1.715E+06	1.153E+02	1.367E+00	3.813E+02	2.562E-02
2064	2.100E+03	1.681E+06	1.130E+02	1.340E+00	3.738E+02	2.511E-02
2065	2.058E+03	1.648E+06	1.107E+02	1.313E+00	3.664E+02	2.462E-02
2066	2.017E+03	1.615E+06	1.085E+02	1.287E+00	3.591E+02	2.413E-02
2067	1.977E+03	1.583E+06	1.064E+02	1.262E+00	3.520E+02	2.365E-02
2068	1.938E+03	1.552E+06	1.043E+02	1.237E+00	3.450E+02	2.318E-02
2069	1.900E+03	1.521E+06	1.022E+02	1.212E+00	3.382E+02	2.272E-02
2070	1.862E+03	1.491E+06	1.002E+02	1.188E+00	3.315E+02	2.227E-02
2071	1.825E+03	1.462E+06	9.821E+01	1.165E+00	3.249E+02	2.183E-02
2072	1.789E+03	1.433E+06	9.627E+01	1.142E+00	3.185E+02	2.140E-02
2073	1.754E+03	1.404E+06	9.436E+01	1.119E+00	3.122E+02	2.098E-02
2074	1.719E+03	1.377E+06	9.249E+01	1.097E+00	3.060E+02	2.056E-02
2075	1.685E+03	1.349E+06	9.066E+01	1.075E+00	3.000E+02	2.015E-02

NMOC EMISSIONS (TOTAL)

Year	Active (New) Landfill	Old Landfill	Total
	Mg/Year	Mg/Year	Mg/Year
1935		0.000E+00	0.000E+00
1936		1.312E-01	1.312E-01
1937		2.597E-01	2.597E-01
1938		3.857E-01	3.857E-01
1939		5.093E-01	5.093E-01
1940		6.303E-01	6.303E-01
1941		7.490E-01	7.490E-01
1942		8.653E-01	8.653E-01
1943		9.794E-01	9.794E-01
1944		1.091E+00	1.091E+00
1945		1.201E+00	1.201E+00
1946		1.308E+00	1.308E+00
1947		1.413E+00	1.413E+00
1948		1.516E+00	1.516E+00
1949		1.618E+00	1.618E+00
1950		1.717E+00	1.717E+00
1951		1.814E+00	1.814E+00
1952		1.909E+00	1.909E+00
1953		2.003E+00	2.003E+00
1954		2.094E+00	2.094E+00
1955		2.184E+00	2.184E+00
1956		2.272E+00	2.272E+00
1957		2.358E+00	2.358E+00
1958		2.442E+00	2.442E+00
1959		2.525E+00	2.525E+00
1960		2.606E+00	2.606E+00
1961		2.686E+00	2.686E+00
1962		2.764E+00	2.764E+00
1963		2.840E+00	2.840E+00
1964		2.915E+00	2.915E+00
1965		2.989E+00	2.989E+00
1966		3.061E+00	3.061E+00
1967		3.131E+00	3.131E+00
1968		3.200E+00	3.200E+00
1969		3.268E+00	3.268E+00
1970		3.334E+00	3.334E+00
1971		3.400E+00	3.400E+00
1972		3.463E+00	3.463E+00
1973		3.526E+00	3.526E+00
1974		3.587E+00	3.587E+00
1975		3.647E+00	3.647E+00
1976		3.706E+00	3.706E+00
1977		3.764E+00	3.764E+00
1978		3.821E+00	3.821E+00
1979		3.876E+00	3.876E+00
1980		3.931E+00	3.931E+00
1981		3.984E+00	3.984E+00
1982		4.036E+00	4.036E+00
1983		4.088E+00	4.088E+00
1984		4.138E+00	4.138E+00
1985		4.187E+00	4.187E+00
1986		4.235E+00	4.235E+00
1987		4.283E+00	4.283E+00
1988		4.329E+00	4.329E+00
1989		4.374E+00	4.374E+00
1990		4.419E+00	4.419E+00
1991		4.463E+00	4.463E+00
1992		4.505E+00	4.505E+00
1993		4.547E+00	4.547E+00
1994		4.588E+00	4.588E+00
1995		4.629E+00	4.629E+00
1996		4.668E+00	4.668E+00
1997		4.707E+00	4.707E+00
1998		4.745E+00	4.745E+00
1999	0.000E+00	4.782E+00	4.782E+00
2000	2.145E-01	4.819E+00	5.033E+00
2001	5.739E-01	4.723E+00	5.297E+00
2002	1.009E+00	4.630E+00	5.638E+00
2003	1.491E+00	4.538E+00	6.029E+00
2004	1.891E+00	4.448E+00	6.339E+00

Year	Active (New) Landfill	Old Landfill	Total
	Mg/Year	Mg/Year	Mg/Year
2005	2.323E+00	4.360E+00	6.683E+00
2006	2.742E+00	4.274E+00	7.015E+00
2007	3.130E+00	4.189E+00	7.319E+00
2008	3.585E+00	4.106E+00	7.691E+00
2009	3.973E+00	4.025E+00	7.998E+00
2010	4.354E+00	3.945E+00	8.299E+00
2011	4.866E+00	3.867E+00	8.733E+00
2012	5.222E+00	3.790E+00	9.012E+00
2013	5.564E+00	3.715E+00	9.279E+00
2014	5.933E+00	3.642E+00	9.575E+00
2015	6.280E+00	3.570E+00	9.850E+00
2016	6.719E+00	3.499E+00	1.022E+01
2017	7.022E+00	3.430E+00	1.045E+01
2018	7.289E+00	3.362E+00	1.065E+01
2019	7.540E+00	3.295E+00	1.084E+01
2020	7.773E+00	3.230E+00	1.100E+01
2021	7.994E+00	3.166E+00	1.116E+01
2022	8.210E+00	3.103E+00	1.131E+01
2023	8.422E+00	3.042E+00	1.146E+01
2024	8.630E+00	2.982E+00	1.161E+01
2025	8.834E+00	2.923E+00	1.176E+01
2026	9.034E+00	2.865E+00	1.190E+01
2027	9.230E+00	2.808E+00	1.204E+01
2028	9.422E+00	2.752E+00	1.217E+01
2029	9.610E+00	2.698E+00	1.231E+01
2030	9.794E+00	2.644E+00	1.244E+01
2031	9.975E+00	2.592E+00	1.257E+01
2032	1.015E+01	2.541E+00	1.269E+01
2033	1.033E+01	2.490E+00	1.282E+01
2034	1.050E+01	2.441E+00	1.294E+01
2035	1.066E+01	2.393E+00	1.306E+01
2036	1.083E+01	2.345E+00	1.317E+01
2037	1.099E+01	2.299E+00	1.329E+01
2038	1.114E+01	2.253E+00	1.340E+01
2039	1.130E+01	2.209E+00	1.351E+01
2040	1.145E+01	2.165E+00	1.361E+01
2041	1.160E+01	2.122E+00	1.372E+01
2042	1.174E+01	2.080E+00	1.382E+01
2043	1.188E+01	2.039E+00	1.392E+01
2044	1.202E+01	1.999E+00	1.402E+01
2045	1.216E+01	1.959E+00	1.412E+01
2046	1.229E+01	1.920E+00	1.421E+01
2047	1.243E+01	1.882E+00	1.431E+01
2048	1.255E+01	1.845E+00	1.440E+01
2049	1.268E+01	1.808E+00	1.449E+01
2050	1.280E+01	1.773E+00	1.458E+01
2051	1.293E+01	1.738E+00	1.466E+01
2052	1.304E+01	1.703E+00	1.475E+01
2053	1.316E+01	1.669E+00	1.483E+01
2054	1.327E+01	1.636E+00	1.491E+01
2055	1.339E+01	1.604E+00	1.499E+01
2056	1.350E+01	1.572E+00	1.507E+01
2057	1.360E+01	1.541E+00	1.514E+01
2058	1.371E+01	1.511E+00	1.522E+01

Year	Active (New) Landfill	Old Landfill	Total
	Mg/Year	Mg/Year	Mg/Year
2059	1.381E+01	1.481E+00	1.529E+01
2060	1.391E+01	1.451E+00	1.536E+01
2061	1.401E+01	1.423E+00	1.544E+01
2062	1.411E+01	1.394E+00	1.550E+01
2063	1.421E+01	1.367E+00	1.557E+01
2064	1.430E+01	1.340E+00	1.564E+01
2065	1.439E+01	1.313E+00	1.570E+01
2066	1.448E+01	1.287E+00	1.577E+01
2067	1.457E+01	1.262E+00	1.583E+01
2068	1.465E+01	1.237E+00	1.589E+01
2069	1.474E+01	1.212E+00	1.595E+01
2070	1.482E+01	1.188E+00	1.601E+01
2071	1.490E+01	1.165E+00	1.607E+01
2072	1.498E+01	1.142E+00	1.612E+01
2073	1.506E+01	1.119E+00	1.618E+01
2074	1.514E+01	1.097E+00	1.623E+01
2075	1.521E+01	1.075E+00	1.629E+01
2076	1.529E+01		1.529E+01
2077	1.536E+01		1.536E+01
2078	1.543E+01		1.543E+01
2079	1.550E+01		1.550E+01
2080	1.519E+01		1.519E+01
2081	1.489E+01		1.489E+01
2082	1.460E+01		1.460E+01
2083	1.431E+01		1.431E+01
2084	1.402E+01		1.402E+01
2085	1.375E+01		1.375E+01
2086	1.347E+01		1.347E+01
2087	1.321E+01		1.321E+01
2088	1.294E+01		1.294E+01
2089	1.269E+01		1.269E+01
2090	1.244E+01		1.244E+01
2091	1.219E+01		1.219E+01
2092	1.195E+01		1.195E+01
2093	1.171E+01		1.171E+01
2094	1.148E+01		1.148E+01
2095	1.125E+01		1.125E+01
2096	1.103E+01		1.103E+01
2097	1.081E+01		1.081E+01
2098	1.060E+01		1.060E+01
2099	1.039E+01		1.039E+01
2100	1.018E+01		1.018E+01
2101	9.981E+00		9.981E+00
2102	9.783E+00		9.783E+00

Year	Active (New) Landfill	Old Landfill	Total
	Mg/Year	Mg/Year	Mg/Year
2103	9.590E+00		9.590E+00
2104	9.400E+00		9.400E+00
2105	9.214E+00		9.214E+00
2106	9.031E+00		9.031E+00
2107	8.852E+00		8.852E+00
2108	8.677E+00		8.677E+00
2109	8.505E+00		8.505E+00
2110	8.337E+00		8.337E+00
2111	8.172E+00		8.172E+00
2112	8.010E+00		8.010E+00
2113	7.851E+00		7.851E+00
2114	7.696E+00		7.696E+00
2115	7.543E+00		7.543E+00
2116	7.394E+00		7.394E+00
2117	7.248E+00		7.248E+00
2118	7.104E+00		7.104E+00
2119	6.964E+00		6.964E+00
2120	6.826E+00		6.826E+00
2121	6.690E+00		6.690E+00
2122	6.558E+00		6.558E+00
2123	6.428E+00		6.428E+00
2124	6.301E+00		6.301E+00
2125	6.176E+00		6.176E+00
2126	6.054E+00		6.054E+00
2127	5.934E+00		5.934E+00
2128	5.816E+00		5.816E+00
2129	5.701E+00		5.701E+00
2130	5.588E+00		5.588E+00
2131	5.478E+00		5.478E+00
2132	5.369E+00		5.369E+00
2133	5.263E+00		5.263E+00
2134	5.159E+00		5.159E+00
2135	5.057E+00		5.057E+00
2136	4.956E+00		4.956E+00
2137	4.858E+00		4.858E+00
2138	4.762E+00		4.762E+00
2139	4.668E+00		4.668E+00

Section 3: Application Summary

Section 3

Application Summary

The **<u>Application</u> <u>Summary</u>** shall include a brief description of the facility and its process, the type of permit application, the applicable regulation (i.e. 20.2.72.200.A.X, or 20.2.73 NMAC) under which the application is being submitted, and any air quality permit numbers associated with this site. If this facility is to be collocated with another facility, provide details of the other facility including permit number(s). In case of a revision or modification to a facility, provide the lowest level regulatory citation (i.e. 20.2.72.219.B.1.d NMAC) under which the revision or modification is being requested. Also describe the proposed changes from the original permit, how the proposed modification will affect the facility's operations and emissions, de-bottlenecking impacts, and changes to the facility's major/minor status (both PSD & Title V).

The **<u>Process</u> <u>Summary</u>** shall include a brief description of the facility and its processes.

<u>Startup,</u> <u>Shutdown,</u> <u>and</u> <u>Maintenance</u> <u>(SSM)</u> routine or predictable emissions: Provide an overview of how SSM emissions are accounted for in this application. Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (http://www.env.nm.gov/aqb/permit/app_form.html) for more detailed instructions on SSM emissions.

Introduction and Applicable Regulations

On behalf of the City of Clovis, CDM Smith Inc. (CDM Smith) is pleased to submit this Title V Operating Permit Renewal Application for the Clovis Regional Solid Waste Facility (CRSWF). The application has been prepared in accordance with 20 NMAC 20.2.70 (Operating Permits). The current Title V Operating Permit (No. P199L-R3) was issued to the City of Clovis, New Mexico, on December 6, 2017.

The CRSWF is located in Clovis, New Mexico (refer to the Location Map included in Figure 8-1). It is operated by the City of Clovis (City) and has accepted municipal solid waste since 1935 as part of a pre-existing landfill (old landfill). The types of waste received at the site include typical household waste, compost, occasionally tires and appliances, and typical construction and demolition waste. The landfill, under its current configuration including closed and operational areas, spans a net area of approximately 110 acres. Approximately 80 acres of pre-existing landfill were closed in 1999. Cells 1-4 have received waste since 1999 under Permit Nos. P199L, P199LR1, P199LR2 and P199LR3. In 2013, the City received approval of the application for modification/renewal of the CRSWF's Solid Waste Facility Permit from the Solid Waste Bureau. The Final Order approved a lateral expansion of approximately 115 additional acres as lined landfill area in the southeast (SE) quadrant landfill. In addition, the proposed modification also includes approval to accept certain types of special waste including asbestos and petroleum contaminated soils in the future. The CRSWF has started accepting waste in new Cell No. 5 starting in 2021.

The CRSWF presently has a design capacity greater than 2.5 million cubic meters and 2.5 million megagrams (Mg). Accordingly, the Landfill is subject to the Clean Air Act Amendments (CAAA) Title V Operating Permit program.

Routine or Predictable Startup, Shutdown, and Maintenance Emissions

The identification of routine or predictable emissions during Startup, Shutdown, and Maintenance (SSM) as outlined in the "Guidance for Including Emissions During Routine or Predictable Startup, Shutdown, and Scheduled Maintenance in Permit Applications" (dated July 29, 2008) is not applicable for the CRSWF, as there is no air pollution control equipment considered to be part of the normal operation of the CRSWF. However, the CRSWF minimizes emissions through good work practice standards and good air pollution control practices, as required by 20 NMAC 2.7.14.A and B. Operations plans, including standard working practices are kept onsite.

Section 4: Process Flow Sheet

Section 4

Process Flow Sheet

A **process flow sheet** and/or block diagram indicating the individual equipment, all emission points and types of control applied to those points. The unit numbering system should be consistent throughout this application.

The process flow sheets for the CRSWF Landfill are included in accordance with Section 4. These sheets correspond to the following Emission Units:

Emission Unit 1: Fugitive Dust Emissions are emitted from the operations at the borrow pit, during loading of the scraper. Fugitive emissions are reduced with the application of water. Figure 4.1 presents a process flow sheet for Fugitive Dust Emissions for the CRSWF Landfill.

Emission Unit 2: Fugitive Dust Emissions are emitted from the paved and unpaved disposal routes. Figure 4.2 presents a process flow sheet for fugitive dust emission from the paved and unpaved access roads for the CRSWF Landfill.

Emission Unit 3: Fugitive Dust Emissions are emitted from the landfill working face. Figure 4.3 presents a diagram of activities that can result in fugitive dust emissions at the CRSWF Landfill working face.

Emission Unit 4: Uncontrolled emissions of non-methane organic compounds (NMOCs), Greenhouse gases (GHGs), Hydrogen Sulfide (H2S) and Hazardous Air Pollutants (HAPs) are generated as a result of anaerobic decomposition of municipal solid waste. Figure 4.4 presents a process flow sheet for emissions of NMOCs and HAPs for the CRSWF Landfill.

Emission Unit 5: Uncontrolled emissions of volatile organic compounds (VOCs) are generated as a result of anaerobic decomposition of petroleum contaminated soils (PCS). Figure 4.5 presents a process flow sheet for emissions of VOCs from PCS, for the CRSWF Landfill.

FIGURE 4.1

EMISSION UNIT 1 – FUGITIVE DUST EMISSIONS FROM BORROW PIT OPERATIONS

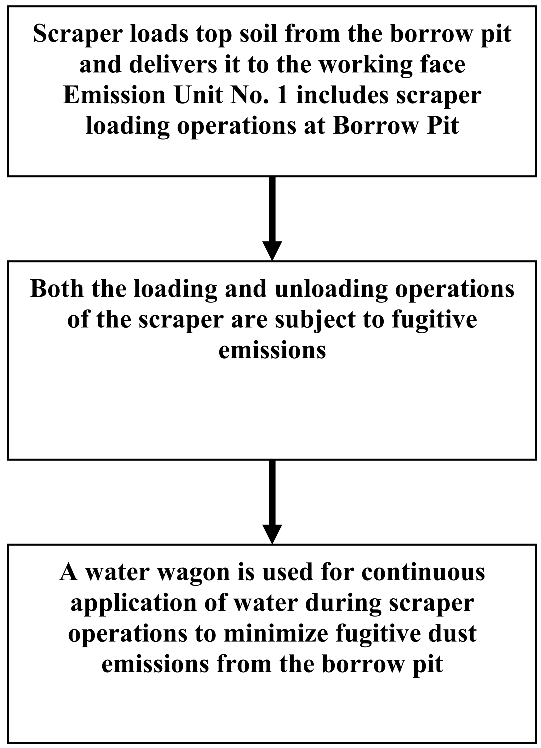
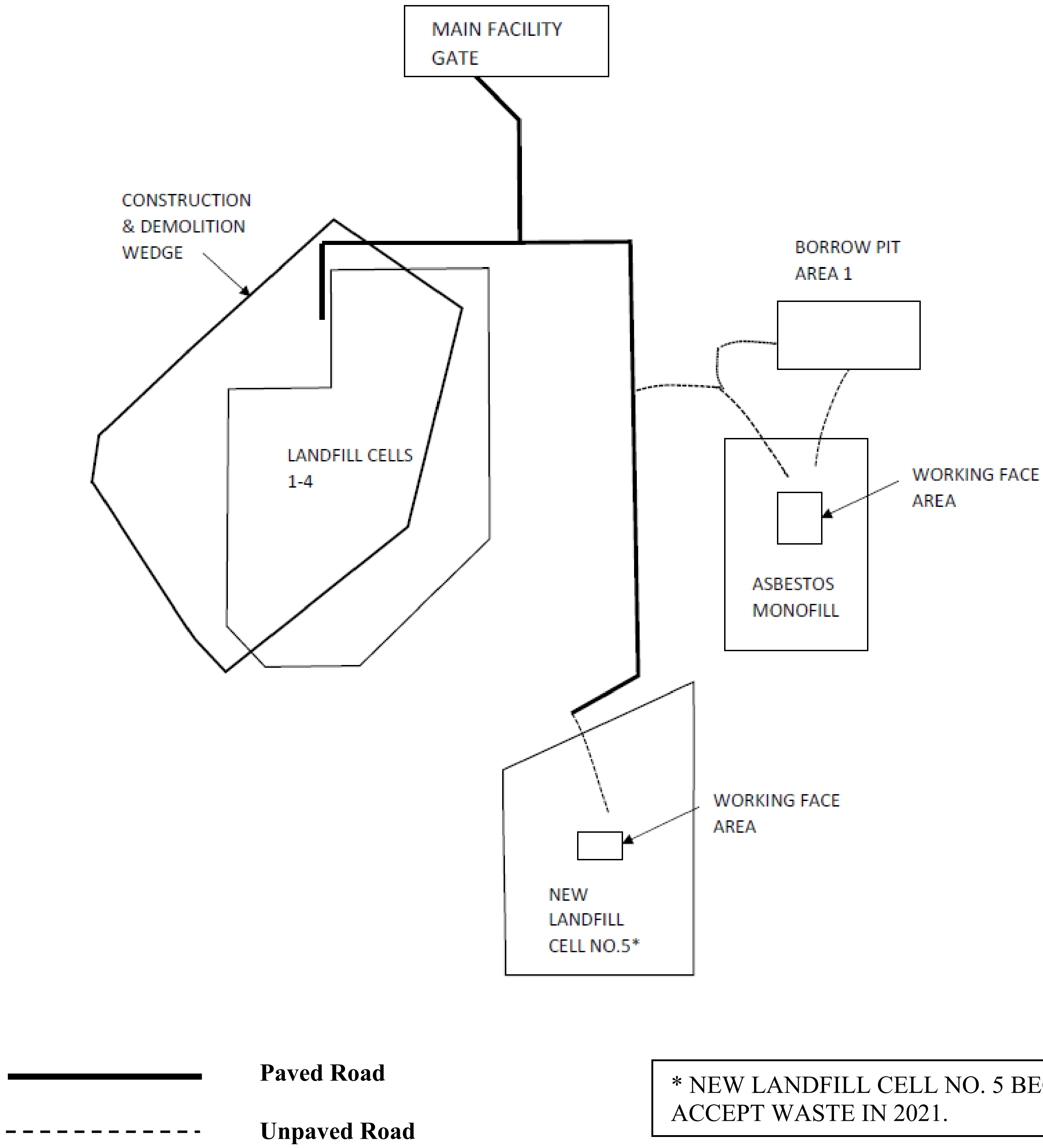


FIGURE 4.2

EMISSION UNIT 2 – FUGITIVE DUST EMISSIONS FROM PAVED AND UNPAVED ACCESS ROADS



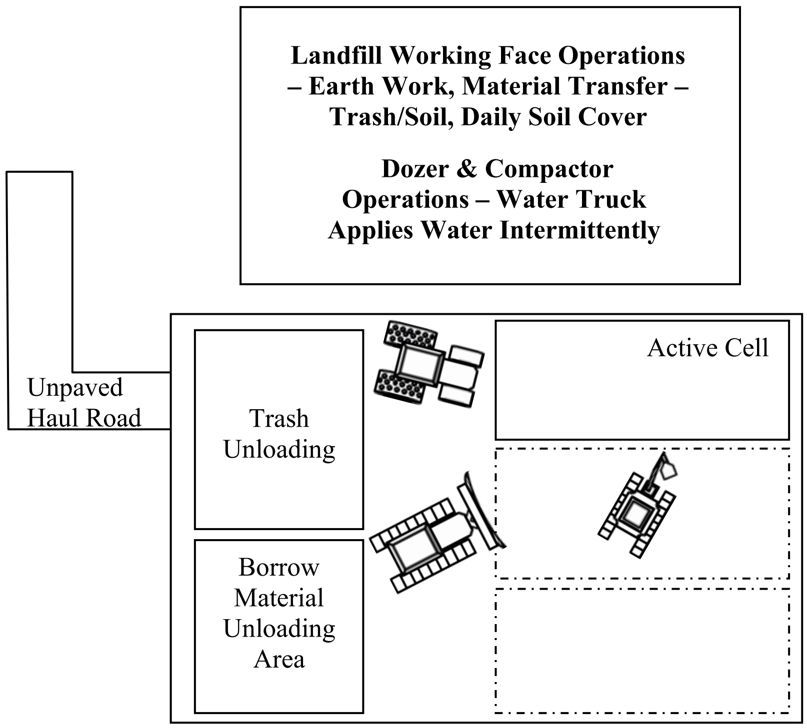
* NEW LANDFILL CELL NO. 5 BEGAN TO ACCEPT WASTE IN 2021.

Notes

1. Solid waste hauling and collection vehicles enter through the main facility gate. The vehicles are weighed at the scale house and then proceed directly to the active cell/working face. After unloading, these vehicles return to the scale house and then exit the facility through the main gate.
2. The scraper hauls cover material on unpaved roads from the borrow pit to the working face areas.
3. A water wagon is used for dust control of all unpaved roads around the facility
4. A motor grader is used on the unpaved haul roads for grading the road surface.

FIGURE 4.3

EMISSION UNIT 3 – WORKING FACE FUGITIVE DUST EMISSIONS



Drawing not to Scale

<u>Notes</u>

1. Solid waste is dumped onto the working face.
2. Dozer pushes trash into the cell until it reaches a certain level.
3. Trash is compacted and a layer of soil applied and compacted again. Water is applied intermittently to suppress fugitive dust
4. For asbestos waste, compaction is not done; a layer of soil is applied over the waste. Water is applied continuously to ensure the visible fugitive emissions from the asbestos monofill working face are zero.
5. The process is repeated until the cell reaches the surface level.
6. A motor grader is used on the tipping area by the working face for 3 hours each day, and for 7 days a week.

FIGURE 4.4

EMISSION UNIT 4 – NMOC AND HAP EMISSIONS

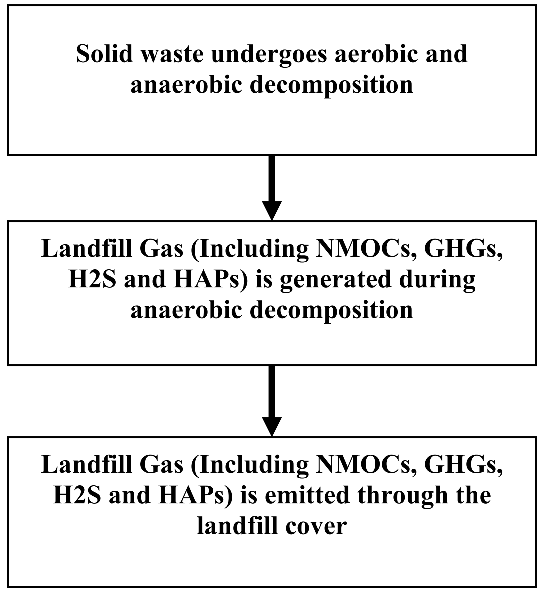
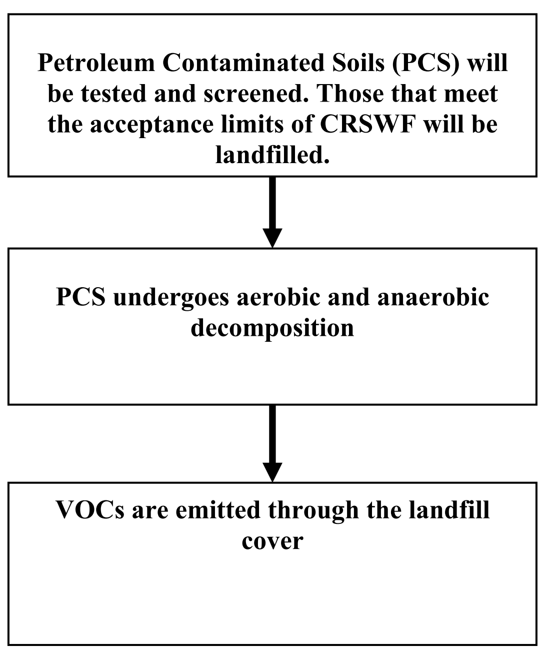


FIGURE 4.5

EMISSION UNIT 5 – VOC EMISSIONS FROM PCS

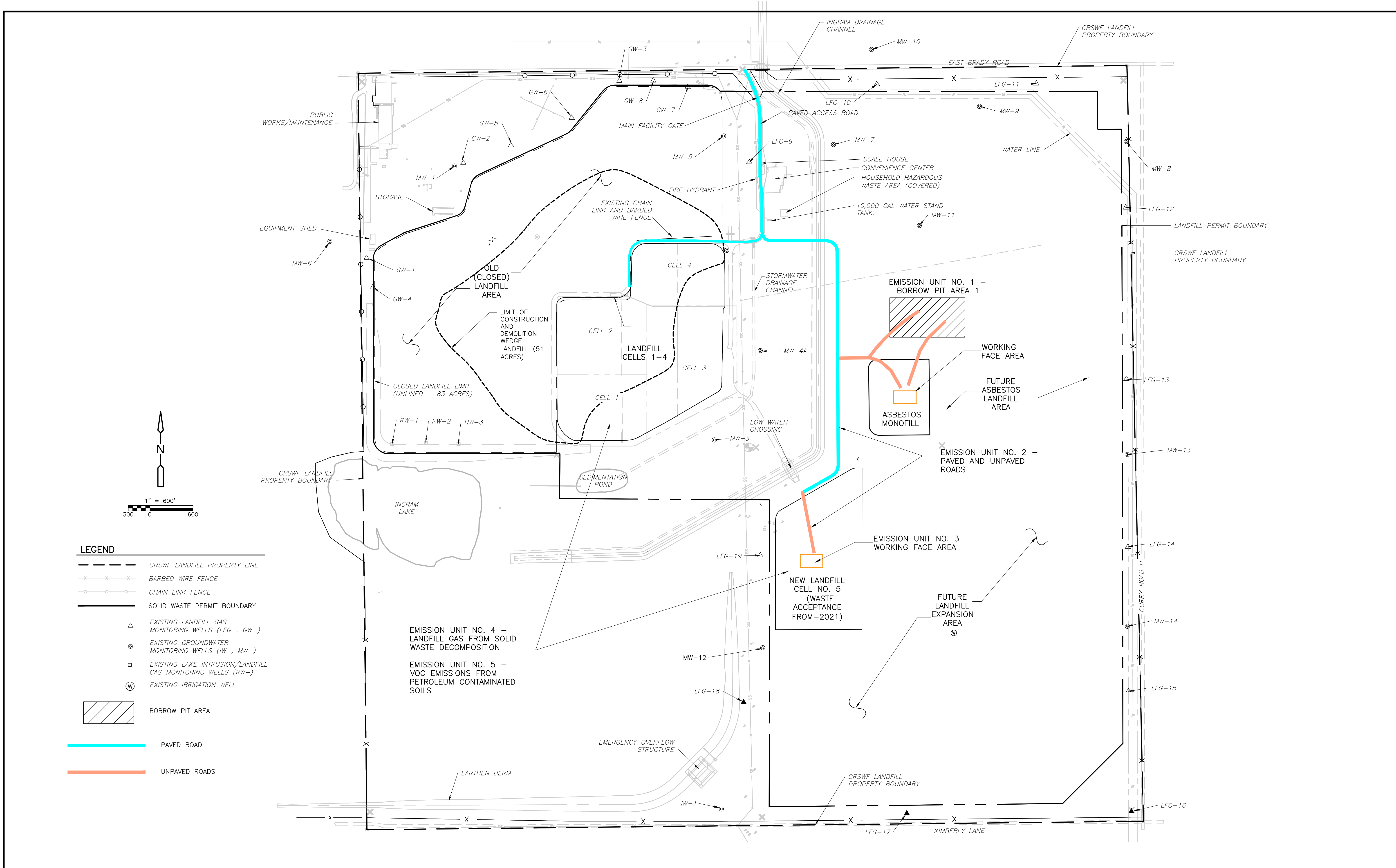


Section 5: Plot Plan Drawn to Scale

Section 5

Plot Plan Drawn To Scale

A **plot plan drawn to scale** showing emissions points, roads, structures, tanks, and fences of property owned, leased, or under direct control of the applicant. This plot plan must clearly designate the restricted area as defined in UA1, Section 1-D.12. The unit numbering system should be consistent throughout this application.



CDM Smith

CITY OF CLOVIS
CLOVIS REGIONAL SOLID WASTE FACILITY (CRSWF) LANDFILL

Figure No. 5-1
PLOT PLAN

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Section 6: All Calculations

Section 6

All Calculations

Show all calculations used to determine both the hourly and annual controlled and uncontrolled emission rates. All calculations shall be performed keeping a minimum of three significant figures. Document the source of each emission factor used (if an emission rate is carried forward and not revised, then a statement to that effect is required). If identical units are being permitted and will be subject to the same operating conditions, submit calculations for only one unit and a note specifying what other units to which the calculations apply. All formulas and calculations used to calculate emissions must be submitted. The "Calculations" tab in the UA2 has been provided to allow calculations to be linked to the emissions tables. Add additional "Calc" tabs as needed. If the UA2 or other spread sheets are used, all calculation spread sheet(s) shall be submitted electronically in Microsoft Excel compatible format so that formulas and input values can be checked. Format all spread sheets and calculations such that the reviewer can follow the logic and verify the input values. Define all variables. If calculation spread sheets are not used, provide the original formulas with defined variables. Additionally, provide subsequent formulas showing the input values for each variable in the formula. All calculations, including those calculations are imbedded in the Calc tab of the UA2 portion of the application, the printed Calc tab(s), should be submitted under this section.

Tank Flashing Calculations: The information provided to the AQB shall include a discussion of the method used to estimate tank-flashing emissions, relative thresholds (i.e., NOI, permit, or major source (NSPS, PSD or Title V)), accuracy of the model, the input and output from simulation models and software, all calculations, documentation of any assumptions used, descriptions of sampling methods and conditions, copies of any lab sample analysis. If Hysis is used, all relevant input parameters shall be reported, including separator pressure, gas throughput, and all other relevant parameters necessary for flashing calculation.

SSM Calculations: It is the applicant's responsibility to provide an estimate of SSM emissions or to provide justification for not doing so. In this Section, provide emissions calculations for Startup, Shutdown, and Routine Maintenance (SSM) emissions listed in the Section 2 SSM and/or Section 22 GHG Tables and the rational for why the others are reported as zero (or left blank in the SSM/GHG Tables). Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (http://www.env.nm.gov/aqb/permit/app_form.html) for more detailed instructions on calculating SSM emissions. If SSM emissions are greater than those reported in the Section 2, Requested Allowables Table, modeling may be required to ensure compliance with the standards whether the application is NSR or Title V. Refer to the Modeling Section of this application for more guidance on modeling requirements.

Glycol Dehydrator Calculations: The information provided to the AQB shall include the manufacturer's maximum design recirculation rate for the glycol pump. If GRI-Glycalc is used, the full input summary report shall be included as well as a copy of the gas analysis that was used.

Road Calculations: Calculate fugitive particulate emissions and enter haul road fugitives in Tables 2-A, 2-D and 2-E for:

1. If you transport raw material, process material and/or product into or out of or within the facility and have PER emissions greater than 0.5 tpy.
2. If you transport raw material, process material and/or product into or out of the facility more frequently than one round trip per day.

Significant Figures:
A. All emissions standards are deemed to have at least two significant figures, but not more than three significant figures.
B. At least 5 significant figures shall be retained in all intermediate calculations.
C. In calculating emissions to determine compliance with an emission standard, the following rounding off procedures shall be used:

- **(1)** If the first digit to be discarded is less than the number 5, the last digit retained shall not be changed;
- **(2)** If the first digit discarded is greater than the number 5, or if it is the number 5 followed by at least one digit other than the number zero, the last figure retained shall be increased by one unit; **and**
- **(3)** If the first digit discarded is exactly the number 5, followed only by zeros, the last digit retained shall be rounded upward if it is an odd number, but no adjustment shall be made if it is an even number.
- **(4)** The final result of the calculation shall be expressed in the units of the standard.

Control Devices: In accordance with 20.2.72.203.A(3) and (8) NMAC, 20.2.70.300.D(5)(b) and (e) NMAC, and 20.2.73.200.B(7) NMAC, the permittee shall report all control devices and list each pollutant controlled by the control device regardless if the applicant takes credit for the reduction in emissions. The applicant can indicate in this section of the application if they chose to not take credit for the reduction in emission rates. For notices of intent submitted under 20.2.73 NMAC, only uncontrolled emission rates can be considered to determine applicability unless the state or federal Acts require the control. This information is necessary to determine if federally enforceable conditions are necessary for the control device, and/or if the control device produces its own regulated pollutants or increases emission rates of other pollutants.

Please refer to the Universal Application Section 2 (Excel file) for all calculations.

Section 6.a

Green House Gas Emissions

(Submitting under 20.2.70, 20.2.72 20.2.74 NMAC)

Title V (20.2.70 NMAC), Minor NSR (20.2.72 NMAC), and PSD (20.2.74 NMAC) applicants must estimate and report greenhouse gas (GHG) emissions to verify the emission rates reported in the public notice, determine applicability to 40 CFR 60 Subparts, and to evaluate Prevention of Significant Deterioration (PSD) applicability. GHG emissions that are subject to air permit regulations consist of the sum of an aggregate group of these six greenhouse gases: carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Calculating GHG Emissions:

1. Calculate the ton per year (tpy) GHG mass emissions and GHG CO_2e emissions from your facility.
2. GHG mass emissions are the sum of the total annual tons of greenhouse gases without adjusting with the global warming potentials (GWPs). GHG CO_2e emissions are the sum of the mass emissions of each individual GHG multiplied by its GWP found in Table A-1 in 40 CFR 98 Mandatory Greenhouse Gas Reporting.
3. Emissions from routine or predictable start up, shut down, and maintenance must be included.
4. Report GHG mass and GHG CO_2e emissions in Table 2-P of this application. Emissions are reported in **short** tons per year and represent each emission unit's Potential to Emit (PTE).
5. All Title V major sources, PSD major sources, and all power plants, whether major or not, must calculate and report GHG mass and CO2e emissions for each unit in Table 2-P.
6. For minor source facilities that are not power plants, are not Title V, and are not PSD there are three options for reporting GHGs in Table 2-P: 1) report GHGs for each individual piece of equipment; 2) report all GHGs from a group of unit types, for example report all combustion source GHGs as a single unit and all venting GHGs as a second separate unit; 3) or check the following ☐ By checking this box, the applicant acknowledges the total CO2e emissions are less than 75,000 tons per year.

Sources for Calculating GHG Emissions:

- Manufacturer's Data
- AP-42 Compilation of Air Pollutant Emission Factors at http://www.epa.gov/ttn/chief/ap42/index.html
- EPA's Internet emission factor database WebFIRE at http://cfpub.epa.gov/webfire/
- 40 CFR 98 Mandatory Green House Gas Reporting except that tons should be reported in short tons rather than in metric tons for the purpose of PSD applicability.
- API Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry. August 2009 or most recent version.
- Sources listed on EPA's NSR Resources for Estimating GHG Emissions at http://www.epa.gov/nsr/clean-air-act-permitting-greenhouse-gases:

Global Warming Potentials (GWP):
Applicants must use the Global Warming Potentials codified in Table A-1 of the most recent version of 40 CFR 98 Mandatory Greenhouse Gas Reporting. The GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to that of one unit mass of CO_2 over a specified time period.

"Greenhouse gas" for the purpose of air permit regulations is defined as the aggregate group of the following six gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. **(20.2.70.7 NMAC, 20.2.74.7 NMAC).** You may also find GHGs defined in 40 CFR 86.1818-12(a).

Metric to Short Ton Conversion:
Short tons for GHGs and other regulated pollutants are the standard unit of measure for PSD and title V permitting programs. 40 CFR 98 Mandatory Greenhouse Reporting requires metric tons.
1 metric ton = 1.10231 short tons (per Table A-2 to Subpart A of Part 98 – Units of Measure Conversions)

Please refer to the Universal Application Section 2 (Excel file) for all calculations.

Section 7: Information Used to Determine Emissions

Section 7

Information Used To Determine Emissions

Information Used to Determine Emissions shall include the following:

- If manufacturer data are used, include specifications for emissions units and control equipment, including control efficiencies specifications and sufficient engineering data for verification of control equipment operation, including design drawings, test reports, and design parameters that affect normal operation.
- If test data are used, include a copy of the complete test report. If the test data are for an emissions unit other than the one being permitted, the emission units must be identical. Test data may not be used if any difference in operating conditions of the unit being permitted and the unit represented in the test report significantly effect emission rates.
- If the most current copy of AP-42 is used, reference the section and date located at the bottom of the page. Include a copy of the page containing the emissions factors, and clearly mark the factors used in the calculations.
- If an older version of AP-42 is used, include a complete copy of the section.
- If an EPA document or other material is referenced, include a complete copy.
- Fuel specifications sheet.
- If computer models are used to estimate emissions, include an input summary (if available) and a detailed report, and a disk containing the input file(s) used to run the model. For tank-flashing emissions, include a discussion of the method used to estimate tank-flashing emissions, relative thresholds (i.e., permit or major source (NSPS, PSD or Title V)), accuracy of the model, the input and output from simulation models and software, all calculations, documentation of any assumptions used, descriptions of sampling methods and conditions, copies of any lab sample analysis.

- Copies of relevant pages (pdf) of Sections 11.9, 13.2.1, 13.2.2 13.2.4 of AP-42 are included (ATTACHMENT 7-1). AP-42 was used to estimate fugitive emissions from the storage pile, from equipment operating at the working face area and from vehicles traveling through paved and unpaved roads at the landfill.

- Below are the versions of AP-42 that were used:

  - Section 11.9 (Western Surface Coal Mining) – 10/98
  - Section 13.2.1 (Paved Roads) – 01/11
  - Section 13.2.2 (Unpaved Roads) – 11/06
  - Section 13.2.4 (Aggregate Handling And Storage Piles) – 11/06

- A copy of relevant pages (pdf) from the EPA document titled “How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites” is also included (ATTACHMENT 7-1). This document was used to estimate VOC emissions from petroleum contaminated soils.

- A copy of the Tier II NMOC Emission Rate Report (pdf) dated August 30, 2021 is included (ATTACHMENT 7-2).

ATTACHMENT 7-1

AP-42 PAGES

11.9 Western Surface Coal Mining

11.9.1 General[1]

There are 12 major coal fields in the western states (excluding the Pacific Coast and Alaskan fields), as shown in Figure 11.9-1. Together, they account for more than 64 percent of the surface minable coal reserves in the United States.[2] The 12 coal fields have varying characteristics that may influence fugitive dust emission rates from mining operations including overburden and coal seam thicknesses and structure, mining equipment, operating procedures, terrain, vegetation, precipitation and surface moisture, wind speeds, and temperatures. The operations at a typical western surface mine are shown in Figure 11.9-2. All operations that involve movement of soil or coal, or exposure of erodible surfaces, generate some amount of fugitive dust.

The initial operation is removal of topsoil and subsoil with large scrapers. The topsoil is carried by the scrapers to cover a previously mined and regraded area as part of the reclamation process or is placed in temporary stockpiles. The exposed overburden, the earth that is between the topsoil and the coal seam, is leveled, drilled, and blasted. Then the overburden material is removed down to the coal seam, usually by a dragline or a shovel and truck operation. It is placed in the adjacent mined cut, forming a spoils pile. The uncovered coal seam is then drilled and blasted. A shovel or front end loader loads the broken coal into haul trucks, and it is taken out of the pit along graded haul roads to the tipple, or truck dump. Raw coal sometimes may be dumped onto a temporary storage pile and later rehandled by a front end loader or bulldozer.

At the tipple, the coal is dumped into a hopper that feeds the primary crusher, then is conveyed through additional coal preparation equipment such as secondary crushers and screens to the storage area. If the mine has open storage piles, the crushed coal passes through a coal stacker onto the pile. The piles, usually worked by bulldozers, are subject to wind erosion. From the storage area, the coal is conveyed to a train loading facility and is put into rail cars. At a captive mine, coal will go from the storage pile to the power plant.

During mine reclamation, which proceeds continuously throughout the life of the mine, overburden spoils piles are smoothed and contoured by bulldozers. Topsoil is placed on the graded spoils, and the land is prepared for revegetation by furrowing, mulching, etc. From the time an area is disturbed until the new vegetation emerges, all disturbed areas are subject to wind erosion.

11.9.2 Emissions

Predictive emission factor equations for open dust sources at western surface coal mines are presented in Tables 11.9-1 and 11.9-2. Each equation applies to a single dust-generating activity, such as vehicle traffic on haul roads. The predictive equation explains much of the observed variance in emission factors by relating emissions to three sets of source parameters: (1) measures of source activity or energy expended (e. g., speed and weight of a vehicle traveling on an unpaved road); (2) properties of the material being disturbed (e. g., suspendable fines in the surface material of an unpaved road); and (3) climate (in this case, mean wind speed).

Table 11.9-1 (English Units). EMISSION FACTOR EQUATIONS FOR UNCONTROLLED OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES[a]

Operation	Material	Emissions By Particle Size Range (Aerodynamic Diameter)[b,c]				Units	EMISSION FACTOR RATING
		Emission Factor Equations		Scaling Factors			
		TSP ≤30 µm	≤15 µm	≤10 µm[d]	≤2.5 µm/TSP[e]		
Blasting[f]	Coal or overburden	$0.000014(A)^{1.5}$	ND	0.52[e]	0.03	lb/blast	C_DD
Truck loading	Coal	$\frac{1.16}{(M)^{1.2}}$	$\frac{0.119}{(M)^{0.9}}$	0.75	0.019	lb/ton	BBCC
Bulldozing	Coal	$\frac{78.4\ (s)^{1.2}}{(M)^{1.3}}$	$\frac{18.6\ (s)^{1.5}}{(M)^{1.4}}$	0.75	0.022	lb/hr	CCDD
	Overburden	$\frac{5.7\ (s)^{1.2}}{(M)^{1.3}}$	$\frac{1.0\ (s)^{1.5}}{(M)^{1.4}}$	0.75	0.105	lb/hr	BCDD
Dragline	Overburden	$\frac{0.0021\ (d)^{1.1}}{(M)^{0.3}}$	$\frac{0.0021\ (d)^{0.7}}{(M)^{0.3}}$	0.75	0.017	lb/yd^3	BCDD
Vehicle traffic[g]							
Grading		$0.040\ (S)^{2.5}$	$0.051\ (S)^{2.0}$	0.60	0.031	lb/VMT	CCDD
Active storage pile[h] (wind erosion and maintenance)	Coal	0.72 u	ND	ND	ND	$\frac{lb}{(acre)(hr)}$	C[i] _ _ _

[a] Reference 1, except as noted. VMT = vehicle miles traveled. ND = no data. Quality ratings coded where "Q, X, Y, Z" are ratings for ≤30 µm, ≤15 µm, ≤10 µm, and ≤2.5 µm, respectively. See also note below.

[b] Particulate matter less than or equal to 30 µm in aerodynamic diameter is sometimes termed "suspendable particulate" and is often used as a surrogate for TSP (total suspended particulate). TSP denotes what is measured by a standard high volume sampler (see Section 13.2).

[c] Symbols for equations:

- A = horizontal area (ft^2), with blasting depth ≤ 70 ft. Not for vertical face of a bench.
- M = material moisture content (%)
- s = material silt content (%)
- u = wind speed (mph)
- d = drop height (ft)
- W = mean vehicle weight (tons)
- S = mean vehicle speed (mph)
- w = mean number of wheels

Table 11.9-1 (cont.).

[d] Multiply the ≤15-µm equation by this fraction to determine emissions, except as noted.
[e] Multiply the TSP predictive equation by this fraction to determine emissions.
[f] Blasting factor taken from a reexamination of field test data reported in Reference 1. See Reference 4.
[g] To estimate emissions from traffic on unpaved surfaces by vehicles such as haul trucks, light-to-medium duty vehicles, or scrapers in the travel mode, see the unpaved road emission factor equation in AP-42 Section 13.2.2.
[h] Coal storage pile factor taken from Reference 5. To estimate emissions on a shorter time scale (e. g., worst-case day), see the procedure presented in Section 13.2.5.
[i] Rating applicable to mine types I, II, and IV (see Tables 11.9-5 and 11.9-6).

Note: Section 234 of the Clean Air Act of 1990 required EPA to review and revise the emission factors in this Section (and models used to evaluate ambient air quality impact), to ensure that they did not overestimate emissions from western surface coal mines. Due to resource and technical limitations, the haul road emission factors were isolated to receive the most attention during these studies, as the largest contributor to emissions. Resultant model evaluation with revised emission factors have improved model prediction for total suspended particulate (TSP); however, there is still a tendency for overprediction of particulate matter impact for PM-10, for as yet undetermined causes, prompting the Agency to make a policy decision not to use them for regulatory applications to these sources. However, the technical consideration exists that no better alternative data are currently available and the information should be made known. Users should accordingly use these factors with caution and awareness of their likely limitations.

Table 11.9-3 (Metric And English Units). TYPICAL VALUES FOR CORRECTION FACTORS APPLICABLE TO THE PREDICTIVE EMISSION FACTOR EQUATIONS[a]

Source	Correction Factor	Number Of Test Samples	Range	Geometric Mean	Units
Blasting	Area blasted	17	100 - 6,800	1,590	m^2
	Area blasted	17	1100 - 73,000	17,000	ft^2
Coal loading	Moisture	7	6.6 - 38	17.8	%
Bulldozers					
Coal	Moisture	3	4.0 - 22.0	10.4	%
	Silt	3	6.0 - 11.3	8.6	%
Overburden	Moisture	8	2.2 - 16.8	7.9	%
	Silt	8	3.8 - 15.1	6.9	%
Dragline	Drop distance	19	1.5 - 30	8.6	m
	Drop distance	19	5 - 100	28.1	ft
	Moisture	7	0.2 - 16.3	3.2	%
Scraper	Silt	10	7.2 - 25.2	16.4	%
	Weight	15	33 - 64	48.8	Mg
	Weight	15	36 - 70	53.8	ton
Grader	Speed	7	8.0 - 19.0	11.4	kph
	Speed		5.0 - 11.8	7.1	mph
Haul truck	Silt content	61	1.2 - 19.2	4.3	%
	Moisture	60	0.3 - 20.1	2.4	%
	Weight	61	20.9 - 260	110	mg
	Weight	61	23.0 - 290	120	ton

[a] Reference 1,6.

Table 11.9-4 (English And Metric Units). UNCONTROLLED PARTICULATE EMISSION FACTORS FOR OPEN DUST SOURCES AT WESTERN SURFACE COAL MINES

Source	Material	Mine Location[a]	TSP Emission Factor[b]	Units	EMISSION FACTOR RATING
Drilling	Overburden	Any	1.3 0.59	lb/hole kg/hole	C C
	Coal	V	0.22 0.10	lb/hole kg/hole	E E
Topsoil removal by scraper	Topsoil	Any	0.058 0.029	lb/ton kg/Mg	E E
		IV	0.44 0.22	lb/ton kg/Mg	E E
Overburden replacement	Overburden	Any	0.012 0.0060	lb/ton kg/Mg	C C
Truck loading by power shovel (batch drop)[c]	Overburden	V	0.037 0.018	lb/ton kg/Mg	E E
Train loading (batch or continuous drop)[c]	Coal	Any	0.028 0.014	lb/ton kg/Mg	E E
		III	0.0002 0.0001	lb/ton kg/Mg	E E
Bottom dump truck unloading (batch drop)[c]	Overburden	V	0.002 0.001	lb/ton kg/Mg	E E
	Coal	IV	0.027 0.014	lb/ton kg/Mg	E E
		III	0.005 0.002	lb/ton kg/Mg	E E
		II	0.020 0.010	lb/ton kg/Mg	E E
		I	0.014 0.0070	lb/T kg/Mg	E E
		Any	0.066 0.033	lb/T kg/Mg	D D

Table 11.9-4 (cont.).

Source	Material	Mine Location[a]	TSP Emission Factor[b]	Units	EMISSION FACTOR RATING
End dump truck unloading (batch drop)[c]	Coal	V	0.007 0.004	lb/T kg/Mg	E E
Scraper unloading (batch drop)[c]	Topsoil	IV	0.04 0.02	lb/T kg/Mg	E E
Wind erosion of exposed areas[d]	Seeded land, stripped overburden, graded overburden	Any	0.38	$\frac{T}{(acre)(yr)}$	C
			0.85	$\frac{Mg}{(hectare)(yr)}$	C

[a] Roman numerals I through V refer to specific mine locations for which the corresponding emission factors were developed (Reference 5). Tables 11.9-4 and 11.9-5 present characteristics of each of these mines. See text for correct use of these "mine-specific" emission factors. The other factors (from Reference 7, except for overburden drilling from Reference 1) can be applied to any western surface coal mine.
[b] Total suspended particulate (TSP) denotes what is measured by a standard high volume sampler (see Section 13.2).
[c] Predictive emission factor equations, which generally provide more accurate estimates of emissions, are presented in Chapter 13.
[d] To estimate wind erosion on a shorter time scale (e. g., worst-case day), see Section 13.2.5.

13.2.1 Paved Roads

13.2.1.1 General

Particulate emissions occur whenever vehicles travel over a paved surface such as a road or parking lot. Particulate emissions from paved roads are due to direct emissions from vehicles in the form of exhaust, brake wear and tire wear emissions and resuspension of loose material on the road surface. In general terms, resuspended particulate emissions from paved roads originate from, and result in the depletion of, the loose material present on the surface (i.e., the surface loading). In turn, that surface loading is continuously replenished by other sources. At industrial sites, surface loading is replenished by spillage of material and trackout from unpaved roads and staging areas. Figure 13.2.1-1 illustrates several transfer processes occurring on public streets.

Various field studies have found that public streets and highways, as well as roadways at industrial facilities, can be major sources of the atmospheric particulate matter within an area.[1-9] Of particular interest in many parts of the United States are the increased levels of emissions from public paved roads when the equilibrium between deposition and removal processes is upset. This situation can occur for various reasons, including application of granular materials for snow and ice control, mud/dirt carryout from construction activities in the area, and deposition from wind and/or water erosion of surrounding unstabilized areas. In the absence of continuous addition of fresh material (through localized track out or application of antiskid material), paved road surface loading should reach an equilibrium value in which the amount of material resuspended matches the amount replenished. The equilibrium surface loading value depends upon numerous factors. It is believed that the most important factors are: mean speed of vehicles traveling the road; the average daily traffic (ADT); the number of lanes and ADT per lane; the fraction of heavy vehicles (buses and trucks); and the presence/absence of curbs, storm sewers and parking lanes.[10]

The particulate emission factors presented in a previous version of this section of AP-42, dated October 2002, implicitly included the emissions from vehicles in the form of exhaust, brake wear, and tire wear as well as resuspended road surface material. EPA included these sources in the emission factor equation for paved roads since the field testing data used to develop the equation included both the direct emissions from vehicles and emissions from resuspension of road dust.

This version of the paved road emission factor equation only estimates particulate emissions from resuspended road surface material[28]. The particulate emissions from vehicle exhaust, brake wear, and tire wear are now estimated separately using EPA's MOVES[29] model. This approach eliminates the possibility of double counting emissions. Double counting results when employing the previous version of the emission factor equation in this section and MOVES to estimate particulate emissions from vehicle traffic on paved roads. It also incorporates the decrease in exhaust emissions that has occurred since the paved road emission factor equation was developed. Earlier versions of the paved road emission factor equation includes estimates of emissions from exhaust, brake wear, and tire wear based on emission rates for vehicles in the 1980 calendar year fleet. The amount of PM released from vehicle exhaust has decreased since 1980 due to lower new vehicle emission standards and changes in fuel characteristics.

13.2.1.3 Predictive Emission Factor Equations[10,29]

The quantity of particulate emissions from resuspension of loose material on the road surface due to vehicle travel on a dry paved road may be estimated using the following empirical expression:

$$E = k\,(sL)^{0.91} \times (W)^{1.02} \qquad (1)$$

where:
- E = particulate emission factor (having units matching the units of k),
- k = particle size multiplier for particle size range and units of interest (see below),
- sL = road surface silt loading (grams per square meter) (g/m^2), and
- W = average weight (tons) of the vehicles traveling the road.

It is important to note that Equation 1 calls for the average weight of all vehicles traveling the road. For example, if 99 percent of traffic on the road are 2 ton cars/trucks while the remaining 1 percent consists of 20 ton trucks, then the mean weight "W" is 2.2 tons. More specifically, Equation 1 is *not* intended to be used to calculate a separate emission factor for each vehicle weight class. Instead, only one emission factor should be calculated to represent the "fleet" average weight of all vehicles traveling the road.

The particle size multiplier (k) above varies with aerodynamic size range as shown in Table 13.2.1-1. To determine particulate emissions for a specific particle size range, use the appropriate value of k shown in Table 13.2.1-1.

To obtain the total emissions factor, the emission factors for the exhaust, brake wear and tire wear obtained from either EPA's MOBILE6.2 [27] or MOVES2010 [29] model should be added to the emissions factor calculated from the empirical equation.

Table 13.2.1-1. PARTICLE SIZE MULTIPLIERS FOR PAVED ROAD EQUATION

Size range[a]	Particle Size Multiplier k[b]		
	g/VKT	g/VMT	lb/VMT
PM-2.5[c]	0.15	0.25	0.00054
PM-10	0.62	1.00	0.0022
PM-15	0.77	1.23	0.0027
PM-30[d]	3.23	5.24	0.011

[a] Refers to airborne particulate matter (PM-x) with an aerodynamic diameter equal to or less than x micrometers.

[b] Units shown are grams per vehicle kilometer traveled (g/VKT), grams per vehicle mile traveled (g/VMT), and pounds per vehicle mile traveled (lb/VMT). The multiplier k includes unit conversions to produce emission factors in the units shown for the indicated size range from the mixed units required in Equation 1.

[c] The k-factors for $PM_{2.5}$ were based on the average $PM_{2.5}$:PM_{10} ratio of test runs in Reference 30.

[d] PM-30 is sometimes termed "suspendable particulate" (SP) and is often used as a surrogate for TSP.

Equation 1 is based on a regression analysis of 83 tests for PM-10.[3, 5-6, 8, 27-29, 31-36] Sources tested include public paved roads, as well as controlled and uncontrolled industrial paved roads. The majority of tests involved freely flowing vehicles traveling at constant speed on relatively level roads. However, 22 tests of slow moving or "stop-and-go" traffic or vehicles under load were available for inclusion in the data base.[32-36] Engine exhaust, tire wear and break wear were subtracted from the emissions measured in the test programs prior to stepwise regression to determine Equation 1.[37, 39] The equations retain the quality rating of A (D for PM-2.5), if applied within the range of source conditions that were tested in developing the equation as follows:

Silt loading:	0.03 - 400 g/m^2 0.04 - 570 grains/square foot (ft^2)
Mean vehicle weight:	1.8 - 38 megagrams (Mg) 2.0 - 42 tons
Mean vehicle speed:	1 - 88 kilometers per hour (kph) 1 - 55 miles per hour (mph)

The upper and lower 95% confidence levels of equation 1 for PM_{10} is best described with equations using an exponents of 1.14 and 0.677 for silt loading and an exponents of 1.19 and 0.85 for weight. Users are cautioned that application of equation 1 outside of the range of variables and operating conditions specified above, e.g., application to roadways or road networks with speeds above 55 mph and average vehicle weights of 42 tons, will result in emission estimates with a higher level of uncertainty. In these situations, users are encouraged to consider an assessment of the impacts of the influence of extrapolation to the overall emissions and alternative methods that are equally or more plausible in light of local emissions data and/or ambient concentration or compositional data.

To retain the quality rating for the emission factor equation when it is applied to a specific paved road, it is necessary that reliable correction parameter values for the specific road in question be determined. With the exception of limited access roadways, which are difficult to sample, the collection and use of site-specific silt loading (sL) data for public paved road emission inventories are strongly recommended. The field and laboratory procedures for determining surface material silt content and surface dust loading are summarized in Appendices C.1 and C.2. In the event that site-specific values cannot be obtained, an appropriate value for a paved public road may be selected from the values in Table 13.2.1-2, but the quality rating of the equation should be reduced by 2 levels.

Equation 1 may be extrapolated to average uncontrolled conditions (but including natural mitigation) under the simplifying assumption that annual (or other long-term) average emissions are inversely proportional to the frequency of measurable (> 0.254 mm [0.01 inch]) precipitation by application of a precipitation correction term. The precipitation correction term can be applied on a daily or an hourly basis [26, 38].

For the daily basis, Equation 1 becomes:

$$E_{ext} = [\, k\,(sL)^{0.91} \times (W)^{1.02}\,]\,(1 - P/4N) \qquad (2)$$

where k, sL, W, and S are as defined in Equation 1 and

E_{ext} = annual or other long-term average emission factor in the same units as k,

P = number of "wet" days with at least 0.254 mm (0.01 in) of precipitation during the averaging period, and

N = number of days in the averaging period (e.g., 365 for annual, 91 for seasonal, 30 for monthly).

Note that the assumption leading to Equation 2 is based on analogy with the approach used to develop long-term average unpaved road emission factors in Section 13.2.2. However, Equation 2 above incorporates an additional factor of "4" in the denominator to account for the fact that paved roads dry more quickly than unpaved roads and that the precipitation may not occur over the complete 24-hour day.

For the hourly basis, equation 1 becomes:

$$E_{ext} = [\ k\ (sL)^{0.91} \times (W)^{1.02}\ ]\ (1 - 1.2P/N) \qquad (3)$$

where k, sL, W, and S are as defined in Equation 1 and

E_{ext} = annual or other long-term average emission factor in the same units as k,

P = number of hours with at least 0.254 mm (0.01 in) of precipitation during the averaging period, and

N = number of hours in the averaging period (e.g., 8760 for annual, 2124 for season 720 for monthly)

Note: In the hourly moisture correction term (1-1.2P/N) for equation 3, the 1.2 multiplier is applied to account for the residual mitigative effect of moisture. For most applications, this equation will produce satisfactory results. Users should select a time interval to include sufficient "dry" hours such that a reasonable emissions averaging period is evaluated. For the special case where this equation is used to calculate emissions on an hour by hour basis, such as would be done in some emissions modeling situations, the moisture correction term should be modified so that the moisture correction "credit" is applied to the first hours following cessation of precipitation. In this special case, it is suggested that this 20% "credit" be applied on a basis of one hour credit for each hour of precipitation up to a maximum of 12 hours.

Note that the assumption leading to Equation 3 is based on analogy with the approach used to develop long-term average unpaved road emission factors in Section 13.2.2.

Figure 13.2.1-2 presents the geographical distribution of "wet" days on an annual basis for the United States. Maps showing this information on a monthly basis are available in the *Climatic Atlas of the United States*[23] . Alternative sources include other Department of Commerce publications (such as local climatological data summaries). The National Climatic Data Center (NCDC) offers several products that provide hourly precipitation data. In particular, NCDC offers *Solar and Meteorological Surface Observation Network 1961-1990* (SAMSON) CD-ROM, which contains 30 years worth of hourly meteorological data for first-order National Weather Service locations. Whatever meteorological data are used, the source of that data and the averaging period should be clearly specified.

It is emphasized that the simple assumption underlying Equations 2 and 3 has not been verified in any rigorous manner. For that reason, the quality ratings for Equations 2 and 3 should be downgraded one letter from the rating that would be applied to Equation 1.

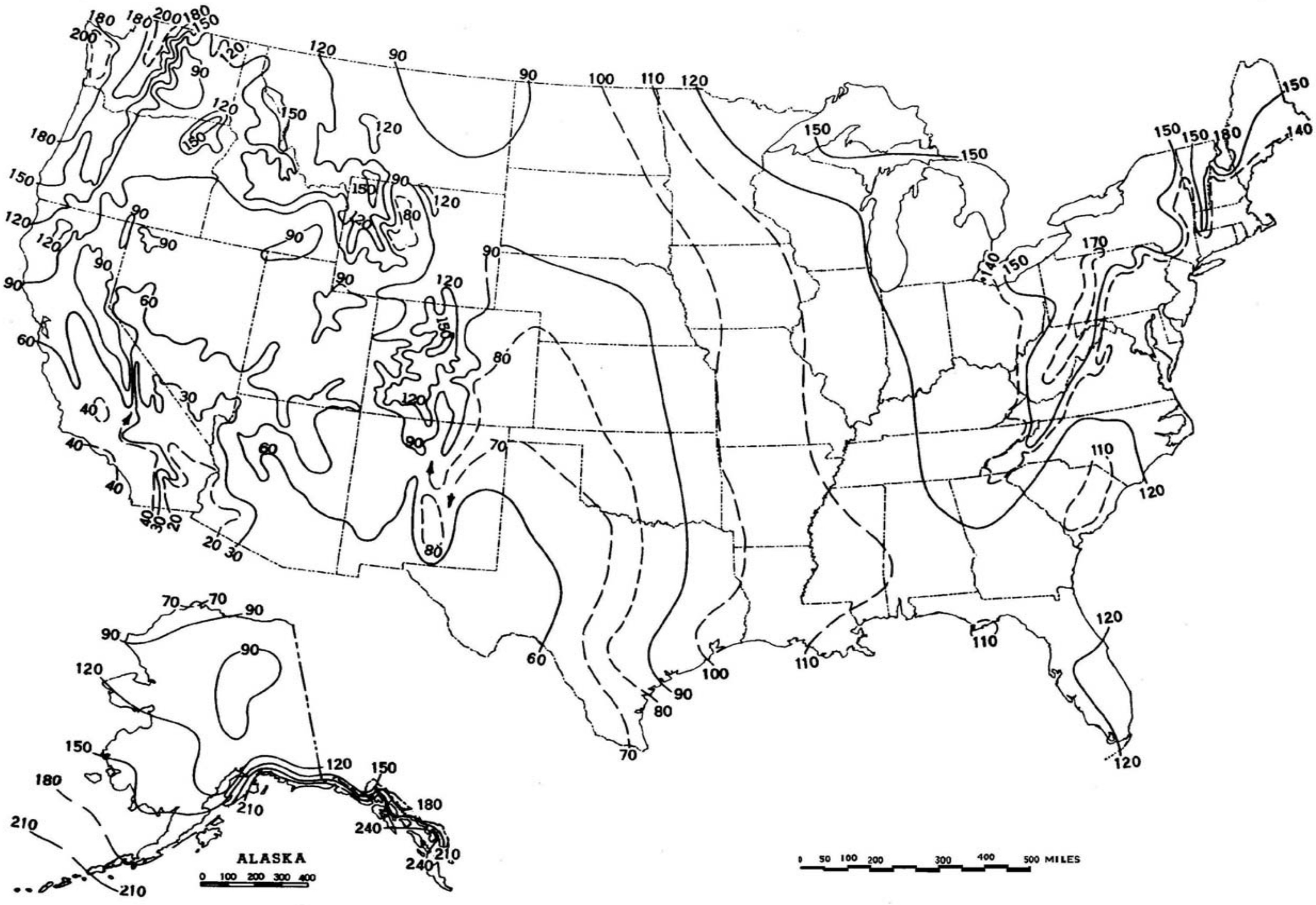


Figure 13.2.1-2. Mean number of days with 0.01 inch or more of precipitation in the United States.

Table 13.2.1-3 (Metric And English Units). TYPICAL SILT CONTENT AND LOADING VALUES FOR PAVED ROADS AT INDUSTRIAL FACILITIES [a]

Industry	No. of Sites	No. Of Samples	Silt Content (%)		No. of Travel Lanes	Total Loading x 10^{-3}			Silt Loading (g/m^2)	
			Range	Mean		Range	Mean	Units[b]	Range	Mean
Copper smelting	1	3	15.4-21.7	19.0	2	12.9 - 19.5 45.8 - 69.2	15.9 55.4	kg/km lb/mi	188-400	292
Iron and steel production	9	48	1.1-35.7	12.5	2	0.006 - 4.77 0.020 -16.9	0.495 1.75	kg/km lb/mi	0.09-79	9.7
Asphalt batching	1	3	2.6 - 4.6	3.3	1	12.1 - 18.0 43.0 - 64.0	14.9 52.8	kg/km lb/mi	76-193	120
Concrete batching	1	3	5.2 - 6.0	5.5	2	1.4 - 1.8 5.0 - 6.4	1.7 5.9	kg/km lb/mi	11-12	12
Sand and gravel processing	1	3	6.4 - 7.9	7.1	1	2.8 - 5.5 9.9 - 19.4	3.8 13.3	kg/km lb/mi	53-95	70
Municipal solid waste landfill	2	7		-	2	-			1.1-32.0	7.4
Quarry	1	6		-	2	-			2.4-14	8.2
Corn wet mills	3	15		-	2	-			0.05 – 2.9	1.1

[a] References 1-2,5-6,11-13. Values represent samples collected from *industrial* roads. Public road silt loading values are presented in Table-13.2.1-2. Dashes indicate information not available.[b] Multiply entries by 1000 to obtain stated units; kilograms per kilometer (kg/km) and pounds per mile (lb/mi).

13.2.2 Unpaved Roads

13.2.2.1 General

When a vehicle travels an unpaved road, the force of the wheels on the road surface causes pulverization of surface material. Particles are lifted and dropped from the rolling wheels, and the road surface is exposed to strong air currents in turbulent shear with the surface. The turbulent wake behind the vehicle continues to act on the road surface after the vehicle has passed.

The particulate emission factors presented in the previous draft version of this section of AP-42, dated October 2001, implicitly included the emissions from vehicles in the form of exhaust, brake wear, and tire wear as well as resuspended road surface material[25]. EPA included these sources in the emission factor equation for unpaved public roads (equation 1b in this section) since the field testing data used to develop the equation included both the direct emissions from vehicles and emissions from resuspension of road dust.

This version of the unpaved public road emission factor equation only estimates particulate emissions from resuspended road surface material [23, 26]. The particulate emissions from vehicle exhaust, brake wear, and tire wear are now estimated separately using EPA's MOBILE6.2 [24]. This approach eliminates the possibility of double counting emissions. Double counting results when employing the previous version of the emission factor equation in this section and MOBILE6.2 to estimate particulate emissions from vehicle traffic on unpaved public roads. It also incorporates the decrease in exhaust emissions that has occurred since the unpaved public road emission factor equation was developed. The previous version of the unpaved public road emission factor equation includes estimates of emissions from exhaust, brake wear, and tire wear based on emission rates for vehicles in the 1980 calendar year fleet. The amount of PM released from vehicle exhaust has decreased since 1980 due to lower new vehicle emission standards and changes in fuel characteristics.

13.2.2.2 Emissions Calculation And Correction Parameters[1-6]

The quantity of dust emissions from a given segment of unpaved road varies linearly with the volume of traffic. Field investigations also have shown that emissions depend on source parameters that characterize the condition of a particular road and the associated vehicle traffic. Characterization of these source parameters allow for "correction" of emission estimates to specific road and traffic conditions present on public and industrial roadways.

Dust emissions from unpaved roads have been found to vary directly with the fraction of silt (particles smaller than 75 micrometers [µm] in diameter) in the road surface materials.[1] The silt fraction is determined by measuring the proportion of loose dry surface dust that passes a 200-mesh screen, using the ASTM-C-136 method. A summary of this method is contained in Appendix C of AP-42. Table 13.2.2-1 summarizes measured silt values for industrial unpaved roads. Table 13.2.2-2 summarizes measured silt values for public unpaved roads. It should be noted that the ranges of silt content vary over two orders of magnitude. Therefore, the use of data from this table can potentially introduce considerable error. Use of this data is strongly discouraged when it is feasible to obtain locally gathered data.

Since the silt content of a rural dirt road will vary with geographic location, it should be measured for use in projecting emissions. As a conservative approximation, the silt content of the parent soil in the area can be used. Tests, however, show that road silt content is normally lower than in the surrounding parent soil, because the fines are continually removed by the vehicle traffic, leaving a higher percentage of coarse particles.

Table 13.2.2-1. TYPICAL SILT CONTENT VALUES OF SURFACE MATERIAL ON INDUSTRIAL UNPAVED ROADS[a]

Industry	Road Use Or Surface Material	Plant Sites	No. Of Samples	Silt Content (%)	
				Range	Mean
Copper smelting	Plant road	1	3	16 - 19	17
Iron and steel production	Plant road	19	135	0.2 - 19	6.0
Sand and gravel processing	Plant road	1	3	4.1 - 6.0	4.8
	Material storage area	1	1	-	7.1
Stone quarrying and processing	Plant road	2	10	2.4 - 16	10
	Haul road to/from pit	4	20	5.0-15	8.3
Taconite mining and processing	Service road	1	8	2.4 - 7.1	4.3
	Haul road to/from pit	1	12	3.9 - 9.7	5.8
Western surface coal mining	Haul road to/from pit	3	21	2.8 - 18	8.4
	Plant road	2	2	4.9 - 5.3	5.1
	Scraper route	3	10	7.2 - 25	17
	Haul road (freshly graded)	2	5	18 - 29	24
Construction sites	Scraper routes	7	20	0.56-23	8.5
Lumber sawmills	Log yards	2	2	4.8-12	8.4
Municipal solid waste landfills	Disposal routes	4	20	2.2 - 21	6.4

[a]References 1,5-15.

The following empirical expressions may be used to estimate the quantity in pounds (lb) of size-specific particulate emissions from an unpaved road, per vehicle mile traveled (VMT):

For vehicles traveling on unpaved surfaces at industrial sites, emissions are estimated from the following equation:

$$E = k\ (s/12)^{a}(W/3)^{b} \tag{1a}$$

and, for vehicles traveling on publicly accessible roads, dominated by light duty vehicles, emissions may be estimated from the following:

$$E = \frac{k\ (s/12)^{a}(S/30)^{d}}{(M/0.5)^{c}} - C \tag{1b}$$

where k, a, b, c and d are empirical constants (Reference 6) given below and

E = size-specific emission factor (lb/VMT)
s = surface material silt content (%)
W = mean vehicle weight (tons)
M = surface material moisture content (%)
S = mean vehicle speed (mph)
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

The source characteristics s, W and M are referred to as correction parameters for adjusting the emission estimates to local conditions. The metric conversion from lb/VMT to grams (g) per vehicle kilometer traveled (VKT) is as follows:

1 lb/VMT = 281.9 g/VKT

The constants for Equations 1a and 1b based on the stated aerodynamic particle sizes are shown in Tables 13.2.2-2 and 13.2.2-4. The PM-2.5 particle size multipliers (k-factors) are taken from Reference 27.

Table 13.2.2-2. CONSTANTS FOR EQUATIONS 1a AND 1b

Constant	Industrial Roads (Equation 1a)			Public Roads (Equation 1b)		
	PM-2.5	PM-10	PM-30*	PM-2.5	PM-10	PM-30*
k (lb/VMT)	0.15	1.5	4.9	0.18	1.8	6.0
a	0.9	0.9	0.7	1	1	1
b	0.45	0.45	0.45	-	-	-
c	-	-	-	0.2	0.2	0.3
d	-	-	-	0.5	0.5	0.3
Quality Rating	B	B	B	B	B	B

*Assumed equivalent to total suspended particulate matter (TSP)
"-" = not used in the emission factor equation

Table 13.2.2-2 also contains the quality ratings for the various size-specific versions of Equation 1a and 1b. The equation retains the assigned quality rating, if applied within the ranges of source conditions, shown in Table 13.2.2-3, that were tested in developing the equation:

Table 13.2.2-3. RANGE OF SOURCE CONDITIONS USED IN DEVELOPING EQUATION 1a AND 1b

Emission Factor	Surface Silt Content, %	Mean Vehicle Weight		Mean Vehicle Speed		Mean No. of Wheels	Surface Moisture Content, %
		Mg	ton	km/hr	mph		
Industrial Roads (Equation 1a)	1.8-25.2	1.8-260	2-290	8-69	5-43	4-17[a]	0.03-13
Public Roads (Equation 1b)	1.8-35	1.4-2.7	1.5-3	16-88	10-55	4-4.8	0.03-13

[a] See discussion in text.

As noted earlier, the models presented as Equations 1a and 1b were developed from tests of traffic on unpaved surfaces. Unpaved roads have a hard, generally nonporous surface that usually dries quickly after a rainfall or watering, because of traffic-enhanced natural evaporation. (Factors influencing how fast a road dries are discussed in Section 13.2.2.3, below.) The quality ratings given above pertain to the mid-range of the measured source conditions for the equation. A higher mean vehicle weight and a higher than normal traffic rate may be justified when performing a worst-case analysis of emissions from unpaved roads.

The emission factors for the exhaust, brake wear and tire wear of a 1980's vehicle fleet (*C*) was obtained from EPA's MOBILE6.2 model [23]. The emission factor also varies with aerodynamic size range average uncontrolled conditions (but including natural mitigation) under the simplifying assumption that annual average emissions are inversely proportional to the number of days with measurable (more than 0.254 mm [0.01 inch]) precipitation:

$$E_{ext} = E\ [(365 - P)/365] \qquad (2)$$

where:

E_{ext} = annual size-specific emission factor extrapolated for natural mitigation, lb/VMT

E = emission factor from Equation 1a or 1b

P = number of days in a year with at least 0.254 mm (0.01 in) of precipitation (see below)

Figure 13.2.2-1 gives the geographical distribution for the mean annual number of "wet" days for the United States.

Equation 2 provides an estimate that accounts for precipitation on an annual average basis for the purpose of inventorying emissions. It should be noted that Equation 2 does not account for differences in the temporal distributions of the rain events, the quantity of rain during any event, or the potential for the rain to evaporate from the road surface. In the event that a finer temporal and spatial resolution is desired for inventories of public unpaved roads, estimates can be based on a more complex set of assumptions. These assumptions include:

1. The moisture content of the road surface material is increased in proportion to the quantity of water added;
2. The moisture content of the road surface material is reduced in proportion to the Class A pan evaporation rate;
3. The moisture content of the road surface material is reduced in proportion to the traffic volume; and
4. The moisture content of the road surface material varies between the extremes observed in the area. The CHIEF Web site (http://www.epa.gov/ttn/chief/ap42/ch13/related/c13s02-2.html) has a file which contains a spreadsheet program for calculating emission factors which are temporally and spatially resolved. Information required for use of the spreadsheet program includes monthly Class A pan evaporation values, hourly meteorological data for precipitation, humidity and snow cover, vehicle traffic information, and road surface material information.

It is emphasized that <u>the simple assumption underlying Equation 2 and the more complex set of assumptions underlying the use of the procedure which produces a finer temporal and spatial resolution</u> have not been verified in any rigorous manner. For this reason, the quality ratings for either approach should be downgraded one letter from the rating that would be applied to Equation 1.

13.2.2.3 Controls[18-22]

A wide variety of options exist to control emissions from unpaved roads. Options fall into the following three groupings:

1. <u>Vehicle restrictions</u> that limit the speed, weight or number of vehicles on the road;

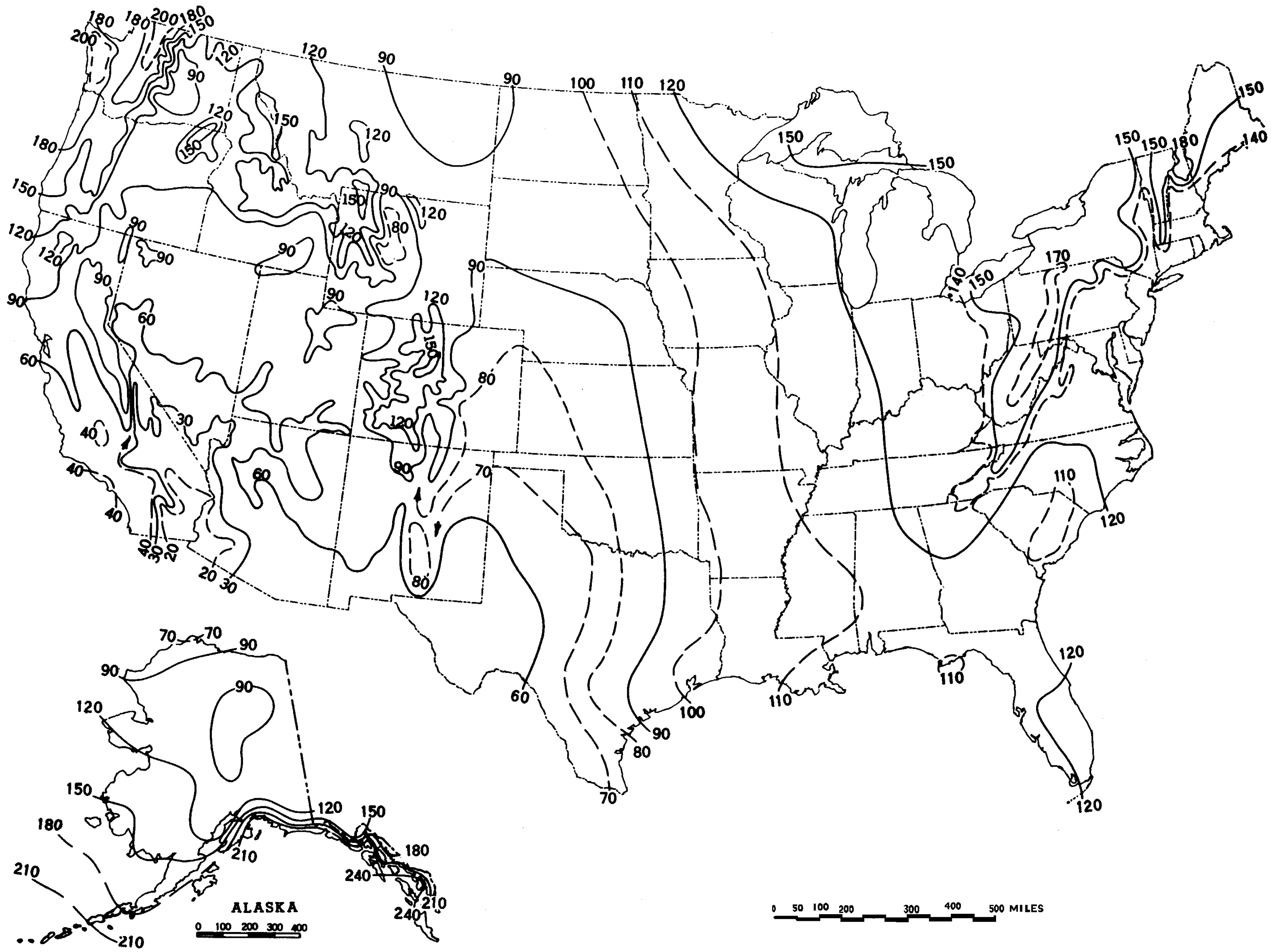


Figure 13.2.2-1. Mean number of days with 0.01 inch or more of precipitation in United States.

13.2.4 Aggregate Handling And Storage Piles

13.2.4.1 General

Inherent in operations that use minerals in aggregate form is the maintenance of outdoor storage piles. Storage piles are usually left uncovered, partially because of the need for frequent material transfer into or out of storage.

Dust emissions occur at several points in the storage cycle, such as material loading onto the pile, disturbances by strong wind currents, and loadout from the pile. The movement of trucks and loading equipment in the storage pile area is also a substantial source of dust.

13.2.4.2 Emissions And Correction Parameters

The quantity of dust emissions from aggregate storage operations varies with the volume of aggregate passing through the storage cycle. Emissions also depend on 3 parameters of the condition of a particular storage pile: age of the pile, moisture content, and proportion of aggregate fines.

When freshly processed aggregate is loaded onto a storage pile, the potential for dust emissions is at a maximum. Fines are easily disaggregated and released to the atmosphere upon exposure to air currents, either from aggregate transfer itself or from high winds. As the aggregate pile weathers, however, potential for dust emissions is greatly reduced. Moisture causes aggregation and cementation of fines to the surfaces of larger particles. Any significant rainfall soaks the interior of the pile, and then the drying process is very slow.

Silt (particles equal to or less than 75 micrometers [µm] in diameter) content is determined by measuring the portion of dry aggregate material that passes through a 200-mesh screen, using ASTM-C-136 method.[1] Table 13.2.4-1 summarizes measured silt and moisture values for industrial aggregate materials.

Table 13.2.4-1. TYPICAL SILT AND MOISTURE CONTENTS OF MATERIALS AT VARIOUS INDUSTRIES[a]

Industry	No. Of Facilities	Material	Silt Content (%)			Moisture Content (%)		
			No. Of Samples	Range	Mean	No. Of Samples	Range	Mean
Iron and steel production	9	Pellet ore	13	1.3 - 13	4.3	11	0.64 - 4.0	2.2
		Lump ore	9	2.8 - 19	9.5	6	1.6 - 8.0	5.4
		Coal	12	2.0 - 7.7	4.6	11	2.8 - 11	4.8
		Slag	3	3.0 - 7.3	5.3	3	0.25 - 2.0	0.92
		Flue dust	3	2.7 - 23	13	1	—	7
		Coke breeze	2	4.4 - 5.4	4.9	2	6.4 - 9.2	7.8
		Blended ore	1	—	15	1	—	6.6
		Sinter	1	—	0.7	0	—	—
		Limestone	3	0.4 - 2.3	1.0	2	ND	0.2
Stone quarrying and processing	2	Crushed limestone	2	1.3 - 1.9	1.6	2	0.3 - 1.1	0.7
		Various limestone products	8	0.8 - 14	3.9	8	0.46 - 5.0	2.1
Taconite mining and processing	1	Pellets	9	2.2 - 5.4	3.4	7	0.05 - 2.0	0.9
		Tailings	2	ND	11	1	—	0.4
Western surface coal mining	4	Coal	15	3.4 - 16	6.2	7	2.8 - 20	6.9
		Overburden	15	3.8 - 15	7.5	0	—	—
		Exposed ground	3	5.1 - 21	15	3	0.8 - 6.4	3.4
Coal-fired power plant	1	Coal (as received)	60	0.6 - 4.8	2.2	59	2.7 - 7.4	4.5
Municipal solid waste landfills	4	Sand	1	—	2.6	1	—	7.4
		Slag	2	3.0 - 4.7	3.8	2	2.3 - 4.9	3.6
		Cover	5	5.0 - 16	9.0	5	8.9 - 16	12
		Clay/dirt mix	1	—	9.2	1	—	14
		Clay	2	4.5 - 7.4	6.0	2	8.9 - 11	10
		Fly ash	4	78 - 81	80	4	26 - 29	27
		Misc. fill materials	1	—	12	1	—	11

[a] References 1-10. ND = no data.

The quantity of particulate emissions generated by either type of drop operation, per kilogram (kg) (ton) of material transferred, may be estimated, with a rating of A, using the following empirical expression:[11]

$$E = k(0.0016) \frac{\left(\frac{U}{2.2}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \quad \text{(kg/megagram [Mg])}$$

(1)

$$E = k(0.0032) \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \quad \text{(pound [lb]/ton)}$$

where:

E = emission factor
k = particle size multiplier (dimensionless)
U = mean wind speed, meters per second (m/s) (miles per hour [mph])
M = material moisture content (%)

The particle size multiplier in the equation, k, varies with aerodynamic particle size range, as follows:

Aerodynamic Particle Size Multiplier (k) For Equation 1				
< 30 µm	< 15 µm	< 10 µm	< 5 µm	< 2.5 µm
0.74	0.48	0.35	0.20	0.053[a]

[a] Multiplier for < 2.5 µm taken from Reference 14.

The equation retains the assigned quality rating if applied within the ranges of source conditions that were tested in developing the equation, as follows. Note that silt content is included, even though silt content does not appear as a correction parameter in the equation. While it is reasonable to expect that silt content and emission factors are interrelated, no significant correlation between the 2 was found during the derivation of the equation, probably because most tests with high silt contents were conducted under lower winds, and vice versa. It is recommended that estimates from the equation be reduced 1 quality rating level if the silt content used in a particular application falls outside the range given:

Ranges Of Source Conditions For Equation 1			
Silt Content (%)	Moisture Content (%)	Wind Speed	
		m/s	mph
0.44 - 19	0.25 - 4.8	0.6 - 6.7	1.3 - 15

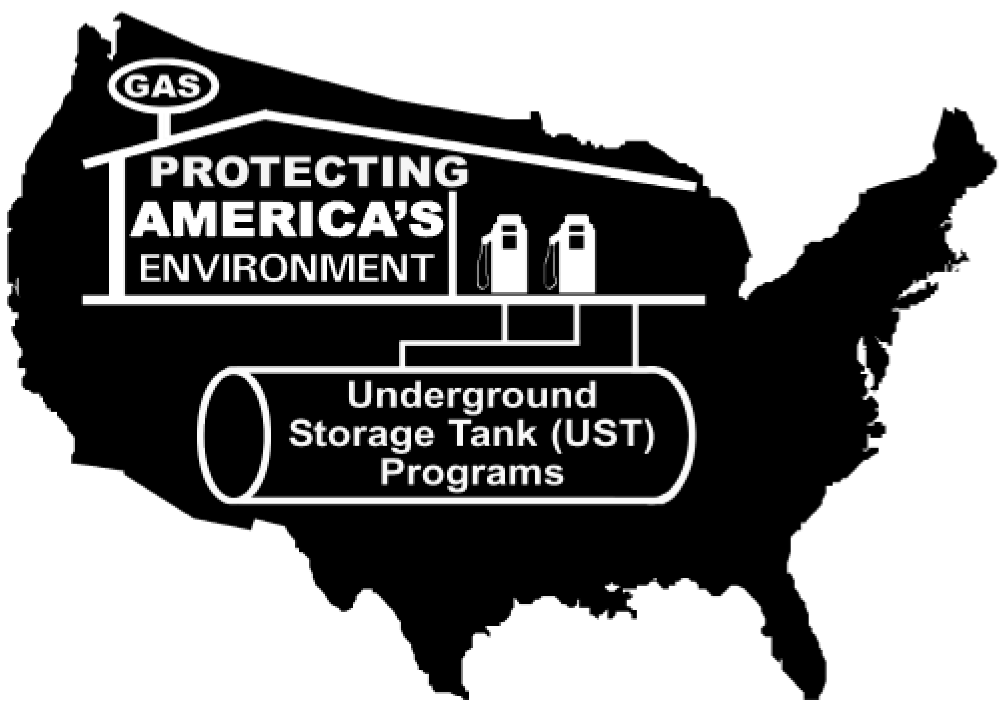
To retain the quality rating of the equation when it is applied to a specific facility, reliable correction parameters must be determined for specific sources of interest. The field and laboratory procedures for aggregate sampling are given in Reference 3. In the event that site-specific values for

United States Environmental Protection Agency
Solid Waste and Emergency Response 5401G
EPA 510-R-04-002
May 2004
www.epa.gov/oust/pubs/tums.htm

EPA

How to Evaluate Alternative Cleanup Technologies for Underground Storage Tank Sites

A Guide for Corrective Action Plan Reviewers



s_r = residual hydrocarbon saturation [volume hydrocarbon/volume soil]
n_e = effective porosity [volume pore space/volume soil]
V_{soil} = volume of soil [L^3]

The above equation is simplistic and does not address factors such as spreading of the hydrocarbon, the rate at which the soil absorbs the liquid, or mass loss due to volatilization. However, it can be used as a screening criterion to determine whether a given UST release is likely to result in free product accumulation at the water table.

Exhibit IX-5 presents typical ranges for the concentration of hydrocarbons (*e.g.*, TPH) that each of three representative soil types could retain in the unsaturated zone. Values in the second column under "Concentration" are in terms of mass per square meter (kg/m^2). To obtain these values, first multiply the concentration in mg/kg by the bulk density of the soil (in kg/m^3) then divide by 1 million (to convert from mg to kg). Next, multiply the result by the thickness (in meters) of the contaminated soil. These concentrations can then be used to develop a rough "rule of thumb" to predict whether a spill will reach the water table. The volume of the material receiving the spill is estimated by multiplying the depth to ground water (in meters) by the "surface" area of the spill–this is the assumed thickness (in meters) of the contaminated soil. If no other information is available, assume the surface area is 1 m^2 (necessary to yield a volume). If the known (or suspected) volume of release (in gallons) divided by the volume (in cubic meters) to the water table exceeds the number of gallons per cubic meter (last column), then it is likely that free product will be present.

Exhibit IX-5
Maximum Hydrocarbon Concentrations For Soil-Only Contamination

Soil Type	Residual Hydrocarbon Saturation	Bulk Density[a] (kg/m^3)	Porosity[b]	Concentration		
				mg/kg	kg/m^2	gal/m^3
silty clay	0.05 to 0.25	1,350	0.36	10,000 to 49,000	13 to 66	5 to 24
sandy silt	0.03 to 0.20	1,650	0.41	5,000 to 36,000	9 to 60	3 to 22
coarse sand	0.01 to 0.10	1,850	0.43	2,000 to 17,000	3 to 31	1 to 11

Sources: [a] Boulding (1994), p.3-37. [b] Carsell and Parrish (1988)

Another use for the data in Exhibit IX-5 would be to compare measured hydrocarbon concentrations in soil samples with those in the table (second to last and next to last columns)—if measured concentrations are close to or exceed those in the table for a given soil type, then it could be expected that free product might accumulate at the water table. In situations where free product is present, monitored natural attenuation is not an appropriate remedial alternative because natural processes will not reduce concentrations to acceptable levels within a reasonable time period (*i.e.*, a few years). At all sites where investigations indicate that free product is present, Federal regulations (40 CFR 280.64) require that it be recovered to the maximum extent practicable. Free product recovery, and other engineered source control measures, are the most effective means of ensuring the timely attainment of remediation objectives. For more guidance on free product recovery, see U.S. EPA, 1996a.

From Exhibit IX-5 we see that one cubic meter of silty clay could potentially retain 5 to 24 gallons of gasoline assuming that it was spread evenly through the soil. For a LUST site where the depth to groundwater below the point of the release was, for example, 5 meters (15 feet), there is no information on the surface area of the spill, and the soil type is silty clay, then a release of up to 120 gallons (24 gallons per meter times five meters depth) might be retained within the unsaturated zone and free product would not be expected to accumulate on the water table. In contrast, a coarse sand might potentially retain a release of only 55 gallons. In either or both of these cases even if the release volume was small enough so that free product did not collect at the water table there could still be a groundwater impact through leaching of soluble hydrocarbons by infiltration of precipitation and groundwater recharge. In such an instance, release volumes much smaller than theoretically retained could result in significant and unacceptable groundwater impact.

Source Longevity

Once it has been determined that the entire release volume will remain trapped within the vadose zone and there is no likelihood of groundwater contamination, the next step is to estimate the lifetime of the residual contamination. The two primary factors that control source longevity are: (1) mass of contaminants present in the source area, and (2) availability of electron acceptors, of which oxygen is the most important.

As previously discussed, the larger the contaminant mass, the longer the period of time required for it to be completely degraded. Across a wide range of concentrations, the rate of biodegradation of petroleum hydrocarbons follows a hyperbolic rate law:

$$V = V_{\max}\left[C / (K + C)\right]$$

where:

where:	V	=	the achieved rate of biodegradation (mg/liter in groundwater or mg/kg in soil)
	V_{max}	=	the maximum possible rate of biodegradation at high concentrations of hydrocarbon
	C	=	the concentration of hydrocarbon (mg/liter or mg/kg)
	K	=	half-saturation constant (the concentration of hydrocarbon that produces one-half of the maximum possible rate of biodegradation; mg/liter in water or ppm [volume/volume in soil gas] or mg/kg in sediment)

When hydrocarbon concentrations (C) are significantly lower than the half-saturation constant (K), the sum of (K+C) is approximately equivalent to K. Because $V_{\max}$ and K are constants, the rate of biodegradation (V) is proportional to

ATTACHMENT 7-2

TIER II NMOC EMISSIONS RATE REPORT

AUGUST 2021

CDM Smith

6001 Indian School Rd NE Ste 310
Albuquerque, New Mexico 87110
tel: 505 243-3200
fax: 505 243-2700

August 30, 2021

Manager, Compliance and Enforcement Section
New Mexico Environment Department
Air Quality Bureau
525 Camino de los Marquez, Suite 1
Santa Fe, NM 87505-1816

RE: Permit P199LR3 City of Clovis, New Mexico, Regional Solid Waste Facility Landfill
NMOC Annual Emission Rate Report (2020-2021)
CDM Smith Project No.: 8331. 262486.NMOC

Dear Manager:

The Clovis Regional Solid Waste Facility (CRSWF) Landfill is currently regulated according to the Municipal Solid Waste (MSW) Landfill New Source Performance Standards (NSPS). Under the requirements of conditions A701 and B110 of the facility's Title V permit, the CRSWF must submit an annual estimate of the waste acceptance rate, design capacity, Non-Methane Organic Compound (NMOC) emission rate, and daily watering logs.

The CRSWF is located in Clovis, New Mexico. It is operated by the City of Clovis and has accepted municipal solid waste since 1935 as part of a pre-existing landfill (Old Landfill). The types of waste received at the site include typical household waste, compost, occasionally tires and appliances, asbestos, and typical construction and demolition waste. The landfill, under its current configuration including closed and operational areas, spans a net area of approximately 130 acres. Approximately 80 acres of pre-existing landfill were closed in 1999. Cells 1-4 have received waste since 1999 under Permit Nos. P199L, P199LR1, P199LR2 and P199LR3. Cell 5 has received waste since 2017 under permit P199LR3.

There have been no deviations in operation or emergencies at the CRSWF during the period of August 1, 2020 through July 31, 2021.

The maximum design capacity of the CRSWF is 17,730,000 cubic meters or 9,911,000 megagrams (Mg). Since the landfill has a design capacity greater than 2.5 million Mg and 2.5 million cubic meters, it is subject to the NSPS for MSW landfills per 40 CFR (Part 60) Subpart Cf and Subpart WWW.

Tier I NMOC emission rate calculations based on default values per 40 CFR 60.33f, yielded an estimated Tier I NMOC value greater than the emission rate standard of 34 Mg/yr (the estimated

Tier I NMOC emission rate is **184.37 Mg/yr** for the Permit Year 2021 based on default values per 40 CFR 60.33f and 40 CFR 60.754(a)(1)).

Per 40 CFR 60.33f and 40 CFR 60.754 (a)(3), the landfill has the option of conducting Tier II testing to determine a site-specific NMOC concentration and recalculate the NMOC emission rate. Site specific Tier II testing was conducted in December 2019 and the Tier II Testing Report was submitted to the NMED AQB in February 2020. Tier II testing resulted in an NMOC value of **251 parts per million by volume (ppmv).** This site-specific data was used as inputs to the LandGEM model which calculates the NMOC emission rate based upon Tier II methodology. Modeling reports for each of the Old and Active sections of the CRSWF landfill have been included in Attachment 1. An NMOC emission rate of **11.90 Mg/yr for year 2021** and a potential total maximum NMOC emission rate of **16.54 Mg/yr in the year 2075** is predicted by the LandGEM model for Old and Active sections of the landfill. These values are significantly less than the standard. Based upon the NMOC emission rate calculated using site specific data and in accordance with 40 CFR 60.33f the CRSWF emits less than 34 Mg/yr of NMOC and therefore is not required to install a gas collection and control system. However, the site-specific conditions shall be retested and NMOC Tier II values recalculated every five years. The next scheduled Tier II testing will be conducted before December 2024.

Waste acceptance data is included in Attachment 2, landfill design capacity details are provided in Attachment 3, and copies of the daily watering logs from the landfill are included in Attachment 4.

CRSWF Contact information is as follows:

Owner
Mr. Justin Howalt
City Manager
City of Clovis
801 South Norris Street
Clovis, New Mexico 88101
Ph: 575-769-7828

Operator
Mr. Oscar Macias
CRSWF Superintendent
City of Clovis
801 South Norris Street
Clovis, New Mexico 88101
Ph: 575-693-6484

Feel free to contact CDM Smith Inc. (CDM Smith) at (505) 243-3200 if you have any additional questions regarding this report.

Sincerely,

Dacia Tucholke

Dacia R. Tucholke
Project Manager
CDM Smith Inc.

Robert A. Fowlie

Robert A Fowlie P.E.,
Associate Client Service Leader
CDM Smith Inc.

Enclosure

cc: Justin Howalt, City Manager, City of Clovis
Hemanth Haft, CDM Smith
File

ATTACHMENTS

Attachment	Description
1	Tier 2 NMOC - LandGEM Reports (Old & Active Landfills)
2	Waste Acceptance Data
3	Design Capacity / NMOC Summary Tables
4	Watering Logs

ATTACHMENT 1

LandGEM REPORTS

Summary Report

Landfill Name or Identifier: CRSWF Active Landfill Permit No. P199LR3

Date: Sunday, August 22, 2021

Description/Comments:

About LandGEM:

First-Order Decomposition Rate Equation:

$$Q_{CH_4} = \sum_{i=1}^{n} \sum_{j=0.1}^{1} k L_o \left(\frac{M_i}{10} \right) e^{-k t_{ij}}$$

Where,

Q_{CH4} = annual methane generation in the year of the calculation *(m^3/year)*

i = 1-year time increment

n = (year of the calculation) - (initial year of waste acceptance)

j = 0.1-year time increment

k = methane generation rate (*$year^{-1}$*)

L_o = potential methane generation capacity (*m^3/Mg*)

M_i = mass of waste accepted in the i^{th} year (*Mg*)

t_{ij} = age of the j^{th} section of waste mass M_i accepted in the i^{th} year (*decimal years*, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at http://www.epa.gov/ttnatw01/landfill/landflpg.html.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for convential landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

The 80-year waste acceptance limit of the model has been exceeded before the Waste Design Capacity was reached. The model will assume the 80th year of waste acceptance as the final year to estimate emissions. See Section 2.6 of the User's Manual.

LANDFILL CHARACTERISTICS

Landfill Open Year	**1999**	
Landfill Closure Year (with 80-year limit)	**2078**	
Actual Closure Year (without limit)	***2129***	
Have Model Calculate Closure Year?	**Yes**	
Waste Design Capacity	**8,320,000**	*megagrams*

MODEL PARAMETERS

Methane Generation Rate, k	**0.020**	*$year^{-1}$*
Potential Methane Generation Capacity, L_o	**170**	*m^3/Mg*
NMOC Concentration	**251**	*ppmv as hexane*
Methane Content	**50**	*% by volume*

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1:	**NMOC**
Gas / Pollutant #2:	**Methane**
Gas / Pollutant #3:	**Carbon dioxide**
Gas / Pollutant #4:	**Total landfill gas**

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
1999	35,370	38,907	0	0
2000	59,980	65,978	35,370	38,907
2001	73,602	80,963	95,350	104,885
2002	82,769	91,046	168,952	185,848
2003	70,852	77,937	251,721	276,894
2004	77,409	85,150	322,573	354,831
2005	76,699	84,369	399,982	439,981
2006	72,944	80,238	476,681	524,350
2007	85,322	93,854	549,625	604,588
2008	75,728	83,301	634,947	698,442
2009	75,747	83,321	710,675	781,742
2010	98,638	108,501	786,421	865,064
2011	74,647	82,112	885,059	973,565
2012	73,466	80,813	959,706	1,055,676
2013	79,012	86,913	1,033,172	1,136,489
2014	76,627	84,290	1,112,184	1,223,402
2015	92,966	102,263	1,188,811	1,307,692
2016	71,935	79,128	1,281,777	1,409,955
2017	66,962	73,658	1,353,712	1,489,083
2018	65,154	71,669	1,420,674	1,562,741
2019	63,055	69,360	1,485,827	1,634,410
2020	61,802	67,982	1,548,882	1,703,770
2021	61,802	67,982	1,610,684	1,771,752
2022	61,802	67,982	1,672,486	1,839,735
2023	61,802	67,982	1,734,288	1,907,717
2024	61,802	67,982	1,796,090	1,975,699
2025	61,802	67,982	1,857,892	2,043,681
2026	61,802	67,982	1,919,694	2,111,664
2027	61,802	67,982	1,981,496	2,179,646
2028	61,802	67,982	2,043,299	2,247,628
2029	61,802	67,982	2,105,101	2,315,611
2030	61,802	67,982	2,166,903	2,383,593
2031	61,802	67,982	2,228,705	2,451,575
2032	61,802	67,982	2,290,507	2,519,558
2033	61,802	67,982	2,352,309	2,587,540
2034	61,802	67,982	2,414,111	2,655,522
2035	61,802	67,982	2,475,913	2,723,504
2036	61,802	67,982	2,537,715	2,791,487
2037	61,802	67,982	2,599,517	2,859,469
2038	61,802	67,982	2,661,319	2,927,451

WASTE ACCEPTANCE RATES (Continued)

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
2039	61,802	67,982	2,723,122	2,995,434
2040	61,802	67,982	2,784,924	3,063,416
2041	61,802	67,982	2,846,726	3,131,398
2042	61,802	67,982	2,908,528	3,199,381
2043	61,802	67,982	2,970,330	3,267,363
2044	61,802	67,982	3,032,132	3,335,345
2045	61,802	67,982	3,093,934	3,403,327
2046	61,802	67,982	3,155,736	3,471,310
2047	61,802	67,982	3,217,538	3,539,292
2048	61,802	67,982	3,279,340	3,607,274
2049	61,802	67,982	3,341,142	3,675,257
2050	61,802	67,982	3,402,945	3,743,239
2051	61,802	67,982	3,464,747	3,811,221
2052	61,802	67,982	3,526,549	3,879,204
2053	61,802	67,982	3,588,351	3,947,186
2054	61,802	67,982	3,650,153	4,015,168
2055	61,802	67,982	3,711,955	4,083,150
2056	61,802	67,982	3,773,757	4,151,133
2057	61,802	67,982	3,835,559	4,219,115
2058	61,802	67,982	3,897,361	4,287,097
2059	61,802	67,982	3,959,163	4,355,080
2060	61,802	67,982	4,020,965	4,423,062
2061	61,802	67,982	4,082,768	4,491,044
2062	61,802	67,982	4,144,570	4,559,027
2063	61,802	67,982	4,206,372	4,627,009
2064	61,802	67,982	4,268,174	4,694,991
2065	61,802	67,982	4,329,976	4,762,973
2066	61,802	67,982	4,391,778	4,830,956
2067	61,802	67,982	4,453,580	4,898,938
2068	61,802	67,982	4,515,382	4,966,920
2069	61,802	67,982	4,577,184	5,034,903
2070	61,802	67,982	4,638,986	5,102,885
2071	61,802	67,982	4,700,788	5,170,867
2072	61,802	67,982	4,762,591	5,238,850
2073	61,802	67,982	4,824,393	5,306,832
2074	61,802	67,982	4,886,195	5,374,814
2075	61,802	67,982	4,947,997	5,442,796
2076	61,802	67,982	5,009,799	5,510,779
2077	61,802	67,982	5,071,601	5,578,761
2078	61,802	67,982	5,133,403	5,646,743

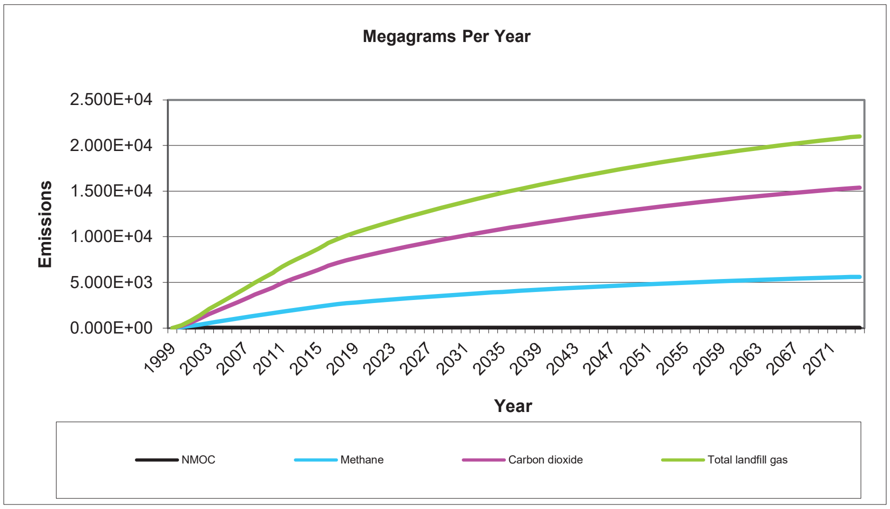
Pollutant Parameters

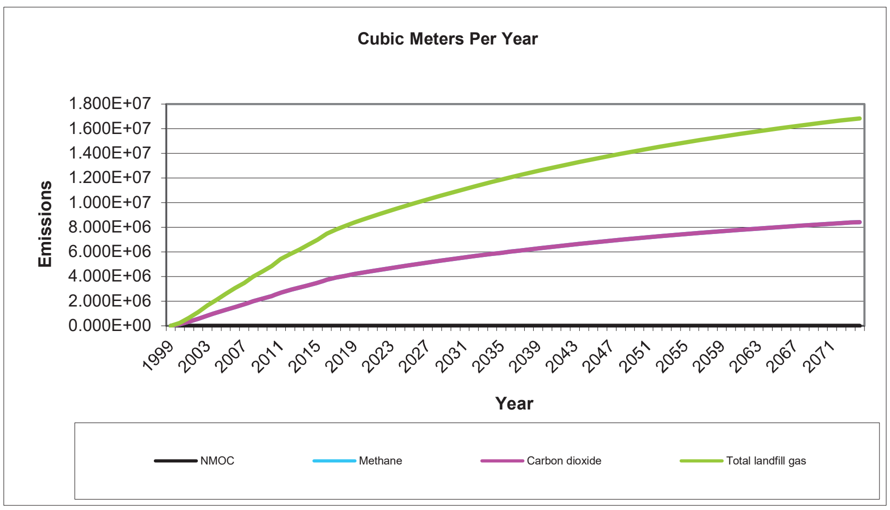
	Gas / Pollutant Default Parameters:			User-specified Pollutant Parameters:	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

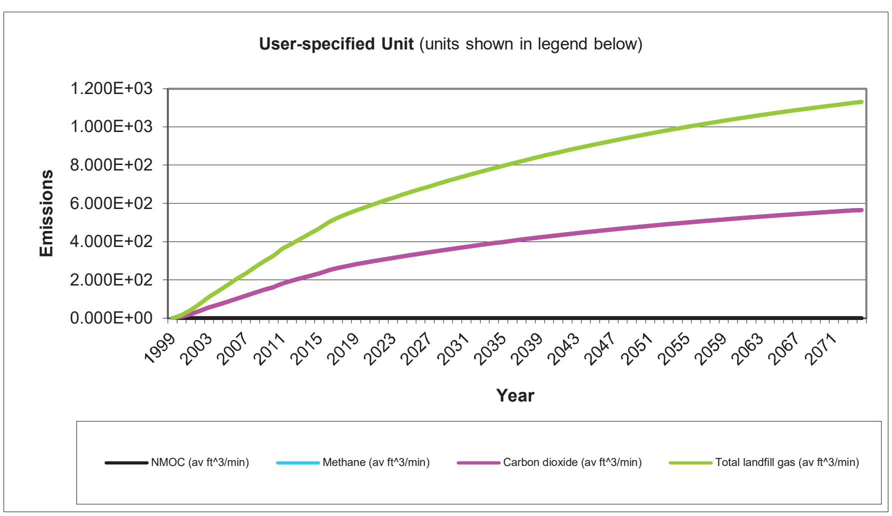
Pollutant Parameters (Continued)

	Gas / Pollutant Default Parameters:			User-specified Pollutant Parameters:	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		

Graphs


Megagrams Per Year
Emissions
Year
NMOC
Methane
Carbon dioxide
Total landfill gas


Cubic Meters Per Year
Emissions
Year
NMOC
Methane
Carbon dioxide
Total landfill gas


User-specified Unit (units shown in legend below)
Emissions
Year
NMOC (av ft^3/min)
Methane (av ft^3/min)
Carbon dioxide (av ft^3/min)
Total landfill gas (av ft^3/min)

Results

Year	NMOC			Methane		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
1999	0	0	0	0	0	0
2000	2.145E-01	5.983E+01	4.020E-03	7.951E+01	1.192E+05	8.008E+00
2001	5.739E-01	1.601E+02	1.076E-02	2.128E+02	3.189E+05	2.143E+01
2002	1.009E+00	2.814E+02	1.891E-02	3.740E+02	5.606E+05	3.767E+01
2003	1.491E+00	4.159E+02	2.794E-02	5.527E+02	8.284E+05	5.566E+01
2004	1.891E+00	5.275E+02	3.544E-02	7.010E+02	1.051E+06	7.060E+01
2005	2.323E+00	6.480E+02	4.354E-02	8.611E+02	1.291E+06	8.673E+01
2006	2.742E+00	7.649E+02	5.139E-02	1.017E+03	1.524E+06	1.024E+02
2007	3.130E+00	8.731E+02	5.867E-02	1.160E+03	1.739E+06	1.169E+02
2008	3.585E+00	1.000E+03	6.720E-02	1.329E+03	1.992E+06	1.339E+02
2009	3.973E+00	1.108E+03	7.448E-02	1.473E+03	2.208E+06	1.484E+02
2010	4.354E+00	1.215E+03	8.161E-02	1.614E+03	2.420E+06	1.626E+02
2011	4.866E+00	1.357E+03	9.121E-02	1.804E+03	2.704E+06	1.817E+02
2012	5.222E+00	1.457E+03	9.788E-02	1.936E+03	2.902E+06	1.950E+02
2013	5.564E+00	1.552E+03	1.043E-01	2.063E+03	3.092E+06	2.078E+02
2014	5.933E+00	1.655E+03	1.112E-01	2.200E+03	3.297E+06	2.215E+02
2015	6.280E+00	1.752E+03	1.177E-01	2.328E+03	3.490E+06	2.345E+02
2016	6.719E+00	1.875E+03	1.260E-01	2.491E+03	3.734E+06	2.509E+02
2017	7.022E+00	1.959E+03	1.316E-01	2.604E+03	3.903E+06	2.622E+02
2018	7.289E+00	2.034E+03	1.366E-01	2.703E+03	4.051E+06	2.722E+02
2019	7.540E+00	2.104E+03	1.413E-01	2.796E+03	4.190E+06	2.815E+02
2020	7.773E+00	2.169E+03	1.457E-01	2.882E+03	4.320E+06	2.902E+02
2021	7.994E+00	2.230E+03	1.498E-01	2.964E+03	4.443E+06	2.985E+02
2022	8.210E+00	2.291E+03	1.539E-01	3.044E+03	4.563E+06	3.066E+02
2023	8.422E+00	2.350E+03	1.579E-01	3.123E+03	4.681E+06	3.145E+02
2024	8.630E+00	2.408E+03	1.618E-01	3.200E+03	4.796E+06	3.223E+02
2025	8.834E+00	2.465E+03	1.656E-01	3.275E+03	4.910E+06	3.299E+02
2026	9.034E+00	2.520E+03	1.693E-01	3.349E+03	5.021E+06	3.373E+02
2027	9.230E+00	2.575E+03	1.730E-01	3.422E+03	5.129E+06	3.446E+02
2028	9.422E+00	2.629E+03	1.766E-01	3.493E+03	5.236E+06	3.518E+02
2029	9.610E+00	2.681E+03	1.801E-01	3.563E+03	5.341E+06	3.588E+02
2030	9.794E+00	2.732E+03	1.836E-01	3.631E+03	5.443E+06	3.657E+02
2031	9.975E+00	2.783E+03	1.870E-01	3.698E+03	5.544E+06	3.725E+02
2032	1.015E+01	2.832E+03	1.903E-01	3.764E+03	5.642E+06	3.791E+02
2033	1.033E+01	2.881E+03	1.936E-01	3.829E+03	5.739E+06	3.856E+02
2034	1.050E+01	2.928E+03	1.968E-01	3.892E+03	5.833E+06	3.919E+02
2035	1.066E+01	2.975E+03	1.999E-01	3.954E+03	5.926E+06	3.982E+02
2036	1.083E+01	3.020E+03	2.029E-01	4.014E+03	6.017E+06	4.043E+02
2037	1.099E+01	3.065E+03	2.060E-01	4.074E+03	6.106E+06	4.103E+02
2038	1.114E+01	3.109E+03	2.089E-01	4.132E+03	6.193E+06	4.161E+02
2039	1.130E+01	3.152E+03	2.118E-01	4.189E+03	6.279E+06	4.219E+02
2040	1.145E+01	3.194E+03	2.146E-01	4.245E+03	6.363E+06	4.275E+02
2041	1.160E+01	3.235E+03	2.174E-01	4.300E+03	6.445E+06	4.330E+02
2042	1.174E+01	3.276E+03	2.201E-01	4.354E+03	6.526E+06	4.385E+02
2043	1.188E+01	3.316E+03	2.228E-01	4.406E+03	6.605E+06	4.438E+02
2044	1.202E+01	3.354E+03	2.254E-01	4.458E+03	6.682E+06	4.490E+02
2045	1.216E+01	3.393E+03	2.279E-01	4.509E+03	6.758E+06	4.541E+02
2046	1.229E+01	3.430E+03	2.305E-01	4.558E+03	6.833E+06	4.591E+02
2047	1.243E+01	3.467E+03	2.329E-01	4.607E+03	6.906E+06	4.640E+02
2048	1.255E+01	3.502E+03	2.353E-01	4.655E+03	6.977E+06	4.688E+02

Results (Continued)

Year	NMOC			Methane		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
2049	1.268E+01	3.538E+03	2.377E-01	4.701E+03	7.047E+06	4.735E+02
2050	1.280E+01	3.572E+03	2.400E-01	4.747E+03	7.116E+06	4.781E+02
2051	1.293E+01	3.606E+03	2.423E-01	4.792E+03	7.183E+06	4.826E+02
2052	1.304E+01	3.639E+03	2.445E-01	4.836E+03	7.249E+06	4.871E+02
2053	1.316E+01	3.672E+03	2.467E-01	4.879E+03	7.314E+06	4.914E+02
2054	1.327E+01	3.703E+03	2.488E-01	4.922E+03	7.377E+06	4.957E+02
2055	1.339E+01	3.735E+03	2.509E-01	4.963E+03	7.440E+06	4.999E+02
2056	1.350E+01	3.765E+03	2.530E-01	5.004E+03	7.500E+06	5.040E+02
2057	1.360E+01	3.795E+03	2.550E-01	5.044E+03	7.560E+06	5.080E+02
2058	1.371E+01	3.825E+03	2.570E-01	5.083E+03	7.619E+06	5.119E+02
2059	1.381E+01	3.853E+03	2.589E-01	5.121E+03	7.676E+06	5.158E+02
2060	1.391E+01	3.882E+03	2.608E-01	5.159E+03	7.732E+06	5.195E+02
2061	1.401E+01	3.909E+03	2.627E-01	5.195E+03	7.787E+06	5.232E+02
2062	1.411E+01	3.936E+03	2.645E-01	5.231E+03	7.842E+06	5.269E+02
2063	1.421E+01	3.963E+03	2.663E-01	5.267E+03	7.895E+06	5.304E+02
2064	1.430E+01	3.989E+03	2.680E-01	5.301E+03	7.946E+06	5.339E+02
2065	1.439E+01	4.015E+03	2.697E-01	5.335E+03	7.997E+06	5.373E+02
2066	1.448E+01	4.040E+03	2.714E-01	5.369E+03	8.047E+06	5.407E+02
2067	1.457E+01	4.064E+03	2.731E-01	5.401E+03	8.096E+06	5.440E+02
2068	1.465E+01	4.088E+03	2.747E-01	5.433E+03	8.144E+06	5.472E+02
2069	1.474E+01	4.112E+03	2.763E-01	5.465E+03	8.191E+06	5.504E+02
2070	1.482E+01	4.135E+03	2.778E-01	5.495E+03	8.237E+06	5.534E+02
2071	1.490E+01	4.158E+03	2.794E-01	5.525E+03	8.282E+06	5.565E+02
2072	1.498E+01	4.180E+03	2.808E-01	5.555E+03	8.326E+06	5.595E+02
2073	1.506E+01	4.202E+03	2.823E-01	5.584E+03	8.370E+06	5.624E+02
2074	1.514E+01	4.223E+03	2.837E-01	5.612E+03	8.412E+06	5.652E+02
2075	1.521E+01	4.244E+03	2.851E-01	5.640E+03	8.454E+06	5.680E+02
2076	1.529E+01	4.264E+03	2.865E-01	5.667E+03	8.495E+06	5.708E+02
2077	1.536E+01	4.285E+03	2.879E-01	5.694E+03	8.535E+06	5.735E+02
2078	1.543E+01	4.304E+03	2.892E-01	5.720E+03	8.574E+06	5.761E+02
2079	1.550E+01	4.324E+03	2.905E-01	5.746E+03	8.613E+06	5.787E+02
2080	1.519E+01	4.238E+03	2.847E-01	5.632E+03	8.442E+06	5.672E+02
2081	1.489E+01	4.154E+03	2.791E-01	5.521E+03	8.275E+06	5.560E+02
2082	1.460E+01	4.072E+03	2.736E-01	5.411E+03	8.111E+06	5.450E+02
2083	1.431E+01	3.991E+03	2.682E-01	5.304E+03	7.950E+06	5.342E+02
2084	1.402E+01	3.912E+03	2.629E-01	5.199E+03	7.793E+06	5.236E+02
2085	1.375E+01	3.835E+03	2.576E-01	5.096E+03	7.639E+06	5.132E+02
2086	1.347E+01	3.759E+03	2.525E-01	4.995E+03	7.487E+06	5.031E+02
2087	1.321E+01	3.684E+03	2.475E-01	4.896E+03	7.339E+06	4.931E+02
2088	1.294E+01	3.611E+03	2.426E-01	4.799E+03	7.194E+06	4.834E+02
2089	1.269E+01	3.540E+03	2.378E-01	4.704E+03	7.051E+06	4.738E+02
2090	1.244E+01	3.470E+03	2.331E-01	4.611E+03	6.912E+06	4.644E+02
2091	1.219E+01	3.401E+03	2.285E-01	4.520E+03	6.775E+06	4.552E+02
2092	1.195E+01	3.334E+03	2.240E-01	4.430E+03	6.641E+06	4.462E+02
2093	1.171E+01	3.268E+03	2.196E-01	4.343E+03	6.509E+06	4.374E+02
2094	1.148E+01	3.203E+03	2.152E-01	4.257E+03	6.380E+06	4.287E+02
2095	1.125E+01	3.140E+03	2.109E-01	4.172E+03	6.254E+06	4.202E+02
2096	1.103E+01	3.077E+03	2.068E-01	4.090E+03	6.130E+06	4.119E+02
2097	1.081E+01	3.016E+03	2.027E-01	4.009E+03	6.009E+06	4.037E+02
2098	1.060E+01	2.957E+03	1.987E-01	3.929E+03	5.890E+06	3.957E+02
2099	1.039E+01	2.898E+03	1.947E-01	3.852E+03	5.773E+06	3.879E+02

Results (Continued)

Year	NMOC			Methane		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
2100	1.018E+01	2.841E+03	1.909E-01	3.775E+03	5.659E+06	3.802E+02
2101	9.981E+00	2.785E+03	1.871E-01	3.701E+03	5.547E+06	3.727E+02
2102	9.783E+00	2.729E+03	1.834E-01	3.627E+03	5.437E+06	3.653E+02
2103	9.590E+00	2.675E+03	1.798E-01	3.555E+03	5.329E+06	3.581E+02
2104	9.400E+00	2.622E+03	1.762E-01	3.485E+03	5.224E+06	3.510E+02
2105	9.214E+00	2.570E+03	1.727E-01	3.416E+03	5.120E+06	3.440E+02
2106	9.031E+00	2.520E+03	1.693E-01	3.348E+03	5.019E+06	3.372E+02
2107	8.852E+00	2.470E+03	1.659E-01	3.282E+03	4.920E+06	3.305E+02
2108	8.677E+00	2.421E+03	1.626E-01	3.217E+03	4.822E+06	3.240E+02
2109	8.505E+00	2.373E+03	1.594E-01	3.153E+03	4.727E+06	3.176E+02
2110	8.337E+00	2.326E+03	1.563E-01	3.091E+03	4.633E+06	3.113E+02
2111	8.172E+00	2.280E+03	1.532E-01	3.030E+03	4.541E+06	3.051E+02
2112	8.010E+00	2.235E+03	1.501E-01	2.970E+03	4.451E+06	2.991E+02
2113	7.851E+00	2.190E+03	1.472E-01	2.911E+03	4.363E+06	2.932E+02
2114	7.696E+00	2.147E+03	1.443E-01	2.853E+03	4.277E+06	2.874E+02
2115	7.543E+00	2.104E+03	1.414E-01	2.797E+03	4.192E+06	2.817E+02
2116	7.394E+00	2.063E+03	1.386E-01	2.741E+03	4.109E+06	2.761E+02
2117	7.248E+00	2.022E+03	1.359E-01	2.687E+03	4.028E+06	2.706E+02
2118	7.104E+00	1.982E+03	1.332E-01	2.634E+03	3.948E+06	2.653E+02
2119	6.964E+00	1.943E+03	1.305E-01	2.582E+03	3.870E+06	2.600E+02
2120	6.826E+00	1.904E+03	1.279E-01	2.531E+03	3.793E+06	2.549E+02
2121	6.690E+00	1.867E+03	1.254E-01	2.481E+03	3.718E+06	2.498E+02
2122	6.558E+00	1.830E+03	1.229E-01	2.431E+03	3.645E+06	2.449E+02
2123	6.428E+00	1.793E+03	1.205E-01	2.383E+03	3.572E+06	2.400E+02
2124	6.301E+00	1.758E+03	1.181E-01	2.336E+03	3.502E+06	2.353E+02
2125	6.176E+00	1.723E+03	1.158E-01	2.290E+03	3.432E+06	2.306E+02
2126	6.054E+00	1.689E+03	1.135E-01	2.245E+03	3.364E+06	2.260E+02
2127	5.934E+00	1.655E+03	1.112E-01	2.200E+03	3.298E+06	2.216E+02
2128	5.816E+00	1.623E+03	1.090E-01	2.157E+03	3.232E+06	2.172E+02
2129	5.701E+00	1.591E+03	1.069E-01	2.114E+03	3.168E+06	2.129E+02
2130	5.588E+00	1.559E+03	1.048E-01	2.072E+03	3.106E+06	2.087E+02
2131	5.478E+00	1.528E+03	1.027E-01	2.031E+03	3.044E+06	2.045E+02
2132	5.369E+00	1.498E+03	1.006E-01	1.991E+03	2.984E+06	2.005E+02
2133	5.263E+00	1.468E+03	9.865E-02	1.951E+03	2.925E+06	1.965E+02
2134	5.159E+00	1.439E+03	9.670E-02	1.913E+03	2.867E+06	1.926E+02
2135	5.057E+00	1.411E+03	9.478E-02	1.875E+03	2.810E+06	1.888E+02
2136	4.956E+00	1.383E+03	9.291E-02	1.838E+03	2.754E+06	1.851E+02
2137	4.858E+00	1.355E+03	9.107E-02	1.801E+03	2.700E+06	1.814E+02
2138	4.762E+00	1.329E+03	8.926E-02	1.766E+03	2.646E+06	1.778E+02
2139	4.668E+00	1.302E+03	8.750E-02	1.731E+03	2.594E+06	1.743E+02

Results (Continued)

Year	Carbon dioxide			Total landfill gas		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
1999	0	0	0	0	0	0
2000	2.182E+02	1.192E+05	8.008E+00	2.977E+02	2.384E+05	1.602E+01
2001	5.838E+02	3.189E+05	2.143E+01	7.966E+02	6.379E+05	4.286E+01
2002	1.026E+03	5.606E+05	3.767E+01	1.400E+03	1.121E+06	7.534E+01
2003	1.516E+03	8.284E+05	5.566E+01	2.069E+03	1.657E+06	1.113E+02
2004	1.923E+03	1.051E+06	7.060E+01	2.624E+03	2.102E+06	1.412E+02
2005	2.363E+03	1.291E+06	8.673E+01	3.224E+03	2.582E+06	1.735E+02
2006	2.789E+03	1.524E+06	1.024E+02	3.806E+03	3.047E+06	2.048E+02
2007	3.184E+03	1.739E+06	1.169E+02	4.344E+03	3.479E+06	2.337E+02
2008	3.647E+03	1.992E+06	1.339E+02	4.976E+03	3.985E+06	2.677E+02
2009	4.042E+03	2.208E+06	1.484E+02	5.515E+03	4.416E+06	2.967E+02
2010	4.429E+03	2.420E+06	1.626E+02	6.043E+03	4.839E+06	3.251E+02
2011	4.950E+03	2.704E+06	1.817E+02	6.754E+03	5.408E+06	3.634E+02
2012	5.312E+03	2.902E+06	1.950E+02	7.248E+03	5.804E+06	3.900E+02
2013	5.660E+03	3.092E+06	2.078E+02	7.723E+03	6.184E+06	4.155E+02
2014	6.035E+03	3.297E+06	2.215E+02	8.235E+03	6.594E+06	4.431E+02
2015	6.389E+03	3.490E+06	2.345E+02	8.717E+03	6.980E+06	4.690E+02
2016	6.835E+03	3.734E+06	2.509E+02	9.327E+03	7.468E+06	5.018E+02
2017	7.144E+03	3.903E+06	2.622E+02	9.747E+03	7.805E+06	5.244E+02
2018	7.415E+03	4.051E+06	2.722E+02	1.012E+04	8.102E+06	5.444E+02
2019	7.670E+03	4.190E+06	2.815E+02	1.047E+04	8.381E+06	5.631E+02
2020	7.907E+03	4.320E+06	2.902E+02	1.079E+04	8.640E+06	5.805E+02
2021	8.132E+03	4.443E+06	2.985E+02	1.110E+04	8.885E+06	5.970E+02
2022	8.352E+03	4.563E+06	3.066E+02	1.140E+04	9.126E+06	6.131E+02
2023	8.568E+03	4.681E+06	3.145E+02	1.169E+04	9.361E+06	6.290E+02
2024	8.780E+03	4.796E+06	3.223E+02	1.198E+04	9.593E+06	6.445E+02
2025	8.987E+03	4.910E+06	3.299E+02	1.226E+04	9.819E+06	6.597E+02
2026	9.190E+03	5.021E+06	3.373E+02	1.254E+04	1.004E+07	6.747E+02
2027	9.389E+03	5.129E+06	3.446E+02	1.281E+04	1.026E+07	6.893E+02
2028	9.585E+03	5.236E+06	3.518E+02	1.308E+04	1.047E+07	7.036E+02
2029	9.776E+03	5.341E+06	3.588E+02	1.334E+04	1.068E+07	7.177E+02
2030	9.964E+03	5.443E+06	3.657E+02	1.360E+04	1.089E+07	7.314E+02
2031	1.015E+04	5.544E+06	3.725E+02	1.385E+04	1.109E+07	7.450E+02
2032	1.033E+04	5.642E+06	3.791E+02	1.409E+04	1.128E+07	7.582E+02
2033	1.050E+04	5.739E+06	3.856E+02	1.433E+04	1.148E+07	7.712E+02
2034	1.068E+04	5.833E+06	3.919E+02	1.457E+04	1.167E+07	7.839E+02
2035	1.085E+04	5.926E+06	3.982E+02	1.480E+04	1.185E+07	7.963E+02
2036	1.101E+04	6.017E+06	4.043E+02	1.503E+04	1.203E+07	8.085E+02
2037	1.118E+04	6.106E+06	4.103E+02	1.525E+04	1.221E+07	8.205E+02
2038	1.134E+04	6.193E+06	4.161E+02	1.547E+04	1.239E+07	8.323E+02
2039	1.149E+04	6.279E+06	4.219E+02	1.568E+04	1.256E+07	8.438E+02
2040	1.165E+04	6.363E+06	4.275E+02	1.589E+04	1.273E+07	8.550E+02
2041	1.180E+04	6.445E+06	4.330E+02	1.610E+04	1.289E+07	8.661E+02
2042	1.195E+04	6.526E+06	4.385E+02	1.630E+04	1.305E+07	8.769E+02
2043	1.209E+04	6.605E+06	4.438E+02	1.650E+04	1.321E+07	8.875E+02
2044	1.223E+04	6.682E+06	4.490E+02	1.669E+04	1.336E+07	8.980E+02
2045	1.237E+04	6.758E+06	4.541E+02	1.688E+04	1.352E+07	9.082E+02
2046	1.251E+04	6.833E+06	4.591E+02	1.707E+04	1.367E+07	9.182E+02
2047	1.264E+04	6.906E+06	4.640E+02	1.725E+04	1.381E+07	9.280E+02
2048	1.277E+04	6.977E+06	4.688E+02	1.743E+04	1.395E+07	9.376E+02

Results (Continued)

Year	Carbon dioxide			Total landfill gas		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
2049	1.290E+04	7.047E+06	4.735E+02	1.760E+04	1.409E+07	9.470E+02
2050	1.303E+04	7.116E+06	4.781E+02	1.777E+04	1.423E+07	9.562E+02
2051	1.315E+04	7.183E+06	4.826E+02	1.794E+04	1.437E+07	9.653E+02
2052	1.327E+04	7.249E+06	4.871E+02	1.811E+04	1.450E+07	9.741E+02
2053	1.339E+04	7.314E+06	4.914E+02	1.827E+04	1.463E+07	9.828E+02
2054	1.350E+04	7.377E+06	4.957E+02	1.843E+04	1.475E+07	9.914E+02
2055	1.362E+04	7.440E+06	4.999E+02	1.858E+04	1.488E+07	9.997E+02
2056	1.373E+04	7.500E+06	5.040E+02	1.873E+04	1.500E+07	1.008E+03
2057	1.384E+04	7.560E+06	5.080E+02	1.888E+04	1.512E+07	1.016E+03
2058	1.395E+04	7.619E+06	5.119E+02	1.903E+04	1.524E+07	1.024E+03
2059	1.405E+04	7.676E+06	5.158E+02	1.917E+04	1.535E+07	1.032E+03
2060	1.415E+04	7.732E+06	5.195E+02	1.931E+04	1.546E+07	1.039E+03
2061	1.425E+04	7.787E+06	5.232E+02	1.945E+04	1.557E+07	1.046E+03
2062	1.435E+04	7.842E+06	5.269E+02	1.959E+04	1.568E+07	1.054E+03
2063	1.445E+04	7.895E+06	5.304E+02	1.972E+04	1.579E+07	1.061E+03
2064	1.455E+04	7.946E+06	5.339E+02	1.985E+04	1.589E+07	1.068E+03
2065	1.464E+04	7.997E+06	5.373E+02	1.997E+04	1.599E+07	1.075E+03
2066	1.473E+04	8.047E+06	5.407E+02	2.010E+04	1.609E+07	1.081E+03
2067	1.482E+04	8.096E+06	5.440E+02	2.022E+04	1.619E+07	1.088E+03
2068	1.491E+04	8.144E+06	5.472E+02	2.034E+04	1.629E+07	1.094E+03
2069	1.499E+04	8.191E+06	5.504E+02	2.046E+04	1.638E+07	1.101E+03
2070	1.508E+04	8.237E+06	5.534E+02	2.057E+04	1.647E+07	1.107E+03
2071	1.516E+04	8.282E+06	5.565E+02	2.069E+04	1.656E+07	1.113E+03
2072	1.524E+04	8.326E+06	5.595E+02	2.080E+04	1.665E+07	1.119E+03
2073	1.532E+04	8.370E+06	5.624E+02	2.090E+04	1.674E+07	1.125E+03
2074	1.540E+04	8.412E+06	5.652E+02	2.101E+04	1.682E+07	1.130E+03
2075	1.548E+04	8.454E+06	5.680E+02	2.112E+04	1.691E+07	1.136E+03
2076	1.555E+04	8.495E+06	5.708E+02	2.122E+04	1.699E+07	1.142E+03
2077	1.562E+04	8.535E+06	5.735E+02	2.132E+04	1.707E+07	1.147E+03
2078	1.570E+04	8.574E+06	5.761E+02	2.142E+04	1.715E+07	1.152E+03
2079	1.577E+04	8.613E+06	5.787E+02	2.151E+04	1.723E+07	1.157E+03
2080	1.545E+04	8.442E+06	5.672E+02	2.109E+04	1.688E+07	1.134E+03
2081	1.515E+04	8.275E+06	5.560E+02	2.067E+04	1.655E+07	1.112E+03
2082	1.485E+04	8.111E+06	5.450E+02	2.026E+04	1.622E+07	1.090E+03
2083	1.455E+04	7.950E+06	5.342E+02	1.986E+04	1.590E+07	1.068E+03
2084	1.427E+04	7.793E+06	5.236E+02	1.946E+04	1.559E+07	1.047E+03
2085	1.398E+04	7.639E+06	5.132E+02	1.908E+04	1.528E+07	1.026E+03
2086	1.371E+04	7.487E+06	5.031E+02	1.870E+04	1.497E+07	1.006E+03
2087	1.343E+04	7.339E+06	4.931E+02	1.833E+04	1.468E+07	9.862E+02
2088	1.317E+04	7.194E+06	4.834E+02	1.797E+04	1.439E+07	9.667E+02
2089	1.291E+04	7.051E+06	4.738E+02	1.761E+04	1.410E+07	9.476E+02
2090	1.265E+04	6.912E+06	4.644E+02	1.726E+04	1.382E+07	9.288E+02
2091	1.240E+04	6.775E+06	4.552E+02	1.692E+04	1.355E+07	9.104E+02
2092	1.216E+04	6.641E+06	4.462E+02	1.659E+04	1.328E+07	8.924E+02
2093	1.192E+04	6.509E+06	4.374E+02	1.626E+04	1.302E+07	8.747E+02
2094	1.168E+04	6.380E+06	4.287E+02	1.594E+04	1.276E+07	8.574E+02
2095	1.145E+04	6.254E+06	4.202E+02	1.562E+04	1.251E+07	8.404E+02
2096	1.122E+04	6.130E+06	4.119E+02	1.531E+04	1.226E+07	8.238E+02
2097	1.100E+04	6.009E+06	4.037E+02	1.501E+04	1.202E+07	8.075E+02
2098	1.078E+04	5.890E+06	3.957E+02	1.471E+04	1.178E+07	7.915E+02
2099	1.057E+04	5.773E+06	3.879E+02	1.442E+04	1.155E+07	7.758E+02

Results (Continued)

Year	Carbon dioxide			Total landfill gas		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
2100	1.036E+04	5.659E+06	3.802E+02	1.413E+04	1.132E+07	7.604E+02
2101	1.015E+04	5.547E+06	3.727E+02	1.385E+04	1.109E+07	7.454E+02
2102	9.952E+03	5.437E+06	3.653E+02	1.358E+04	1.087E+07	7.306E+02
2103	9.755E+03	5.329E+06	3.581E+02	1.331E+04	1.066E+07	7.162E+02
2104	9.562E+03	5.224E+06	3.510E+02	1.305E+04	1.045E+07	7.020E+02
2105	9.373E+03	5.120E+06	3.440E+02	1.279E+04	1.024E+07	6.881E+02
2106	9.187E+03	5.019E+06	3.372E+02	1.254E+04	1.004E+07	6.745E+02
2107	9.005E+03	4.920E+06	3.305E+02	1.229E+04	9.839E+06	6.611E+02
2108	8.827E+03	4.822E+06	3.240E+02	1.204E+04	9.644E+06	6.480E+02
2109	8.652E+03	4.727E+06	3.176E+02	1.181E+04	9.453E+06	6.352E+02
2110	8.481E+03	4.633E+06	3.113E+02	1.157E+04	9.266E+06	6.226E+02
2111	8.313E+03	4.541E+06	3.051E+02	1.134E+04	9.083E+06	6.103E+02
2112	8.148E+03	4.451E+06	2.991E+02	1.112E+04	8.903E+06	5.982E+02
2113	7.987E+03	4.363E+06	2.932E+02	1.090E+04	8.727E+06	5.863E+02
2114	7.829E+03	4.277E+06	2.874E+02	1.068E+04	8.554E+06	5.747E+02
2115	7.674E+03	4.192E+06	2.817E+02	1.047E+04	8.384E+06	5.634E+02
2116	7.522E+03	4.109E+06	2.761E+02	1.026E+04	8.218E+06	5.522E+02
2117	7.373E+03	4.028E+06	2.706E+02	1.006E+04	8.056E+06	5.413E+02
2118	7.227E+03	3.948E+06	2.653E+02	9.861E+03	7.896E+06	5.305E+02
2119	7.084E+03	3.870E+06	2.600E+02	9.666E+03	7.740E+06	5.200E+02
2120	6.944E+03	3.793E+06	2.549E+02	9.474E+03	7.587E+06	5.097E+02
2121	6.806E+03	3.718E+06	2.498E+02	9.287E+03	7.436E+06	4.996E+02
2122	6.671E+03	3.645E+06	2.449E+02	9.103E+03	7.289E+06	4.898E+02
2123	6.539E+03	3.572E+06	2.400E+02	8.923E+03	7.145E+06	4.801E+02
2124	6.410E+03	3.502E+06	2.353E+02	8.746E+03	7.003E+06	4.705E+02
2125	6.283E+03	3.432E+06	2.306E+02	8.573E+03	6.865E+06	4.612E+02
2126	6.158E+03	3.364E+06	2.260E+02	8.403E+03	6.729E+06	4.521E+02
2127	6.036E+03	3.298E+06	2.216E+02	8.237E+03	6.595E+06	4.431E+02
2128	5.917E+03	3.232E+06	2.172E+02	8.073E+03	6.465E+06	4.344E+02
2129	5.800E+03	3.168E+06	2.129E+02	7.914E+03	6.337E+06	4.258E+02
2130	5.685E+03	3.106E+06	2.087E+02	7.757E+03	6.211E+06	4.173E+02
2131	5.572E+03	3.044E+06	2.045E+02	7.603E+03	6.088E+06	4.091E+02
2132	5.462E+03	2.984E+06	2.005E+02	7.453E+03	5.968E+06	4.010E+02
2133	5.354E+03	2.925E+06	1.965E+02	7.305E+03	5.850E+06	3.930E+02
2134	5.248E+03	2.867E+06	1.926E+02	7.161E+03	5.734E+06	3.853E+02
2135	5.144E+03	2.810E+06	1.888E+02	7.019E+03	5.620E+06	3.776E+02
2136	5.042E+03	2.754E+06	1.851E+02	6.880E+03	5.509E+06	3.701E+02
2137	4.942E+03	2.700E+06	1.814E+02	6.744E+03	5.400E+06	3.628E+02
2138	4.844E+03	2.646E+06	1.778E+02	6.610E+03	5.293E+06	3.556E+02
2139	4.748E+03	2.594E+06	1.743E+02	6.479E+03	5.188E+06	3.486E+02

Summary Report

Landfill Name or Identifier: CRSWF Old Landfill Permit No. P199L

Date: Sunday, August 22, 2021

Description/Comments:

About LandGEM:

First-Order Decomposition Rate Equation:

$$Q_{CH_4} = \sum_{i=1}^{n} \sum_{j=0.1}^{1} k L_o \left(\frac{M_i}{10} \right) e^{-k t_{ij}}$$

Where,
Q_{CH4} = annual methane generation in the year of the calculation *(m^3/year)*
i = 1-year time increment
n = (year of the calculation) - (initial year of waste acceptance)
j = 0.1-year time increment
k = methane generation rate (*$year^{-1}$*)
L_o = potential methane generation capacity (*m^3/Mg*)

M_i = mass of waste accepted in the i^{th} year (*Mg*)
t_{ij} = age of the j^{th} section of waste mass M_i accepted in the i^{th} year (*decimal years*, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at http://www.epa.gov/ttnatw01/landfill/landflpg.html.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for convential landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

LANDFILL CHARACTERISTICS

Landfill Open Year	**1935**	
Landfill Closure Year (with 80-year limit)	**1999**	
Actual Closure Year (without limit)	***1999***	
Have Model Calculate Closure Year?	**No**	
Waste Design Capacity	**1,587,570**	*megagrams*

MODEL PARAMETERS

Methane Generation Rate, k	**0.020**	*year $^{-1}$*
Potential Methane Generation Capacity, L_o	**170**	*m^3/Mg*
NMOC Concentration	**251**	*ppmv as hexane*
Methane Content	**50**	*% by volume*

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1:	**NMOC**
Gas / Pollutant #2:	**Methane**
Gas / Pollutant #3:	**Carbon dioxide**
Gas / Pollutant #4:	**Total landfill gas**

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	*(short tons/year)*	*(Mg)*	*(short tons)*
1935	21,134	23,247	0	0
1936	21,134	23,247	21,134	23,247
1937	21,134	23,247	42,268	46,495
1938	21,134	23,247	63,402	69,742
1939	21,134	23,247	84,536	92,990
1940	21,134	23,247	105,670	116,237
1941	21,134	23,247	126,804	139,485
1942	21,134	23,247	147,938	162,732
1943	21,134	23,247	169,072	185,980
1944	21,134	23,247	190,206	209,227
1945	21,134	23,247	211,340	232,475
1946	21,134	23,247	232,475	255,722
1947	21,134	23,247	253,609	278,969
1948	21,134	23,247	274,743	302,217
1949	21,134	23,247	295,877	325,464
1950	21,134	23,247	317,011	348,712
1951	21,134	23,247	338,145	371,959
1952	21,134	23,247	359,279	395,207
1953	21,134	23,247	380,413	418,454
1954	21,134	23,247	401,547	441,702
1955	21,134	23,247	422,681	464,949
1956	21,134	23,247	443,815	488,197
1957	21,134	23,247	464,949	511,444
1958	21,134	23,247	486,083	534,691
1959	21,134	23,247	507,217	557,939
1960	21,134	23,247	528,351	581,186
1961	21,134	23,247	549,485	604,434
1962	21,134	23,247	570,619	627,681
1963	21,134	23,247	591,753	650,929
1964	21,134	23,247	612,887	674,176
1965	21,134	23,247	634,021	697,424
1966	21,134	23,247	655,156	720,671
1967	21,134	23,247	676,290	743,919
1968	21,134	23,247	697,424	767,166
1969	21,134	23,247	718,558	790,413
1970	21,134	23,247	739,692	813,661
1971	21,134	23,247	760,826	836,908
1972	21,134	23,247	781,960	860,156
1973	21,134	23,247	803,094	883,403
1974	21,134	23,247	824,228	906,651

WASTE ACCEPTANCE RATES (Continued)

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	(short tons/year)	(Mg)	(short tons)
1975	21,134	23,247	845,362	929,898
1976	21,134	23,247	866,496	953,146
1977	21,134	23,247	887,630	976,393
1978	21,134	23,247	908,764	999,641
1979	21,134	23,247	929,898	1,022,888
1980	21,134	23,247	951,032	1,046,135
1981	21,134	23,247	972,166	1,069,383
1982	21,134	23,247	993,300	1,092,630
1983	21,134	23,247	1,014,434	1,115,878
1984	21,134	23,247	1,035,568	1,139,125
1985	21,134	23,247	1,056,702	1,162,373
1986	21,134	23,247	1,077,837	1,185,620
1987	21,134	23,247	1,098,971	1,208,868
1988	21,134	23,247	1,120,105	1,232,115
1989	21,134	23,247	1,141,239	1,255,363
1990	21,134	23,247	1,162,373	1,278,610
1991	21,134	23,247	1,183,507	1,301,857
1992	21,134	23,247	1,204,641	1,325,105
1993	21,134	23,247	1,225,775	1,348,352
1994	21,134	23,247	1,246,909	1,371,600
1995	69,514	76,465	1,268,043	1,394,847
1996	75,714	83,285	1,337,557	1,471,312
1997	73,641	81,005	1,413,270	1,554,597
1998	75,443	82,987	1,486,911	1,635,602
1999	25,211	27,732	1,562,354	1,718,589
2000	0	0	1,587,565	1,746,321
2001	0	0	1,587,565	1,746,321
2002	0	0	1,587,565	1,746,321
2003	0	0	1,587,565	1,746,321
2004	0	0	1,587,565	1,746,321
2005	0	0	1,587,565	1,746,321
2006	0	0	1,587,565	1,746,321
2007	0	0	1,587,565	1,746,321
2008	0	0	1,587,565	1,746,321
2009	0	0	1,587,565	1,746,321
2010	0	0	1,587,565	1,746,321
2011	0	0	1,587,565	1,746,321
2012	0	0	1,587,565	1,746,321
2013	0	0	1,587,565	1,746,321
2014	0	0	1,587,565	1,746,321

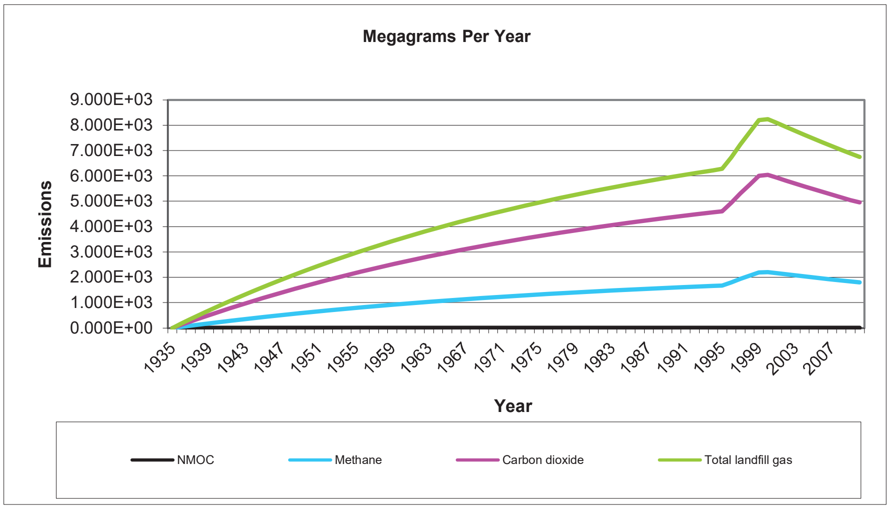
Pollutant Parameters

	Gas / Pollutant Default Parameters:			User-specified Pollutant Parameters:	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

Pollutant Parameters (Continued)

	Gas / Pollutant Default Parameters:			User-specified Pollutant Parameters:	
	Compound	Concentration (*ppmv*)	Molecular Weight	Concentration (*ppmv*)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		

Graphs


Megagrams Per Year
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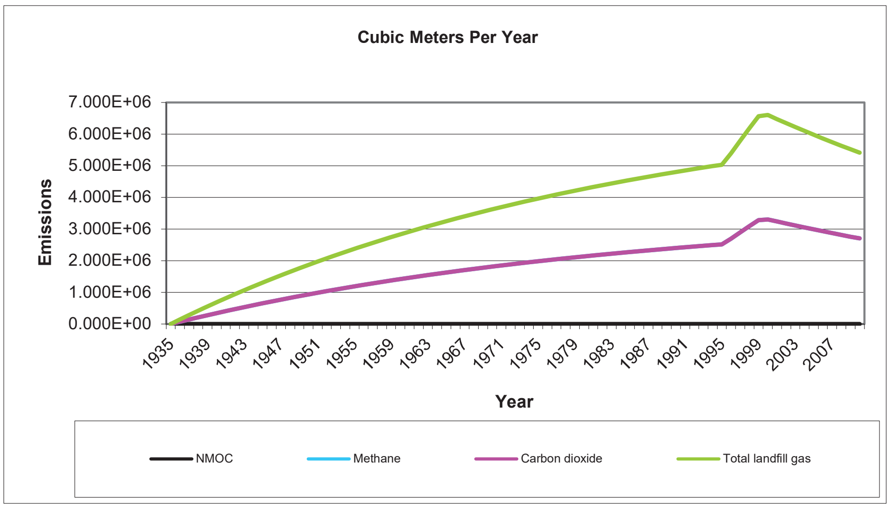
7.000E+03
6.000E+03
5.000E+03
4.000E+03
3.000E+03
2.000E+03
1.000E+03
0.000E+00
1935 1939 1943 1947 1951 1955 1959 1963 1967 1971 1975 1979 1983 1987 1991 1995 1999 2003 2007
Year
NMOC
Methane
Carbon dioxide
Total landfill gas


Cubic Meters Per Year
Emissions
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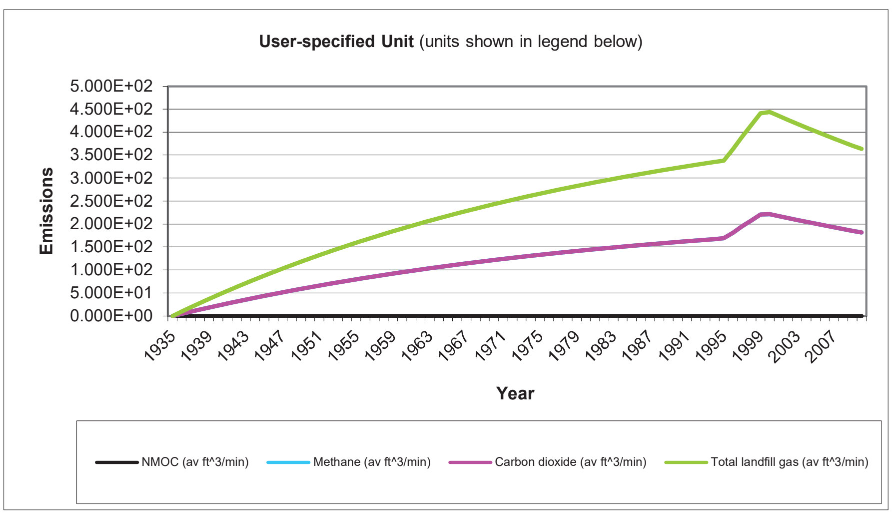
6.000E+06
5.000E+06
4.000E+06
3.000E+06
2.000E+06
1.000E+06
0.000E+00
1935 1939 1943 1947 1951 1955 1959 1963 1967 1971 1975 1979 1983 1987 1991 1995 1999 2003 2007
Year
NMOC
Methane
Carbon dioxide
Total landfill gas


User-specified Unit (units shown in legend below)
Emissions
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4.500E+02
4.000E+02
3.500E+02
3.000E+02
2.500E+02
2.000E+02
1.500E+02
1.000E+02
5.000E+01
0.000E+00
1935 1939 1943 1947 1951 1955 1959 1963 1967 1971 1975 1979 1983 1987 1991 1995 1999 2003 2007
Year
NMOC (av ft^3/min)
Methane (av ft^3/min)
Carbon dioxide (av ft^3/min)
Total landfill gas (av ft^3/min)

Results

Year	NMOC			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
1935	0	0	0	0	0	0
1936	1.281E-01	3.575E+01	2.402E-03	4.751E+01	7.121E+04	4.785E+00
1937	2.537E-01	7.079E+01	4.756E-03	9.408E+01	1.410E+05	9.475E+00
1938	3.769E-01	1.051E+02	7.064E-03	1.397E+02	2.094E+05	1.407E+01
1939	4.975E-01	1.388E+02	9.326E-03	1.845E+02	2.765E+05	1.858E+01
1940	6.158E-01	1.718E+02	1.154E-02	2.283E+02	3.422E+05	2.300E+01
1941	7.318E-01	2.042E+02	1.372E-02	2.713E+02	4.067E+05	2.732E+01
1942	8.454E-01	2.359E+02	1.585E-02	3.135E+02	4.698E+05	3.157E+01
1943	9.568E-01	2.669E+02	1.794E-02	3.548E+02	5.317E+05	3.573E+01
1944	1.066E+00	2.974E+02	1.998E-02	3.952E+02	5.924E+05	3.981E+01
1945	1.173E+00	3.273E+02	2.199E-02	4.349E+02	6.519E+05	4.380E+01
1946	1.278E+00	3.565E+02	2.396E-02	4.738E+02	7.102E+05	4.772E+01
1947	1.381E+00	3.852E+02	2.588E-02	5.119E+02	7.674E+05	5.156E+01
1948	1.482E+00	4.133E+02	2.777E-02	5.493E+02	8.234E+05	5.532E+01
1949	1.580E+00	4.409E+02	2.962E-02	5.860E+02	8.783E+05	5.901E+01
1950	1.677E+00	4.679E+02	3.144E-02	6.219E+02	9.321E+05	6.263E+01
1951	1.772E+00	4.944E+02	3.322E-02	6.571E+02	9.849E+05	6.617E+01
1952	1.865E+00	5.204E+02	3.496E-02	6.916E+02	1.037E+06	6.965E+01
1953	1.956E+00	5.458E+02	3.667E-02	7.254E+02	1.087E+06	7.305E+01
1954	2.046E+00	5.708E+02	3.835E-02	7.585E+02	1.137E+06	7.639E+01
1955	2.133E+00	5.952E+02	3.999E-02	7.910E+02	1.186E+06	7.966E+01
1956	2.219E+00	6.192E+02	4.160E-02	8.229E+02	1.233E+06	8.287E+01
1957	2.304E+00	6.427E+02	4.318E-02	8.541E+02	1.280E+06	8.602E+01
1958	2.386E+00	6.657E+02	4.473E-02	8.847E+02	1.326E+06	8.910E+01
1959	2.467E+00	6.882E+02	4.624E-02	9.147E+02	1.371E+06	9.212E+01
1960	2.546E+00	7.104E+02	4.773E-02	9.441E+02	1.415E+06	9.508E+01
1961	2.624E+00	7.320E+02	4.919E-02	9.729E+02	1.458E+06	9.798E+01
1962	2.700E+00	7.533E+02	5.061E-02	1.001E+03	1.501E+06	1.008E+02
1963	2.775E+00	7.741E+02	5.201E-02	1.029E+03	1.542E+06	1.036E+02
1964	2.848E+00	7.946E+02	5.339E-02	1.056E+03	1.583E+06	1.063E+02
1965	2.920E+00	8.146E+02	5.473E-02	1.083E+03	1.623E+06	1.090E+02
1966	2.990E+00	8.342E+02	5.605E-02	1.109E+03	1.662E+06	1.117E+02
1967	3.059E+00	8.534E+02	5.734E-02	1.134E+03	1.700E+06	1.142E+02
1968	3.127E+00	8.723E+02	5.861E-02	1.159E+03	1.738E+06	1.167E+02
1969	3.193E+00	8.907E+02	5.985E-02	1.184E+03	1.774E+06	1.192E+02
1970	3.258E+00	9.089E+02	6.107E-02	1.208E+03	1.810E+06	1.216E+02
1971	3.321E+00	9.266E+02	6.226E-02	1.231E+03	1.846E+06	1.240E+02
1972	3.384E+00	9.440E+02	6.343E-02	1.255E+03	1.880E+06	1.264E+02
1973	3.445E+00	9.611E+02	6.457E-02	1.277E+03	1.914E+06	1.286E+02
1974	3.505E+00	9.778E+02	6.570E-02	1.299E+03	1.948E+06	1.309E+02
1975	3.564E+00	9.942E+02	6.680E-02	1.321E+03	1.980E+06	1.331E+02
1976	3.621E+00	1.010E+03	6.788E-02	1.343E+03	2.012E+06	1.352E+02
1977	3.678E+00	1.026E+03	6.894E-02	1.364E+03	2.044E+06	1.373E+02
1978	3.733E+00	1.041E+03	6.997E-02	1.384E+03	2.075E+06	1.394E+02
1979	3.787E+00	1.057E+03	7.099E-02	1.404E+03	2.105E+06	1.414E+02
1980	3.840E+00	1.071E+03	7.199E-02	1.424E+03	2.134E+06	1.434E+02
1981	3.892E+00	1.086E+03	7.296E-02	1.443E+03	2.163E+06	1.453E+02
1982	3.943E+00	1.100E+03	7.392E-02	1.462E+03	2.192E+06	1.472E+02
1983	3.994E+00	1.114E+03	7.486E-02	1.481E+03	2.219E+06	1.491E+02
1984	4.043E+00	1.128E+03	7.578E-02	1.499E+03	2.247E+06	1.510E+02

Results (Continued)

Year	NMOC			Methane		
	(Mg/year)	*(m^3/year)*	*(av ft^3/min)*	*(Mg/year)*	*(m^3/year)*	*(av ft^3/min)*
1985	4.091E+00	1.141E+03	7.668E-02	1.517E+03	2.273E+06	1.527E+02
1986	4.138E+00	1.154E+03	7.756E-02	1.534E+03	2.300E+06	1.545E+02
1987	4.184E+00	1.167E+03	7.843E-02	1.551E+03	2.325E+06	1.562E+02
1988	4.229E+00	1.180E+03	7.928E-02	1.568E+03	2.350E+06	1.579E+02
1989	4.274E+00	1.192E+03	8.011E-02	1.585E+03	2.375E+06	1.596E+02
1990	4.317E+00	1.204E+03	8.093E-02	1.601E+03	2.399E+06	1.612E+02
1991	4.360E+00	1.216E+03	8.172E-02	1.616E+03	2.423E+06	1.628E+02
1992	4.402E+00	1.228E+03	8.251E-02	1.632E+03	2.446E+06	1.644E+02
1993	4.443E+00	1.239E+03	8.328E-02	1.647E+03	2.469E+06	1.659E+02
1994	4.483E+00	1.251E+03	8.403E-02	1.662E+03	2.491E+06	1.674E+02
1995	4.522E+00	1.262E+03	8.477E-02	1.677E+03	2.513E+06	1.689E+02
1996	4.854E+00	1.354E+03	9.099E-02	1.800E+03	2.698E+06	1.813E+02
1997	5.217E+00	1.455E+03	9.779E-02	1.934E+03	2.899E+06	1.948E+02
1998	5.560E+00	1.551E+03	1.042E-01	2.062E+03	3.090E+06	2.076E+02
1999	5.908E+00	1.648E+03	1.107E-01	2.190E+03	3.283E+06	2.206E+02
2000	5.944E+00	1.658E+03	1.114E-01	2.204E+03	3.303E+06	2.219E+02
2001	5.826E+00	1.625E+03	1.092E-01	2.160E+03	3.238E+06	2.175E+02
2002	5.710E+00	1.593E+03	1.070E-01	2.117E+03	3.174E+06	2.132E+02
2003	5.597E+00	1.562E+03	1.049E-01	2.075E+03	3.111E+06	2.090E+02
2004	5.487E+00	1.531E+03	1.028E-01	2.034E+03	3.049E+06	2.049E+02
2005	5.378E+00	1.500E+03	1.008E-01	1.994E+03	2.989E+06	2.008E+02
2006	5.271E+00	1.471E+03	9.881E-02	1.954E+03	2.930E+06	1.968E+02
2007	5.167E+00	1.442E+03	9.685E-02	1.916E+03	2.872E+06	1.929E+02
2008	5.065E+00	1.413E+03	9.494E-02	1.878E+03	2.815E+06	1.891E+02
2009	4.964E+00	1.385E+03	9.306E-02	1.841E+03	2.759E+06	1.854E+02
2010	4.866E+00	1.358E+03	9.121E-02	1.804E+03	2.704E+06	1.817E+02
2011	4.770E+00	1.331E+03	8.941E-02	1.768E+03	2.651E+06	1.781E+02
2012	4.675E+00	1.304E+03	8.764E-02	1.733E+03	2.598E+06	1.746E+02
2013	4.583E+00	1.279E+03	8.590E-02	1.699E+03	2.547E+06	1.711E+02
2014	4.492E+00	1.253E+03	8.420E-02	1.665E+03	2.496E+06	1.677E+02
2015	4.403E+00	1.228E+03	8.253E-02	1.632E+03	2.447E+06	1.644E+02
2016	4.316E+00	1.204E+03	8.090E-02	1.600E+03	2.399E+06	1.612E+02
2017	4.230E+00	1.180E+03	7.930E-02	1.568E+03	2.351E+06	1.580E+02
2018	4.147E+00	1.157E+03	7.773E-02	1.537E+03	2.304E+06	1.548E+02
2019	4.065E+00	1.134E+03	7.619E-02	1.507E+03	2.259E+06	1.518E+02
2020	3.984E+00	1.111E+03	7.468E-02	1.477E+03	2.214E+06	1.488E+02
2021	3.905E+00	1.089E+03	7.320E-02	1.448E+03	2.170E+06	1.458E+02
2022	3.828E+00	1.068E+03	7.175E-02	1.419E+03	2.127E+06	1.429E+02
2023	3.752E+00	1.047E+03	7.033E-02	1.391E+03	2.085E+06	1.401E+02
2024	3.678E+00	1.026E+03	6.894E-02	1.364E+03	2.044E+06	1.373E+02
2025	3.605E+00	1.006E+03	6.757E-02	1.337E+03	2.003E+06	1.346E+02
2026	3.534E+00	9.858E+02	6.624E-02	1.310E+03	1.964E+06	1.319E+02
2027	3.464E+00	9.663E+02	6.492E-02	1.284E+03	1.925E+06	1.293E+02
2028	3.395E+00	9.471E+02	6.364E-02	1.259E+03	1.887E+06	1.268E+02
2029	3.328E+00	9.284E+02	6.238E-02	1.234E+03	1.849E+06	1.243E+02
2030	3.262E+00	9.100E+02	6.114E-02	1.209E+03	1.813E+06	1.218E+02
2031	3.197E+00	8.920E+02	5.993E-02	1.185E+03	1.777E+06	1.194E+02
2032	3.134E+00	8.743E+02	5.875E-02	1.162E+03	1.742E+06	1.170E+02
2033	3.072E+00	8.570E+02	5.758E-02	1.139E+03	1.707E+06	1.147E+02
2034	3.011E+00	8.400E+02	5.644E-02	1.116E+03	1.673E+06	1.124E+02
2035	2.951E+00	8.234E+02	5.532E-02	1.094E+03	1.640E+06	1.102E+02

Results (Continued)

Year	NMOC			Methane		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
2036	2.893E+00	8.071E+02	5.423E-02	1.073E+03	1.608E+06	1.080E+02
2037	2.836E+00	7.911E+02	5.315E-02	1.051E+03	1.576E+06	1.059E+02
2038	2.780E+00	7.755E+02	5.210E-02	1.031E+03	1.545E+06	1.038E+02
2039	2.725E+00	7.601E+02	5.107E-02	1.010E+03	1.514E+06	1.017E+02
2040	2.671E+00	7.450E+02	5.006E-02	9.901E+02	1.484E+06	9.972E+01
2041	2.618E+00	7.303E+02	4.907E-02	9.705E+02	1.455E+06	9.775E+01
2042	2.566E+00	7.158E+02	4.810E-02	9.513E+02	1.426E+06	9.581E+01
2043	2.515E+00	7.017E+02	4.714E-02	9.325E+02	1.398E+06	9.391E+01
2044	2.465E+00	6.878E+02	4.621E-02	9.140E+02	1.370E+06	9.205E+01
2045	2.416E+00	6.741E+02	4.530E-02	8.959E+02	1.343E+06	9.023E+01
2046	2.369E+00	6.608E+02	4.440E-02	8.782E+02	1.316E+06	8.844E+01
2047	2.322E+00	6.477E+02	4.352E-02	8.608E+02	1.290E+06	8.669E+01
2048	2.276E+00	6.349E+02	4.266E-02	8.438E+02	1.265E+06	8.498E+01
2049	2.231E+00	6.223E+02	4.181E-02	8.270E+02	1.240E+06	8.329E+01
2050	2.186E+00	6.100E+02	4.099E-02	8.107E+02	1.215E+06	8.164E+01
2051	2.143E+00	5.979E+02	4.017E-02	7.946E+02	1.191E+06	8.003E+01
2052	2.101E+00	5.861E+02	3.938E-02	7.789E+02	1.167E+06	7.844E+01
2053	2.059E+00	5.745E+02	3.860E-02	7.635E+02	1.144E+06	7.689E+01
2054	2.018E+00	5.631E+02	3.783E-02	7.483E+02	1.122E+06	7.537E+01
2055	1.978E+00	5.519E+02	3.708E-02	7.335E+02	1.099E+06	7.387E+01
2056	1.939E+00	5.410E+02	3.635E-02	7.190E+02	1.078E+06	7.241E+01
2057	1.901E+00	5.303E+02	3.563E-02	7.048E+02	1.056E+06	7.098E+01
2058	1.863E+00	5.198E+02	3.493E-02	6.908E+02	1.035E+06	6.957E+01
2059	1.826E+00	5.095E+02	3.423E-02	6.771E+02	1.015E+06	6.819E+01
2060	1.790E+00	4.994E+02	3.356E-02	6.637E+02	9.949E+05	6.684E+01
2061	1.755E+00	4.895E+02	3.289E-02	6.506E+02	9.752E+05	6.552E+01
2062	1.720E+00	4.798E+02	3.224E-02	6.377E+02	9.558E+05	6.422E+01
2063	1.686E+00	4.703E+02	3.160E-02	6.251E+02	9.369E+05	6.295E+01
2064	1.653E+00	4.610E+02	3.098E-02	6.127E+02	9.184E+05	6.171E+01
2065	1.620E+00	4.519E+02	3.036E-02	6.006E+02	9.002E+05	6.048E+01
2066	1.588E+00	4.429E+02	2.976E-02	5.887E+02	8.824E+05	5.929E+01
2067	1.556E+00	4.342E+02	2.917E-02	5.770E+02	8.649E+05	5.811E+01
2068	1.525E+00	4.256E+02	2.859E-02	5.656E+02	8.478E+05	5.696E+01
2069	1.495E+00	4.171E+02	2.803E-02	5.544E+02	8.310E+05	5.583E+01
2070	1.466E+00	4.089E+02	2.747E-02	5.434E+02	8.145E+05	5.473E+01
2071	1.437E+00	4.008E+02	2.693E-02	5.326E+02	7.984E+05	5.364E+01
2072	1.408E+00	3.929E+02	2.640E-02	5.221E+02	7.826E+05	5.258E+01
2073	1.380E+00	3.851E+02	2.587E-02	5.118E+02	7.671E+05	5.154E+01
2074	1.353E+00	3.775E+02	2.536E-02	5.016E+02	7.519E+05	5.052E+01
2075	1.326E+00	3.700E+02	2.486E-02	4.917E+02	7.370E+05	4.952E+01

Results (Continued)

Year	Carbon dioxide			Total landfill gas		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
1935	0	0	0	0	0	0
1936	1.304E+02	7.121E+04	4.785E+00	1.779E+02	1.424E+05	9.570E+00
1937	2.581E+02	1.410E+05	9.475E+00	3.522E+02	2.820E+05	1.895E+01
1938	3.834E+02	2.094E+05	1.407E+01	5.231E+02	4.189E+05	2.814E+01
1939	5.061E+02	2.765E+05	1.858E+01	6.906E+02	5.530E+05	3.716E+01
1940	6.265E+02	3.422E+05	2.300E+01	8.548E+02	6.845E+05	4.599E+01
1941	7.444E+02	4.067E+05	2.732E+01	1.016E+03	8.134E+05	5.465E+01
1942	8.600E+02	4.698E+05	3.157E+01	1.173E+03	9.397E+05	6.314E+01
1943	9.734E+02	5.317E+05	3.573E+01	1.328E+03	1.063E+06	7.146E+01
1944	1.084E+03	5.924E+05	3.981E+01	1.480E+03	1.185E+06	7.961E+01
1945	1.193E+03	6.519E+05	4.380E+01	1.628E+03	1.304E+06	8.760E+01
1946	1.300E+03	7.102E+05	4.772E+01	1.774E+03	1.420E+06	9.544E+01
1947	1.405E+03	7.674E+05	5.156E+01	1.917E+03	1.535E+06	1.031E+02
1948	1.507E+03	8.234E+05	5.532E+01	2.057E+03	1.647E+06	1.106E+02
1949	1.608E+03	8.783E+05	5.901E+01	2.194E+03	1.757E+06	1.180E+02
1950	1.706E+03	9.321E+05	6.263E+01	2.328E+03	1.864E+06	1.253E+02
1951	1.803E+03	9.849E+05	6.617E+01	2.460E+03	1.970E+06	1.323E+02
1952	1.897E+03	1.037E+06	6.965E+01	2.589E+03	2.073E+06	1.393E+02
1953	1.990E+03	1.087E+06	7.305E+01	2.716E+03	2.175E+06	1.461E+02
1954	2.081E+03	1.137E+06	7.639E+01	2.840E+03	2.274E+06	1.528E+02
1955	2.170E+03	1.186E+06	7.966E+01	2.961E+03	2.371E+06	1.593E+02
1956	2.258E+03	1.233E+06	8.287E+01	3.081E+03	2.467E+06	1.657E+02
1957	2.343E+03	1.280E+06	8.602E+01	3.197E+03	2.560E+06	1.720E+02
1958	2.427E+03	1.326E+06	8.910E+01	3.312E+03	2.652E+06	1.782E+02
1959	2.510E+03	1.371E+06	9.212E+01	3.424E+03	2.742E+06	1.842E+02
1960	2.590E+03	1.415E+06	9.508E+01	3.534E+03	2.830E+06	1.902E+02
1961	2.669E+03	1.458E+06	9.798E+01	3.642E+03	2.917E+06	1.960E+02
1962	2.747E+03	1.501E+06	1.008E+02	3.748E+03	3.001E+06	2.016E+02
1963	2.823E+03	1.542E+06	1.036E+02	3.852E+03	3.084E+06	2.072E+02
1964	2.897E+03	1.583E+06	1.063E+02	3.953E+03	3.166E+06	2.127E+02
1965	2.970E+03	1.623E+06	1.090E+02	4.053E+03	3.245E+06	2.181E+02
1966	3.042E+03	1.662E+06	1.117E+02	4.150E+03	3.323E+06	2.233E+02
1967	3.112E+03	1.700E+06	1.142E+02	4.246E+03	3.400E+06	2.285E+02
1968	3.181E+03	1.738E+06	1.167E+02	4.340E+03	3.475E+06	2.335E+02
1969	3.248E+03	1.774E+06	1.192E+02	4.432E+03	3.549E+06	2.384E+02
1970	3.314E+03	1.810E+06	1.216E+02	4.522E+03	3.621E+06	2.433E+02
1971	3.379E+03	1.846E+06	1.240E+02	4.610E+03	3.692E+06	2.480E+02
1972	3.442E+03	1.880E+06	1.264E+02	4.697E+03	3.761E+06	2.527E+02
1973	3.504E+03	1.914E+06	1.286E+02	4.782E+03	3.829E+06	2.573E+02
1974	3.565E+03	1.948E+06	1.309E+02	4.865E+03	3.896E+06	2.617E+02
1975	3.625E+03	1.980E+06	1.331E+02	4.946E+03	3.961E+06	2.661E+02
1976	3.684E+03	2.012E+06	1.352E+02	5.026E+03	4.025E+06	2.704E+02
1977	3.741E+03	2.044E+06	1.373E+02	5.105E+03	4.088E+06	2.746E+02
1978	3.797E+03	2.075E+06	1.394E+02	5.181E+03	4.149E+06	2.788E+02
1979	3.853E+03	2.105E+06	1.414E+02	5.257E+03	4.209E+06	2.828E+02
1980	3.907E+03	2.134E+06	1.434E+02	5.330E+03	4.268E+06	2.868E+02
1981	3.960E+03	2.163E+06	1.453E+02	5.403E+03	4.326E+06	2.907E+02
1982	4.012E+03	2.192E+06	1.472E+02	5.474E+03	4.383E+06	2.945E+02
1983	4.063E+03	2.219E+06	1.491E+02	5.543E+03	4.439E+06	2.982E+02
1984	4.112E+03	2.247E+06	1.510E+02	5.611E+03	4.493E+06	3.019E+02

Results (Continued)

Year	Carbon dioxide			Total landfill gas		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
1985	4.161E+03	2.273E+06	1.527E+02	5.678E+03	4.547E+06	3.055E+02
1986	4.209E+03	2.300E+06	1.545E+02	5.743E+03	4.599E+06	3.090E+02
1987	4.256E+03	2.325E+06	1.562E+02	5.808E+03	4.650E+06	3.125E+02
1988	4.302E+03	2.350E+06	1.579E+02	5.870E+03	4.701E+06	3.158E+02
1989	4.348E+03	2.375E+06	1.596E+02	5.932E+03	4.750E+06	3.192E+02
1990	4.392E+03	2.399E+06	1.612E+02	5.992E+03	4.799E+06	3.224E+02
1991	4.435E+03	2.423E+06	1.628E+02	6.052E+03	4.846E+06	3.256E+02
1992	4.478E+03	2.446E+06	1.644E+02	6.110E+03	4.892E+06	3.287E+02
1993	4.519E+03	2.469E+06	1.659E+02	6.167E+03	4.938E+06	3.318E+02
1994	4.560E+03	2.491E+06	1.674E+02	6.222E+03	4.983E+06	3.348E+02
1995	4.600E+03	2.513E+06	1.689E+02	6.277E+03	5.026E+06	3.377E+02
1996	4.938E+03	2.698E+06	1.813E+02	6.738E+03	5.395E+06	3.625E+02
1997	5.307E+03	2.899E+06	1.948E+02	7.242E+03	5.799E+06	3.896E+02
1998	5.656E+03	3.090E+06	2.076E+02	7.718E+03	6.180E+06	4.152E+02
1999	6.010E+03	3.283E+06	2.206E+02	8.200E+03	6.566E+06	4.412E+02
2000	6.046E+03	3.303E+06	2.219E+02	8.250E+03	6.606E+06	4.439E+02
2001	5.926E+03	3.238E+06	2.175E+02	8.086E+03	6.475E+06	4.351E+02
2002	5.809E+03	3.174E+06	2.132E+02	7.926E+03	6.347E+06	4.265E+02
2003	5.694E+03	3.111E+06	2.090E+02	7.769E+03	6.221E+06	4.180E+02
2004	5.581E+03	3.049E+06	2.049E+02	7.616E+03	6.098E+06	4.097E+02
2005	5.471E+03	2.989E+06	2.008E+02	7.465E+03	5.977E+06	4.016E+02
2006	5.363E+03	2.930E+06	1.968E+02	7.317E+03	5.859E+06	3.937E+02
2007	5.256E+03	2.872E+06	1.929E+02	7.172E+03	5.743E+06	3.859E+02
2008	5.152E+03	2.815E+06	1.891E+02	7.030E+03	5.629E+06	3.782E+02
2009	5.050E+03	2.759E+06	1.854E+02	6.891E+03	5.518E+06	3.707E+02
2010	4.950E+03	2.704E+06	1.817E+02	6.754E+03	5.409E+06	3.634E+02
2011	4.852E+03	2.651E+06	1.781E+02	6.621E+03	5.302E+06	3.562E+02
2012	4.756E+03	2.598E+06	1.746E+02	6.490E+03	5.197E+06	3.492E+02
2013	4.662E+03	2.547E+06	1.711E+02	6.361E+03	5.094E+06	3.422E+02
2014	4.570E+03	2.496E+06	1.677E+02	6.235E+03	4.993E+06	3.355E+02
2015	4.479E+03	2.447E+06	1.644E+02	6.112E+03	4.894E+06	3.288E+02
2016	4.390E+03	2.399E+06	1.612E+02	5.991E+03	4.797E+06	3.223E+02
2017	4.304E+03	2.351E+06	1.580E+02	5.872E+03	4.702E+06	3.159E+02
2018	4.218E+03	2.304E+06	1.548E+02	5.756E+03	4.609E+06	3.097E+02
2019	4.135E+03	2.259E+06	1.518E+02	5.642E+03	4.518E+06	3.035E+02
2020	4.053E+03	2.214E+06	1.488E+02	5.530E+03	4.428E+06	2.975E+02
2021	3.973E+03	2.170E+06	1.458E+02	5.421E+03	4.341E+06	2.916E+02
2022	3.894E+03	2.127E+06	1.429E+02	5.313E+03	4.255E+06	2.859E+02
2023	3.817E+03	2.085E+06	1.401E+02	5.208E+03	4.170E+06	2.802E+02
2024	3.741E+03	2.044E+06	1.373E+02	5.105E+03	4.088E+06	2.747E+02
2025	3.667E+03	2.003E+06	1.346E+02	5.004E+03	4.007E+06	2.692E+02
2026	3.595E+03	1.964E+06	1.319E+02	4.905E+03	3.927E+06	2.639E+02
2027	3.523E+03	1.925E+06	1.293E+02	4.808E+03	3.850E+06	2.587E+02
2028	3.454E+03	1.887E+06	1.268E+02	4.712E+03	3.773E+06	2.535E+02
2029	3.385E+03	1.849E+06	1.243E+02	4.619E+03	3.699E+06	2.485E+02
2030	3.318E+03	1.813E+06	1.218E+02	4.528E+03	3.625E+06	2.436E+02
2031	3.253E+03	1.777E+06	1.194E+02	4.438E+03	3.554E+06	2.388E+02
2032	3.188E+03	1.742E+06	1.170E+02	4.350E+03	3.483E+06	2.340E+02
2033	3.125E+03	1.707E+06	1.147E+02	4.264E+03	3.414E+06	2.294E+02
2034	3.063E+03	1.673E+06	1.124E+02	4.180E+03	3.347E+06	2.249E+02
2035	3.002E+03	1.640E+06	1.102E+02	4.097E+03	3.280E+06	2.204E+02

Results (Continued)

Year	Carbon dioxide			Total landfill gas		
	(Mg/year)	(m^3/year)	(av ft^3/min)	(Mg/year)	(m^3/year)	(av ft^3/min)
2036	2.943E+03	1.608E+06	1.080E+02	4.016E+03	3.216E+06	2.161E+02
2037	2.885E+03	1.576E+06	1.059E+02	3.936E+03	3.152E+06	2.118E+02
2038	2.828E+03	1.545E+06	1.038E+02	3.858E+03	3.089E+06	2.076E+02
2039	2.772E+03	1.514E+06	1.017E+02	3.782E+03	3.028E+06	2.035E+02
2040	2.717E+03	1.484E+06	9.972E+01	3.707E+03	2.968E+06	1.994E+02
2041	2.663E+03	1.455E+06	9.775E+01	3.633E+03	2.910E+06	1.955E+02
2042	2.610E+03	1.426E+06	9.581E+01	3.562E+03	2.852E+06	1.916E+02
2043	2.559E+03	1.398E+06	9.391E+01	3.491E+03	2.795E+06	1.878E+02
2044	2.508E+03	1.370E+06	9.205E+01	3.422E+03	2.740E+06	1.841E+02
2045	2.458E+03	1.343E+06	9.023E+01	3.354E+03	2.686E+06	1.805E+02
2046	2.410E+03	1.316E+06	8.844E+01	3.288E+03	2.633E+06	1.769E+02
2047	2.362E+03	1.290E+06	8.669E+01	3.223E+03	2.581E+06	1.734E+02
2048	2.315E+03	1.265E+06	8.498E+01	3.159E+03	2.529E+06	1.700E+02
2049	2.269E+03	1.240E+06	8.329E+01	3.096E+03	2.479E+06	1.666E+02
2050	2.224E+03	1.215E+06	8.164E+01	3.035E+03	2.430E+06	1.633E+02
2051	2.180E+03	1.191E+06	8.003E+01	2.975E+03	2.382E+06	1.601E+02
2052	2.137E+03	1.167E+06	7.844E+01	2.916E+03	2.335E+06	1.569E+02
2053	2.095E+03	1.144E+06	7.689E+01	2.858E+03	2.289E+06	1.538E+02
2054	2.053E+03	1.122E+06	7.537E+01	2.802E+03	2.243E+06	1.507E+02
2055	2.013E+03	1.099E+06	7.387E+01	2.746E+03	2.199E+06	1.477E+02
2056	1.973E+03	1.078E+06	7.241E+01	2.692E+03	2.155E+06	1.448E+02
2057	1.934E+03	1.056E+06	7.098E+01	2.638E+03	2.113E+06	1.420E+02
2058	1.895E+03	1.035E+06	6.957E+01	2.586E+03	2.071E+06	1.391E+02
2059	1.858E+03	1.015E+06	6.819E+01	2.535E+03	2.030E+06	1.364E+02
2060	1.821E+03	9.949E+05	6.684E+01	2.485E+03	1.990E+06	1.337E+02
2061	1.785E+03	9.752E+05	6.552E+01	2.436E+03	1.950E+06	1.310E+02
2062	1.750E+03	9.558E+05	6.422E+01	2.387E+03	1.912E+06	1.284E+02
2063	1.715E+03	9.369E+05	6.295E+01	2.340E+03	1.874E+06	1.259E+02
2064	1.681E+03	9.184E+05	6.171E+01	2.294E+03	1.837E+06	1.234E+02
2065	1.648E+03	9.002E+05	6.048E+01	2.248E+03	1.800E+06	1.210E+02
2066	1.615E+03	8.824E+05	5.929E+01	2.204E+03	1.765E+06	1.186E+02
2067	1.583E+03	8.649E+05	5.811E+01	2.160E+03	1.730E+06	1.162E+02
2068	1.552E+03	8.478E+05	5.696E+01	2.117E+03	1.696E+06	1.139E+02
2069	1.521E+03	8.310E+05	5.583E+01	2.075E+03	1.662E+06	1.117E+02
2070	1.491E+03	8.145E+05	5.473E+01	2.034E+03	1.629E+06	1.095E+02
2071	1.461E+03	7.984E+05	5.364E+01	1.994E+03	1.597E+06	1.073E+02
2072	1.433E+03	7.826E+05	5.258E+01	1.955E+03	1.565E+06	1.052E+02
2073	1.404E+03	7.671E+05	5.154E+01	1.916E+03	1.534E+06	1.031E+02
2074	1.376E+03	7.519E+05	5.052E+01	1.878E+03	1.504E+06	1.010E+02
2075	1.349E+03	7.370E+05	4.952E+01	1.841E+03	1.474E+06	9.904E+01

Section 8: Map

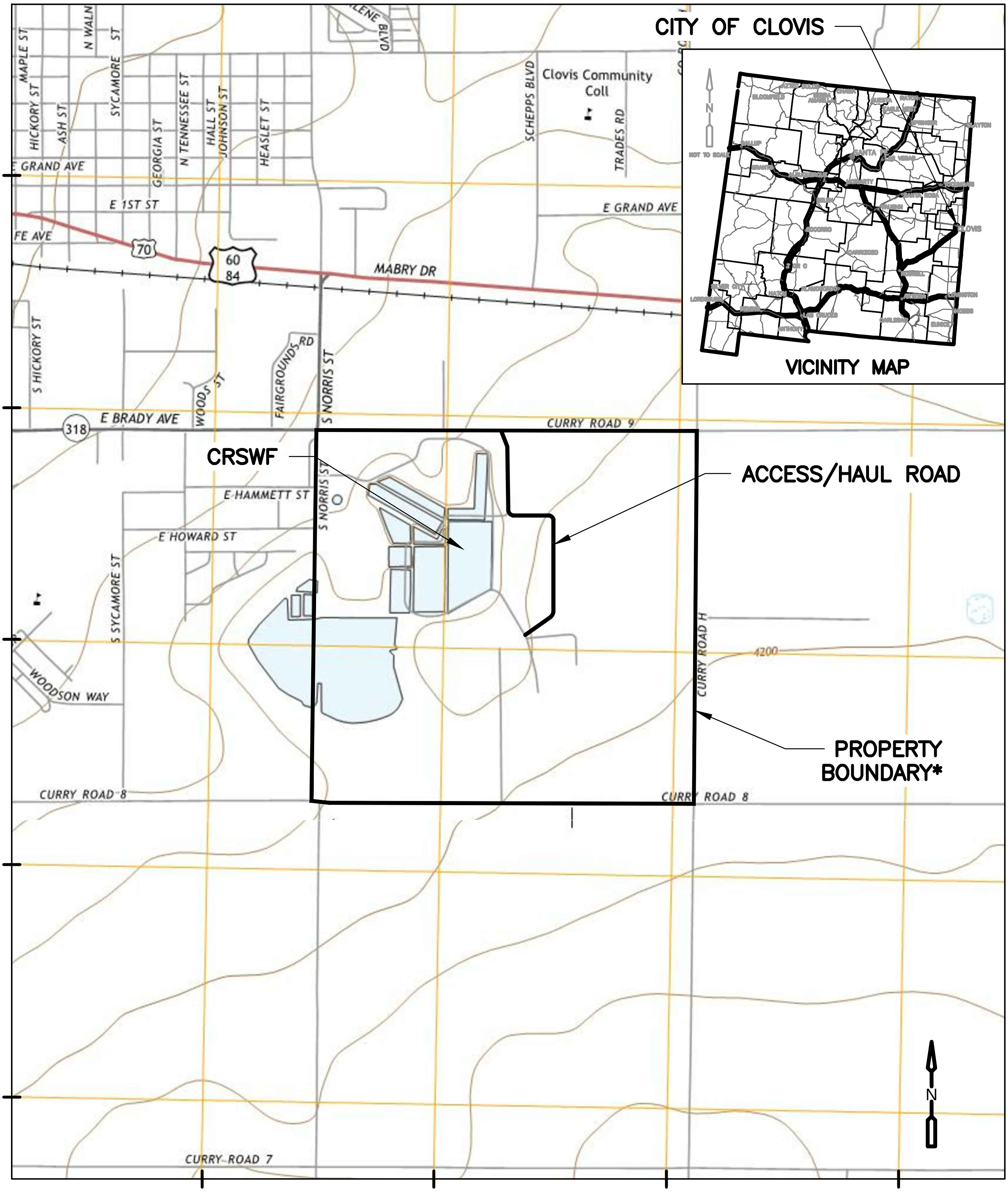
Section 8

Map(s)

A map such as a 7.5 minute topographic quadrangle showing the exact location of the source. The map shall also include the following:

The UTM or Longitudinal coordinate system on both axes	An indicator showing which direction is north
A minimum radius around the plant of 0.8km (0.5 miles)	Access and haul roads
Topographic features of the area	Facility property boundaries
The name of the map	The area which will be restricted to public access
A graphical scale	

Please refer to attached Figure 8-1.



* – AREA WITHIN PROPERTY BOUNDARY IS RESTRICTED FOR PUBLIC ACCESS
SOURCE: USGS TOPOGRAPHIC MAP; CLOVIS, NM QUADRANGLE 2013
USGS TOPOGRAPHIC MAP; MIDWAY, NM QUADRANGLE 2013

CDM Smith

CLOVIS REGIONAL SOLID WASTE FACILITY
AIR QUALITY PERMIT APPLICATION

SITE LOCATION MAP

1" = 2000'
1000 0 2000

FIGURE NO. 8–1

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Section 9: Proof of Public Notice

Section 9

Proof of Public Notice

(for NSR applications submitting under 20.2.72 or 20.2.74 NMAC)
(This proof is required by: 20.2.72.203.A.14 NMAC "Documentary Proof of applicant's public notice")

The CRSWF is not subject to 20.2.72 NMAC (Construction Permits) or 20.2.74 (Permits – Prevention of Significant Deterioration, PSD) NMAC. Therefore, the *Section 9: Proof of Public Notice* requirements are not applicable for the CRSWF Title V Operating Permit Renewal Application.

☐ **I have read the AQB "Guidelines for Public Notification for Air Quality Permit Applications"**
This document provides detailed instructions about public notice requirements for various permitting actions. It also provides public notice examples and certification forms. Material mistakes in the public notice will require a re-notice before issuance of the permit.

Unless otherwise allowed elsewhere in this document, the following items document proof of the applicant's Public Notification. Please include this page in your proof of public notice submittal with checkmarks indicating which documents are being submitted with the application.

New Permit and **Significant Permit Revision** public notices must include all items in this list.

Technical Revision public notices require only items 1, 5, 9, and 10.

Per the Guidelines for Public Notification document mentioned above, include:

1. ☐ A copy of the certified letter receipts with post marks (20.2.72.203.B NMAC)
2. ☐ A list of the places where the public notice has been posted in at least four publicly accessible and conspicuous places, including the proposed or existing facility entrance. (e.g: post office, library, grocery, etc.)
3. ☐ A copy of the property tax record (20.2.72.203.B NMAC).
4. ☐ A sample of the letters sent to the owners of record.
5. ☐ A sample of the letters sent to counties, municipalities, and Indian tribes.
6. ☐ A sample of the public notice posted and a verification of the local postings.
7. ☐ A table of the noticed citizens, counties, municipalities and tribes and to whom the notices were sent in each group.
8. ☐ A copy of the public service announcement (PSA) sent to a local radio station and documentary proof of submittal.
9. ☐ A copy of the classified or legal ad including the page header (date and newspaper title) or its affidavit of publication stating the ad date, and a copy of the ad. When appropriate, this ad shall be printed in both English and Spanish.
10. ☐ A copy of the display ad including the page header (date and newspaper title) or its affidavit of publication stating the ad date, and a copy of the ad. When appropriate, this ad shall be printed in both English and Spanish.
11. ☐ A map with a graphic scale showing the facility boundary and the surrounding area in which owners of record were notified by mail. This is necessary for verification that the correct facility boundary was used in determining distance for notifying land owners of record.

Section 10: Written Description of the Routine Operations of the Facility

Section 10

Written Description of the Routine Operations of the Facility

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A written description of the routine operations of the facility. Include a description of how each piece of equipment will be operated, how controls will be used, and the fate of both the products and waste generated. For modifications and/or revisions, explain how the changes will affect the existing process. In a separate paragraph describe the major process bottlenecks that limit production. The purpose of this description is to provide sufficient information about plant operations for the permit writer to determine appropriate emission sources.

Work practices that serve to reduce the emission of regulated air pollutants during routine operations at the CRSWF are limited to the control of fugitive particulates. The measures taken to mitigate excessive fugitive particulate emissions consist of two water wagons that are available on-site, and access to water stored in the site's water storage tank. Routine operations of the CRSWF are described in the Operations Plan below.

OPERATIONS PLAN

Introduction

The Operations Plan (Plan) for the Clovis Regional Solid Waste Facility (CRSWF) has been prepared in accordance with the requirements of Paragraph 6 of Subsection C of 20.9.3 NMAC of the New Mexico Environment Department (NMED) Solid Waste Bureau's (SWB) Solid Waste Management Regulations. This Plan identifies and addresses the applicable NMED Regulations, as well as provides a working plan for safe, efficient, and orderly operating practices for the CRSWF. The contents of this Plan address daily routine procedures, vehicle routing, emissions control, and waste inspection. Copies of this Plan are maintained at the scale house and office/maintenance building.

Site Description

The CRSWF is owned and operated by the City of Clovis (City) and is located in Curry County in Township 2 North, Range 36 East, Section 2. The CRSWF is bounded by Norris Street on the west and East Brady Avenue to the north. Operation of the CRSWF began in 1931 and the facility has been in continuous service for the past 80 years. The closed landfill area (approximately 80 acres) was closed in 1999 and the existing (active) landfill area (30 Acres) is permitted to accept municipal solid waste until 2021. However, the existing landfill area will be accepting construction and demolition waste for the next 51 years. The new SE quadrant landfill is approximately 115 Acres and will provide approximately 84 years of airspace for the surrounding region. Waste on the new SE quadrant landfill started receiving solid waste ("fluff" layer) this year (2021). Access to the CRSWF will remain in the current location from the intersection of the site access road and E. Brady Avenue to the current scale house.

The City of Clovis, New Mexico, Public Works Department will operate the CRSWF to provide solid waste disposal and recycling/re-use programs for the City of Clovis and surrounding communities. The CRSWF, including the active and proposed areas, will be operated in accordance with this Plan as to not cause a public nuisance or create a potential hazard to public health, welfare, or the environment.

Operating Hours, Security and Access Control

Normal operating hours for the CRSWF are as follows:

Monday - Saturday

7:00 a.m. – 5:00 p.m.

Sunday

12:00 noon – 5:00 p.m.

Closed New Year's Day, Thanksgiving Day, and Christmas Day

Under normal operating conditions, it is not anticipated that modification to the days and hours of operation will be necessary. However, in order to manage differing waste flows, equipment malfunctions, wind, and/or inclement weather solid waste personnel may modify schedules within the operating hours to ensure the continual handling and disposal of solid waste. In accordance with 20.9.5.8.B (1) NMAC a certified operator or representative will be present at all times while the facility is operational.

The entire perimeter of the facility is fenced to secure the site and maintain access control. The gates and fencing will help prevent the unauthorized access by the public and entry by large animals to the active portion of the CRSWF.

CRSWF Operation Signage
CRSWF personnel maintain all new and existing signage that indicate location of the site, facility owners/operators, hours of operation, emergency telephone numbers, disposal instructions, speed limits, all prohibited activities, including fires and scavenging, and other health and safety precautions.

CRSWF Equipment and Vehicles
Table 10-1 lists the type and number of equipment used for routine landfilling operations at the CRSWF.

Table 10-1
Landfill Operations Equipment

Type of Equipment	Quantity
Bulldozer, CAT/D8T	2
Compactors, CAT 836K826G Cat	3
Scrapers (CAT 623F/621G)	2
Motor Graders (CAT 120H/CAT 140 M3 AW)	2
Front End Loader W/ Box, CAT 928G, 950M	2
Roll-off, Volvo/VE-D-12-435, Peterbelt	1
Water Wagon (8,000 gal capacity)	2
4x4 Pickup Trucks	7
Side Loader Collection Truck (Cardboard Recycling)	1
Skid Steer (Bobcat 753)	1

Written and Electronic Operating Records
CRSWF personnel will maintain written operating records at the scale house that includes Daily Operations Records, Annual Reports, Scrap Tire Manifests, Unauthorized Waste Screening Records, permits, and metrological records in accordance with Section 20.9.5.16 NMAC. All reports, forms, inspections, monitoring and test results, and other operating records will be retained on site in hard copy form for at least thirteen months prior to storing in electronic format via the City's Dropbox service. Electronic files will be maintained on site in a manner that provides viewing accessible for site personnel and inspectors.

Waste Characterization, Screening, and Inspection
Incoming waste to the CRSWF is characterized and screened by scale house personnel prior to disposal in the appropriate area. Authorized waste accepted at the CRSWF shall be one of the following types of municipal solid waste as described in 20.9.2.7.M (8) NMAC:

1. Household solid waste
2. Commercial solid waste
3. Industrial solid waste or petroleum contaminated soils that are not considered a special waste.

Specific source-separated waste, such as green waste and household appliances, is identified at the scale house and diverted to the appropriate processing areas. Recyclable materials shall be kept separate from other waste streams and stored in a dedicated area with proper signage. Materials shall be separated by type and segregated from potential contaminants. The recyclable materials will be removed in a timely manner.

Based on the Final Order approving the City's application for modification/renewal of the CRSWF's Solid Waste Facility Permit in 2013, the CRSWF is authorized to accept certain types of special wastes including asbestos waste, ash, petroleum contaminated soils, sludge, industrial (non-hazardous) solids waste, etc. Detailed plans for screening and handling of regulated hazardous or unauthorized special waste haven been developed for implementation. Construction of new landfill Cell No. 5 and new Asbestos Monofill Cell No. 1 was completed in 2015. These newly constructed cells started accepting waste in 2021.

At any time, the CRSWF operators may inspect incoming loads to detect and prevent the disposal of unauthorized waste, including hazardous waste, hot waste, PCB's, and other materials deemed incompatible with the CRSWF's operation, such as odorous waste. Loads shall be initially inspected upon arrival, and determined if accepted from known waste sources, such as City residential collection vehicles, with specific markings, truck numbers, and/or other identifying characteristics. Inspections shall only be performed while wearing adequate personal protective equipment (PPE), such as safety glasses and protective gloves, and by trained landfill operators only.

Secondly, operators may inspect incoming loads for regulated and unauthorized special waste during the unloading process. During this observation/survey process, personnel may reject the load if deemed unacceptable for disposal. On a random basis, operators will inspect incoming loads to prevent the receipt, and subsequent processing, of regulated and unauthorized special waste. If the incoming flow is continuous, it is recommended that at least one truckload of waste be selected at random for screening. The waste should then be unloaded at a designated area, inspected, and the results recorded.

Solid Waste Hauling and Collection Vehicles Entering the Site
Solid waste collection vehicles utilizing the CRSWF will comply with all State and local laws and regulations, as well as the requirements of this Plan. This will include ensuring that waste from their vehicles does not litter the area or local roadways and that their vehicles are driven in a safe and responsible manner and in compliance with posted speed limits, both on and off the site.

Vehicle Access and Weighing
Vehicles will access the CRSWF by turning south from E. Brady Avenue (approximately 2,600 feet east of the intersection of E. Brady Avenue and Norris Road) and onto the Access Road. Once on the Access Road, vehicles will proceed south approximately 650 feet to the Scale House (there is a scale at the way in and another one at the way out of site). Upon arriving at the Scale House, vehicles will stop on the scale and their gross weights will be recorded by solid waste personnel.

Vehicle Unloading
After the gross weight is recorded at the scale house, all City and commercial solid waste hauling and collection vehicles will proceed directly to the working face. The vehicle will be directed by equipment operators to the appropriate unloading point at the working face. Vehicles will be properly aligned and positioned at the waste lift to facilitate the spreading of refuse and the subsequent compaction, covering and cleanup activities.

Vehicles transporting refuse (as well as earth moving equipment transporting cover material) to the working face will be routed over previously filled areas, whenever possible, to provide for additional compaction of refuse and soil. A water wagon will be used to wet down roadways to minimize dust generation.

Working Face Operations
All start-up and first lift operations will involve unloading solid waste at the top of the active ramp and then spreading waste material in 1 to 2 feet lifts toward the base. The compactor should make a minimum 3 to 5 passes over each waste lift for all first lifts and subsequent operational lifts. During waste spreading and compaction operations, personnel will monitor and control cell width, height and slope at the working face. On average, the working face will be confined to the smallest practical area, ranging from 2,000 to 6,000 square feet (e.g. 40 feet long by 50 feet wide to 120 feet long by 50 feet wide). The depth of the operational lift will vary between 5 and 15 feet.

During normal operations, waste will be deposited at the toe of the working face and pushed uphill along an approximate 5 horizontal to 1 vertical slope. The CRSWF will utilize an approved Alternative Daily Cover (ADC) consisting of a 20 mil tarp or 6-inches of daily cover soil. An automatic tarping machine (i.e. Tarp-o-matic) will deploy the tarp over compacted exposed solid waste. The CRSWF may also utilize approved Category 1 ADC materials. Twelve inches of soil material, identified as intermediate cover, will be applied on areas that will be exposed for more than 60 days or as necessary to provide an adequate working deck for disposal operations.

The asbestos monofill area is subject to the requirements of 40 CFR Part 61, Subpart M which requires that there be no visible emissions from any active waste disposal site where asbestos containing waste material is deposited. Water is continuously applied to the asbestos monofill working face area during landfilling. No compaction/dozing operations occur at the asbestos monofill. A layer of soil is placed over the landfilled asbestos containing waste loads. For emissions calculations, it is assumed that the total fugitive particulate emissions from the asbestos monofill working face is zero.

Borrow Pit Operations

Borrow pit area is used for supplying soil cover material for landfilling operations. A tractor scraper is used at the borrow pit to load top soil into the scraper and convey the soil to the active working face.

Solid Waste Hauling and Collection Vehicles Exiting the Site

After depositing waste material at the working face, all drivers inspect their vehicles for loose debris that remains attached to the vehicle. This debris is removed before exiting the working face. Once the vehicle inspection is completed, the solid waste hauling and collection vehicles proceed to the scale house to obtain vehicle tare weights.

Drivers observe all posted speed limits and practice safe driving methods upon entering the facility, approaching the working face, while at the working face, and upon exiting the facility.

Section 11: Source Determination

Section 11

Source Determination

Source submitting under 20.2.70, 20.2.72, 20.2.73, and 20.2.74 NMAC

Sources applying for a construction permit, PSD permit, or operating permit shall evaluate surrounding and/or associated sources (including those sources directly connected to this source for business reasons) and complete this section. Responses to the following questions shall be consistent with the Air Quality Bureau's permitting guidance, Single Source Determination Guidance, which may be found on the Applications Page in the Permitting Section of the Air Quality Bureau website.

Typically, buildings, structures, installations, or facilities that have the same SIC code, that are under common ownership or control, and that are contiguous or adjacent constitute a single stationary source for 20.2.70, 20.2.72, 20.2.73, and 20.2.74 NMAC applicability purposes. Submission of your analysis of these factors in support of the responses below is optional, unless requested by NMED.

A. Identify the emission sources evaluated in this section (list and describe)**:**

Emission Unit 1: Fugitive Dust Emissions are emitted from the operations at the borrow pit, during loading of the scraper. Fugitive emissions are reduced with the application of water. Figure 4.1 presents a process flow sheet for Fugitive Dust Emissions for the CRSWF Landfill.

Emission Unit 2: Fugitive Dust Emissions are emitted from the paved and unpaved disposal routes. Figure 4.2 presents a process flow sheet for fugitive dust emission from the paved and unpaved access roads for the CRSWF Landfill.

Emission Unit 3: Fugitive Dust Emissions are emitted from the landfill working face. Figure 4.3 presents a diagram of activities that can result in fugitive dust emissions at the CRSWF Landfill working face.

Emission Unit 4: Uncontrolled emissions of non-methane organic compounds (NMOCs), Greenhouse gases (GHGs), Hydrogen Sulfide (H2S) and Hazardous Air Pollutants (HAPs) are generated as a result of anaerobic decomposition of municipal solid waste. Figure 4.4 presents a process flow sheet for emissions of NMOCs and HAPs for the CRSWF Landfill.

Emission Unit 5: Uncontrolled emissions of volatile organic compounds (VOCs) are generated as a result of anaerobic decomposition of petroleum contaminated soils (PCS). Figure 4.5 presents a process flow sheet for emissions of VOCs from PCS, for the CRSWF Landfill.

B. Apply the 3 criteria for determining a single source:

SIC Code: Surrounding or associated sources belong to the same 2-digit industrial grouping (2-digit SIC code) as this facility, OR surrounding or associated sources that belong to different 2-digit SIC codes are support facilities for this source.

X Yes ☐ No

Common Ownership or Control: Surrounding or associated sources are under common ownership or control as this source.

X Yes ☐ No

Contiguous or Adjacent: Surrounding or associated sources are contiguous or adjacent with this source.

X **Yes** ☐ **No**

C. Make a determination:

X The source, as described in this application, constitutes the entire source for 20.2.70, 20.2.72, 20.2.73, or 20.2.74 NMAC applicability purposes. If in "A" above you evaluated only the source that is the subject of this application, all "**YES**" boxes should be checked. If in "A" above you evaluated other sources as well, you must check **AT LEAST ONE** of the boxes "**NO**" to conclude that the source, as described in the application, is the entire source for 20.2.70, 20.2.72, 20.2.73, and 20.2.74 NMAC applicability purposes.

☐ The source, as described in this application, **does not** constitute the entire source for 20.2.70, 20.2.72, 20.2.73, or 20.2.74 NMAC applicability purposes (A permit may be issued for a portion of a source). The entire source consists of the following facilities or emissions sources (list and describe):

Section 12: PSD Applicability Determination for All Sources & Special Requirements for a PSD Application

Section 12

Section 12.A

PSD Applicability Determination for All Sources

(Submitting under 20.2.72, 20.2.74 NMAC)

The CRSWF Landfill is not subject to 20.2.72 NMAC (Construction Permits) or 20.2.74 NMAC (Permits – Prevention of Significant Deterioration, PSD). Therefore, the *Section 12: PSD Applicability Determination for All Sources* requirements are not applicable for the CRSWF Landfill Title V Operating Permit Application.

A PSD applicability determination for all sources. For sources applying for a significant permit revision, apply the applicable requirements of 20.2.74.AG and 20.2.74.200 NMAC and to determine whether this facility is a major or minor PSD source, and whether this modification is a major or a minor PSD modification. It may be helpful to refer to the procedures for Determining the Net Emissions Change at a Source as specified by Table A-5 (Page A.45) of the EPA New Source Review Workshop Manual to determine if the revision is subject to PSD review.

A. This facility is:

- ☐ **a minor PSD source before and after this modification (if so, delete C and D below).**
- ☐ **a major PSD source before this modification. This modification will make this a PSD minor source.**
- ☐ **an existing PSD Major Source that has never had a major modification requiring a BACT analysis.**
- ☐ **an existing PSD Major Source that has had a major modification requiring a BACT analysis**
- ☐ **a new PSD Major Source after this modification.**

B. **This facility [is or is not] one of the listed 20.2.74.501 Table I – PSD Source Categories. The "project" emissions** for this modification are **[significant or not significant]. [Discuss why.] The "project" emissions listed below [do or do not] only result from changes described in this permit application, thus no emissions from other [revisions or modifications, past or future] to this facility. Also, specifically discuss whether this project results in "de-bottlenecking", or other associated emissions resulting in higher emissions. The project emissions (before netting) for this project are as follows [see Table 2 in 20.2.74.502 NMAC for a complete list of significance levels]:**

a. **NOx: XX.X TPY**
b. **CO: XX.X TPY**
c. **VOC: XX.X TPY**
d. **SOx: XX.X TPY**
e. **PM: XX.X TPY**
f. **PM10: XX.X TPY**
g. **PM2.5: XX.X TPY**
h. **Fluorides: XX.X TPY**
i. **Lead: XX.X TPY**
j. **Sulfur compounds (listed in Table 2): XX.X TPY**
k. **GHG: XX.X TPY**

C. **Netting [is required, and analysis is attached to this document.] OR [is not required (project is not significant)] OR [Applicant is submitting a PSD Major Modification and chooses not to net.]**

D. **BACT** is **[not required for this modification, as this application is a minor modification.] OR [required, as this application is a major modification. List pollutants subject to BACT review and provide a full top down BACT determination.]**

E. If this is an existing PSD major source, or any facility with emissions greater than 250 TPY (or 100 TPY for 20.2.74.501 Table 1 – PSD Source Categories), determine whether any permit modifications are related, or could be considered a single project with this action, and provide an explanation for your determination whether a PSD modification is triggered.

Section 13: Discussion Demonstrating Compliance with Each Applicable State & Federal Regulation

Section 13

Determination of State & Federal Air Quality Regulations

This section lists each state and federal air quality regulation that may apply to your facility and/or equipment that are stationary sources of regulated air pollutants.

Not all state and federal air quality regulations are included in this list. Go to the Code of Federal Regulations (CFR) or to the Air Quality Bureau's regulation page to see the full set of air quality regulations.

Required Information for Specific Equipment:
For regulations that apply to specific source types, in the 'Justification' column **provide any information needed to determine if the regulation does or does not apply**. **For example**, to determine if emissions standards at 40 CFR 60, Subpart IIII apply to your three identical stationary engines, we need to know the construction date as defined in that regulation; the manufacturer date; the date of reconstruction or modification, if any; if they are or are not fire pump engines; if they are or are not emergency engines as defined in that regulation; their site ratings; and the cylinder displacement.

Required Information for Regulations that Apply to the Entire Facility:
See instructions in the 'Justification' column for the information that is needed to determine if an 'Entire Facility' type of regulation applies (e.g. 20.2.70 or 20.2.73 NMAC).

Regulatory Citations for Regulations That Do Not, but Could Apply:
If there is a state or federal air quality regulation that does not apply, but you have a piece of equipment in a source category for which a regulation has been promulgated, you must **provide the low level regulatory citation showing why your piece of equipment is not subject to or exempt from the regulation. For example** if you have a stationary internal combustion engine that is not subject to 40 CFR 63, Subpart ZZZZ because it is an existing 2 stroke lean burn stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, your citation would be 40 CFR 63.6590(b)(3)(i). **We don't want a discussion of every non-applicable regulation, but if it is possible a regulation could apply, explain why it does not. For example,** if your facility is a power plant, you do not need to include a citation to show that 40 CFR 60, Subpart OOO does not apply to your non-existent rock crusher.

Regulatory Citations for Emission Standards:
For each unit that is subject to an emission standard in a source specific regulation, such as 40 CFR 60, Subpart OOO or 40 CFR 63, Subpart HH, include the low level regulatory citation of that emission standard. Emission standards can be numerical emission limits, work practice standards, or other requirements such as maintenance. **Here are examples:** a glycol dehydrator is subject to the general standards at 63.764C(1)(i) through (iii); an engine is subject to 63.6601, Tables 2a and 2b; a crusher is subject to 60.672(b), Table 3 and all transfer points are subject to 60.672(e)(1)

Federally Enforceable Conditions:
All federal regulations are federally enforceable. All Air Quality Bureau State regulations are federally enforceable except for the following: affirmative defense portions at 20.2.7.6.B, 20.2.7.110(B)(15), 20.2.7.11 through 20.2.7.113, 20.2.7.115, and 20.2.7.116; 20.2.37; 20.2.42; 20.2.43; 20.2.62; 20.2.63; 20.2.86; 20.2.89; and 20.2.90 NMAC. Federally enforceable means that EPA can enforce the regulation as well as the Air Quality Bureau and federally enforceable regulations can count toward determining a facility's potential to emit (PTE) for the Title V, PSD, and nonattainment permit regulations.

INCLUDE ANY OTHER INFORMATION NEEDED TO COMPLETE AN APPLICABILITY DETERMINATION OR THAT IS RELEVENT TO YOUR FACILITY'S NOTICE OF INTENT OR PERMIT.

EPA Applicability Determination Index for 40 CFR 60, 61, 63, etc: http://cfpub.epa.gov/adi/

To save paper and to standardize the application format, delete this sentence, and begin your submittal for this attachment on this page.

Example of a Table for STATE REGULATIONS:

STATE REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION: (You may delete instructions or statements that do not apply in the justification column to shorten the document.)
20.2.1 NMAC	General Provisions	Yes	Facility	General Provisions apply to Title V permit applications.
20.2.3 NMAC	Ambient Air Quality Standards NMAAQS		Facility	20.2.3.9 NMAC, LIMITATION OF APPLICABILITY TO 20.2.70 NMAC. The requirements of this part are not applicable requirements under 20.2.70 NMAC, as defined by that part. This section does not limit the applicability of this part to sources required to obtain a permit under 20.2.72 NMAC, nor does it limit which terms and conditions of permits issued pursuant to 20.2.72 NMAC are applicable requirements for permit issued pursuant to 20.2.70 NMAC.
20.2.7 NMAC	Excess Emissions		Facility	Applies since this is a source subject to 20.2.70 NMAC.
20.2.33 NMAC	Gas Burning Equipment - Nitrogen Dioxide			This facility has **no** new gas burning equipment (external combustion emission sources, such as gas fired boilers and heaters) having a heat input of greater than 1,000,000 million British Thermal Units per year per unit. This facility has **no** existing gas burning equipment having a heat input of greater than 1,000,000 million British Thermal Units per year per unit.
20.2.34 NMAC	Oil Burning Equipment: NO_2			This facility has **no** oil burning equipment (external combustion emission sources, such as oil fired boilers and heaters) having a heat input of greater than 1,000,000 million British Thermal Units per year per unit.
20.2.35 NMAC	Natural Gas Processing Plant – Sulfur			This facility has no natural gas processing plants and is not subject to the requirements of NMAC 2.35.
20.2.38 NMAC	Hydrocarbon Storage Facility			This facility has no hydrocarbon storage facility and is not subject to the requirements of NMAC 2.38.
20.2.39 NMAC	Sulfur Recovery Plant - Sulfur			This facility has no sulfur recovery plants and is not subject to the requirements of NMAC 2.39.
20.2.61.109 NMAC	Smoke & Visible Emissions			The Engine at this facility are exempt based on 20.2.61.111 (D) NMAC since their emissions result from insignificant activities as defined in 20.2.70 NMAC.
20.2.70 NMAC	Operating Permits		Facility	The municipal solid waste landfill has a design capacity greater than 2.5 million megagrams and 2.5 million cubic meters.
20.2.71 NMAC	Operating Permit Fees		Facility	This facility is subject to 20.2.70 NMAC and is in turn subject to 20.2.71 NMAC.
20.2.72 NMAC	Construction Permits		Facility	This facility is not subject to 20.2.72 NMAC.
20.2.73 NMAC	NOI & Emissions Inventory Requirements		Facility	**NOI:** 20.2.73.200 NMAC does not apply; NOI application is not required. **Emissions Inventory Reporting:** 20.2.73.300 NMAC applies. The facility will submit an emissions inventory when requested by NMED.
20.2.74 NMAC	Permits – Prevention of Significant Deterioration (PSD)		Facility	This facility is not PSD major because it does not have the potential to emit two hundred fifty (250) tons per year or more of any regulated pollutant.
20.2.75 NMAC	Construction Permit Fees		Facility	This facility is not subject to 20.2.72 NMAC and is in turn is not subject to 20.2.75 NMAC.
20.2.77 NMAC	New Source Performance		Units subject to 40 CFR 60	The landfill is subject to New Source Performance Standards for Municipal Solid Waste Landfills (NSPS) in 40 CFR 60 Subparts A and Cf, because the landfill was modified before July 17, 2014.

STATE REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION: (You may delete instructions or statements that do not apply in the justification column to shorten the document.)
20.2.78 NMAC	Emission Standards for HAPS		Units Subject to 40 CFR 61	This regulation is not applicable because it incorporates by reference 40 CFR 61 regulations. The facility is not subject to 40 CFR 61.
20.2.79 NMAC	Permits – Nonattainment Areas		Facility	Not applicable since the facility is not located within a non-attainment area.
20.2.80 NMAC	Stack Heights			The facility does not have any stacks subject to 20 NMAC 2.80.
20.2.82 NMAC	MACT Standards for source categories of HAPS		Units Subject to 40 CFR 63	This regulation applies to all sources emitting hazardous air pollutants, which are subject to the requirements of 40 CFR Part 63.

Example of a Table for Applicable FEDERAL REGULATIONS (Note: This is not an exhaustive list):

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
40 CFR 50	NAAQS		Facility	The rule is applicable because it applies to all sources operating within the State of New Mexico.
NSPS 40 CFR 60, Subpart A	General Provisions		Units subject to 40 CFR 60	The landfill is subject to New Source Performance Standards for Municipal Solid Waste Landfills (NSPS) in 40 CFR 60 Subparts A and Cf, because the landfill was modified before July 17, 2014.
NSPS 40 CFR60.40a, Subpart Da	Subpart Da, Performance Standards for **Electric Utility Steam Generating Units**			This facility has no electric utility steam generating units and is not subject to the requirements of NSPS 40 CFR 60.40 Subpart Da.
NSPS 40 CFR60.40b Subpart Db	**Electric Utility Steam Generating Units**			This facility has no electric utility steam generating units and is not subject to the requirements of NSPS 40 CFR 60.40 Subpart Db.

[FEDERAL REGU-LATIONS] CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
NSPS 40 CFR 60, Subpart Ka	Standards of Performance for **Storage Vessels for Petroleum Liquids** for which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and **Prior** to July 23, 1984			This facility has no petroleum storage vessels and is not subject to the requirements of NSPS 40 CFR 60 Subpart Ka.
NSPS 40 CFR 60, Subpart Kb	Standards of Performance for **Volatile Organic Liquid Storage Vessels** (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced **After** July 23, 1984			This facility has no petroleum storage vessels and is not subject to the requirements of NSPS 40 CFR 60 Subpart Kb.
NSPS 40 CFR 60.330 Subpart GG	**Stationary Gas Turbines**			This facility has no stationary gas turbines and is not subject to the requirements of NSPS 40 CFR 60.330 Subpart GG.
NSPS 40 CFR 60, Subpart KKK	Leaks of VOC from **Onshore Gas Plants**			This facility has no onshore gas plants and is not subject to the requirements of NSPS 40 CFR 60 Subpart KKK.
NSPS 40 CFR Part 60 Subpart LLL	Standards of Performance for **Onshore Natural Gas Processing**: SO_2 Emissions			The facility has no onshore natural gas processing operations and does not meet the applicability criteria of 40 CFR 60.640
NSPS 40 CFR Part 60 Subpart OOOO	Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution for which construction, modification or reconstruction commenced after August 23, 2011 and before September 18, 2015			The facility is not subject to 40 CFR Part 60 Subpart OOOO.
NSPS 40 CFR Part 60 Subpart JJJJ	Standards of Performance for Stationary Spark Ignition Internal			Unit 5, gasoline engine is not applicable to 40 CFR Part 60 Subpart JJJJ since it is portable.

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
	Combustion Engines			
NSPS 40 CFR 60 Subpart TTTT	Standards of Performance for Greenhouse Gas Emissions for Electric Generating Units			The facility is not subject to 40 CFR Part 60 Subpart TTTT.
NSPS 40 CFR 60 Subpart UUUU	Emissions Guidelines for Greenhouse Gas Emissions and Compliance Times for Electric Utility Generating Units			The facility is not subject to 40 CFR Part 60 Subpart UUUU.
NSPS 40 CFR 60, Subparts WWW, XXX, Cc, and Cf	Standards of performance for Municipal Solid Waste (MSW) Landfills			The landfill is subject to New Source Performance Standards for Municipal Solid Waste Landfills (NSPS) in 40 CFR 60 Subparts A and Cf, because the landfill was modified before July 17, 2014.
NESHAP 40 CFR 61 Subpart A	General Provisions		Units Subject to 40 CFR 61	The facility is not subject to 40 CFR 61.
NESHAP 40 CFR 61 Subpart E	National Emission Standards for **Mercury**			The facility does not have stationary sources which process mercury ore to recover mercury, use mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide, and incinerate or dry wastewater treatment plant sludge.
NESHAP 40 CFR 61 Subpart V	National Emission Standards for **Equipment Leaks** (Fugitive Emission Sources)			The facility does not have the following sources that are intended to operate in volatile hazardous air pollutant (VHAP) service: pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, and control devices or systems required by this subpart.
MACT 40 CFR 63, Subpart A	General Provisions		Units Subject to 40 CFR 63	Applies if any other Subpart in 40 CFR 63 applies.
MACT 40 CFR 63 Subpart DDDDD	National Emission Standards for Hazardous Air Pollutants for Major Industrial, Commercial, and Institutional Boilers & Process Heaters			The facility is not subject to 40 CFR 63 Subpart DDDD.
MACT 40 CFR 63 Subpart UUUUU	National Emission Standards for Hazardous Air Pollutants Coal & Oil Fire Electric Utility Steam Generating Unit			The facility is not subject to 40 CFR 63 Subpart UUUU.
MACT 40 CFR 63 Subpart ZZZZ	National Emissions Standards for Hazardous Air Pollutants for			The facility is not subject to this subpart as it does not own or operate a stationary RICE. Unit 5, gasoline engine, is portable and therefore not subject to MACT 40 CFR 63 Subpart ZZZZ

FEDERAL REGU-LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
	Stationary Reciprocating Internal Combustion Engines (**RICE MACT**)			
40 CFR 64	**Compliance Assurance Monitoring**			The is not subject to 40 CFR Part 64, as emission control devices are not used at the facility and the facility does not have the potential pre-control device emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source.
40 CFR 68	**Chemical Accident Prevention**			The facility does not store the identified toxic and flammable substances in quantities exceeding the applicability threshold.
Title IV – Acid Rain 40 CFR 72	**Acid Rain**			The facility does not have an affected source under 40 CFR 72.6.
Title IV – Acid Rain 40 CFR 73	**Sulfur Dioxide** Allowance Emissions			The facility is not subject to 40 CFR 73.
Title IV – Acid Rain 40 CFR 76	**Acid Rain** Nitrogen Oxides **Emission Reduction Program**			The facility is not subject to 40 CFR 76.
Title VI – 40 CFR 82	Protection of **Stratospheric Ozone**		N/A	This regulation does not apply since the Landfill does not produce, transform, destroy, import or export a class I, class II or their non-exempt substitutes products or substances. Also, the facility does not service, maintain, repair, dispose or purchase class I, class II or their non-exempt substitutes products or substances.

Section 14: Operational Plan to Mitigate Emissions

Section 14

Operational Plan to Mitigate Emissions

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

☐ **Title V Sources** (20.2.70 NMAC)**:** By checking this box and certifying this application the permittee certifies that it has developed an **Operational Plan to Mitigate Emissions During Startups, Shutdowns, and Emergencies** defining the measures to be taken to mitigate source emissions during startups, shutdowns, and emergencies as required by 20.2.70.300.D.5(f) and (g) NMAC. This plan shall be kept on site to be made available to the Department upon request. This plan should not be submitted with this application.

☐ **NSR** (20.2.72 NMAC)**, PSD** (20.2.74 NMAC) **& Nonattainment** (20.2.79 NMAC) **Sources:** By checking this box and certifying this application the permittee certifies that it has developed an **Operational Plan to Mitigate Source Emissions During Malfunction, Startup, or Shutdown** defining the measures to be taken to mitigate source emissions during malfunction, startup, or shutdown as required by 20.2.72.203.A.5 NMAC. This plan shall be kept on site to be made available to the Department upon request. This plan should not be submitted with this application.

X **Title V** (20.2.70 NMAC)**, NSR** (20.2.72 NMAC)**, PSD** (20.2.74 NMAC) **& Nonattainment** (20.2.79 NMAC) **Sources:** By checking this box and certifying this application the permittee certifies that it has established and implemented a Plan to Minimize Emissions During Routine or Predictable Startup, Shutdown, and Scheduled Maintenance through work practice standards and good air pollution control practices as required by 20.2.7.14.A and B NMAC. This plan shall be kept on site or at the nearest field office to be made available to the Department upon request. This plan should not be submitted with this application.

Section 15: Alternative Operating Scenarios

Section 15

Alternative Operating Scenarios

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

Alternative Operating Scenarios: Provide all information required by the department to define alternative operating scenarios. This includes process, material and product changes; facility emissions information; air pollution control equipment requirements; any applicable requirements; monitoring, recordkeeping, and reporting requirements; and compliance certification requirements. Please ensure applicable Tables in this application are clearly marked to show alternative operating scenario.

Construction Scenarios: When a permit is modified authorizing new construction to an existing facility, NMED includes a condition to clearly address which permit condition(s) (from the previous permit and the new permit) govern during the interval between the date of issuance of the modification permit and the completion of construction of the modification(s). There are many possible variables that need to be addressed such as: Is simultaneous operation of the old and new units permitted and, if so for example, for how long and under what restraints? In general, these types of requirements will be addressed in Section A100 of the permit, but additional requirements may be added elsewhere. Look in A100 of our NSR and/or TV permit template for sample language dealing with these requirements. Find these permit templates at: https://www.env.nm.gov/aqb/permit/aqb_pol.html. Compliance with standards must be maintained during construction, which should not usually be a problem unless simultaneous operation of old and new equipment is requested.

In this section, under the bolded title "Construction Scenarios", specify any information necessary to write these conditions, such as: conservative-realistic estimated time for completion of construction of the various units, whether simultaneous operation of old and new units is being requested (and, if so, modeled), whether the old units will be removed or decommissioned, any PSD ramifications, any temporary limits requested during phased construction, whether any increase in emissions is being requested as SSM emissions or will instead be handled as a separate Construction Scenario (with corresponding emission limits and conditions, etc.

The purpose of the CRSWF is to dispose of municipal solid waste. However, management at the CRSWF is prepared for alternate operating scenarios that would affect the operation of the facility, which have been described below.

Alternative Waste Handling and Disposal procedures to be followed in case of a disruption of normal operation, such as an equipment breakdown will be in in accordance with Paragraph (6) (d) of Subsection C of 20 NMAC 9.3.8. The need for the diversion of waste from the Clovis Regional Solid Waste Facility (CRSWF) is not anticipated at any time. Disposal operations are conducted during the posted business hours.

Operating Hours
Normal operating hours for the CRSWF are as follows:

Monday - Saturday

7:00 a.m. – 5:00 p.m.

Sunday

12:00 noon – 5:00 p.m.

Closed New Year's Day, Thanksgiving Day, and Christmas Day

Under normal operation, it is not anticipated that modifications to the days and hours of operation will be necessary. However, in the event that such changes in operating times are required, solid waste personnel modify their schedules in order to ensure the continual handling and disposal of solid waste.

Diversion of Waste

The need for the diversion of waste from the CRSWF is not anticipated at any time. Solid waste personnel can procure solid waste equipment on a rental basis, as well as modify the operating schedule of the facility; both actions designed to ensure the continual disposal of waste. Additionally, in the event that the facility is considered inaccessible due to impassable roads, solid waste equipment is used to provide passage.

Section 16: Air Dispersion Modeling

Section 16

Air Dispersion Modeling

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1) Minor Source Construction (20.2.72 NMAC) and Prevention of Significant Deterioration (PSD) (20.2.74 NMAC) ambient impact analysis (modeling): Provide an ambient impact analysis as required at 20.2.72.203.A(4) and/or 20.2.74.303 NMAC and as outlined in the Air Quality Bureau's Dispersion Modeling Guidelines found on the Planning Section's modeling website. If air dispersion modeling has been waived for one or more pollutants, attach the AQB Modeling Section modeling waiver approval documentation.
2) SSM Modeling: Applicants must conduct dispersion modeling for the total short term emissions during routine or predictable startup, shutdown, or maintenance (SSM) using realistic worst case scenarios following guidance from the Air Quality Bureau's dispersion modeling section. Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (http://www.env.nm.gov/aqb/permit/app_form.html) for more detailed instructions on SSM emissions modeling requirements.
3) Title V (20.2.70 NMAC) ambient impact analysis: Title V applications must specify the construction permit and/or Title V Permit number(s) for which air quality dispersion modeling was last approved. Facilities that have only a Title V permit, such as landfills and air curtain incinerators, are subject to the same modeling required for preconstruction permits required by 20.2.72 and 20.2.74 NMAC.

What is the purpose of this application?	Enter an X for each purpose that applies
New PSD major source or PSD major modification (20.2.74 NMAC). See #1 above.	
New Minor Source or significant permit revision under 20.2.72 NMAC (20.2.72.219.D NMAC). See #1 above. **Note:** Neither modeling nor a modeling waiver is required for VOC emissions.	
Reporting existing pollutants that were not previously reported.	
Reporting existing pollutants where the ambient impact is being addressed for the first time.	
Title V application (new, renewal, significant, or minor modification. 20.2.70 NMAC). See #3 above.	X
Relocation (20.2.72.202.B.4 or 72.202.D.3.c NMAC)	
Minor Source Technical Permit Revision 20.2.72.219.B.1.d.vi NMAC for like-kind unit replacements.	
Other: i.e. SSM modeling. See #2 above.	
This application does not require modeling since this is a No Permit Required (NPR) application.	
This application does not require modeling since this is a Notice of Intent (NOI) application (20.2.73 NMAC).	
This application does not require modeling according to 20.2.70.7.E(11), 20.2.72.203.A(4), 20.2.74.303, 20.2.79.109.D NMAC and in accordance with the Air Quality Bureau's Modeling Guidelines.	

Check each box that applies:

☒ See attached, approved modeling **waiver for all** pollutants from the facility.
☐ See attached, approved modeling **waiver for some** pollutants from the facility.
☐ Attached in Universal Application Form 4 (UA4) is a **modeling report for all** pollutants from the facility.
☐ Attached in UA4 is a **modeling report for some** pollutants from the facility.
☐ No modeling is required.

New Mexico Environment Department Air Quality Bureau Modeling Section 525 Camino de Los Marquez - Suite 1 Santa Fe, NM 87505 Phone: (505) 476-4300 Fax: (505) 476-4375 www.env.nm.gov/aqb/	**For Department use only:** Approved by: Eric Peters Date: November 18, 2021

Air Dispersion Modeling Waiver Request Form

This form must be completed and submitted with all air dispersion modeling waiver requests.

If an air permit application requires air dispersion modeling, in some cases the demonstration that ambient air quality standards and Prevention of Significant Deterioration (PSD) increments will not be violated can be satisfied with a discussion of previous modeling. The purpose of this form is to document and streamline requests to certify that previous modeling satisfies all or some of the current modeling requirements. The criteria for requesting and approving modeling waivers is found in the Air Quality Bureau Modeling Guidelines. Typically, only construction permit applications submitted per 20.2.72, 20.2.74, or 20.2.79 NMAC require air dispersion modeling. However, modeling is sometimes also required for a Title V permit application.

A waiver may be requested by e-mailing this completed form in **MS Word** format to the modeling manager, sufi.mustafa@state.nm.us.

This modeling waiver is not valid if the emission rates in the application are higher than those listed in the approved waiver request.

Section 1 and Table 1: Contact and facility information:

Contact name	Justin Howalt, City Manager
E-mail Address:	jhowalt@cityofclovis.org
Phone	575-769-7828
Facility Name	801 South Norris Street, Clovis, NM 88101
Air Quality Permit Number(s)	P199L-R3
Agency Interest Number (if known)	111
Latitude and longitude of facility (decimal degrees)	34.3829, -103.170053

General Comments: (Add introductory remarks or comments here, including the purpose of and type of permit application.)

The Clovis Landfill is requesting a modeling waiver for fugitive dust emissions of PM10 and PM2.5 based on the responses provided throughout this waiver.

Note that construction and demolition (C&D) waste will now be disposed as a wedge in the edges of cell 4 (old cell). The route corresponding to this activity was previously not modeled in the 2016 application (its closer to the west fenceline) but only represents approximately 12% of the trips from routes that were previously modeled, so it is not anticipated to contribute to exceedances of any PM standards.

Section 2 – List All Regulated Pollutants from the Entire Facility - Required

In Table 2, below, list all regulated air pollutants emitted from your facility, except for New Mexico Toxic Air Pollutants, which are listed in Table 6 of this form. All pollutants emitted from the facility must be listed regardless if a modeling waiver is requested for that pollutant or if the pollutant emission rate is subject to the proposed permit changes.

Table 2: Air Pollutant summary table (Check all that apply. Include all pollutants emitted by the facility):

Pollutant*	Pollutant is not emitted at the facility and modeling or waiver are not required.	Pollutant does not increase in emission rate at any emission unit (based on levels currently in the permit) and stack parameters are unchanged. Modeling or waiver are not required.	Stack parameters or stack location has changed.	Pollutant is new to the permit, but already emitted at the facility.	Pollutant is increased at any emission unit (based on levels currently in the permit).	A modeling waiver is being requested for this pollutant.	Modeling for this pollutant will be included in the permit application.
CO	x						
NO_2	x						
SO_2	x						
PM10					x	x	
PM2.5					x	x	
H_2S		x					
Reduced S	x						
O_3 (PSD only)	x						
Pb	x						

*Emissions from portable generator (24.8 HP [Trailblazer 325]) are not accounted for since the small portable generator is considered an insignificant activity source based on NMED's List of Insignificant Activities (dated March 24, 2005).

Section 3: Facility wide pollutants, other than NMTAPs, with very low emission rates

The Air Quality Bureau has performed generic modeling to demonstrate that small sources, as listed in Appendix 2 of this form, do not need computer modeling. After comparing the facility's emission rates for various pollutants to Appendix 2, please list in Table 3 the pollutants that do not need to be modeled because of very low emission rates.

Section 3 Comments. (If you are not requesting a waiver for any pollutants based on their low emission rate, then note that here. You do not need to complete the rest of Section 3 or Table 3.)
The only emissions from Appendix 2 that are being released are H2S, PM10 and PM2.5. Those were all modeled in the previous Title V Renewal Application (submitted in 2016). Therefore, we are requesting the modeling for these pollutants to be waived as discussed in the following sections (H2S modeling does not need a waiver since current emissions are below emissions used for the modeling in the 2016 application).

Table 3: List of Pollutants with very low facility-wide emission rates

Pollutant	Requested Allowable Emission Rate From Facility (pounds/hour)	Release Type (select "all from stacks >20 ft" or "other")	Waiver Threshold (from appendix 2) (lb/hr)

Section 4: Pollutants that have previously been modeled at equal or higher emission rates

List the pollutants and averaging periods in Table 4 for which you are requesting a modeling waiver based on previous modeling for this facility. The previous modeling reports that apply to the pollutant must be submitted with the modeling waiver request. Request previous modeling reports from the Modeling Section of the Air Quality Bureau if you do not have them and believe they exist in the AQB modeling file archive or in the permit folder.

Section 4 Comments. (If you are not asking for a waiver based on previously modeled pollutants, note that here. You do not need to complete the rest of section 4 or table 4.)

The current H2S emissions are lower than the previous 2016 permit application H2S emissions. The 2016 modeling showed to be below the NMAAQs. Therefore, modeling for this pollutant is not required with this permit application.

Table 4: List of previously modeled pollutants (facility-wide emission rates)

Pollutant	Averaging period	Proposed emission rate (pounds/hour)	Previously modeled emission rate (pounds/hour)	Proposed minus modeled emissions (lb/hr)	Modeled percent of standard or increment	Year modeled
H_2S	1hr	0.139	0.168	-0.029	62%	2016

Section 4, Table 5: Questions about previous modeling:

Question	Yes	No
Was AERMOD used to model the facility?	x	
Did previous modeling predict concentrations less than 95% of each air quality standard and PSD increment?	x	
Were all averaging periods modeled that apply to the pollutants listed above?	x	
Were all applicable startup/shutdown/maintenance scenarios modeled?	N/A*	
Did modeling include all sources within 1000 meters of the facility fence line that now exist?		
Did modeling include background concentrations at least as high as current background concentrations?**		
If a source is changing or being replaced, is the following equation true for all pollutants for which the waiver is requested? (Attach calculations if applicable.) EXISTING SOURCE — REPLACMENT SOURCE $\frac{[(g) \times (h1)] + [(v1)^2/2] + [(c) \times (T1)]}{q1} <= \frac{[(g) \times (h2)] + [(v2)^2/2] + [(c) \times (T2)]}{q2}$ Where g = gravitational constant = 32.2 ft/sec^2 h1 = existing stack height, feet v1 = exhaust velocity, existing source, feet per second c = specific heat of exhaust, 0.28 BTU/lb-degree F T1 = absolute temperature of exhaust, existing source = degree F + 460 q1 = emission rate, existing source, lbs/hour h2 = replacement stack height, feet v2 = exhaust velocity, replacement source, feet per second T2 = absolute temperature of exhaust, replacement source = degree F + 460 q2 = emission rate, replacement source, lbs/hour	N/A	

*Not applicable for fugitive landfill emission sources.
**PM10 24hr, PM2.5 24hr and Annual background concentrations used in the previous modeling were from Roswell air monitoring station 5ZG can't be compared to current values since no current data from this station is available.

If you checked "no" for any of the questions, provide an explanation for why you think the previous modeling may still be used to demonstrate compliance with current ambient air quality standards.

Section 5: Modeling waiver using scaled emission rates and scaled concentrations
At times it may be possible to scale the results of modeling one pollutant and apply that to another pollutant. If the analysis for the waiver gets too complicated, then it becomes a modeling review rather than a modeling waiver, and applicable modeling fees will be charged for the modeling. Plume depletion, ozone chemical reaction modeling, post-processing, and unequal pollutant ratios from different sources are likely to invalidate scaling.

If you are not scaling previous results, note that here. You do not need to complete the rest of section 5.

To demonstrate compliance with standards for a pollutant describe scenarios below that you wish the modeling section to consider for scaling results.

PM10 emissions from current application are 8.38 lb/hr and 6.38 lb/hr for the 2016 previous application. That is a 31% increase. The PM10 24-hour modeling from the 2016 application was at 54% and 49% of the NAAQS and PSD Increment Class II, respectively. Therefore, it is not expected that the increase in PM10 emissions would exceed the corresponding standards.
54%*8.38/6.38 = 70.93%　　　　49%*8.38/6.38 = 64.36%

PM2.5 emissions from current application are 1.43 lb/hr and 1.23 lb/hr for the 2016 previous application. That is a 16% increase. The PM10 24-hour modeling from the 2016 application was at 58% and 78% of the NAAQS and PSD Increment Class II, respectively. Also, PM2.5 annual was 62% of the NAAQS. Therefore, it is not expected that the increase in PM2.5 emissions would exceed the corresponding standard.
58%*1.43/1.23 = 67.43%　　　　78%*1.43/1.23 = 90.68%

Section 6: New Mexico Toxic air pollutants – 20.2.72.400 NMAC
Modeling must be provided for any New Mexico Toxic Air Pollutant (NMTAP) with a facility-wide controlled emission rate in excess of the pound per hour emission levels specified in Tables A and B at **20.2.72.502 NMAC -** Toxic Air Pollutants and Emissions. An applicant may use a stack height correction factor based on the release height of the stack for the purpose of determining whether modeling is required. See Table C - Stack Height Correction Factor at 20.2.72.502 NMAC. Divide the emission rate for each release point of a NMTAP by the correction factor for that release height and add the total values together to determine the total adjusted pound per hour emission rate for that NMTAP. If the total adjusted pound per hour emission rate is lower than the emission rate screening level found in Tables A and B, then modeling is not required.

In Table 6, below, list the total facility-wide emission rates for each New Mexico Toxic Air Pollutant emitted by the facility. The table is pre-populated with common examples. Extra rows may be added for NMTAPS not listed or for NMTAPS emitted from multiple stack heights. NMTAPS not emitted at the facility may be deleted, left blank, or noted as 0 emission rate. Toxics previously modeled may be addressed in Section 5 of this waiver form. For convenience, we have listed the stack height correction factors in Appendix 1 of this form.

Section 6 Comments. (If you are not requesting a waiver for any NMTAPs then note that here. You do not need to complete the rest of section 6 or Table 6.)
The 2016 application showed all NMTAPs to be below the emissions levels in Tables A and B at 20.2.72.502 NMAC and therefore modeling was not required for these pollutants. NMTAPs are even lower in this current application (compared to 2016 permit application emissions) so modeling of NMTAPs is not required.

Table 6: New Mexico Toxic Air Pollutants emitted at the facility

If requesting a waiver for any NMTAP, all NMTAPs from this facility must be listed in Table 3 regardless if a modeling waiver is requested for that pollutant or if the pollutant emission rate is subject to the proposed permit changes.

Pollutant	Requested Allowable Emission Rate (pounds/hour)	Release Height (Meters)	Correction Factor	Allowable Emission Rate Divided by Correction Factor	Emission Rate Screening Level (pounds/hour)
Ammonia					1.20
Asphalt (petroleum) fumes					0.333
Carbon black					0.233
Chromium metal					0.0333
Glutaraldehyde					0.0467
Nickel Metal					0.0667
Wood dust (certain hard woods as beech & oak)					0.0667
Wood dust (soft wood)					0.333
(add additional toxics if they are present)					

Section 7: Approval or Disapproval of Modeling Waiver

The AQB air dispersion modeler should list each pollutant for which the modeling waiver is approved, the reasons why, and any other relevant information. If not approved, this area may be used to document that decision.

This waiver is approved for PM10, PM2.5, and H_2S. Scaling of previous results demonstrates compliance with standards for particulate matter. H_2S emissions are decreasing and the modeling remains valid.

Appendix 1: Stack Height Release Correction Factor (adapted from 20.2.72.502 NMAC)

Release Height in Meters	Correction Factor
0 to 9.9	1
10 to 19.9	5
20 to 29.9	19
30 to 39.9	41
40 to 49.9	71
50 to 59.9	108
60 to 69.9	152
70 to 79.9	202
80 to 89.9	255
90 to 99.9	317
100 to 109.9	378
110 to 119.9	451
120 to 129.9	533
130 to 139.9	617
140 to 149.9	690
150 to 159.9	781
160 to 169.9	837
170 to 179.9	902
180 to 189.9	1002
190 to 199.9	1066
200 or greater	1161

Appendix 2. Very small emission rate modeling waiver requirements

Modeling is waived if emissions of a pollutant for the entire facility (including haul roads) are below the amount:

Pollutant	If all emissions come from stacks 20 feet or greater in height and there are no horizontal stacks or raincaps (lb/hr)	If not all emissions come from stacks 20 feet or greater in height, or there are horizontal stacks, raincaps, volume, or area sources (lb/hr)
CO	50	2
H_2S (Pecos-Permian Basin)	0.1	0.02
H_2S (Not in Pecos-Permian Basin)	0.01	0.002
Lead	No waiver	No waiver
NO_2	2	0.025
PM2.5	0.3	0.015
PM10	1.0	0.05
SO_2	2	0.025
Reduced sulfur (Pecos-Permian Basin)	0.033	No waiver
Reduced sulfur (Not in Pecos-Permian Basin)	No waiver	No waiver

Section 17: Compliance Test History

Section 17

Compliance Test History

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

To show compliance with existing NSR permits conditions, you must submit a compliance test history. The table below provides an example.

Compliance Test History Table

Unit No.	Test Description	Test Date
4 (NMOC)	Tier II testing conducted per requirements of 40 CFR 60.754(a)(3), and Method 25C in Appendix A of 40 CFR 60.	1999
4 (NMOC)	Tier II testing conducted per requirements of 40 CFR 60.754(a)(3), and Method 25C in Appendix A of 40 CFR 60.	2004
4 (NMOC)	Tier II testing conducted per requirements of 40 CFR 60.754(a)(3), and Method 25C in Appendix A of 40 CFR 60.	2009
4 (NMOC)	Tier II testing conducted per requirements of 40 CFR 60.754(a)(3), and Method 25C in Appendix A of 40 CFR 60.	2014
4 (NMOC)	Tier II testing conducted per requirements of 40 CFR 60.754(a)(3), and Method 25C in Appendix A of 40 CFR 60.	2019

Section 18: Addendum for Streamline Applications
(streamline applications only)

Section 18

Addendum for Streamline Applications

Do not print this section unless this is a streamline application.

The CRSWF Landfill is not requesting a Streamline Application for the Title V Operating Permit Application. Therefore, the *Section 18: Addendum for Streamline Applications* requirements are not applicable at this time.

Streamline Applications do not require a complete application. Submit Sections 1-A, 1-B, 1-D, 1-F, 1-G, 2-A, 2-C thru L, Sections 3 thru 8, Section 13, Section 18, Section 22, and Section 23 (Certification). Other sections may be required at the discretion of the Department. 20.2.72.202 NMAC Exemptions do not apply to Streamline sources. 20.2.72.219 NMAC revisions and modifications do not apply to Streamline sources, thus 20.2.72.219 type actions require a complete new application submittal. Please do not print sections of a streamline application that are not required.

Section 19: Requirements for the Title V (20.2.70 NMAC) Program
(Title V applications only)

Section 19

Requirements for Title V Program

Do not print this section unless this is a Title V application.

Who Must Use this Attachment:

* Any major source as defined in 20.2.70 NMAC.
* Any source, including an area source, subject to a standard or other requirement promulgated under Section 111 - Standards of Performance for New Stationary Sources, or Section 112 Hazardous Air Pollutants, of the 1990 federal Clean Air Act ("federal Act"). Non-major sources subject to Sections 111 or 112 of the federal Act are exempt from the obligation to obtain an 20.2.70 NMAC operating permit until such time that the EPA Administrator completes rulemakings that require such sources to obtain operating permits. In addition, sources that would be required to obtain an operating permit solely because they are subject to regulations or requirements under Section 112(r) of the federal Act are exempt from the requirement to obtain an Operating Permit.
* Any Acid Rain source as defined under title IV of the federal Act. The Acid Rain program has additional forms. See http://www.env.nm.gov/aqb/index.html. Sources that are subject to both the Title V and Acid Rain regulations are encouraged to submit both applications simultaneously.
* Any source in a source category designated by the EPA Administrator ("Administrator"), in whole or in part, by regulation, after notice and comment.

To save paper and to standardize the application format, delete this sentence, and begin your submittal for this item here.

19.1 - 40 CFR 64, Compliance Assurance Monitoring (CAM) (20.2.70.300.D.10.e NMAC)

Any source subject to 40CFR, Part 64 (Compliance Assurance Monitoring) must submit all the information required by section 64.7 with the operating permit application. The applicant must prepare a separate section of the application package for this purpose; if the information is already listed elsewhere in the application package, make reference to that location. Facilities not subject to Part 64 are invited to submit periodic monitoring protocols with the application to help the AQB to comply with 20.2.70 NMAC. Sources subject to 40 CFR Part 64, must submit a statement indicating your source's compliance status with any enhanced monitoring and compliance certification requirements of the federal Act.

The Clovis Regional Solid Waste Facility (CRSWF) landfill is not subject to 40 CFR Part 64, Compliance Assurance Monitoring (CAM), as emission control devices are not used at the facility and the facility does not have the potential pre-control device emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source. Therefore, the enhanced monitoring and compliance certification requirements are not applicable.

19.2 - Compliance Status (20.2.70.300.D.10.a & 10.b NMAC)

Describe the facility's compliance status with each applicable requirement at the time this permit application is submitted. This statement should include descriptions of or references to all methods used for determining compliance. This statement should include descriptions of monitoring, recordkeeping and reporting requirements and test methods used to determine compliance with all applicable requirements. Refer to Section 2, Tables 2-N and 2-O of the Application Form as necessary. (20.2.70.300.D.11 NMAC) For facilities with existing Title V permits, refer to most recent Compliance Certification for existing requirements. Address new requirements such as CAM, here, including steps being taken to achieve compliance.

Management of the Clovis Regional Solid Waste Facility (CRSWF) landfill believes that with the submission of this Title V

permit application, the Clovis Landfill is in compliance with applicable regulatory requirements as defined in 20 NMAC 2.70 at the time of this Permit Application. The CRSWF is committed to comply with all applicable regulatory requirements. To that end, applicable regulatory citations have been complied and listed in Section 13.

Tier II NMOC Emissions Rates presented in Section 6 (Calculations) were determined in accordance with Tier II testing requirements per 40 CFR 60.754(a)(3), and Method 25C in Appendix A of 40 CFR 60. Samples were analyzed by Air Technology Laboratories, Inc. for NMOC concentration by United States Environmental Protection Agency (USEPA) Method 25C, and for carbon dioxide, methane, oxygen, and nitrogen analyzed by Method 3C in Appendix A of 40 CFR 60.

19.3 - Continued Compliance (20.2.70.300.D.10.c NMAC)

Provide a statement that your facility will continue to be in compliance with requirements for which it is in compliance at the time of permit application. This statement must also include a commitment to comply with other applicable requirements as they come into effect during the permit term. This compliance must occur in a timely manner or be consistent with such schedule expressly required by the applicable requirement.

The Clovis Regional Solid Waste Facility (CRSWF) landfill will continue to be in compliance with applicable requirements for which it is in compliance at the time of this permit application. In addition, the CRSWF will, in a timely manner or consistent with such schedule, comply with other applicable requirements as they come into effect during the permit term.

19.4 - Schedule for Submission of Compliance (20.2.70.300.D.10.d NMAC)

You must provide a proposed schedule for submission to the department of compliance certifications during the permit term. This certification must be submitted annually unless the applicable requirement or the department specifies a more frequent period. A sample form for these certifications will be attached to the permit.

The certification will be submitted annually after the date of issuance of the Title V permit.

19.5 - Stratospheric Ozone and Climate Protection

In addition to completing the four (4) questions below, you must submit a statement indicating your source's compliance status with requirements of Title VI, Section 608 (National Recycling and Emissions Reduction Program) and Section 609 (Servicing of Motor Vehicle Air Conditioners).

---

1. Does your facility have any air conditioners or refrigeration equipment that uses CFCs, HCFCs or other ozone-depleting substances? ☐ **Yes** ☐ **No**

2. Does any air conditioner(s) or any piece(s) of refrigeration equipment contain a refrigeration charge greater than 50 lbs? ☐ **Yes** ☐ **No**

   (If the answer is yes, describe the type of equipment and how many units are at the facility.)

3. Do your facility personnel maintain, service, repair, or dispose of any motor vehicle air conditioners (MVACs) or appliances ("appliance" and "MVAC" as defined at 82. 152)? ☐ **Yes** ☐ **No**

4. Cite and describe which Title VI requirements are applicable to your facility (i.e. 40 CFR Part 82, Subpart A through G.)

N/A based on email from Cember Hardison dated 7/3/2019.

19.6 - Compliance Plan and Schedule

Applications for sources, which are not in compliance with all applicable requirements at the time the permit application is submitted to the department, must include a proposed compliance plan as part of the permit application package. This plan shall include the information requested below:

A. Description of Compliance Status: (20.2.70.300.D.11.a NMAC)
A narrative description of your facility's compliance status with respect to all applicable requirements (as defined in 20.2.70 NMAC) at the time this permit application is submitted to the department.

B. Compliance plan: (20.2.70.300.D.11.B NMAC)
A narrative description of the means by which your facility will achieve compliance with applicable requirements with which it is not in compliance at the time you submit your permit application package.

C. Compliance schedule: (20.2.70.300D.11.c NMAC)
A schedule of remedial measures that you plan to take, including an enforceable sequence of actions with milestones, which will lead to compliance with all applicable requirements for your source. This schedule of compliance must be at least as stringent as that contained in any consent decree or administrative order to which your source is subject. The obligations of any consent decree or administrative order are not in any way diminished by the schedule of compliance.

D. Schedule of Certified Progress Reports: (20.2.70.300.D.11.d NMAC)
A proposed schedule for submission to the department of certified progress reports must also be included in the compliance schedule. The proposed schedule must call for these reports to be submitted at least every six (6) months.

E. Acid Rain Sources: (20.2.70.300.D.11.e NMAC)
If your source is an acid rain source as defined by EPA, the following applies to you. For the portion of your acid rain source subject to the acid rain provisions of title IV of the federal Act, the compliance plan must also include any additional requirements under the acid rain provisions of title IV of the federal Act. Some requirements of title IV regarding the schedule and methods the source will use to achieve compliance with the acid rain emissions limitations may supersede the requirements of title V and 20.2.70 NMAC. You will need to consult with the Air Quality Bureau permitting staff concerning how to properly meet this requirement.

NOTE: The Acid Rain program has additional forms. See http://www.env.nm.gov/aqb/index.html. Sources that are subject to both the Title V and Acid Rain regulations are **encouraged** to submit both applications **simultaneously**.

Management of the Clovis Regional Solid Waste Facility (CRSWF) landfill believes that with the submission of this Title V permit application, the Clovis Landfill is in compliance with applicable regulatory requirements as defined in 20 NMAC 2.70 at the time of this Permit Application.

19.7 - 112(r) Risk Management Plan (RMP)

Any major sources subject to section 112(r) of the Clean Air Act must list all substances that cause the source to be subject to section 112(r) in the application. The permittee must state when the RMP was submitted to and approved by EPA.

CRSWF is not subject to section 112(r) of the Clean Air Act.

19.8 - Distance to Other States, Bernalillo, Indian Tribes and Pueblos

Will the property on which the facility is proposed to be constructed or operated be closer than 80 km (50 miles) from other states, local pollution control programs, and Indian tribes and pueblos (20.2.70.402.A.2 and 20.2.70.7.B NMAC)?

(If the answer is yes, state which apply and provide the distances.)

State of Texas – 11 kilometers

19.9 - Responsible Official

Provide the Responsible Official as defined in 20.2.70.7.AD NMAC:

Mr. Justin Howalt
City Manager
City of Clovis
801 South Norris Street
Clovis, New Mexico 88101

Section 20: Other Relevant Information

Section 20

Other Relevant Information

Other relevant information. Use this attachment to clarify any part in the application that you think needs explaining. Reference the section, table, column, and/or field. Include any additional text, tables, calculations or clarifying information.

Additionally, the applicant may propose specific permit language for AQB consideration. In the case of a revision to an existing permit, the applicant should provide the old language and the new language in track changes format to highlight the proposed changes. If proposing language for a new facility or language for a new unit, submit the proposed operating condition(s), along with the associated monitoring, recordkeeping, and reporting conditions. In either case, please limit the proposed language to the affected portion of the permit.

No additional information or clarification is required to complete this Title V Operating Permit Application for the Clovis Landfill, as the Application has been prepared in accordance with 20 NMAC 2.70 (Operating Permits). Additionally, there are no proposed exemptions from applicable regulatory requirements being requested at this time.

Section 21: Addendum for Landfill Applications

Section 21

Addendum for Landfill Applications

Do not print this section unless this is a landfill application.

Landfill Applications are not required to complete Sections 1-C Input Capacity and Production Rate, 1-E Operating Schedule, 17 Compliance Test History, and 18 Streamline Applications. Section 12 – PSD Applicability is required only for Landfills with Gas Collection and Control Systems and/or landfills with other non-fugitive stationary sources of air emissions such as engines, turbines, boilers, heaters. All other Sections of the Universal Application Form are required.

EPA Background Information for MSW Landfill Air Quality Regulations:
https://www3.epa.gov/airtoxics/landfill/landflpg.html

NM Solid Waste Bureau Website: https://www.env.nm.gov/swb/

21-A: Municipal Solid Waste Landfill Information

1	How long will the landfill be operated? **2102 (the closure date of the landfill, per the CRSWF's Solid Waste Facility Permit application).**			
2	Maximum operational hours per year: **3,390**			
3	Landfill Operating hours (open to the public) M-F: **7:00 am to 5:00 pm**		Sat. **7:00 am to 5:00 pm**	Sun. **12:00 pm to 5:00 pm**
4	To determine to what NSPS and emissions guidelines the landfill is subject, what is the date that the landfill was constructed, modified, or reconstructed as defined at 40 CFR 60, Subparts A, WWW, XXX, Cc, and Cf. **The landfill was last modified in 2013 with the approval of the application for modification/renewal of the CRSWF's Solid Waste Facility Permit from the Solid Waste Bureau. So, the facility is subject to 40 CFR 60 Subparts A and Cf, because the modification occurred before July 17, 2014.**			
5	Landfill Design Capacity. Enter all 3	Tons: **10,925,007**	Megagrams (Mg): **9,911,000**	Cubic meters: **17,730,000**
6	Landfill NMOC Emission Rate (NSPS Cf)	☒ Less than 34 Mg/year using Tiers 1 to 3	☐ Equal to or Greater than 34 Mg/year using Tiers 1 to 3	
	Landfill NMOC Emission Rate (NSPS XXX) **(N/A)**	☐ Less than 500 ppm using Tier 4	☐ Equal to or Greater than 500 ppm using Tier 4	
	Landfill NMOC Emission Rate (NSPS WWW) **(N/A)**	☐ Less than 50 Mg/yr	☐ Equal to or Greater than 50 Mg/yr	
7	Annual Waste Acceptance Rate: **85,000 tons (approximately)**			
8	Is Petroleum Contaminated Soil Accepted? **Yes**		If so, what is the annual acceptance rate? **241 tons (August 2020 to July 2021)**	
9	NM Solid Waste Bureau (SWB) Permit No.: **SWM-050303**		SWB Permit Date: **June 15, 1998**	
10	Describe the NM Solid Waste Bureau Permit, Status, and Type of waste deposited at the landfill. **The CRSWF obtained an operating permit from the NMED on June 15, 1998 for disposal of municipal solid waste. The Permit # is SWM-050303. The CRSWF's application for permit modification was approved in January 2013. The Final Order approved lateral and vertical expansion of the landfill and authorizes CRSWF to accept certain types of special waste including, asbestos, petroleum contaminated soils, commercial solid waste, construction and demolition debris, green waste, ash, packing house and killing plant offal.**			
11	Describe briefly any process(es) or any other operations conducted at the landfill.			

	All of the in-bound waste loads will be weighed at the scale. Large container vehicles will dump directly at the cell, private vehicles such as cars, and pickups will dump at the convenience center into large roll-off containers which will be hauled to the landfill cell once they are filled up. Near the convenience center, there is a small concrete pad with some metal containers to accept used paints, batteries, motor oil and filters, tires and appliances. **The landfill does not engage in the following process/activities nor does it operate the following equipment: Transfer Station, Recycling Facility Composting Facility, or Boilers.**

21-B: NMOC Emissions Determined Pursuant to 40 CFR 60, Subparts WWW or XXX

	Enter the regulatory citation of all Tier 1, 2, 3, and/or 4 procedures used to determine NMOC emission rates and the date(s) that each Tier procedure was conducted. In Section 7 of the application, include the input data and results.
1	Tier 1 equations (e.g. LandGEM): **184.37 Mg/yr (peak emissions rate - year 2075) (40 CFR § 60.33f and 40 CFR 60.754)**
2	Tier 2 Sampling: 11.89 Mg/year (2021); **16.53 Mg/year (peak emissions rate - year 2075). Copy of the Tier II NMOC Emissions Rate Report (dated August 30, 2021 is included).**
3	Tier 3 Rate Constant: **N/A**
4	Tier 4 Surface Emissions Monitoring: **N/A**
5	Attach all Tier Procedure calculations, procedures, and results used to determine the Gas Collection and Control System (GCCS) requirements. **N/A**

Facilities that have a landfill GCCS must complete Section 21-C.

21-C: Landfill Gas Collection and Control System (GCCS) Design Plan (N/A)

1	Was the GCCS design certified by a Professional Engineer?
2	Attach a copy of the GCCS Design Plan and enter the submittal date of the Plan pursuant to the deadlines in either NSPS WWW or NSPS XXX. The NMOC applicability threshold requiring a GCCS plan is 50Mg/yr for NSPS WWW and 34 Mg/yr or 500 ppm for NSPS XXX.
3	Is/Was the GCCS planned to be operational within 30 months of reporting NMOC emission rates equal to or greater than 50 Mg/yr, 34 Mg/yr, or 500 ppm pursuant to the deadlines specified in NSPS WWW or NSPS XXX?
4	Does the GCCS comply with the design and operational requirements found at 60.752, 60.753, and 69.759 (NSPS WWW) or at 60.762, 60.763, and 60.769 (NSPS XXX)?
5	Enter the control device(s) to which the landfill gas will be/is routed such as an open flare, enclosed combustion device, boiler, process heater, or other.
6	Do the control device(s) meet the operational requirements at 60.752 and 60.756 (NSPS WWW) or 60.762, 60.763, 60.766 (NSPS XXX)?

Section 22: Certification Page

Section 22: Certification

Company Name: City of Clovis

I, Justin A. Howalt, hereby certify that the information and data submitted in this application are true and as accurate as possible, to the best of my knowledge and professional expertise and experience.

Signed this 15th day of November, 2021, upon my oath or affirmation, before a notary of the State of New Mexico.

[signature]
*Signature

11/15/21
Date

Justin A. Howalt
Printed Name

City Manager
Title

Scribed and sworn before me on this 15th day of November, 2021.

My authorization as a notary of the State of New Mexico expires on the 7th day of June, 2024.

[signature]
Notary's Signature

11/15/2021
Date

CLAIRE L. BURROUGHS
Notary's Printed Name

*For Title V applications, the signature must be of the Responsible Official as defined in 20.2.70.7.AE NMAC.