Dave Bearden
Waste Management
Four Corners Market Area
222 S. Mill Avenue, Suite 333
Tempe, Arizona 85281
Phone: 602-708-9815
dbearde2@wm.com

August 7, 2023

Melinda Owens,
Manager, Title V Unit
Air Quality Bureau
New Mexico Environment Department
525 Camino De Los Marquez Ste 1
Santa Fe, NM 87505

Subject: San Juan County Regional Landfill – Title V Operating Permit P246L-R2
Universal Air Quality Permit Application, Renewal of Title V

The San Juan County Regional Landfill (SJCRL) and Waste Management of New Mexico, Inc. (WMNM) is submitting the enclosed application for the renewal of the existing Title V application. The current permit, number P246L-R2 will expire on October 2, 2024.

During the current permit period, a Gas Collection and Control System (GCCS) was installed in compliance with 40 CFR 60 Subpart XXX. A NSR application was submitted and approved in 2022 to include the emissions of the landfill gas. Per NSPS regulations, the GCCS is to be fully operational by August 11, 2023. This permit renewal application includes this new source.

This application utilizes the most recent version of the NMED's Universal Air Quality Permit Application and includes three Attachments:

- Attachment 1: Application Form UA1;
- Attachment 2: Application Form UA2; and
- Attachment 3: Application Form UA3.

If you have additional questions, please contact me via e-mail at dbearde2@wm.com or by phone at (602) 708-9815.

Respectfully Submitted,

Dave Bearden
Senior Environmental Protection Mgr.
Waste Management Four Corners Market Area

cc Joshua Vinzant, WMNM

ATTACHMENT 1

Universal Air Quality Permit Application Form UA1

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		

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.

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.: NA in the amount of

X 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.

X 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: **20.2.70.300.B.2 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.): 4544	Updating Permit/NOI #: P246L-R2
1	Facility Name: **San Juan County Regional Landfill**	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): **78 County Rd 3140 Aztec NM 87410**		
2	Plant Operator Company Name: **San Juan County Regional Landfill**	Phone/Fax: **505-386-5005/505-334-8769**	
a	Plant Operator Address: **222 S. Mill Ave., Tempe, AZ 85281**		

b	Plant Operator's New Mexico Corporate ID or Tax ID: **01-799015007**	
3	Plant Owner(s) name(s): **San Juan County Regional Landfill**	Phone/Fax: **505-386-5005/505-334-8769**
a	Plant Owner(s) Mailing Address(s): **100 S Oliver Dr., Aztec, NM 87410**	
4	Bill To (Company): **San Juan County Regional Landfill**	Phone/Fax: **(505) 334-1121/(505) 334-8769**
a	Mailing Address: **222 S Mill Ave Ste 333 Tempe AZ 85281**	E-mail: **jvinzant@wm.com**
5	X Preparer: **Denise Manchego** ☐ Consultant:	Phone/Fax: **480-352-2522**
a	Mailing Address: **222 S Mill Ave Ste 333 Tempe AZ 85281**	E-mail: **dmancheg@wm.com**
6	Plant Operator Contact: **Dave Bearden**	Phone/Fax: **602-708-9815**
a	Address: **222 S Mill Ave Ste 333 Tempe AZ 85281**	E-mail: **dbearde2@wm.com**
7	Air Permit Contact: **Denise Manchego**	Title: **Environmental Protection Specialist II**
a	E-mail: **dmancheg@wm.com**	Phone/Fax: **480-352-2522**
b	Mailing Address: **222 S Mill Ave Ste 333 Tempe AZ 85281**	
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):
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: P-246L-R2
7	Has this facility been issued a No Permit Required (NPR)? ☐ Yes ☒ No	If yes, the NPR No. is:
8	Has this facility been issued a Notice of Intent (NOI)? ☐ Yes ☒ No	If yes, the NOI No. is:
9	Does this facility have a construction permit (20.2.72/20.2.74 NMAC)? ☒ Yes ☐ No	If yes, the permit No. is: **P246L-R2**
10	Is this facility registered under a General permit (GCP-1, GCP-2, etc.)? ☐ Yes ☒ No	If yes, the register No. is:

Section 1-C: Facility Input Capacity & Production Rate

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: N/A	Daily: N/A	Annually: N/A
b	Proposed	Hourly: N/A	Daily: N/A	Annually: N/A
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: N/A	Daily: N/A	Annually: N/A

b	Proposed	Hourly: N/A	Daily: N/A	Annually: N/A

Section 1-D: Facility Location Information

1	Section: **36**	Range: **12W**	Township: **30N**	County: **San Juan**	Elevation (ft): **5,757**
2	UTM Zone: ☒ 12 or ☐ 13			Datum: ☐ NAD 27 ☒ NAD 83 ☐ WGS 84	
a	UTM E (in meters, to nearest 10 meters): **763,382**			UTM N (in meters, to nearest 10 meters): **36 46 1.88 N**	
b	**AND** Latitude (deg., min., sec.): **36 46 1.88 N**			Longitude (deg., min., sec.): **36 46 1.88 N**	
3	Name and zip code of nearest New Mexico town: **Aztec, New Mexico 87410**				
4	Detailed Driving Instructions from nearest NM town (attach a road map if necessary): **from the intersection of NM 516 and NM 550 in Aztec, travel 0.8 miles south on NM 550 to Rio Grande Ave (County Rd 3000), turn right on Rio Grande Ave (County Rd 3000) and travel 2.2 miles southwest to County Rd 3100, bear left on County Rd. 3100 and travel 2.8 miles south to the facility entrance.**				
5	The facility is **5** (distance) miles **SW** (direction) of **Aztec** (nearest town).				
6	Status of land at facility (check one): ☐ Private ☐ Indian/Pueblo ☐ Federal BLM ☐ Federal Forest Service ☒ Other (specify) **San Juan County**				
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: **The facility is located in San Juan County** **City of Aztec, NM – (5 miles northeast)** **City of Farmington, NM – (9.9 miles west)** **City of Bloomfield, NM – (5.0 miles southeast)** **Flora Vista, NM – (2.7 miles northwest)** **There are no Indian tribes within 10 miles of the San Juan County Regional Landfill**				
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/air-quality/modeling-publications/)? ☐ 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: **The nearest Class 1 area is the Mesa Verde National Park**				
10	Shortest distance (in km) from facility boundary to the boundary of the nearest Class I area (to the nearest 10 meters): **56.20 km**				
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: **14 meters**				
12	Method(s) used to delineate the Restricted Area: **The facility property is completely enclosed by a 6-foot chain link fence equipped with a locking gate.** "**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.)

1	Facility **maximum** operating ($\frac{\text{hours}}{\text{day}}$): 12	($\frac{\text{days}}{\text{week}}$): 7	($\frac{\text{weeks}}{\text{year}}$): 52	($\frac{\text{hours}}{\text{year}}$): 4038

2	Facility's maximum daily operating schedule (if less than 24 $\frac{\text{hours}}{\text{day}}$)? Start: 6	☒AM ☐PM	End: 6	☐AM ☒PM
3	Month and year of anticipated start of construction: **Facility is constructed; modification on facility to start 6/23/2023**			
4	Month and year of anticipated construction completion: **Facility is constructed – modification on facility to end 8/11/2023**			
5	Month and year of anticipated startup of new or modified facility: **Start-up commissioning between 6/26/2023 & 7/28/2023**			
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:		
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:	Requirement # (or page # and paragraph #):
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.) **Damon DeFrates** (20.2.70.300.D.2 NMAC):		Phone: **480-751-9904**
a	R.O. Title: **Director of Post Collections Operations**	R.O. e-mail: **DDefrates@wm.com**	
b	R. O. Address: **222 S. Mill Ave., Tempe, AZ 85281**		
2	Alternate Responsible Official **Dave Bearden** (20.2.70.300.D.2 NMAC):		Phone: **602-708-9815**
a	A. R.O. Title: **Senior Environmental Protection Manager**	A. R.O. e-mail: **dbearde2@wm.com**	
b	A. R. O. Address: **222 S. Mill Ave., Tempe, AZ 85281**		
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): **Rio Rancho Landfill, Permit No. P-208L-R3-M3** **Valencia County Regional Landfill and Recycling Facility, Permit No. P-247L-R2-M1**		

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.): **Waste Management, Inc.**
a	Address of Parent Company: **1001 Fannin Suite 4000, Houston, TX 77002**
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: **Mr. Nick Porell, Public Works Director** **San Juan County Public Works** **100 South Oliver Dr.** **Aztec, NM 87410** **(505) 334-4520** **Mr. Joshua Vinzant, Operations Manager** **San Juan County Regional Landfill** **#78 County Road 3140** **Aztec, NM 87410** **(505) 334-1121**
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: **Colorado, 27.4 km (17 miles) north** **Navajo Nation, 19.3 km (12 miles) west** **Ute Mountain Indian Reservation, 23.3 km (14.5 miles) north** **Southern Ute Indian Reservation, 27.4 km (17 miles) south** **Jicarilla Apache Indian Reservation, 64.4 km (40 miles) east**

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

☐ secure electronic transfer. Air Permit Contact Name_____, Email_____ Phone number _____.

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.

Table of Contents

Change Log – Do **not** submit this page with your application.

If you are using a form older than the most current form posted on the website, you are required to incorporate the changes listed. Periodically, AQB will announce when older form versions will no longer be accepted.

Version Date	Changes Incorporated
4/1/2021	Current version of this form. Older versions are not accepted.

ATTACHMENT 2

Universal Air Quality Permit Application Form UA2

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	Make	Model #	Serial #	Manufacturer's Rated Capacity[3] (Specify Units)	Requested Permitted Capacity[3] (Specify Units)	Date of Manufacture[2] / Date of Construction/ Reconstruction[2]	Controlled by Unit # / Emissions vented to Stack #	Source Classification Code (SCC)	For Each Piece of Equipment, Check One	RICE Ignition Type (CI, SI, 4SLB, 4SRB, 2SLB)[4]	Replacing Unit No.
1	Landfill Roads	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	30502504	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
2	General Landfill Operations	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	30502504	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
3	Landfill Gas	N/A	N/A	N/A	N/A	N/A	N/A N/A	Unit 5 NMOC	50400201	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
4	Petroleum Contaminated Soils Landfarm	N/A	N/A	N/A	N/A	N/A	N/A N/A	N/A N/A	50410310	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A
5	Non-Enclosed Flare	Perennial Energy	N/A	2035	700 SCFM	700 scfm (50% CH4)	N/A N/A	N/A N/A	50100402	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	N/A	N/A

[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

[5] New emission unit to be added noted in blue text

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. Serial No.	Max Capacity Capacity Units	List Specific 20.2.72.202 NMAC Exemption (e.g. 20.2.72.202.B.5) Insignificant Activity citation (e.g. IA List Item #1.a)	Date of Manufacture /Reconstruction[2] Date of Installation /Construction[2]	For Each Piece of Equipment, Check One
2	Diesel Storage Tank	N/A	N/A N/A	10000 gallons	N/A I.A. List Item No.8	N/A N/A	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
2	Propane Heater	Lennox	N/A N/A	75000 btu	N/A I.A. List Item No. 3	N/A N/A	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
2	Propane Heater	Lennox	N/A N/A	5000 btu	N/A I.A. List Item No. 3	N/A N/A	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
2	Used Oil Heater	Clean Burn, Inc.	N/A N/A	185000 btu	N/A I.A. List Item No. 4	N/A N/A	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
2	Used Oil Storage Tank	N/A	N/A N/A	240 gallons	N/A I.A. List Item No. 5	N/A N/A	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
2	Used Oil Storage Tank	N/A	N/A N/A	260 gallons	N/A I.A. List Item No. 5	N/A N/A	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
2	Portable Light Plant	Ingersol Rand	D905-BG-ES 5Q0564	17.4 hp	N/A I.A. List Item No. 6	N/A N/A	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
2	Welder	Miller	S-32P N/A	23 hp	N/A I.A. List Item No. 6	N/A N/A	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
2	Hot Water Pressure Washer	Smity's	GX390 N/A	<200 hp	N/A I.A. List Item No. 6	N/A N/A	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
2	Air Compressor	Ingersol Rand	P185/D 237014UGD328	65 hp	N/A I.A. List Item No. 6	N/A N/A	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
2	Welder	Lincoln	K1828-1 U1030916836	16 hp	N/A I.A. List Item No. 6	N/A N/A	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
2	Portable Generator	Generac	G0058022 3001716400	16.3 hp	N/A I.A. List Item No. 6	N/A N/A	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
2	Portable Generator	Generac	64311 3000737823	6.4 hp	N/A I.A. List Item No. 6	N/A N/A	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
2	Lawn Mower	22" Murray 5 HP	N/A N/A	5 hp	N/A I.A. List Item No. 6	N/A N/A	Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
2	Welder	Lincoln 225 Ranger	CH730	23.5	N/A	N/A	Existing (unchanged) ☐ To be Removed X New/Additional ☐ Replacement Unit

Unit Number	Source Description	Manufacturer	Model No. / Serial No.	Max Capacity / Capacity Units	List Specific 20.2.72.202 NMAC Exemption (e.g. 20.2.72.202.B.5) / Insignificant Activity citation (e.g. IA List Item #1.a)	Date of Manufacture /Reconstruction[2] / Date of Installation /Construction[2]	For Each Piece of Equipment, Check One
			4810100941	HP	I.A. List Item No. 6	N/A	X New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
2	Trash Pump	Honda	QP-3TH	7.9	N/A	N/A	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			3TH-28348	hp	I.A. List Item No. 6	N/A	
2	Weed Eater	Husqvarna	128LD	0.8	N/A	N/A	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			17136N301817	hp	I.A. List Item No. 6	N/A	
2	Air Compressor (Primary)	Ingersol Rand	P185/D	85	N/A	N/A	X Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
			259949UJG286	hp	I.A. List Item No. 6	N/A	

[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
1	Water Truck	N/A	TSP, PM10, PM2.5	1, 2	60, 80%	NMED AQB recommendation
2	Application of Cold Millings to Disposal Route	N/A	TSP, PM10, PM2.5	1, 2	80%	NMED ABQ recommendation
5	700 Scfm Open Flare	6/27/2023	NMOC, HAPs, VOC	3	98%	40 CFR 60 Subpart XXX

[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)

X 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.[2,3]	NOx		CO		VOC		SOx		PM[1]		PM10[1]		PM2.5[1]		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																		
2																		
3																		
4																		
5																		
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 PM is a regulated air pollutant under PSD (20.2.74 NMAC) and Title V (20.2.70 NMAC).

[2] Units 1,2, and 4 are fugitive sources. SCFRL is a Municipal Solid Waste Landfill. Source is not one of the 28 listed sources and only has fugitive emissions which are not considered towards PSD applicability. Emissions shown are those affected by the proposed change, Emission Units 3 and 5.

[2] Unit 5 serves as the control device for Emission Unit 3. Emissions from this unit are produced after the system collects LFG from Emission Unit 3. Therefore for this form, emissions from Unit 5 are zero (0)

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.[2,3]	NOx		CO		VOC		SOx		PM[1]		PM10[1]		PM2.5[1]		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	-	-	-	-	-	-	-	-	38.82	61.22	10.47	16.50	1.05	1.66	-	-	-	-
2	-	-	-	-	-	-	-	-	8.03	12.67	2.17	3.42	0.65	1.03	-	-	-	-
3	-	-	-	-	0.73	3.18	-	-	-	-	-	-	-	-	0.04	0.16	-	-
4	-	-	-	-	3.58	15.67	-	-	-	-	-	-	-	-	-	-	-	-
5	1.17	5.12	5.33	23.34	0.04	0.19	1.41	6.16	0.27	1.18	0.27	1.18	0.27	1.18	2.12E-03	9.30E-03	-	-
Totals	1.17	5.12	5.3289	23.34	4.35	19.04	1.41	6.16	47.12	75.06	12.90	21.10	1.97	3.86	0.04	0.16	-	-

[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).

2 Units 1,2, and 4 are fugitive sources. SCFRL is a Municipal Solid Waste Landfill. Source is not one of the 28 listed sources and only has fugitive emissions which are not considered towards PSD applicability. Emisson from fugitive sources are not applied to the determination of status of facility with Prevention of Signficant Deteriation status.

3. Emissions from Units 3 and 5 show the change due to the proposed modification (noted in blue text). Emissions from unit 3 are reduced by 75% and the emissions from Unit 5 have been added after collected LFG has been combusted.

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

X This table is intentionally left blank since all emissions at this facility due to routine or predictable startup, shutdown, or scheduled 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 2-P. Provide an explanations of SSM emissions in Section 6 and 6a.

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		PM[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
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.

[2] **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-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		PM		PM10		PM2.5		X 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
5	3	1.17	5.12	5.33	23.34	0.04	0.19	1.41	6.16	0.27	1.18	0.27	1.18	0.27	1.18	2.12E-03	9.30E-03
Totals:																	

Table 2-H: Stack Exit Conditions

Unit and stack numbering must correspond throughout the application package. Include the stack exit conditions for each unit that emits from a stack, including blowdown venting parameters and tank emissions. If the facility has multiple operating scenarios, complete a separate Table 2-H for each scenario and, for each, type scenario name here:

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 (ft)
						(acfs)	(dscfs)			
5	3	V	No	28	1100-1400	11.7	11	8	59.45	0.50

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		Provide Pollutant Name Here ☐ HAP or ☐ TAP		Provide Pollutant Name Here ☐ HAP or ☐ TAP		Provide Pollutant Name Here ☐ HAP or ☐ TAP		Provide Pollutant Name Here ☐ HAP or ☐ TAP		Provide Pollutant Name Here ☐ HAP or ☐ TAP		Provide Pollutant Name Here ☐ HAP or ☐ TAP		Provide Pollutant Name Here ☐ HAP or ☐ TAP		Provide Pollutant Name Here ☐ 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
				Emissions are less than 1.0 tons per year. Max HAP emissions are from Hydrogen Chloride from combustion of flare at 0.59 tons'yr															
Totals:																			

Table 2-J: Fuel

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

Unit No.	Fuel Type (low sulfur Diesel, ultra low sulfur diesel, Natural Gas, Coal, ...)	Fuel Source: purchased commercial, pipeline quality natural gas, residue gas, raw/field natural gas, process gas (e.g. SRU tail gas) or other	Specify Units				
			Lower Heating Value	Hourly Usage	Annual Usage	% Sulfur	% Ash
N/A	N/A	N/A	N/A	N/A	N/A	N/A	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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	N/A	N/A	N/A	N/A	N/A	N/A	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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	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
5	Pilot Flame/temperature	Thermocouple	^{0}F	N/A	As required by Manufacturer	inspection, calibration or replacement	Certification from Manufacturer or computer	N/A
5	Flow	flow meter	scfm	N/A	As required by Manufacturer	inspection, calibration or replacement	Certification from Manufacturer or computer	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	PFC/HFC 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	footnote 3										
5	mass GHG	17,386.09	0.10	0.53	-	-	-	-	-	-	-	-	-	-	17,386.73	-
	CO_2e	17,386.09	31.16	13.28	-	-	-	-	-	-	-	-	-	-	-	17,430.53
3	mass GHG	2,914.34	-	1,062.17	-	-	-	-	-	-	-	-	-	-	3,976.51	-
	CO_2e	2,914.34	-	26,554.24	-	-	-	-	-	-	-	-	-	-	-	29,468.59
Total	**mass GHG**	**20,300.43**	**0.10**	**1,062.70**	-	-	-	-	-	-	-	-	-	-	**21,363.24**	-
	CO_2e	**20,300.43**	**31.16**	**26,567.52**	-	-	-	-	-	-	-	-	-	-	-	**46,899.12**

[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.

ATTACHMENT 3

Universal Air Quality Permit Application Form UA3

Section 3

Application Summary

The **Application Summary** 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 **Process Summary** shall include a brief description of the facility and its processes.

Startup, Shutdown, and Maintenance (SSM) 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.

SITE DESCRIPTION

San Juan County Regional Landfill (SJCRLF) is a municipal solid waste (MSW) landfill located in Aztec NM. SJCRLF is operating pursuant to New Mexico Environmental Department (NMED) Solid Waste Facility Permit Nos. SWM-0424366 and SWM-0424367 (SP). The facility is currently authorized to dispose of MSW and many other acceptable wastes including the following approved special wastes:

- Ash
- Industrial Solid Waste
- Offal
- Petroleum Contaminated Soils (PCS)
- Sludge
- Spill of a Chemical Substance or Commercial Product
- Treated, Formerly Characteristic Hazardous Waste

SJCRL is permitted to operate the following emission units as identified in Air Quality Bureau Title V Operating Permit (Title V Permit) P246L-R2. This permit has an expiration date of October 2, 2024. On November 28, 2022, NMED issued a New Source Review Permit, Number 9648, in response to the addition of a Non-Enclosed Flare.

- Unit No. 1 – Landfill Roads – Particulate Matter (PM10 and PM2.5) fugitive dust emissions from refuse delivery, miscellaneous Public Convenience Center, and Material Recovery Facility (MRF) vehicles that travel on paved, unpaved, and base course-treated roads;
- Unit No. 2 – General Landfill Operations – PM10 and PM2.5 fugitive dust emissions from landfill earthmoving equipment (e.g. scrapers, road grader, bull dozer, and compactor) and wind erosion;
- Unit No. 3 – Landfill Gas – nonmethane organic compounds (NMOC) emissions (which include VOC and HAP) from anaerobic decomposition of MSW; and
- Unit No. 4. – PCS Landfarm
- Unit No. 5 – Non-Enclosed Flare for combustion of landfill gas.

APPLICATION SUMMARY

The purpose of this application is to provide the supporting information as well as the emission calculations to renew and update the existing Title V permit, P246L-R2 to include the Non-Enclosed Flare.

PROCESS SUMMARY

Section 4 provides the process flow diagram for the existing Units 1-4 and the newly installed Unit 5, the 700 scfm Non-Enclosed Flare. Decomposing municipal solid waste in the landfill, Unit 3, generates landfill gas (LFG). This LFG is drawn from several LFG wells and conveyed through a network of pipe to the Non-Enclosed Flare for combustion and destruction. Modeling using the EPA's LandGEM estimates that the landfill could generate up to 759 scfm of LFG through 2029, the end of the next permit period. With the standard collection efficiency of 75 percent, the Non-Enclosed flare could process 569 scfm. This is within the flare's capacity. The flare will operate continuously, 24 hours and 365 days a year except for periods of shutdown. The collected LFG will be combusted with a minimum destruction efficiency for NMOCs of 98 percent, as required by 40 CFR 60 Subpart XXX. Emissions resulting from the combustion of LFG include criteria pollutants (carbon monoxide (CO), PM2.5, PM, PM10, Sulfur Dioxide (SO2), and Nitrogen Oxides (NOx)), Volatile Organic Compounds (VOCs), Greenhouse Gas (GHG), Hazardous Air Pollutants (HAPs), and NMOCs.

Based upon the EPA LandGEM model, an estimated 75 percent of the generated LFG generated routed to the flare, the remaining 25 percent is assumed to be emitted to the atmosphere. These emissions will include the criteria pollutants Volatile Organic Compounds (VOCs), Greenhouse Gas (GHG), Hazardous Air Pollutants (HAPs), and NMOCs.

STARTUP SHUTDOWN AND/OR MALFUNCTION EMISSIONS

Subpart XXX requires the non-enclosed flare to be in continuous operation when LFG is routed to it. To confirm continuous operation, a flow meter is installed. This flow is recorded at least every 15 minutes. The gas collection and control system (GCCS) is equipped with a automatic shut-down valve that will close in the event the flare needs to be shutdown or there is a malfunction with the flare and/or gas mover system. Subpart XXX requires this valve or valves to shut within an hour of the GCCS not operating. Once this valve(s) is shutdown, emissions through the flare will cease.

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 diagram for the Unit 5 – 700 scfm open flare is in blue in Figure 4.2 below. See Section 2 for a description on the proposed open flare.

Figure 4.1
Landfill Gas Process Flow Diagram
(Emission Unit 3)

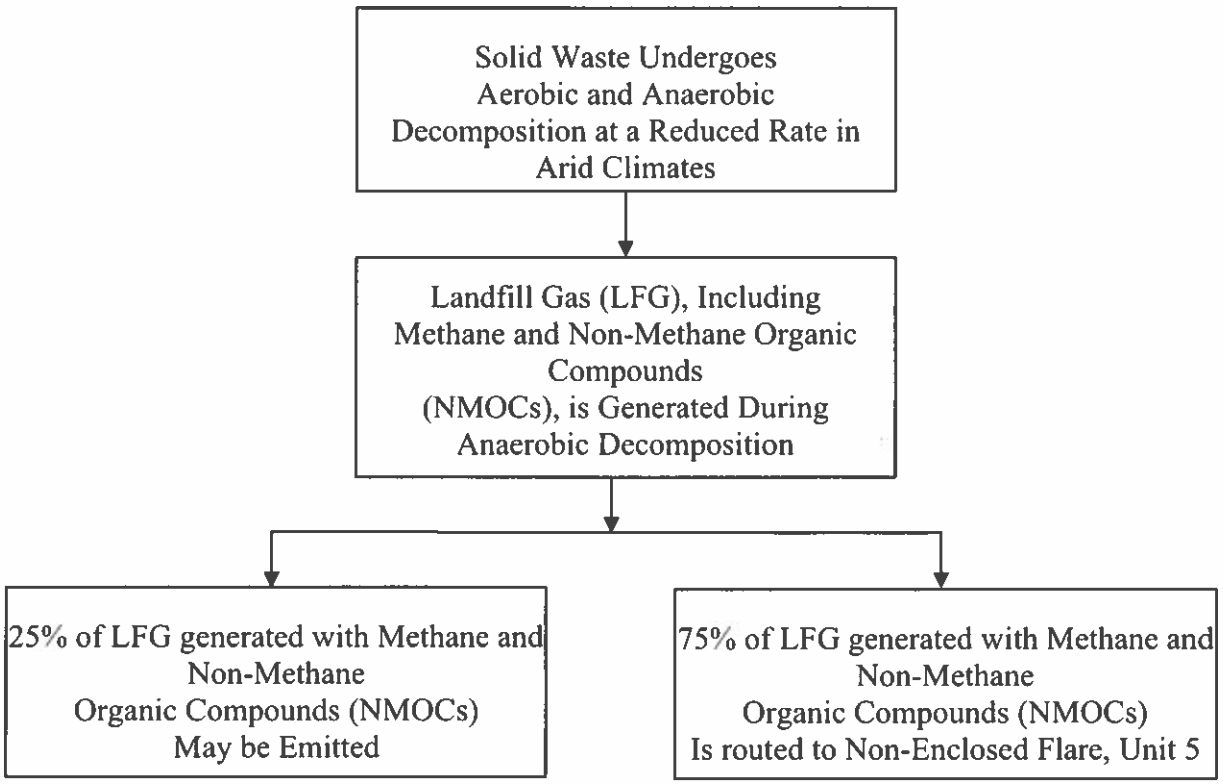


Figure 4.2
Landfill Gas Open Flow Diagram
(Emission Unit 5)

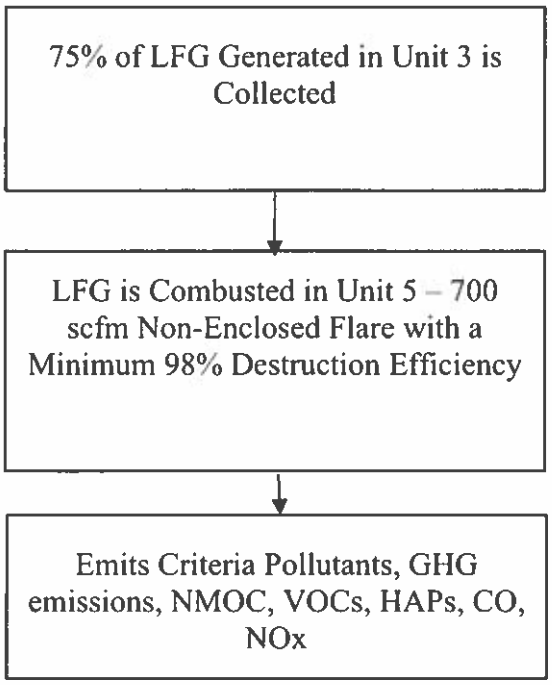


Figure 4.3
Landfill Roads Process Flow Diagram
(Emission Unit 1)

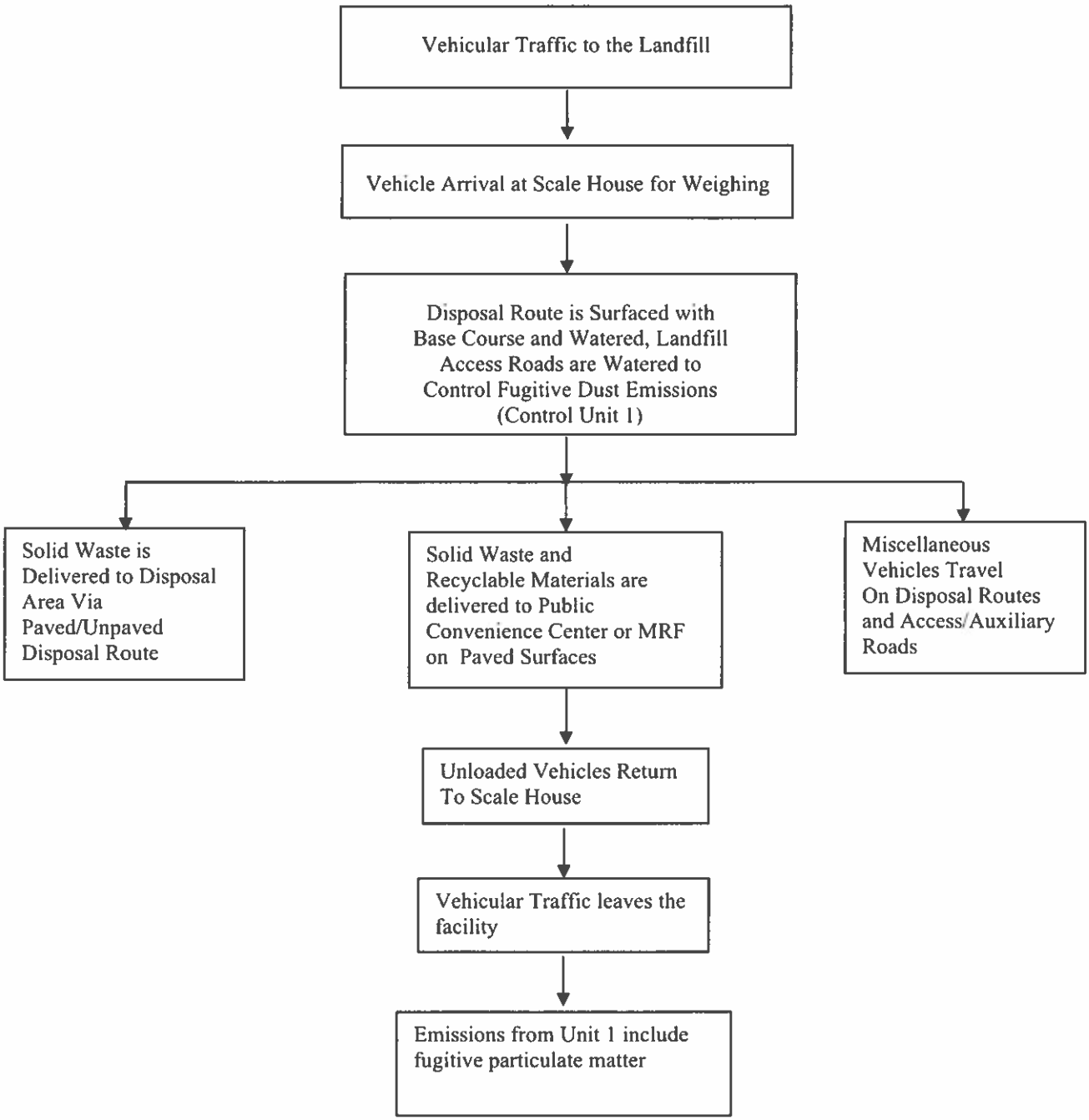


Figure 4.4
General Landfill Operations Process Flow Diagram
(Emission Unit 2)

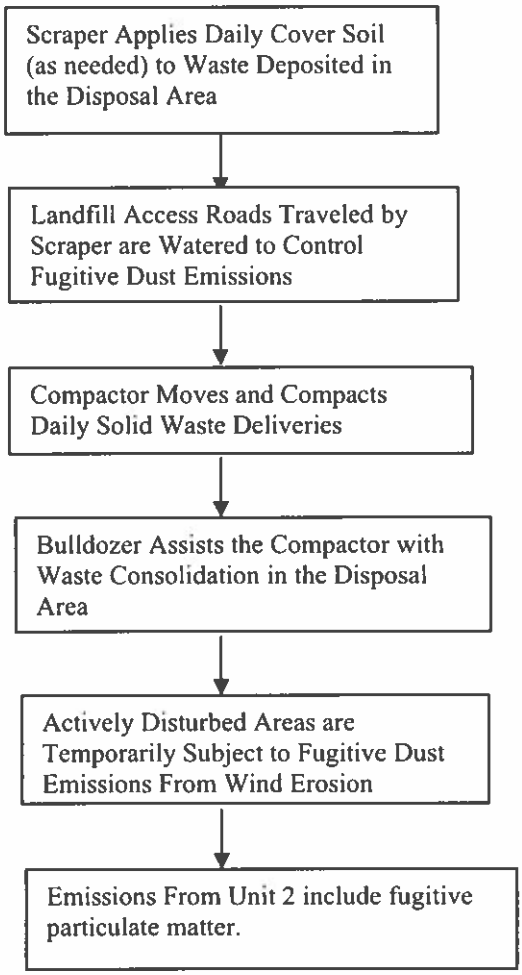
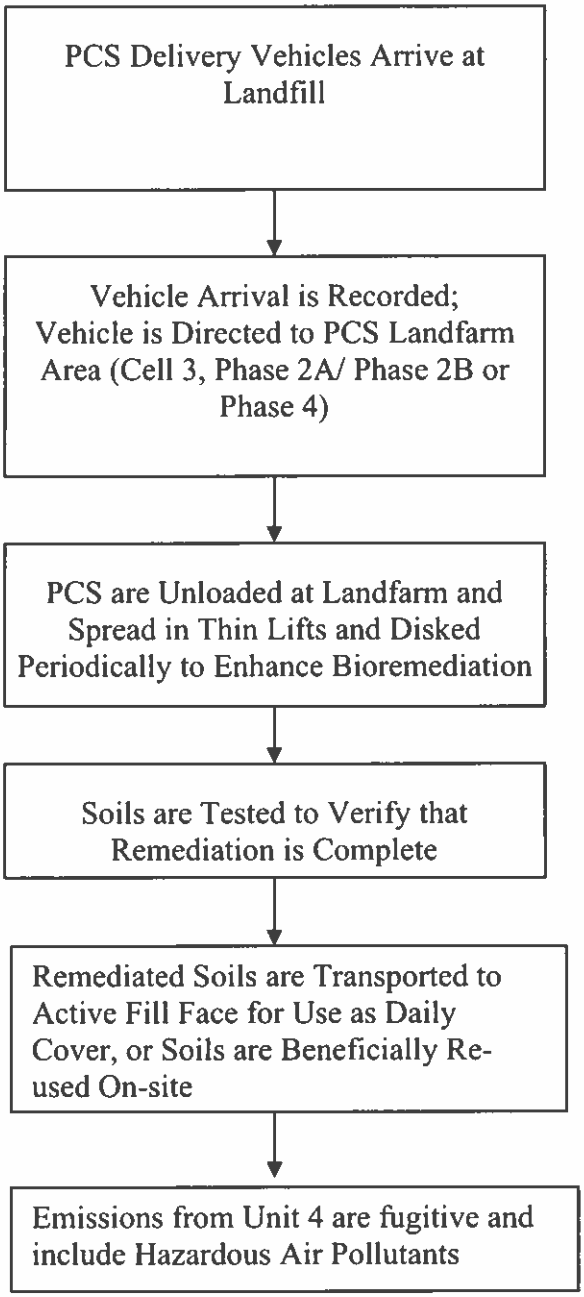


Figure 4.5
Petroleum Contaminated Soils (PCS) Landfarm Process Flow Diagram
(Emission Unit 4)

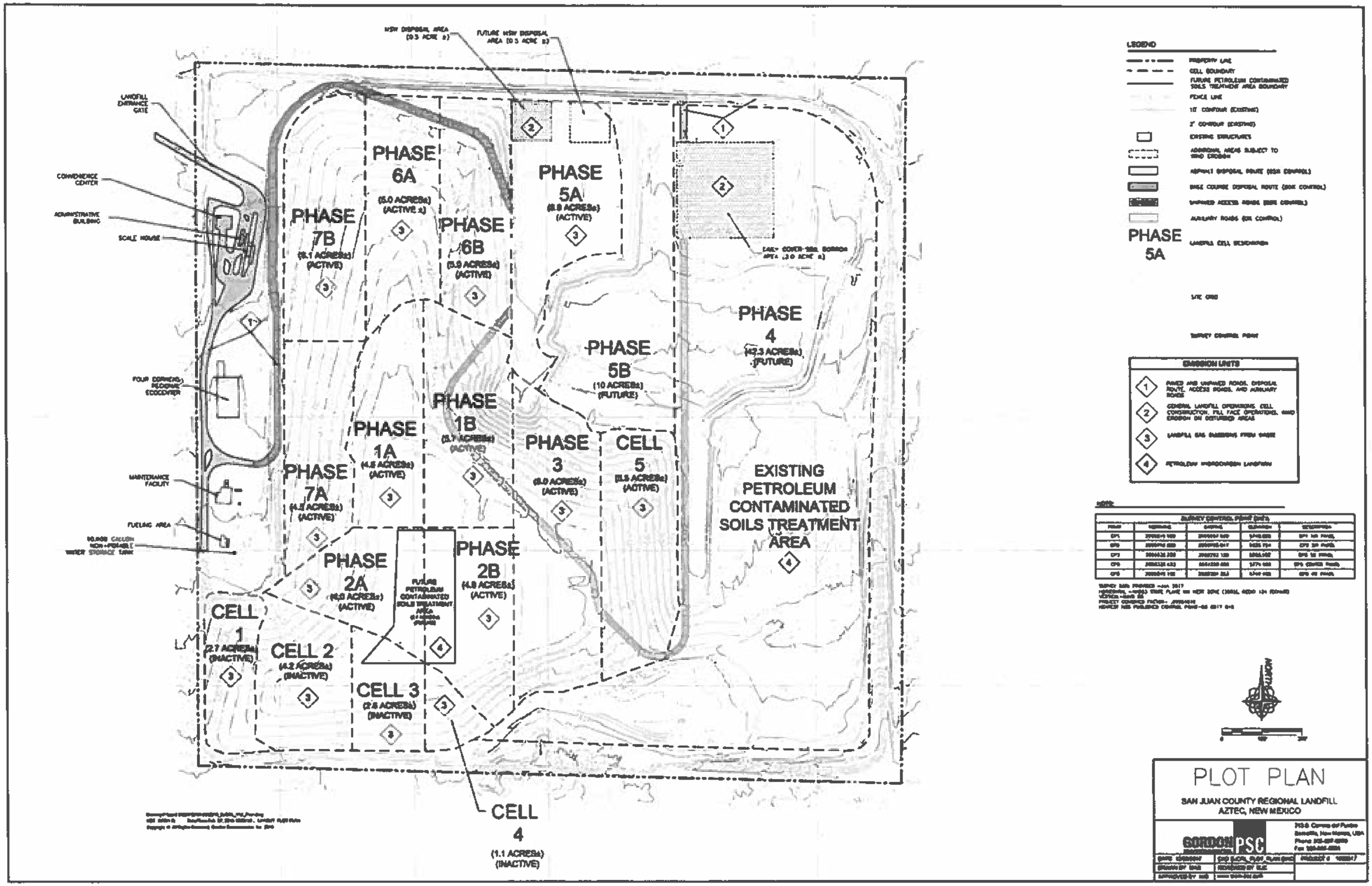


Section 5

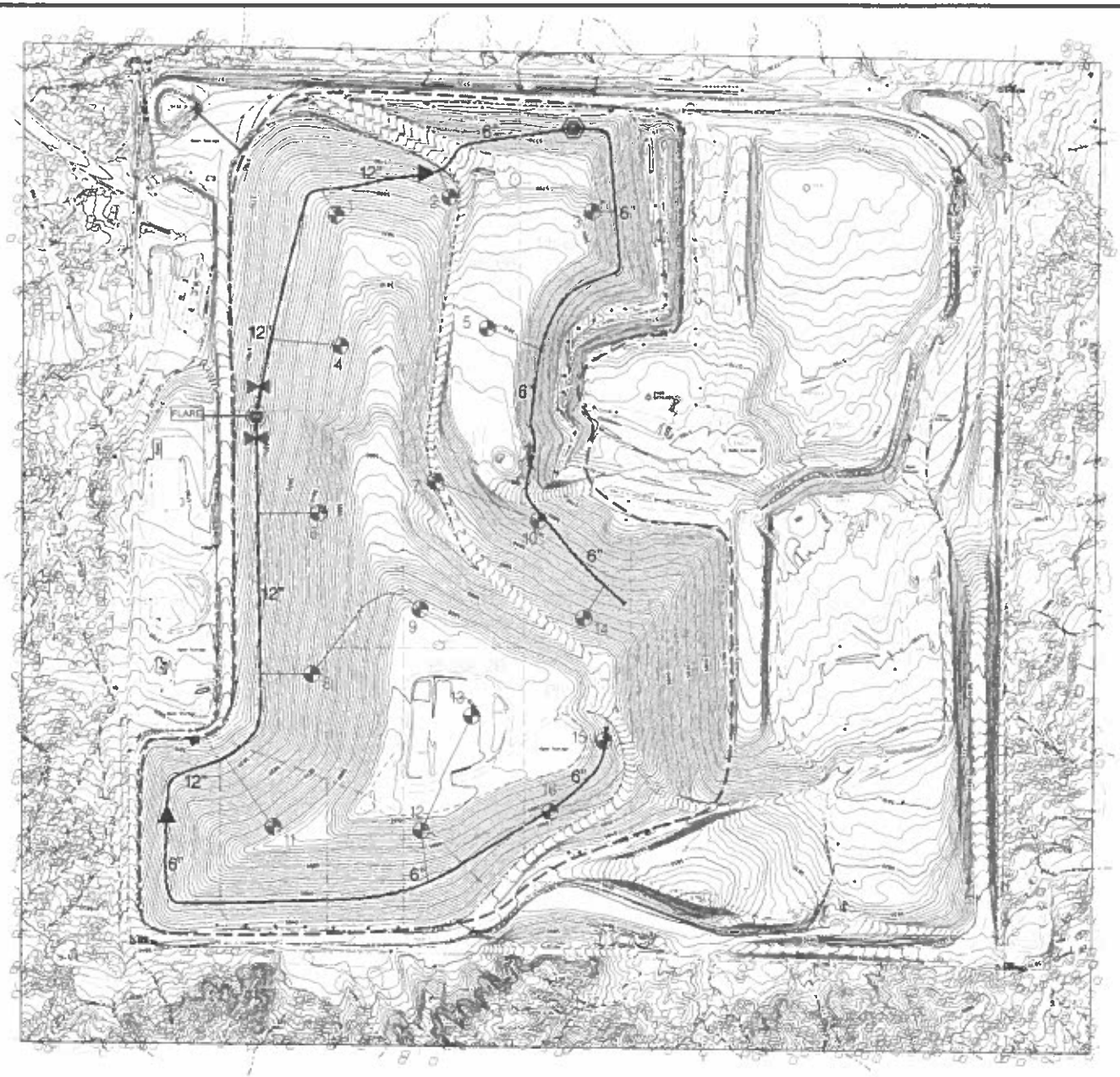
Plot Plan Drawn To Scale

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.

The facility is shown in the attached drawing. Note that the landfill and PCS operations vary on-site depending upon the fill sequencing and operating needs thus these operationsv can occur anywhere within the permitted footprint. A copy of the preliminary stage of the GCCS is also included.


LEGEND
PHASE 5A
EMISSION UNITS
PHASE 6A
(5.0 ACRES±)
(ACTIVE ±)
PHASE 7B
(9.1 ACRES±)
(ACTIVE)
PHASE 6B
(5.0 ACRES±)
(ACTIVE)
PHASE 5A
(8.9 ACRES±)
(ACTIVE)
PHASE 4
(42.3 ACRES±)
(FUTURE)
PHASE 5B
(10 ACRES±)
(FUTURE)
PHASE 1B
(5.7 ACRES±)
(ACTIVE)
PHASE 1A
(4.6 ACRES±)
(ACTIVE)
PHASE 7A
(4.5 ACRES±)
(ACTIVE)
PHASE 3
(6.9 ACRES±)
(ACTIVE)
CELL 5
(3.5 ACRES±)
(ACTIVE)
EXISTING PETROLEUM CONTAMINATED SOILS TREATMENT AREA
PHASE 2A
(6.0 ACRES±)
(ACTIVE)
PHASE 2B
(4.8 ACRES±)
(ACTIVE)
CELL 1
(2.7 ACRES±)
(INACTIVE)
CELL 2
(4.2 ACRES±)
(INACTIVE)
CELL 3
(2.6 ACRES±)
(INACTIVE)
CELL 4
(1.1 ACRES±)
(INACTIVE)
NORTH
PLOT PLAN
SAN JUAN COUNTY REGIONAL LANDFILL
AZTEC, NEW MEXICO
GORDON PSC

SAN JUAN COUNTY LANDFILL



- Gas Extraction Well
- Condensate Trap
- Isolation Valve
- Lateral Pipe
- Header Pipe
- Reducer
- Main Access Road
- Unpaved Road
- Contour Interval
- Area Subject to NSPS in 2023 (waste older than 5 years)
- Cell Boundary

N

REV	DATE	DESCRIPTION	DES BY	APP BY
PROJECT NO.		AZTEC, NEW MEXICO		
DATE	05/03/21			
DES BY	EJD	GCCS LAYOUT		
DRN BY	EJD	YEARS 2023 - 2025		
CHK BY				
APP BY				

WM WASTE MANAGEMENT

SHEET 1 OF
DRAWING NO 1

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.

EMISSION CALCULATIONS

This Section describes the methods used to estimate potential fugitive emissions of particulate matter (TSP, PM_{10}, and $PM_{2.5}$); non-methane organic compounds (NMOCs); hazardous air pollutants (HAPs); and volatile organic compounds (VOCs) from each of the following area and point sources (i.e., Emission Units:

- Emission Unit 1 – Landfill Roads
- Emission Unit 2 – General Landfill Operations
- Emission Unit 3 – Landfill Gas
- Emission Unit 4 – Petroleum Contaminated Soils Landfarm
- Emission Unit 5 – Non-enclosed Landfill Gas Flare

Details of the calculations are provided in Attachment 6.1, included at the end of this section.

Emission Unit 1 – Landfill Roads

Emissions from Unit 1 consist of fugitive particulate matter emissions from vehicle traffic over various roads around SJCL. The roads include unpaved, cold millings or base course, and paved roads. The drawing shown in Section 5 also depicts the typical road pathways and types of road surfaces found at SJCRL. As shown in the calculations, fugitive particulate matter emission rates were determined for the following activities:

- Refuse delivery vehicles traveling round trip over paved, unpaved, and base course surface roads to deliver waste to and from the landfill;
- Miscellaneous vehicles traveling around the facility for disposal operations and other daily activities;
- Residential haulers traveling to the material recovery facility to drop off recyclables; and
- Vehicles traveling to the Public Convenience Center located at SJCRL.

Emissions were calculated using methodologies found in USEPA's AP 42 Sections 13.2.1 Paved Roads and 13.2.2 Unpaved Roads, (November 2006).

Emission Unit 2 – General Landfill Operations

Emissions from Unit 2 consist of fugitive particulate matter emissions generated from waste disposal operations as well as movement of materials around SJCRL. Specifically, emission rates were calculated from the use of the following equipment:

- Compactor and Bull Dozer;
- Scraper;
- Grader; and
- Wind.

Emission rates were calculated methodology identified in AP-42, Section 13.2.2 and 13.2.4, (November 2006).

Unit 3 – Landfill Gas Generation Emissions

Solid waste is subject to aerobic and anaerobic decomposition that results in the generation of LFG. The rate of LFG generation is a function of the composition, moisture content, age, temperature, pH, alkalinity of the refuse, nutrient supply, etc. Methane (CH_4) and CO_2 are the products of decomposition and are the primary constituents of LFG, generated in approximately equal proportions. In addition, LFG also contains a very small proportion (<0.1%) of NMOCs, of which VOCs and HAPs are subsets, which are present in the waste mass and combines with the landfill gas as it moves through the waste mass.

The LFG generation rates for the landfill were estimated using the EPA LandGEM V3.02. The model is based on waste acceptance rates, site specific and EPA gas generation parameters. The waste acceptance rate for the permit period were estimated using the 2022 acceptance total and a growth rate of 3% year over year. The gas generation parameters established by the EPA for arid environments are methane generation potential (Lo) of 100 cubic meters per megagram of solid waste and a methane generation constant (k) of 0.02 year-1 for air areas. The NMOC concentration used was 738.33, as determined in the 2021 Tier 2 Sampling. The EPA LandGEM model has been shown to overestimate LFG generation in arid regions. Therefore, usage of these models is considered to be conservative. The LandGEM results for the end of the next permit period model a landfill gas flow of 764 scfm in 2029. Given the EPA average collection efficiency, it is assumed that 75%, 573 scfm, is directed to the flare for combustion, and the uncollectable portion, 191 scfm, is assumed to emit through the landfill surface.

Detailed emission calculations for fugitive LFG were estimated using emission factors from Table 2.4-1 of United States Environmental Protection Agency's (USEPA's) AP-42 Compilation of Emission Factor for MSW Landfills, November 1998, February 2021 Tier 2 testing results, as well as Waste Industry Air Coalition of Recent Landfill Gas Analysis (WIAC) with Historic AP-42 Values, January 2001. GHG emissions were calculated using emission factors from 40 CFR 98 Mandatory GHG Reporting Rule. See calculations for emission results and further details on emission factors and resulting calculations.

Emission Unit 4 – Petroleum Contaminated Soils, Landfarm

Emissions from Unit 4 consist of HAPs and VOCs emitted fugitively through the remediation process. Once treated, these soils are used as daily cover in the waste disposal operation. The acceptance of PCS has yielded minimal emissions – a total of 1.06 tons over the past 10 years. In recognition of the potential for a large clean up, given the oil production operations in the area, SJCRLF included additional disposal quantities of PCS.

Emission calculations for Emission Unit 4 are the same as previously submitted. Attachment Section 6.1 of this application provides specific details of these calculations.

Unit 5 – Non-enclosed Flare Emissions

Potential emissions from the non-enclosed flare include pollutants that are not completely destroyed in the combustion process (NMOCs, VOCs, and HAPs) and the additional products of combustion (PM2.5/PM10, CO and NOx.) The flare, by design, has a guaranteed 98% destruction efficiency. This is the efficiency used for VOC destruction. The HAPS each have their own control efficiencies, listed in AP42 Table 2.4-3. The effective HAP destruction efficiency was calculated to be 99.2% The calculation methodologies and emission factors are from Chapters 2.4 and 13.5 of the USEPA's Compilation of Air Pollutant Emission Factors.

GHG emissions were calculated using emission factors from 40 CFR 98 Mandatory GHG Reporting Rule. See calculations for emission results and further details on emission factors and resulting calculations.

SSM EMISSIONS

Table 2-F, Section 2, identifies additional allowances for potential emissions during startup, shutdown, and routine maintenance (SSM). Additional emissions allowances for SSM emissions are not being requested for this facility, as none of the processes which take place at SJCRLF produces an excess

amount of emissions during SSM. Units 1 through 4 are continuous and do not have associated SSM events.

Only Unit 5 has the potential for emissions above those seen during normal operation. These would occur when the collected landfill gas is vented without proper combustion. Subpart XXX requires the non-enclosed flare to be in continuous operation when landfill gas is routed to it. To confirm operation, a flow meter was installed to continuously detect flow to the flare and send this information to a recorder which will record a measurement at least every 15 minutes. The GCCS is equipped with an automatic valve that will close in the event of power loss or malfunction with the flare and/or gas mover system. Subpart XXX requires this valve or valves to shut within an hour of the GCCS not operating. Once this valve(s) is shutdown, emissions through the flare cease.

REFERENCES

AP-42: Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Fifth Edition, Office of Air Quality Planning and Standards/Office of Air and Radiation, US Environmental Protection Agency, Research Triangle Park, NC 27711, October 2008 (Draft), November 2006; September, October, and November 1998; January 1995; and September 1991.

Caterpillar® Performance Handbook, Edition 42, Caterpillar®, Inc., Peoria, Illinois, 2012.

SUMMARY OF ALL EMISSIONS

Emission Source	Regulated Air Pollutant	Estimated Actual Emissions	
		pounds/hour	tons/year
Paved Roadways	$PM_{2.5}$	0.01	0.02
Unit 1 -Landfill Roads	PM_{10}	0.04	0.06
	TSP	0.20	0.32
Unpaved Roadways	$PM_{2.5}$	1.04	1.64
Unit 1 - Landfill Roads	PM_{10}	10.42	16.44
	TSP	38.61	60.89
Landfill Equipment	$PM_{2.5}$	0.65	1.03
Unit 2 - General Landfill Operations	PM_{10}	2.17	3.42
	TSP	8.03	12.66
Cover Operations	$PM_{2.5}$	3.05E-04	4.81E-04
Unit 2 - General Landfill Operations	PM_{10}	2.02E-03	3.18E-03
	TSP	4.26E-03	6.72E-03
Landfill Gas Surface Emissions	VOC	0.73	3.18
Unit 3 - Landfill Gas (Non-Fugitive)	NMOC	1.86	8.16
	HAPs	0.30	1.30
	SOx	1.41	6.16
Petroleum Contaminated Soils	HAPs/VOCs	3.58	15.67
Unit 4 - PCS Landfarm			
Non-Enclosed Landfill Gas Flare	VOC	0.04	0.19
Unit 5 - 700 scfm Flare	NMOC	0.11	0.49
	HAPs	0.14	0.62
	CO	5.33	23.34
	NOx	1.17	5.12
	$PM_{2.5}$ /PM_{10}	0.27	1.18
Total From All Emission Points	$PM_{2.5}$	1.97	3.86
	PM_{10}	12.90	21.10
	TSP	47.12	75.06
	VOC	4.35	19.04
	NMOC	1.97	8.64
	HAPs	0.44	17.59

NOTE: An insignificant quantity of double counting of VOCs occurs because many reported HAPs are also considered VOCs.

DISPOSAL HISTORY (DEGRADEABLE WASTE)

Year	Disposal Rate (tons/yr)	Refuse In-Place (tons)	Disposal Rate (Mg/yr)	Refuse In-Place (Mg)
1988	69,465	0	63,150	0
1989	69,465	69,465	63,150	63,150
1990	69,465	138,930	63,150	126,300
1991	69,465	208,395	63,150	189,450
1992	69,465	277,860	63,150	252,600
1993	69,465	347,325	63,150	315,750
1994	69,465	416,790	63,150	378,900
1995	69,465	486,255	63,150	442,050
1996	69,465	555,720	63,150	505,200
1997	69,465	625,185	63,150	568,350
1998	128,120	694,650	116,473	631,500
1999	79,959	822,770	72,690	747,973
2000	106,344	902,729	96,676	820,663
2001	87,051	1,009,073	79,137	917,339
2002	94,083	1,096,124	85,530	996,476
2003	102,534	1,190,207	93,213	1,082,006
2004	108,715	1,292,741	98,832	1,175,219
2005	153,447	1,401,456	139,497	1,274,051
2006	161,119	1,554,903	146,472	1,413,548
2007	213,682	1,716,022	194,256	1,560,020
2008	199,998	1,929,704	181,816	1,754,276
2009	173,491	2,129,701	157,719	1,936,092
2010	160,416	2,303,192	145,832	2,093,811
2011	137,262	2,463,608	124,784	2,239,643
2012	106,839	2,600,870	97,126	2,364,427
2013	114,673	2,707,708	104,248	2,461,553
2014	122,771	2,822,381	111,610	2,565,801
2015	120,165	2,945,152	109,241	2,677,411
2016	115,198	3,065,317	104,725	2,786,652
2017	85,429	3,180,515	77,663	2,891,377
2018	97,756	3,265,944	88,870	2,969,040
2019	96,258	3,363,701	87,507	3,057,910
2020	101,026	3,459,958	91,842	3,145,417
2021	86,996	3,560,984	79,087	3,237,258
2022	106,265	3,647,980	96,605	3,316,346
*2023**	*109,453*	*3,754,245*	*99,503*	3,412,950
*2024**	*112,737*	*3,863,698*	*102,488*	3,512,453
*2025**	*116,119*	*3,976,435*	*105,563*	3,614,941
*2026**	*119,603*	*4,092,554*	*108,730*	3,720,504
*2027**	*123,191*	*4,212,157*	*111,992*	3,829,234
*2028**	*126,887*	*4,335,348*	*115,352*	3,941,226
*2029**	*130,694*	*4,462,235*	*118,813*	4,056,578

* Projected Disposal Rate at a 3% increase

FUGITIVE EMISSIONS FROM PAVED ROADWAYS

Process ID: Unit 1, Landfill Roads

Estimate of Total Vehicle Miles Traveled

Type of Vehicle	Vehicle Count		Length of road (round trip)		Total VMT	
	#/day	#/yr	Feet	Miles	(per day)	(per year)
Lightweight Self-haul trucks	127	39,810	4,224	0.80	101.7	31,848
Flatbed & 6-wheel Self-haul Trucks	7	2,297	4,224	0.80	5.9	1,837
Front/Side Loader & Packer Trucks	42	13,015	4,224	0.80	33.3	10,412
Dump Trucks	12	3,828	4,224	0.80	9.8	3,062
Roll Off Trucks	54	16,843	4,224	0.80	43.0	13,474
Transfer and Tractor Trailers	2	766	4,224	0.80	2.0	612
Totals	245	76,557	4,224	0.80	195.7	61,246

Operations Data

Description	Value	Description	Value
Days/Week	6	%Winter	25%
Weeks/Year	52	%Spring	25%
Days/Year	313	%Summer	25%
Hours/Year	3,154	%Fall	25%

Assumptions:

Vehicle usage data provided by Waste Management.

Road surfaces are treated every hour for a control efficiency of 90% TSP, PM_{10}

70% $PM_{2.5}$

Mean vehicle weights were derived by averaging the full and empty vehicle weights.

Mean Vehicle Weight (W)

Type of Vehicle	W (tons)
Lightweight Self-haul trucks	1.65
Flatbed & 6-wheel Self-haul Trucks	2.45
Front/Side Loader & Packer Trucks	23.35
Dump Trucks	24.5
Roll Off Trucks	27.85
Transfer and Tractor Trailers	39.35

FUGITIVE EMISSIONS FROM PAVED ROADWAYS

Emissions Calculation Methodology (AP-42, Section 13.2.1 for Paved Roads):

Calculation of emission factor for fugitive emissions for refuse vehicles on paved haul roads - Use Equation (2) in AP-42 Section 13.2.1, p. 13.2.1-6.

$$E = [k(sL/1)^{0.91}*(W/1)^{1.02}](1-P/4N)$$

Where:

E	=	Emission factor in pounds per vehicle mile traveled (lb/VMT)
k	=	Particle size multiplier (dimensionless)
sL	=	Road surface silt loading factor (grams per m^2)
W	=	Vehicle weight in tons
P	=	Number of days with >0.01 in. rainfall
N	=	Number of days in averaging period for P estimate

Variables:

			0.00054	lb/VMT, $PM_{2.5}$ (AP-42 Table 13.2-1.1)	
k	=	k factor =	0.0022	lb/VMT, PM_{10} (AP-42 Table 13.2-1.1)	
			0.011	lb/VMT, PM_{10} (AP-42 Table 13.2-1.1)	
sL	=	Silt loading factor =	7.4	g/m^2 (AP-42 Table 13.2.1-4)	
W	=	Mean vehicle weight =	12.65	tons (fleet average)	
P	=	Number of days with >0.01" rain =	80	days/year	(from AP-42, Figure 13.2.1-2)
N	=	Number of days in period =	365	days	

E =	0.01	lb/VMT	($PM_{2.5}$)
	0.04	lb/VMT	(PM_{10})
	0.21	lb/VMT	(TSP)

Example Calculations - PM_{10}:

Assume:

Operating hours per day	=	10.08	hours
Length of roadway (roundtrip)	=	0.80	miles
Number of vehicles	=	244.6	

Obtain vehicle miles traveled (VMT) per day as follows:

VMT/day	=	Number of vehicles * length of roadway (round trip in miles)
	=	195.7

Assume: 90% reduction in emissions through dust suppression operations with the water truck

Obtain emissions in pounds per day as follows:

lbs/day	=	E * VMT / day * (1 - reduction rate for dust control measures)
	=	0.82

Obtain emissions in pounds per hour as follows:

lbs/hour	=	lbs per day / operating hours per day
	=	0.08

Assume:

Operating days per year = 313

Obtain emissions in tons per year as follows:

tons/year	=	(lbs per day * operating days per year) / pounds per ton
	=	0.13

Total Particulate Matter Emissions Due to Vehicle Traffic on Paved Roads

	Total VMT			Emission Factor	Control Efficiency	Actual Emissions	
Pollutant	VMT/hr	VMT/day	VMT/yr	(lb/VMT)	(%)	lb/hr	tons/yr
$PM_{2.5}$	19.4	195.7	61,245.6	0.01	95%	0.01	0.02
PM_{10}	19.4	195.7	61,245.6	0.04	95%	0.04	0.06
TSP	19.4	195.7	61,245.6	0.21	95%	0.20	0.32

FUGITIVE EMISSIONS FROM UNPAVED ROADWAYS

Process ID: Unit 1. Landfill Roads

Estimate of Total Vehicle Miles Traveled

Type of Vehicle	Vehicle Count		Length of road (round trip)		Total VMT	
	#/day	#/yr	Feet	Miles	(per day)	(per year)
Lightweight Self-haul trucks	127	39,810	6,336	1.20	152.6	47,772
Flatbed & 6-wheel Self-haul Trucks	7	2,297	6,336	1.20	8.8	2,756
Front/Side Loader & Packer Trucks	42	13,015	6,336	1.20	49.9	15,618
Dump Trucks	12	3,828	6,336	1.20	14.7	4,593
Roll Off Trucks (includes one for ops)	55	16,843	6,336	1.20	65.8	20,587
Transfer and Tractor Trailers	2	766	6,336	1.20	2.9	919
Totals	245	76,557	6,336	1.20	294.7	92,244

Operations Data

Description	Value	Description	Value
Days/Week	6	%Winter	25%
Weeks/Year	52	%Spring	25%
Days/Year	313	%Summer	25%
Hours/Year	3,154	%Fall	25%

Assumptions:

Vehicle usage data provided by Waste Management.

Water trucks and cold milling treat road surfaces for a control efficiency of 90% PM_{10}

70% $PM_{2.5}$

Mean vehicle weights were derived by averaging the full and empty vehicle weights.

Mean Vehicle Weight (W)

Type of Vehicle	W (tons)
Lightweight Self-haul trucks	1.65
Flatbed & 6-wheel Self-haul Trucks	2.45
Front/Side Loader & Packer Trucks	23.35
Dump Trucks	24.5
Roll Off Trucks (includes one for ops)	27.85
Transfer and Tractor Trailers	39.35

0

Emissions Calculation Methodology (AP-42, Section 13.2.2 for Unpaved Roads):

$$E_{ext} = [k * (s/12)^a * (W/3)^b] * [(365 - p)/365]$$

Where:

E_{ext} = Annual size-specific emission factor extrapolated for natural mitigation (lb/VMT)

k = Empirical constant (lb/VMT)

a, b = Empirical constant (unitless)

s = Surface material silt content (%)

W = Vehicle weight (tons)

p = Number of days per year with >0.01 inch of rainfall (AP-42, Figure 13.2.2-1 or climate website)

M_{dry} = Surface material moisture content under dry, uncontrolled conditions (%)

FUGITIVE EMISSIONS FROM UNPAVED ROADWAYS

Variables:

k factor for $PM_{2.5}$ =	0.15	lb/VMT	(from AP-42, Table 13.2.2-2.)
k factor for PM_{10} =	1.5	lb/VMT	(from AP-42, Table 13.2.2-2.)
k factor for TSP =	4.9	lb/VMT	(from AP-42, Table 13.2.2-2.)
Fleet Average Vehicle Weight (W)	12.71	tons	
Mean Silt content (s)	6.4	%	(from AP-42, Table 13.2.4-1 - MSW landfills cover soils)
# of days w/ >0.01 in. rainfall (p)	46	days/year	(from AP-42, Figure 13.2.1-2)
a (constant) =	0.9		(from AP-42, Table 13.2.2-2.)
	0.7		(from AP-42, Table 13.2.2-2.) (TSP)
b (constant) =	0.45		(from AP-42, Table 13.2.2-2.)
	0.14	lb/VMT	($PM_{2.5}$)
E_{ext} =	1.43	lb/VMT	(PM_{10})
	5.28	lb/VMT	(TSP)

Example Calculations - PM_{10}:

Assume:

Operating hours per day	=	10.08	hours
Length of roadway (roundtrip)	=	1.20	miles
Number of vehicles	=	244.6	

Obtain vehicle miles traveled (VMT) per day as follows:

VMT/day = Number of vehicles * length of roadway (round trip in miles)

= 293.5

Assume: 90% reduction in emissions through dust suppression operations with the water truck

Obtain emissions in pounds per day as follows:

lbs/day = E * VMT / day * (1 - reduction rate for dust control measures)

= 41.85

Obtain emissions in pounds per hour as follows:

lbs/hour = lbs per day / operating hours per day

= 4.15

Assume:

Operating days per year = 313

Obtain emissions in tons per year as follows:

tons/year = (lbs per day * operating days per year) / pounds per ton

= 6.55

Total Particulate Matter Emissions Due to Vehicle Traffic on Unpaved Roads

	Total VMT			Emission Factor	Control Efficiency	Actual Emissions	
Pollutant	VMT/hr	VMT/day	VMT/yr	(lb/VMT)	(%)	lb/hr	tons/yr
$PM_{2.5}$	29.2	294.7	92,244.0	0.14	75%	1.04	1.64
PM_{10}	29.2	294.7	92,244.0	1.43	75%	10.42	16.44
TSP	29.2	294.7	92,244.0	5.28	75%	38.61	60.89

EMISSIONS FROM LANDFILL EQUIPMENT OPERATIONS

Process ID: Unit 2, General Landfill Operations

Estimate of Total Vehicle Miles Traveled

Type of Landfill Equipment	# of Vehicles	Avg. Vehicle Speed (mph)	Avg. hrs/day per vehicle	Total VMT	
				miles/day	miles/year
Compactors					
826 H Compactor (Back up)	1	2	6.4	12.8	4,006
826 H Compactor (Primary)	1	2	7.4	14.8	4,632
826 G Compactor	1	2	2.8	5.6	1,753
Dozers			0		
D6R Dozer	1	2	4.9	9.8	3,067
Scrapers			0		
627F Scraper	1	10	1.2	12.0	3,756
Motor Graders			0		
140H Grader	1	2	1.2	2.4	751
Backhoes			0		
Backhoe	1	2	2.5	5.0	1,565
Roll off			0		
Roll off Truck	1	5	1.3	6.5	2,035
Water Trucks			0		
Water Truck	1	2	3.7	--	--
Other Trucks			0		
HM300- ADT	1	2	0.9	2	563
PC360LC- Excavator	1	2	0.9	2	563
Rental ADT (Volvo A30D)	1	2	1.5	3	939
Rental Loader (VolvoL120H)	1	2	1.5	3	939
Maintenance Truck	1	10	1.2	12	3,756
Other On-site Vehicles			0		
Pickup Truck	2	10	2.5	50	15,650
Total - All Vehicles			42.4	140.5	43,977

Operations Data

Description	Value	Description	Value
Days/Week	6	%Winter	25%
Weeks/Year	52	%Spring	25%
Days/Year	313	%Summer	25%
Hours/Year	3,154	%Fall	25%

Assumptions:

Vehicle usage data provided by Waste Management

Average vehicle weights are based on Caterpillar data (from Caterpillar Performance Handbook Edition 31, Oct. 2000).

Water trucks are used as dust suppressants with control efficiency of 90% PM_{10}

70% $PM_{2.5}$

Water trucks utilized on site for dust control are assumed to emit no particulate matter.

EMISSIONS FROM LANDFILL EQUIPMENT OPERATIONS

Vehicle Data

Type of Construction Vehicle	Operating Weight (lbs)	Operating Weight (tons)	Soil Density (lb/cf)	Soil Loading Capacity (cy)	Soil Loading Capacity (tons)	Average Vehicle Weight (tons)
Compactors						
826 H Compactor (Back up)	73,370	36.69	-	-	-	36.69
826 H Compactor (Primary)	73,370	36.69	-	-	-	36.69
826 G Compactor	81,498	40.75	-	-	-	40.75
Dozers						
D6R Dozer	43,380	21.69	-	-	-	21.69
Scrapers						
627F Scraper	77,530	38.77	120.00	20.00	32.40	54.97
Motor Graders						
140H Grader	31,090	15.55	120.00	-	-	15.55
Backhoes						
Backhoe	15,550	7.78	120.00	-	-	7.78
Roll off						
Roll off Truck	15,000	7.50	120.00	10.00	16.20	15.60
Water Trucks						
Water Truck	50,000	25.00	120.00	12.89	20.88	35.44
Other Trucks						
HM300- ADT	45,000	22.50	-	-	-	22.50
PC360LC- Excavator	80,547	22.50	-	-	-	22.50
Rental ADT (Volvo A30D)	46,120	23.06	-	-	-	23.06
Rental Loader (VolvoL120H)	44,820	22.41	-	-	-	22.41
Maintenance Truck	22,400	11.20	120.00	0.62	1.00	11.70
Other On-site Vehicles						
Pickup Truck	5,300	2.65	-	-	-	2.65

Methodologies:

AP-42, Section 13.2.2 for Unpaved Roads.

Emissions Calculation Methodology:

Calculation of emission factor for fugitive emissions for construction vehicles on landfill surface and unpaved haul roads -

Use Equation 1a in AP-42 Section 13.2.2, p. 13.2.2-4, with an adjustment for rainfall per AP-42 Equation 2 (p. 13.2.2-7).

$$E_{ext} = [k * (s/12)^a * (W/3)^b] * [(365 - p)/365]$$

Where:

E_{ext} = Annual size-specific emission factor extrapolated for natural mitigation (lb/VMT)

k = Empirical constant [lb/VMT]

a, b = Empirical constant [unitless]

s = Surface material silt content [%]

W = Vehicle weight [tons]

p = Number of days per year with >0.01 inch of rainfall (AP-42, Figure 13.2.2-1 or climate website)

M_{dry} = Surface material moisture content under dry, uncontrolled conditions [%]

EMISSIONS FROM LANDFILL EQUIPMENT OPERATIONS

Variables:

k factor for $PM_{2.5}$ =	0.15	lb/VMT	(from AP-42, Table 13.2.2-2.)
k factor for PM_{10} =	1.5	lb/VMT	(from AP-42, Table 13.2.2-2.)
k factor for TSP =	4.9	lb/VMT	(from AP-42, Table 13.2.2-2.)
Fleet Average Vehicle Weight (W) =	19.8	tons	
Mean Silt content (s) =	6.4	%	(from AP-42, Table 13.2.4-1 - MSW landfills cover soils)
# of days w/ >0.01 in. rainfall (p) =	80	days/year	(from AP-42, Figure 13.2.1-2)
a (constant) =	0.9		(from AP-42, Table 13.2.2-2.)
	0.7		(from AP-42, Table 13.2.2-2.) (TSP)
b (constant) =	0.45		(from AP-42, Table 13.2.2-2.)

E_{ext} =	0.16	lb/VMT	($PM_{2.5}$)
	1.55	lb/VMT	(PM_{10})
	5.76	lb/VMT	(TSP)

Example Calculations - PM_{10}:

Obtain vehicle miles traveled (VMT) per day as follows:

VMT/day = (Operating hours per day * speed of vehicle * number of vehicles)

= 140.5 (calculated in table above)

Assume: 90% reduction in emissions through dust suppression operations with the water truck

Obtain emissions in pounds per day as follows:

lbs/day = E_{ext} * VMT/day * (1 - reduction rate for dust control measures)

= 21.84

Obtain emissions in pounds per hour as follows:

lbs/hour = lbs per day / operating hours per day

= 1.82

Assume: Operating days per year = 313

Obtain emissions in tons per year as follows:

tons/year = (lbs per day * operating days per year) / pounds per ton

= 3.42

Total Particulate Matter Emissions Due to Landfilling Equipment Operations

	Total VMT			Emission Factor	Control	Actual Emissions	
Pollutant	VMT/hr	VMT/day	VMT/yr	(lb/VMT)	Efficiency (%)	lb/hr	tons/yr
$PM_{2.5}$	13.9	140.5	43,977	0.16	70%	0.65	1.03
PM_{10}	13.9	140.5	43,977	1.55	90%	2.17	3.42
TSP	13.9	140.5	43,977	5.76	90%	8.03	12.66

FUGITIVE EMISSIONS FROM COVER OPERATIONS

Process ID: Unit 2, General Landfill Operations

Estimate total Amount of Cover Used

Total cover used [cy/day] = (disposal rate [tons]*(2000 lb/ton)/(refuse density) [lb/cy]*(% soil volume)

Description	Quantity	Units	Description	Value
Disposal Rate	130,694	tons/yr		
	418	tons/day	Days/Week	6
Refuse Density	1,500	lb/cy	Weeks/Year	52
% Soil Volume	25%		Hours/Year	313
Soil Cover Density	2,600	lb/cy	%Winter	25%
Daily Cover	181	tons/day	%Spring	25%
Active Days	313	days/yr	%Summer	25%
Total Cover Used	56,634	tons/yr	%Fall	25%

Calculate Emission Factor

$E = k\,(0.0032)\,(U/5)^{1.3} / (M/2)^{1.4}$ (From AP-42, Section 13.2.4.3, Equation 1)

Where:

k = particle size multiplier	0.053	$PM_{2.5}$	
	0.35	PM_{10}	
	0.74	TSP	
U = mean wind speed (mph)	10	mph	
M = material moisture content (%)	12.00	%	
E = emissions factor (lbs/ton)	3.40E-05	lbs/ton ($PM_{2.5}$)	0%
	2.24E-04	lbs/ton (PM_{10})	
	4.75E-04	lbs/ton (TSP)	

Total Emissions From Cover Operations

Pollutant	Total Cover Used (tons)	Emission Factor (lb/ton)	Control Efficiency (%)	Actual Emissions (tons/yr)
$PM_{2.5}$	56,634	3.40E-05	50%	4.81E-04
PM_{10}	56,634	2.24E-04	50%	3.18E-03
TSP	56,634	4.75E-04	50%	6.72E-03

EMISSIONS FROM LANDFILL GAS AND FLARE

Process ID: Unit 3, Landfill Gas Emissions and Unit 5, Flare Emissions

Pollutant	Molecular Weight (g/Mol)	Average Concentration Found in LFG (ppmv) (2)	Pollutant Generation (tons/yr) (3)	Collected Pollutant (tons/yr) (4)	Control Efficiency (5)	Unit 5 LFG Emissions from Flare (tons/yr) (6)	Unit 3 Fugitive Emissions from Landfill (tons/yr) (7)	Total LFG Emissions from Flare and Landfill (tons/yr)
Hazardous Air Pollutants (HAPs) (1)								
1,1,1-Trichloroethane (methyl chloroform)	133.41	0.168	1.15E-02	8.62E-03	98.0%	1.72E-04	2.87E-03	3.05E-03
1,1,2,2-Tetrachloroethane	167.85	0.070	6.02E-03	4.52E-03	98.0%	9.04E-05	1.51E-03	1.60E-03
1,1-Dichloroethane (ethylidene dichloride)	98.97	0.741	3.76E-02	2.82E-02	98.0%	5.64E-04	9.40E-03	9.96E-03
1,1-Dichloroethene (vinylidene chloride)	96.94	0.092	4.57E-03	3.43E-03	98.0%	6.86E-05	1.14E-03	1.21E-03
1,2-Dichloroethane (ethylene dichloride)	98.96	0.120	6.09E-03	4.57E-03	98.0%	9.13E-05	1.52E-03	1.61E-03
1,2-Dichloropropane (propylene dichloride)	112.99	0.023	1.33E-03	9.99E-04	98.0%	2.00E-05	3.33E-04	3.53E-04
Acrylonitrile	53.06	0.036	9.79E-04	7.34E-04	99.7%	2.20E-06	2.45E-04	2.47E-04
Benzene	78.11	10.376	4.16E-01	3.12E-01	99.7%	9.35E-04	1.04E-01	1.05E-01
Carbon disulfide	76.13	0.320	1.25E-02	9.37E-03	99.7%	2.81E-05	3.12E-03	3.15E-03
Carbon tetrachloride	153.84	0.007	5.52E-04	4.14E-04	99.7%	1.24E-06	1.38E-04	1.39E-04
Carbonyl sulfide	60.07	0.183	5.64E-03	4.23E-03	99.7%	1.27E-05	1.41E-03	1.42E-03
Chlorobenzene	112.56	0.227	1.31E-02	9.82E-03	98.0%	1.96E-04	3.27E-03	3.47E-03
Chloroethane (ethyl chloride)	64.52	0.448	1.48E-02	1.11E-02	98.0%	2.22E-04	3.70E-03	3.93E-03
Chloroform	119.39	0.021	1.29E-03	9.64E-04	98.0%	1.93E-05	3.21E-04	3.41E-04
Chloromethane (methyl chloride)	50.49	0.249	6.45E-03	4.83E-03	98.0%	9.67E-05	1.61E-03	1.71E-03
Dichlorobenzene (1,4-Dichlorobenzene)	147.00	1.607	1.21E-01	9.08E-02	98.0%	1.82E-03	3.03E-02	3.21E-02
Dichloromethane (Methylene Chloride)	84.94	3.395	1.48E-01	1.11E-01	98.0%	2.22E-03	3.70E-02	3.92E-02
Ethylbenzene	106.16	6.789	3.70E-01	2.77E-01	99.7%	8.31E-04	9.24E-02	9.32E-02
Ethylene dibromide (1,2-Dibromoethane)	187.88	0.046	4.43E-03	3.32E-03	98.0%	6.65E-05	1.11E-03	1.17E-03
Hexane	86.18	2.324	1.03E-01	7.70E-02	99.7%	2.31E-04	2.57E-02	2.59E-02
Hydrogen sulfide*	34.08	35.500	6.20E-01	0.465	98%	9.30E-03	0.155	1.64E-01
Mercury (total)*	200.61	2.92E-04	3.00E-05	2.25E-05	0.0%	2.25E-05	--	2.25E-05
Methyl ethyl ketone	72.11	10.557	3.90E-01	2.93E-01	98%	5.85E-03	0.098	1.03E-01
Methyl isobutyl ketone	100.16	0.750	3.85E-02	2.89E-02	99.7%	8.67E-05	9.63E-03	9.72E-03
Perchloroethylene (tetrachloroethylene)	165.83	1.193	1.01E-01	7.61E-02	98.0%	1.52E-03	2.54E-02	2.69E-02
Toluene	92.13	37.456	1.77E+00	1.33E+00	99.7%	3.98E-03	4.42E-01	4.46E-01
Trichloroethylene (trichloroethene)	131.40	0.681	4.59E-02	3.44E-02	98.0%	6.88E-04	1.15E-02	1.22E-02
Vinyl chloride	62.50	1.077	3.45E-02	2.59E-02	98.0%	5.18E-04	8.63E-03	9.15E-03
Xylenes	106.16	16.582	9.03E-01	6.77E-01	99.7%	2.03E-03	2.26E-01	2.28E-01
Hydrochloric Acid (HCl)* (8)	36.45	42.000	-	-	0.0%	5.89E-01	--	5.89E-01
Total HAPs			5.19	3.89		0.62	1.30	1.92
Max Single HAPs			1.77	1.33		0.59	0.44	0.59
Criteria Air Pollutants								
VOCs (9)	86.18	288	12.72	9.54	98.0%	0.2	3.18	3.4
Sulfur Dioxide (SO_2) (8)	64.06	250	-	-	-	6.2	-	6.2
Carbon Monoxide (CO) (10)	-	-	-	-	-	23.3	-	23.3
Nitrogen Oxides (NO_x) (10)	-	-	-	-	-	5.1	-	5.1
Particulates ($PM_{10/2.5}$) (10)	-	-	-	-	-	1.2	-	1.2
Other Regulated Air Pollutants								
NMOCs as Hexane (11)	86.18	738	32.62	24.47	98.0%	0.5	8.2	8.6

NOTES:

(1) Listed Hazardous Air Pollutants (HAPs) are among compounds commonly found in landfill gas (LFG), as presented in AP-42, Tables 2.4-1 and 2.4-2

(2) Average concentrations of pollutants in LFG, other than sulfur compounds (for SO_x emissions estimates) and NMOCs, are based on Waste Industry Air Coalition Values, except hydrogen sulfide, mercury and HCl (marked with an asterisk), which uses values listed on AP-42, Tables 2.4-1 and 2.4-2.

(3) Based on average concentrations of compounds found in LFG, and assuming the new flare captures 75% of landfill g 764 scfm

(4) Portion of generated LFG that is being collected and flared.

(5) Minimum typical control efficiencies, as found in AP-42, Table 2.4-3, which lists control efficiency of 98% for halogenated species and 99.7 for non-halogenated species.

(6) (LFG to flare) * (1-control efficiency) = LFG emissions from flare.

(7) LFG that is not collected.

(8) Concentration of HCl is from AP-42, Section 2.4.4. SO_2 is maximum engineering estimate.

(9) According to AP-42, Table 2.4-2, Note C, VOC content at MSW sites with unknown concentrations equals 39% by weight of total NMOC concentration.

10 Emission factors AP42 chapter 13.5 as well as 2.4.

(11) NMOC concentration is based on Source Test conducted in December 2020.

(12) Emission factors in this column are back-calculated from actual emissions (including controlled and uncontrolled) for purposes of data entry into the i-Steps program. These back calculated

MODEL INPUT VARIABLES

Total Landfill Gas Generated	764	scfm	
	50.00%	assumed methane corours of Operation	8760 hrs
	201	MMscf as methane	
Total Landfill Gas Collected	151	MMscf (at 50% methane)	
	573	scfm methane (averaged at 50% methane)	
	150,584	MMBtu	
Fugitive LFG	191	scfm	
	50	MMscf	
Collectable LFG (4)	75%	based on site specific collection efficiency	

FLARE EMISSION FACTORS:

Pollutant	Emission factor (10)	
CO	0.310	lb/MMBtu
NO_x	0.068	lb/MMBtu
PM	0.0010	lb/hr/dscfm methane

EXAMPLE CALCULATIONS

(HAPs, VOCs, NMOCs)
Landfill Gas Generation Rate [scfm] = {(700/0.75)-70}; assumes 700 scfm, capacity of the flare, Unit 5, equals 75% of the amount landfill gas generated.
Pollutant Generation [tons/year] = (Molecular Weight of Compound[g/mol])*(Concentration of Compound[ppm]/1,000,000)*[LFG Generation Rate [cfm]]*(525,600
Pollutant To Flare [tons/year] = LFG generation rate [tons/year] x Collection efficiency [%] * Flare Operating Hours [hours/year] / 8,760 hours/year
LFG Emissions From Flare [tons/year] = [LFG To Flare [tons/yr]]*(1 - Control Efficiency).
Fugitive Emissions From Landfill = [LFG Generation [tons/year]] - [LFG To Flare [tons/year]]
Total LFG Emissions From Flare and Landfill [tons/year] = [Fugitive Emissions From Landfill] + [LFG Emissions from Flare].
(SO_2, HCl)
LFG Emissions from Flare = (Molecular Weight of Compound[g/mol])*(Concentration of Compound[ppm]/1,000,000)*[LFG to Flare [cfm]]*(525,600 min/yr)*(1ton/2,000lb)*(1lb/453.6g)*(1mol/24.45L @
(CO, NOx)
LFG Emissions from Flare = (Methane Flow Rate to Flare [cfm])*(Emission Factor)*(1000 Btu / cubic ft of methane).
(PM)
LFG Emissions from Flare = (Methane Flow Rate to Flare [cfm])*(Emission Factor).

EMISSIONS FROM PETROLEUM CONTAMINATED SOILS

Process ID: Unit 4, Petroleum Contaminated Soil Farm

Description	Soil Tons	Emissions				
		Total Benzene (tons)	Total Toluene (tons)	Total Ethyl benzene (tons)	Total Xylene (tons)	Total BTEX Emissions (tons)
2013-2022 Total	7,789.95	8.95E-04	1.68E-01	1.72E-01	7.18E-01	1.06
Potential Large Non-routine Deposit	107,431.33	0.01	2.32	2.37	9.90	14.61
					Total BTEX	15.67

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)

Based on the most recent available data (i.e., through year 2022) obtained from WMNM, the greenhouse gas (GHG) emissions for SJCRL are estimated to be approximately 46,899 tons/year (42,546 Mg/yr) CO_2e. **Section 2, Table 2-P** summarizes these estimated GHG emissions from the site. The greenhouse emissions calculations are based on the methodology in 40 CFR 98 and are included in Attachment 6.1.

SAN JUAN COUNTY REGIONAL LANDFILL
2023 TITLE V RENEWAL

GREEN HOUSE EMISSIONS for UNIT 3, the LANDFILL SURFACE

Uncollected Landfill Gas		191	scfm
Annual potential throughput (LFG) = (UnCollected LFG in scfm)*(525,600 min/yr)/(10^6 scf/MMscf)		100.3896	MMscf/yr
CH_4 content of LFG		0.5	
CO_2 content of LFG		0.5	
Annual potential throughput CH_4 = (LFG MMscf/yr)*(% CH_4 in LFG by volume)		50.1948	MMscf/yr
Annual potential throughput CO_2 = (LFG MMscf)*(% CO_2 in LFG by volume)		50.1948	MMscf/yr
Emission Factors			
	CO_2	52.07	kg/MMBTU
	CH_4	0.0032	kg/MMBTU
Global Warming Potential			
	CO_2	1	
	CH_4	25	

POTENTIAL BIOGENIC GHG EMISSIONS

Source Description		CO2 Metric Tons CO2e	CH4 Metric Tons	CH4 Metric Tons CO2e	Total Biogenic (metric tons CO_2e)		Total Biogenic (US tons CO_2e)
Landfill		2,643.88	963.59	24,089.85	26,734		29,468.59

Total CO_2e from Unit 5	26,733.73	Metric Tons
	29,468.59	US Tons
	6728.0	Lb/hr

Notes:

1. Fugitive emissions were excluded per Title V/PSD rules because MSW Landfills are not listed sources.
2. Global Warming Potentials taken from 40 CFR 98, Table A-1 "Global Warming Potentials"; GWP of CH_4 = 25 and GWP of N_20 = 298

Calculation Methodology, as determined by 40 CFR 98 Greenhouse Gas Mandatory Reporting Rule:

Annual CO_2 generation (mmscf) = Annual Potential LFG throughput (mmscf) * % CO_2

Annual CH_4 generation (mmscf) = Annual Potential LFG throughput (mmscf) * % CH_4

Heat Rate (MMBTU/hr) = Annual CH_4 throughput (MMscf/yr) * 1000 BTU/scf (heating value of CH_4)

Fugitive metric tons CO_2 = CO_2 generation (mmscf) * 1,000,000 scf/1mmscf / 379 SCF/lb-mol * 44.01 lb/lb-mol CO_2 / 2,000 lb/ton / 1.1023 metric ton/ton.

Fugitive metric tons CH_4 = CH_4 generation (mmscf) * 1,000,000 scf/1mmscf / 379 SCF/lb-mol * 16.04 lb/lb-mol CO_2 / 2,000 lb/ton / 1.1023 metric ton/ton.

Total US (short) tons (CO2e) = Metric tons * 1.1023

SAN JUAN COUNTY REGIONAL LANDFILL
2023 TITLE V RENEWAL

GREEN HOUSE EMISSIONS for UNIT 5, the LANDFILL GAS FLARE

Collected LFG to Flare		573	scfm as landfill gas
Annual potential throughput (LFG) = (Collected LFG in scfm)*(525,600 min/yr)/(10^6 scf/MMscf)		301	MMscf/yr
	CH_4 content of LFG	50.0%	
	CO_2 content of LFG	50.0%	
Annual potential throughput CH_4 = (LFG MMscf/yr)*(% CH_4 in LFG by volume)		151	MMscf/yr
Annual potential throughput CO_2 = (LFG MMscf)*(% CO_2 in LFG by volume)		151	MMscf/yr
Emission Factors			
	CO_2	52.07	kg/MMBTU
	CH_4	3.20E-03	kg/MMBTU
	N_2O	6.30E-04	kg/MMBTU
Global Warming Potential			
	CO_2	1	
	CH_4	25	
	N_2O	298	

POTENTIAL ANTHROPOGENIC GHG EMISSIONS (using 40 CFR 98, Table A-1)

Combustion Source	Heat Rate (MMBTU/Hr)	N_2O (metric tons)	CH_4 (metric tons)	N_2O (metric tons CO_2e)	CH_4 (metric tons CO_2e)	Total Anthropogenic (metric tons CO_2e)	Total Anthropogenic (US tons CO_2e)
Flare	17	0.09	0.48	28.3	12.0	40.3	44.4

POTENTIAL BIOGENIC GHG EMISSIONS

Passthrough CO_2 (metric tons)		Combustion Source	Heat Rate (MMBTU/Hr)	Combustion CO_2 (metric tons)	Total Biogenic (metric tons CO_2e)	Total Biogenic (US tons CO_2e)
7,932		Unit 5	17.19	7,841	15,773	17,386.1

Total CO_2e from Unit 5	15,812.9	Metric Tons
	17,430.5	US Tons
	3979.6	lb/hr

Notes:

1. Potential anthropogenic emissions of methane and nitrous oxide are calculated from landfill gas combustion by the flare.
2. Biogenic emissions from passthrough carbon dioxide and combusted methane are presented for informational purposed only.
3. Fugitive emissions were excluded per Title V/PSD rules because MSW Landfills are not listed sources.
4. Global Warming Potentials taken from 40 CFR 98, Table A-1 "Global Warming Potentials"; GWP of CH_4 = 25 and GWP of N_2O = 298
6. Emission Factors taken from Table C-1: Default CO_2 Emission Factors and HHV for Various Types of Fuel, and Table C-2: Default CH_4 and N_2O
7. Emission Factors for Various Types of Fuel, Subpart C of 40 CFR Part 98, Mandatory Reporting of Greenhouse Gases; Final Rule
   CO_2 = 52.07 kg /MMBTU
   CH_4 = 3.20E-03 kg/MMBTU
   N_2O = 6.30E-04 kg/MMBTU

Calculation Methodology, as determined by 40 CFR 98 Greenhouse Gas Mandatory Reporting Rule:

Annual Potential Throughput (MMscf/yr) = Peak Collected LFG to Flare (scfm) * 60 min/hr * 24 hr/day * 365 days/year X 0.000001

Annual CO_2 generation (mmscf) = Annual Potential LFG throughput (mmscf) * % CO_2

Annual CH_4 generation (mmscf) = Annual Potential LFG throughput (mmscf) * % CH_4

Heat Rate (MMBTU/hr) = Annual CH_4 throughput (MMscf/yr) * 1000 BTU/scf (heating value of CH_4)

Total metric tons CO_2 = LFG Combustion Product metric tons of CO_2 + Passthrough metric tons of CO_2, where:

Combustion product metric tons CO_2e = heat rate (MMBTU/hr) * 8760 hr/yr * emission factor CH_4 (3.20E-03 kg/MMBTU) * 0.001 metric tons/kg * GWP;

Combustion product metric tons CO_2e = heat rate (MMBTU/hr) * 8760 hr/year * emission factor N_2O (6.30E-04 kg/MMBTU) * 0.001 metric tons/kg * GWP;

Combustion product metric tons CO_2 = Heat Rate (MMBTU/hr) * 8760 hr/year * emission factor CO_2 (52.07) * 0.001;

Total US (short) tons (CO2e) = Metric tons * 1.1023

Passthrough CO2 is contained in the landfill gas. Tons/year = MMCF/yr / 379 CF/lb-mol * MW CO2 (lb/lb-mol) * ppmv / 2000 lb/ton

Section 7

Information Used To Determine Emissions

Information Used to Determine Emissions shall include the following:

- X 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.
- X 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.
- X 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.
- X 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.

Introduction

Multiple sources of equipment and activity-specific data, equations, and emissions factors were used in determining potential emissions produced by activities at SJCRLF. Information used to determine emissions is outlined in the following Sections. Details for the calculations are included in Attachment 6.1

7.1 Manufacturer Data

Manufacturer data were used in determining emissions rates from heavy equipment operations at the facility. Equipment weight and soil density data from the Caterpillar Performance and Komatsu were used to determine particulate emissions from scraper, and motor grader operations. **Attachment 7.1** provides copies of manufacturer specifications to determine emissions from scraper loading/unloading operations.

7.2 Test Data

Testing provisions for the determination of a site specific NMOC concentration are provided in 40 CFR § 60.764. This test, the Tier 2 test, was conducted in February 2021. The resulting data was used for the NMOC and VOC calculations for Units 3 and 5. The results are included in **Attachment 7.2.**

7.3 EPA Emissions Factors and AP-42

The most recent version of the USEPA's Compilation of Air Pollutant Emission Factors AP-42 (5th Edition and associated updates) were used in determining emissions for this Application. Emission factors from Chapter 13.5 of were used to calculate CO and NOx emissions from the non-enclosed flare. Emissions for PM and SO2 were calculated using emission factors from Chapter 2.4. Emission factors from Chapter 13.2.1, 13.2.2, and 13.2.4 were used to determine particulate emissions. Pages containing relevant equations, emissions factors, and tables are included in **Attachment 7.3**.

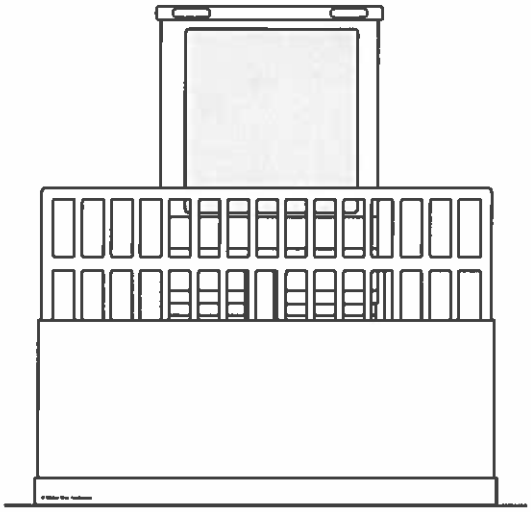
7.4 Alternate Emissions Factors

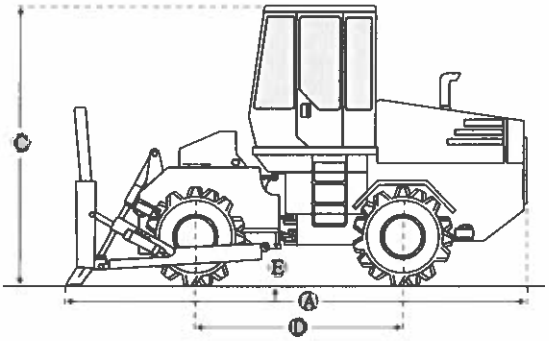
The emission factors used for the calculation of HAP emissions are from the Waste Industry Air Coalition of Recent Landfill Gas Analysis (WIAC) with Historic AP-42 Values, January 2001 and are included in **Attachment 7.4**.

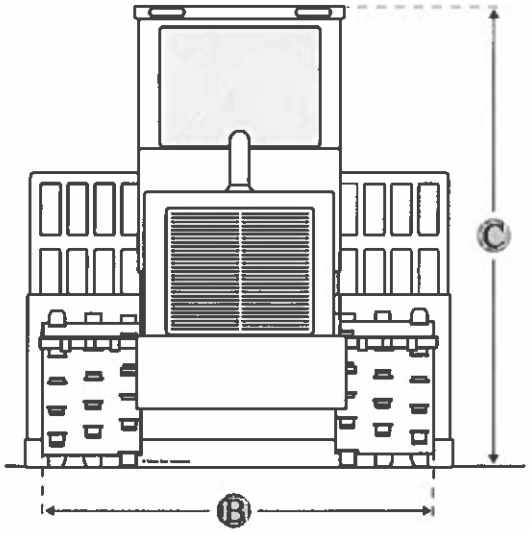
ATTACHMENT 7.1

Landfill Equipment Specification

Caterpillar 826H Compactor







Units Imperial Metric

Dimensions

Dimensions

A	**Length With Blade On Ground**	27.34 ft in
E	**Ground Clearance**	1.61 ft in
C	**Height To Top Of Cab**	13.76 ft in
D	**Wheelbase**	12.14 ft in

Dimensions (Approximate)

Centerline Of Rear Axle To Hitch	7.46 ft in
Width - Over Wheels	12.5 ft in
Turning Radius - Inside	10.57 ft in
Turning Radius - Outside	24.06 ft in
Width - Over End Bits - Blade	14.77 ft in

Specifications

Engine

Engine Make	2236
Engine Model	C15 diesel with ACERT Technology
Gross Power	401 hp
Net Power	354 hp
Displacement	927.6 cu in
Torque Rise	19 %
Bore	5.4 in
Stroke	6.7 in
Engine Model	Cat C15 ACERT
Flywheel Power	354 hp
Peak Torque - Gross	1387 lb ft

Operational

Operating Weight	81498 lb
Fuel Capacity	177.6 gal
Hydraulic System Fluid Capacity	23.3 gal
Engine Oil Capacity	9 gal
Cooling System Fluid Capacity	21.7 gal
Transmission Fluid Capacity	16.4 gal

Transmission

Number Of Forward Gears	2
Number Of Reverse Gears	2
Max Speed	6.6 mph
Forward - 1	3.6 mph
Forward - 2	6.1 mph
Reverse - 1	4.1 mph
Reverse - 2	6.6 mph

Wheels

Front Wheels Drum Width	47.3 in

Weights

Operating Weight	81498 lb

Wheels

Front Wheels Drum Diameter	60.4 in
Rear Wheels Drum Width	47.3 in
Rear Wheels Drum Diameter	60.4 in

Blade

Blade Capacity	17.1 yd3

Hydraulic System

Relief Valve Setting	3506.29 psi

Blade

Height	74.8 in
Width	14.8 ft in

Axles

Front	Planetary - Fixed

Hydraulic System

Lift Cylinder Bore X Stroke	120.65 mm 915 mm (4.74 in 36.02 in)

Axles

Oscillating Rear	5 degrees

Hydraulic System

Vane Pump Output At 2,000 Rpm And 6900 Kpa (1,000 Psi)	93 gal/min

Brakes

Standards	Meet OSHA, SAE J1473 DEC84, ISO 3450:1985 standards

Service Refill Capacities

Cooling System	21.7 gal
Fuel Tank	177.6 gal
Crankcase	9 gal
Hydraulic Tank	23.3 gal
Transmission	16.4 gal
Differential - Final Drives - Front	23.8 gal
Differential - Final Drives - Rear	23.8 gal

Cab

Rops/Fops	Meets SAE and ISO standards

Sound Performance

Standards	Meet ANSI/SAE and ISO standards

Straight Blade

Height	6.3 ft in
Width - Over End Bits	14.8 ft in
Moldboard - Length	14.2 ft in
Capacity	17 yd3

Wheels - Chevron-Pattern, Chopper Blades

Drum Width	4 ft in
Drum Diameter	5.1 ft in
Blades Per Wheel	24
Diameter - With Blades	6.1 ft in

Hydraulic Steering System

Piston Pump Output At 2,000 Rpm And 7000 Kpa (1,015 Psi)	49 gal/min
Relief Valve Setting	3499 psi
Steering Cylinder, Bore And Stroke	114.3 mm 576 mm (4.49 in 22.68 in)
Steering Angle	42 degrees

Step Tips

Diameter - With Tips	6.2 ft in
Tips Per Wheel	30

Semi U-Blade

Capacity	19 yd3
Height	6.5 ft in
Width - Over End Bits	14.8 ft in
Moldboard - Straight Length	12 ft in
Moldboard - Semi U-Length	1.6 ft in
Semi U-Angle	25 degrees

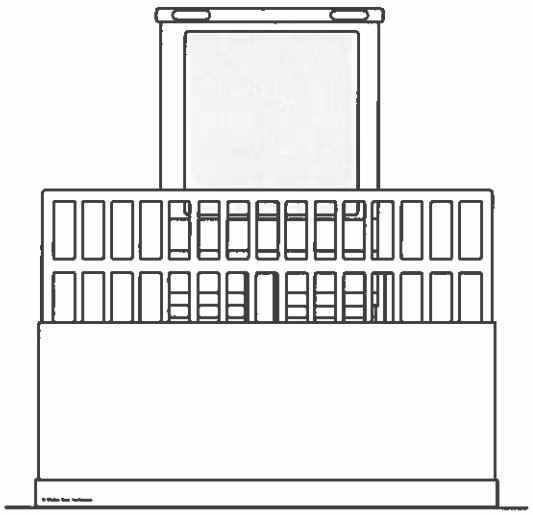
U-Blade

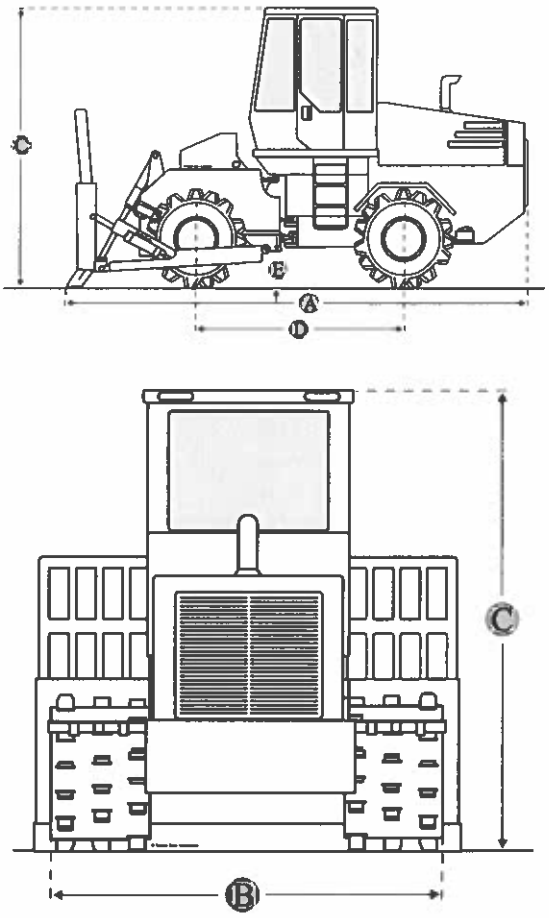
Capacity	21.9 yd3
Height	6.9 ft in
Width - Over End Bits	14.5 ft in
Moldboard - Straight Length	6.9 ft in
Moldboard - U-Length	4.1 ft in
U-Angle	25 degrees

Compare similar models

Manufacturer/Model	Front Wheels Drum Diameter	Net Power	Operating Weight
Caterpillar 825H	51.2 in	354 hp	72166.2 lb
Caterpillar 826C	60.1 in	315 hp	69732.3 lb

Caterpillar 826G Series II Compactor





Units Imperial Metric

Dimensions

Dimensions (Approximate)

Centerline Of Rear Axle To Edge Of Counterweight	8.61 ft in
Centerline Of Rear Axle To Hitch	6.07 ft in
Height - Bottom Of Ladder	2.33 ft in
Ground Clearance - Counterweight	3.38 ft in

Height - Top Of Cab With A/C	13.75 ft in
Height - Top Of Exhaust Pipe	12.57 ft in
Height - Top Of Hood	8.86 ft in
Length - With Blade On Ground	27.13 ft in
Turning Radius - Inside	10.58 ft in
Turning Radius - Outside	24.06 ft in
Wheel Base	145.67 ft in
Width - Over End Bits - Blade	14.77 ft in
Width - Over Wheels	12.47 ft in

Specifications

Engine

Gross Power	380 hp
Displacement	893 cu in
Torque Rise	28 %
Bore	5.4 in
Stroke	6.5 in
Net Power - Iso 9249	340 hp
Engine Model	Cat 3406E ATAAC Diesel
Flywheel Power	340 hp
Eec 80/1269	340 hp
Peak Torque - 1,200 Rpm - Net	1232.5 lb ft
Sae J1349	340 hp
Net Power Iso 3046-2	340 hp
Din 70020	327 PS

Operational

Operating Weight	81498 lb

Transmission

Forward - 1	3.6 mph
Forward - 2	6 mph
Reverse - 1	4.1 mph
Reverse - 2	6.6 mph

Hydraulic System

Relief Valve Setting	3500 psi

Axles

Front	Planetary - Fixed

Hydraulic System

Lift Cylinder Bore X Stroke	114.3 mm x 576 mm 4.49 in x 22.68 in

Axles

Oscillating Rear	Planetary - Oscillating 5 degrees

Hydraulic System

Vane Pump Output At 2,000 Rpm And 6900 Kpa (1,000 Psi)	26.5 gal/min

Brakes

Standards	Meet OSHA, SAE J1473 Dec 84, ISO 3450-1985 standards.

Service Refill Capacities

Cooling System	21.9 gal
Fuel Tank	166.5 gal
Crankcase	9 gal
Hydraulic Tank	23.2 gal
Transmission	16.4 gal
Differential - Final Drives - Front	23.8 gal
Differential - Final Drives - Rear	23.8 gal

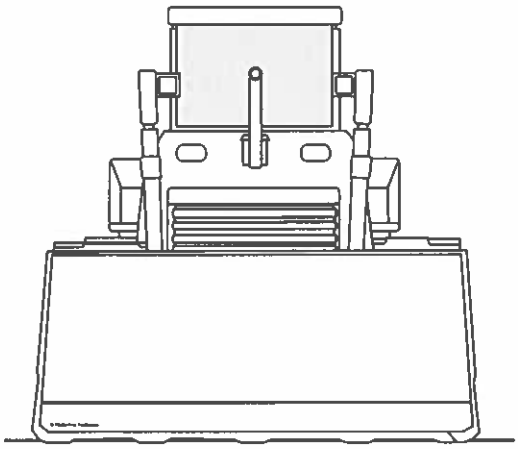
Cab

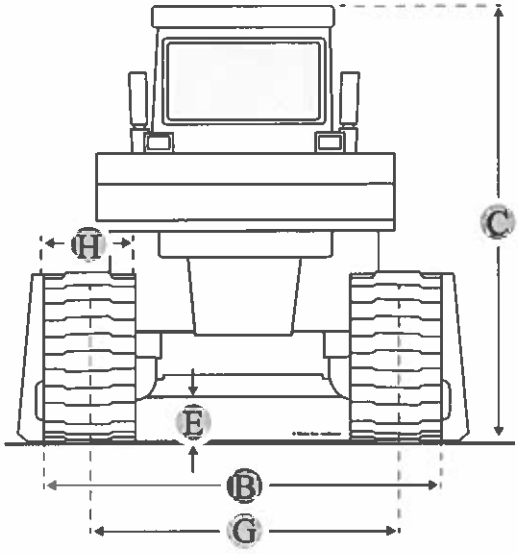
Rops/Fops	Meets SAE and ISO standards.

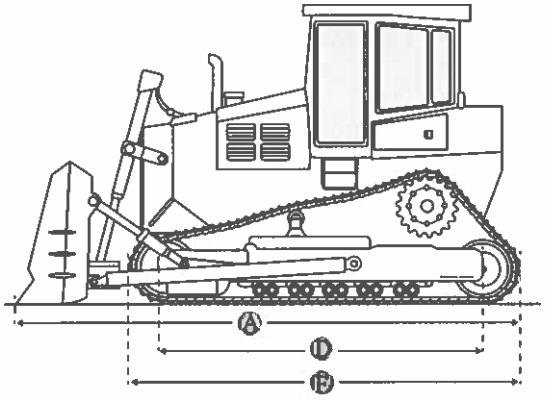
Sound Performance	
Standards	Meets ANSI/SAE and ISO standards.
Straight Blade	
Height	6.3 ft in
Width - Over End Bits	14.8 ft in
Moldboard - Length	14.1 ft in
Lift Speed At Rated Rpm	1.42 ft/s
End Bits (2), Self-Sharpening, Length - Each	19 in
Cutting Edges (2), Reversible, End Section Length (Each)	5.9 ft in
End Bits (2), Self-Sharpening, Width X Thickness	254 mm x 25 mm 10 in x 1 in
Cutting Edges (2), Reversible, Width X Thickness	254 mm x 25 mm 10 in x 1 in
Wheels - Chevron-Pattern, Chopper Blades	
Drum Width	4 ft in
Drum Diameter	5.1 ft in
Blades Per Wheel	25
Diameter - With Blades	6.1 ft in
Wheels - Plus Tip Teeth With Abrasion Resistant Material (Arm)	
Drum Width	4 ft in
Drum Diameter	5.1 ft in
Tips Per Wheel	25
Diameter - With Tips	6.1 ft in
Wheels - Traction Tip Wheel With Abrasion Resistant Material (Arm)	
Drum Width	4 ft in
Drum Diameter	5.1 ft in
Diameter - With Tips	5.7 ft in
Tips Per Wheel	45

Compare similar models

Caterpillar D6R Crawler Tractor







Units Imperial Metric

Dimensions

Dimensions

A	**Length W/ Blade**	16.09 ft in
B	**Width Over Tracks**	8.01 ft in

C	**Height To Top Of Cab**	10.49 ft in
D	**Length Of Track On Ground**	8.57 ft in
E	**Ground Clearance**	1.26 ft in
F	**Length W/O Blade**	12.67 ft in

Undercarriage

G	**Track Gauge**	6.17 ft in
H	**Standard Shoe Size**	22.05 in
	Number Of Shoes Per Side	39
	Ground Pressure	8.94 psi
	Ground Contact Area	4518 in2
	Number Of Track Rollers Per Side	6
	Track Pitch	8 in

Specifications

Engine

Number Of Cylinders	6
Engine Make	2236
Engine Model	3306
Gross Power	179 hp
Net Power	165 hp
Power Measured @	1900 rpm
Displacement	638 cu in
Aspiration	Turbocharged

Operational

Operating Weight	40000 lb
Fuel Capacity	101.2 gal
Cooling System Fluid Capacity	19.6 gal
Engine Oil Capacity	7.3 gal

Hydraulic Fluid Capacity	20.1 gal
Powertrain Fluid Capacity	41 gal
Final Drives Fluid Capacity	3.6 gal
Operating Voltage	24 V
Alternator Supplied Amperage	70 amps

Transmission

Transmission Type	Power Shift
Number Of Forward Gears	3
Number Of Reverse Gears	3
Max Speed - Forward	7.4 mph
Max Speed - Reverse	9.5 mph

Hydraulic System

Pump Type	Piston Style
Relief Valve Pressure	2800 psi
Pump Flow Capacity	50.2 gal/min

Standard Blade

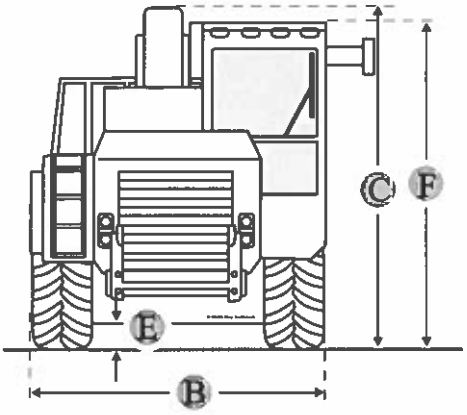
Width	11.1 ft in
Height	49.5 in
Capacity	5.1 yd3
Cutting Depth	18.7 in

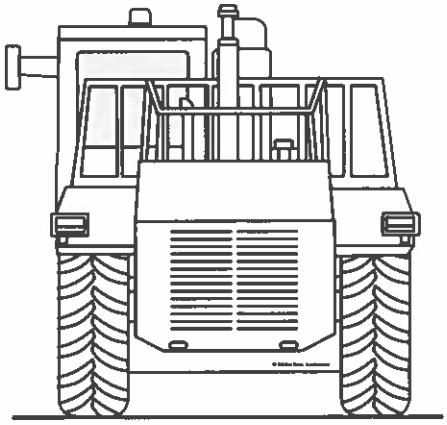
Compare similar models

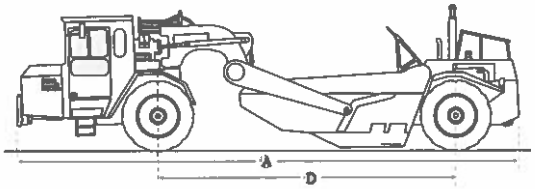
Manufacturer/Model	Ground Pressure	Net Power	Operating Weight
Caterpillar D6N WH XL	–	150 hp	38224 lb
Caterpillar D6T	9.4 psi	–	44418 lb
John Deere 750K	–	165 hp	34566.3 lb

Compare

Caterpillar 627F Motor Scraper







Units Imperial Metric

Dimensions

Dimensions

A	**Overall Length**	42.25 ft in
B	**Overall Width**	11.34 ft in
C	**Overall Height**	12.17 ft in
	Front Of Tractor To Front Axle	10.42 in
	Ground Clearance - Tractor	1.83 in
	Height - Overall Shipping	146 in

Height - Scraper Blade Maximum	21 in
Height - Top Of Cab	11.09 ft in
Length - Overall Machine	507 in
Rear Axle - Rear Of Machine	85 in
Wheel Base	25.34 ft in
Width - Inside Of Bowl	116 in
Width - Outside Rear Tires	120 in
Width - Overall Machine	136 in
Width - Rear Tire Center Lines	87 in
Axle To Vertical Hitch Pin	17 in
Width - Tractor	117 in
Ball Length - Maximum (Push-Pull)	60 in
Extended Push Block (Push-Pull)	110 in

Specifications

Tractor Engine

Gross Power	347 hp
Net Power	327 hp
Displacement	893 cu in

Engine

Tractor Engine	3306 / 3406C

Tractor Engine

Net Power - Gears 1-2	330 hp
Gross Power - Gears 1-2	347 hp
Caterpillar Net Power	330 hp
Iso 9249	330 hp
Eec 80/1269	330 hp
Sae J1349	327 hp

Bore	5.4 in
Stroke	6.5 in

Engine

Scraper Engine	3306

Scraper Engine

Make	Caterpillar
Model	3306
Gross Power	246 hp
Power Measured @	2200 rpm
Displacement	638 cu in
Bore	4.8 in
Stroke	6 in
Net Power - Gear 1	225 hp
Gross Power - Gear 1	246 hp
Iso 9249	225 hp
Caterpillar Net Power	225 hp
Eec 80/1269	225 hp
Sae J1349	223 hp

Operational

Fuel Capacity	262 gal
Hydraulic System Fluid Capacity	37 gal
Tire Size	33.25-R29 MX XRB 2

Transmission

Number Of Forward Gears	8
Number Of Reverse Gears	1
Reverse	5.7 mile/h

Steering

Width - 180 Degrees Turn	35.8 ft in

Steering Angle - Right	90 degrees
Steering Angle - Left	85 degrees

Transmission

1 Forward	3.1 mph
2 Forward	5.6 mph
3 Forward	7.1 mph
4 Forward	9.6 mph
5 Forward	12.9 mph
6 Forward	17.5 mph
7 Forward	23.6 mph
8 Forward	31.9 mph

Weights

Operating Weight	84050 lb
Total Operating - Loaded	80599 lb

Bowl

Heaped Capacity	26.2 yd3
Struck Capacity	18.4 yd3
Width Of Cut	10 ft in

Hydraulics

Bowl Cylinder Bore	6 in
Bowl Cylinder Stroke	32 in
Steering Circuit	52 gal/min
Scraper Circuit	65.5 gal/min
Cushion Hitch Circuit	9.2 gal/min
Relief Valve - Steering Circuit	2250 psi
Relief Valve - Implement Circuit	2150 psi
Ejector Cylinder Bore	6.5 in
Ejector Cylinder Stroke	61 in

Secondary Steering Circuit	37 gal/min
Apron Cylinder Bore	7.3 in
Apron Cylinder Stroke	24 in

Scraper Bowl

Width - Cut - To Router Bits	119 in
Rated Load	48000 lb
Capacity - Struck	14 yd3
Depth Of Cut - Maximum	13.1 in
Ground Clearance - Maximum	20.6 in
Cutting Edge Thickness	1.2 in
Depth Of Spread - Maximum	20.6 in
Scraper Capacity - Heaped	20 yd3
Hyd. Penetration Force - 621g	48375 lb
Apron Closure Force	24075 lb
Apron Opening	70 in

Service Refill Capacities - Tractor

Transmission	19 gal
Differential	43 gal
Final Drive - Each	5 gal
Cooling System	22 gal
Hydraulic Reservoir	37 gal
Crankcase	9.5 gal
Wheel Coolant - Each	12 gal

Weights - Standard, Tandem

Total Shipping	83768 lb
Tractor Shipping	51098 lb
Scraper Shipping	32669 lb
Total Operating - Empty	84050 lb

Front Axle	49590 lb
Rear Axle	34460 lb
Total Operating - Loaded	132057 lb
Front Axle Weight - Loaded	64708 lb
Rear Axle - Weight - Loaded	67350 lb

Compare similar models

Manufacturer/Model	Heaped Capacity
Caterpillar 623F	23.1 yd3
Caterpillar 621F	20.1 yd3
Caterpillar 637G	31 yd3

Compare

Find Caterpillar 627F Motor Scraper for Sale

1978 Cat 637D Motor Scraper

6501

AUSTRALIA, AUS

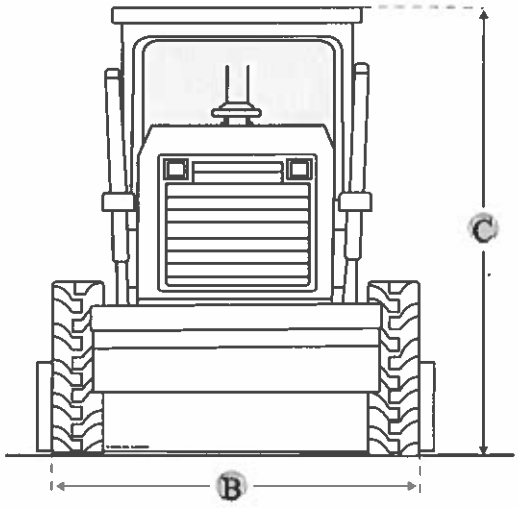
1993 Cat 637E Motor Scraper (Inoperable)

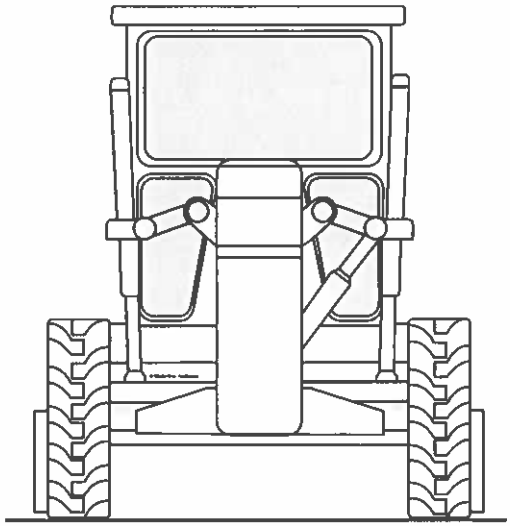
14766

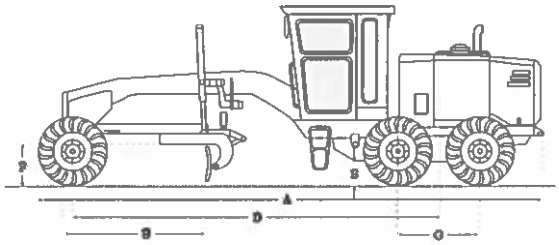
ALUM CREEK, WV

See Caterpillar Motor Scraper for sale rbauction.com
See Caterpillar Motor Scraper for sale ironplanet.com
See Caterpillar Motor Scraper for sale mascus.com

Caterpillar 140H Motor Grader







Units Imperial Metric

Dimensions

Dimensions

A	**Overall Length**	28.58 ft in
B	**Width Over Tires**	8.08 ft in
D	**Wheelbase**	20.24 ft in
E	**Rear Ground Clearance**	1.13 ft in
G	**Tandem Axle Wheelbase**	5 ft in

F	**Front Ground Clearance**	1.96 ft in
H	**Blade Base**	8.4 ft in
	Height To Top Of Isomount Cab	10.25 ft in

Specifications

Engine

Number Of Cylinders	6
Net Power Gear 4-6	185 hp
Engine Make	2236
Engine Model	3176C DITA ATAAC VHP
Net Power Gear 1-2	165 hp
Power Measured @	2000 rpm
Net Power Gear 5-6	185 hp
Max Power	185 hp
Net Power Gears 7-8	185 hp
Displacement	629 cu in

Operational

Std Operation Weight - Front Axle	9123 lb
Hydraulic System Fluid Capacity	20.8 gal
Std Operation Weight - Rear Axle	23234 lb
Std Operation Weight - Total	32357 lb
Max Operation Weight - Front Axle	16733 lb
Max Operation Weight - Rear Axle	30139 lb
Max Operation Weight - Total	46872 lb
Fuel Capacity	105 gal
Cooling System Fluid Capacity	10 gal
Rear Diff/Final Drive Fluid Capacity	12.4 gal
Circle Gearbox Fluid Capacity	1.8 gal

Tandem Case Fluid Capacity (Each)	16.9 gal

Steering

Articulation Angle	20 degrees
Turning Radius	24.6 ft in

Transmission

Transmission Type	direct drive, power shift
Number Of Gears - Forward	8
Number Of Gears - Reverse	6
Max Speed - Forward	27.4 mph
Max Speed - Reverse	21.6 mph

Front Axle

Wheel Lean	18 degrees
Oscillation - Total	32 degrees
Ground Clearance	2 ft in

Moldboard

Moldboard Width	12 ft in
Moldboard Height	24 in
Moldboard Thickness	0.9 in
Max Depth Of Cut	28.1 in
Side Shift Left	20.6 in
Side Shift Right	26 in
Blade Pull At Max Weight	42184 lb
Blade Down Pressure	28697.6 lb

Hydraulic System

Pump Type	axial piston
Pump Flow	54.4 gal/min
Relief Valve Pressure	3500 psi

Circle	
Diameter	60.2 in
Shift Left	27.4 in
Shift Right	28.7 in
Max Reach Outside Tires - Left	74.6 in
Max Reach Outside Tires - Right	77.9 in
Max Lift Above Ground	18.9 in
Blade Tip Angle - Front	40 degrees
Blade Tip Angle - Rear	5 degrees

Compare similar models

Manufacturer/Model	Max Power	Moldboard Width	Std Operation Weight - Total
John Deere 670D	185 hp	12.1 ft in	32010 lb
Caterpillar 140H ES	185 hp	12.1 ft in	32460.9 lb
John Deere 672D	185 hp	12.1 ft in	33630 lb

Compare

Find Caterpillar 140H Motor Grader for Sale

2006 Cat 140H Motor Grader

7975

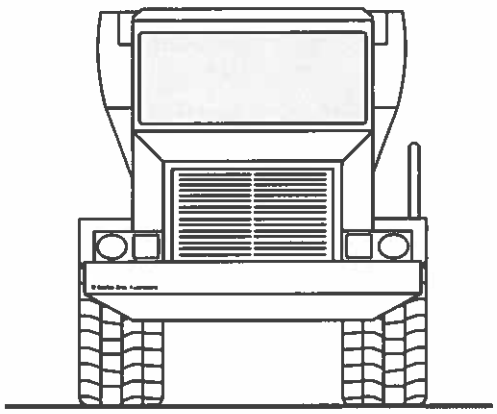
SPLENDORA, TX

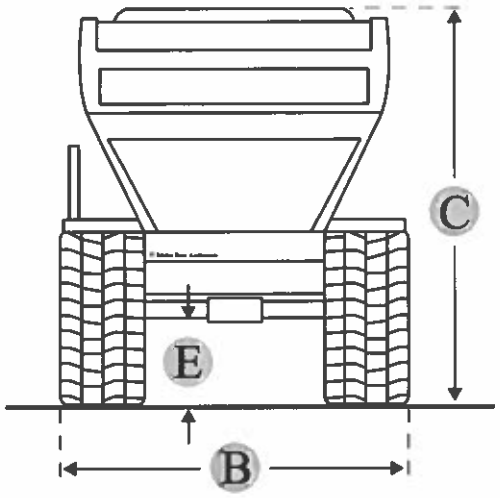
2005 Cat 140H VHP Plus Motor Grader

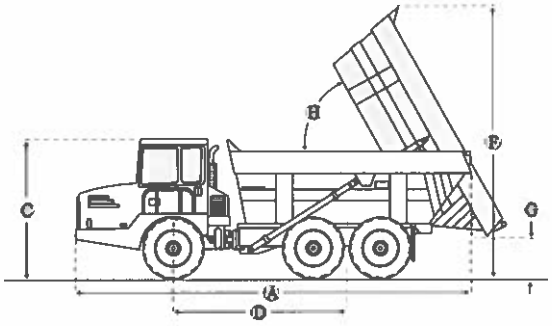
–

NEW ZEALAND

Komatsu HM300-2 Articulated Dump Truck







Units Imperial Metric

Dimensions

Dimensions

A	**Overall Length**	34.26 ft in
B	**Overall Width**	9.52 ft in
C	**Overall Height**	11.55 ft in
E	**Ground Clearance**	1.68 ft in

Turning Radius – Outside Minimum	26.09 ft in
Tyre Gauge	7.49 ft in

Specifications

Steering System

Steering System Type	Articulated type, fully hydraulic power steering with two double-acting cylinders
Supplementary Steering	Automatically actuated electrically powered
Minimum Turning Radius, Wall To Wal	7.96 m 26\'1\"
Articulation Angle	45°each direction

Electrical System

Alternator	24V, 75 Ah.
Batteries	12V, 136 Ah x 2.
Starter Motor	24V, 11.0 kW.

Suspension System

Rear	Combined hydro-pneumatic and rubber suspension system
Front	Hydro-pneumatic suspension

Main Frame

Main Frame Type	Articulated type, box-sectioned construction on front and rear Connected by strong torque tubes.

Body

Capacity Struck	16.9 yd3
Heaped (2:1, Sae)	21.7 yd3
Payload	27.3 metric tons 30.1 U.S. tons
Material	130 kg/mm2 184,925 psi high tensile strength steel
Material Thickness-Bottom	0.6 in
Material Thickness-Front	0.4 in

Material Thickness-Sides	0.5 in
Target Area	5240 mm x 2685 mm 17\'2\" x 8\'10\"
Heating	Exhaust heating (option)

Engine

Number Of Cylinders	6
Engine Make	0
Engine Model	Komatsu SAA6D125E-5
Engine Type	Water-cooled, 4-cycle
Gross Power	340 hp
Lubrication	Method- Gear pump, force-lubrication Filter-Full-flow type
Air Cleaner	Dry type with double elements and precleaner (cyclonpack type), plus dust indicator EPA Tier 3 and EU Stage 3A emissions certified
Governor	Electronically controlled
Net Power	329 hp
Power Measured @	2000 rpm
Aspiration	Turbo-charged, after-cooled, cooled EGR
Displacement	674 cu in
Bore	5 in
Stroke	6 in
Fan Drive Type	Mechanical
Fuel System	Direct injection
Maximum Torque	174 kg•m 1,259 lb. ft

Capacities

Fuel Tank - Diesel	101.5 gal
Final Drive	6.3 gal
Hydraulic System	31.7 gal
Engine Oil	9.8 gal

Torque Converter, Transmission And Retarder Cooling	20.5 gal
Differentials	16.8 gal
Suspension	2.7 gal

Transmission

Travel Speed	36.4 mph
Torque Converter	3-elements, 1-stage, 2-phase
Transmission	Full-automatic, counter-shaft type
Speed Range	6 speeds forward and 2 reverse
Lockup Clutch	Wet, single-disk clutch
Forward	Torque converter drive in 1st gear, direct drive in 1st lockup and all higher gears
Reverse	Torque converter drive and direct drive in all gear
Shift Control	Electronic shift control with automatic clutch modulation in all gear

Weights

Gross Weight	113360 lb
Empty Weight	53000 lb
Front Axle - Empty	55.8 %
Center Axle - Empty	23.6 %
Rear Axle - Empty	20.6 %
Front Axle - Loaded	30.3 %
Center Axle - Loaded	35.5 %
Rear Axle - Loaded	34.2 %

Tires

Standard Tire	23.5 R25

Axles

Differential	3.154
Planetary	4.667

Hydraulic System	
Hoist Cylinder	Twin, 2-stage telescopic type
Relief Pressure	20.6 MPa 210 kg/cm2 2,990 psi
Hoist Time	12 sec
Cab	
Compliance	Dimensions comply with ISO 3471 ROPS (Roll-Over Protective Structure) standard
Brakes	
Service Brake	Full-hydraulic control, oil-cooled multiple-disc type on front and center axles
Parking Brake	Spring applied, caliper disc type
Retarder	Front and center axle brakes act as retarder

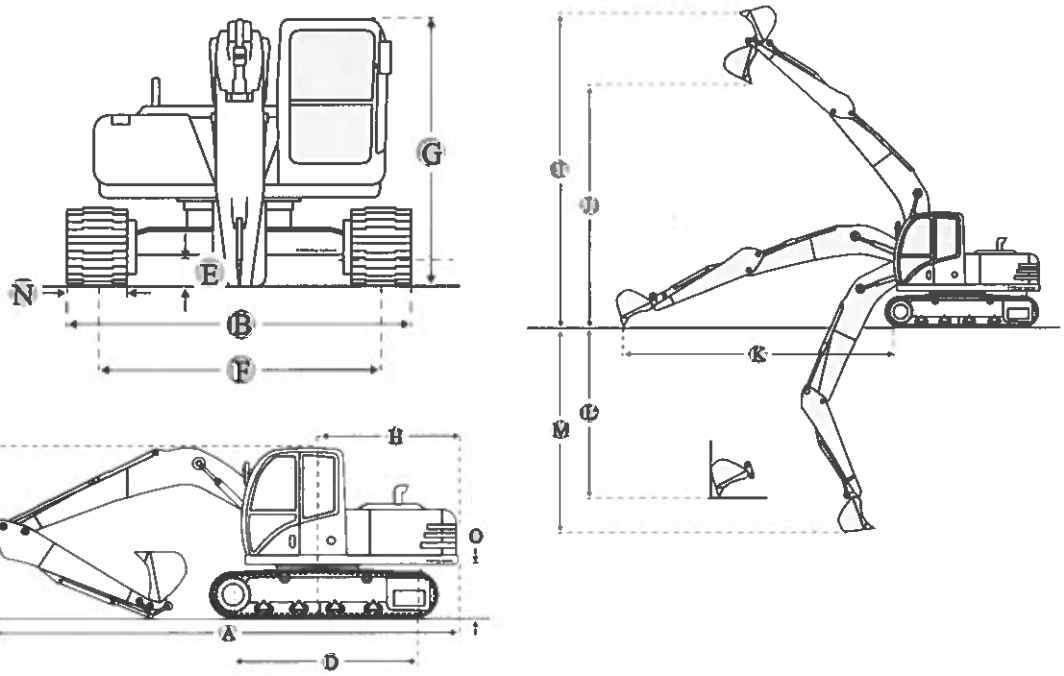
Compare similar models

Manufacturer/Model	Net Power
Volvo A30D	328 hp
Caterpillar 730	325 hp
Komatsu Hm300-1	324.6 hp

Compare

Find Komatsu HM300-2 Articulated Dump Truck for Sale

Komatsu PC360LC-10 Hydraulic Excavator



Units Imperial Metric

Dimensions

Boom/Stick Option (Hex) 1

K	**Max Reach Along Ground**	35.83 ft in
L	**Max Vertical Wall Digging Depth**	21.26 ft in
M	**Max Digging Depth**	24.22 ft in
	Boom/Stick Option (Hex) 1	Boom 21'3" (6470mm)/Stick 10'5" (3185mm)

Dimensions

E	**Ground Clearance**	1.64 ft in
G	**Height To Top Of Cab**	10.37 ft in

B	**Width To Outside Of Tracks**	11.29 ft in
D	**Length Of Track On Ground**	13.23 ft in
H	**Tail Swing Radius**	11.31 ft in
	Removal Counterweight Clearance	3.89 ft in

Undercarriage

F	**Track Gauge**	8.5 ft in
N	**Shoe Size**	33.47 in
	Max Travel Speed	3.42 mph
	Ground Pressure	8.31 psi

Specifications

Engine

Number Of Cylinders	6
Engine Make	2238
Engine Model	SAA6D114E-5
Gross Power	271 hp
Power Measured @	1950 rpm
Displacement	540.1 cu in

Operational

Operating Weight	78255.3 lb
Fuel Capacity	159.9 gal
Hydraulic System Fluid Capacity	49.7 gal
Hydraulic System Relief Valve Pressure	5400 psi
Hydraulic Pump Flow Capacity	141.3 gal/min

Swing Mechanism

Swing Speed	9.5 rpm

Buckets

Reference Bucket Capacity	1.8 yd3

Compare similar models

Manufacturer/Model	Operating Weight	Reference Bucket Capacity
Sumitomo SH350HD-3	77602.8 lb	1.9 yd3
Sumitomo SH350HD-5	78484.6 lb	1.9 yd3
Hella HE360LCH	78263 lb	1.9 yd3

Compare

Find Komatsu PC360LC-10 Hydraulic Excavator for Sale

2013 Komatsu PC360LC-10 Tracked Excavator

10253

DENVER, CO

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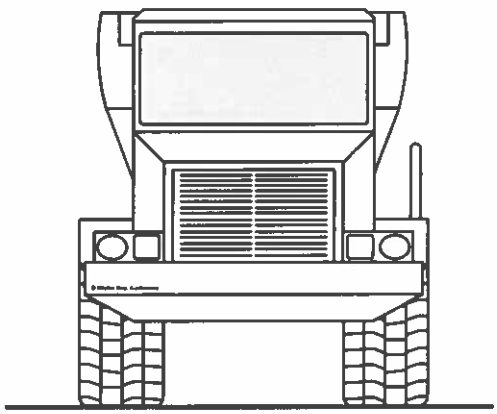
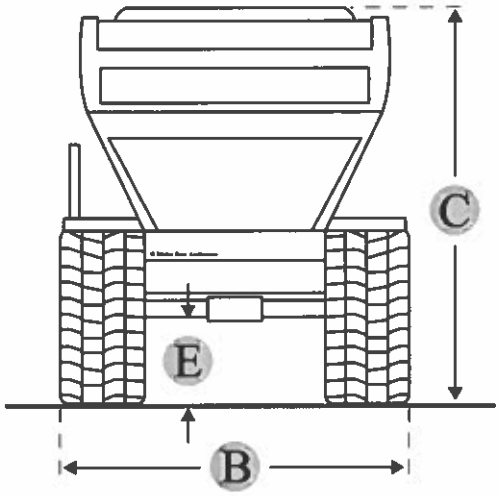
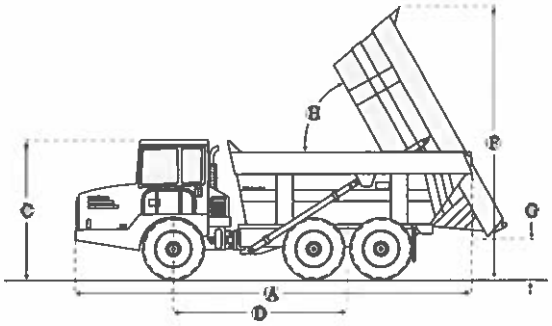
Volvo A30D Articulated Dump Truck







Units Imperial Metric

Dimensions

Dimensions

A	**Overall Length**	33.79 ft in
B	**Overall Width**	9.38 ft in
C	**Overall Height**	11.25 ft in
D	**Wheelbase**	13.7 ft in

E	**Ground Clearance**	1.69 ft in
F	**Dump Height**	21.63 ft in
G	**Dump Ground Clearance**	2.26 ft in

Dump

H	**Dump Angle**	70 degrees
	Lower Time	9 sec
	Rated Payload	6172.95 lb
	Capacity - Struck	17.79 yd3
	Capacity - Heaped	22.89 yd3

Specifications

Engine

Engine Make	2244
Engine Model	D10BAAE2*
Gross Power	329 hp
Net Power	328 hp
Power Measured @	2000 rpm
Max Torque	1047.4 lb ft
Torque Measured @	1350 rpm
Aspiration	Turbocharged
Displacement	585.9 cu in

Operational

Fuel Capacity	105.7 gal
Hydraulic System Fluid Capacity	46.3 gal
Cooling System Fluid Capacity	18.8 gal
Engine Oil Capacity	10.1 gal
Transmission Fluid Capacity	10.9 gal
Operating Voltage	24 V

Alternator Supplied Amperage	55 amps
Tire Size	750/65 R 25

Transmission

Transmission Type	Fully Automatic
Number Of Forward Gears	6
Number Of Reverse Gears	2
Max Speed	33 mph

Weights

Front Axle - Empty	27557.8 lb
Rear Axle - Empty	23280.9 lb
Front Axle - Loaded	33047.3 %
Rear Axle - Loaded	79520.8 lb
Total Empty	61729.5 lb
Total Loaded	112568.1 lb

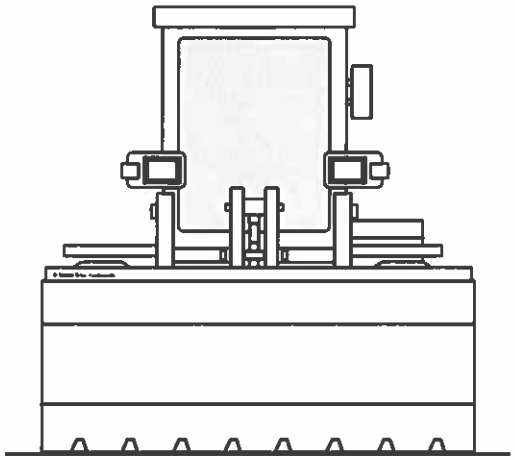
Compare similar models

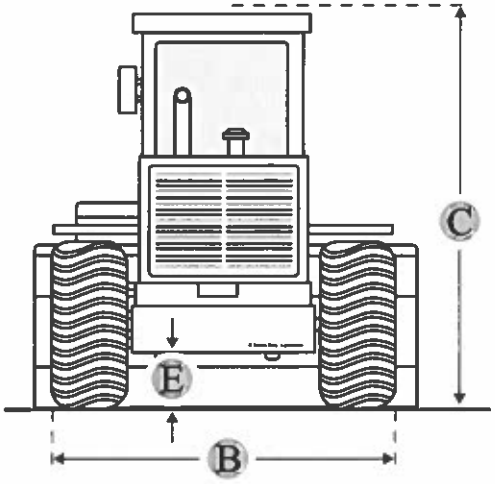
Manufacturer/Model	Capacity - Heaped	Net Power	Rated Payload
Caterpillar 730	22.2 yd3	325 hp	61949.9 lb
Caterpillar 730EJ	22.1 yd3	317 hp	6200 lb
Caterpillar AD30	18.8 yd3	377 hp	66150 lb

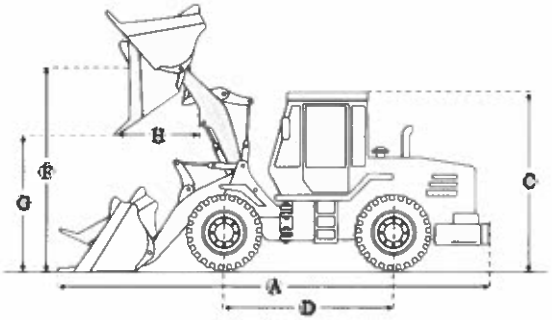
Compare

Find Volvo A30D Articulated Dump Truck for Sale

Volvo L120H Wheel Loader







Units Imperial Metric

Dimensions

Bucket

	Breakout Force	41364.85 lb

Dimensions

E	**Ground Clearance**	1.51 ft in
A	**Length With Bucket On Ground**	27.24 ft in
B	**Width Over Tires**	8.76 ft in
C	**Height To Top Of Cab**	11.13 ft in

D	**Wheelbase**	10.5 ft in
F	**Hinge Pin - Max Height**	13.46 ft in

Specifications

Steering System

Working Pressure	21 MPa, 210 bar
Articulation Angle	40 degrees
Stroke	1.6 ft in
Steering Cylinders	2
Cylinder Bore	3.2 in
Rod Diameter	2 in
Maximum Flow	31.8 gal/min

Hydraulic Cycle Times (Unloaded)

Lift	5.4 sec
Lower	2.5 sec
Tilt	2.1 sec
Total Cycle Time	10 sec

Electrical System

Battery Capacity	2 x 170 Ah
Cold Cranking Capacity	1000 A
Alternator Rating	2280/80 (W/A)
Starter Motor Output	7.4 hp
Voltage	24 V V
Batteries	2 x 12 V

Engine

Number Of Cylinders	6
Engine Model	Volvo D8J
Net Power	272.3 hp

Gross Power	272.3 hp
Power Measured @	1500 rpm
Max Torque	Gross - 1320 Nm, Net - 1317 Nm
Displacement	476 cu in
Torque Measured @	1450 rpm
Aspiration	Turbocharged

Drive Train

Torque Multiplication, Stall Ratio	2.47:1
Transport Speed, Maximum	24.9 mph
Transmission	Volvo HTL 206C

Operational

Def Tank Capacity	6.7 gal
Fuel Capacity	71.4 gal
Hydraulic System Fluid Capacity	35.2 gal
Engine Oil Fluid Capacity	5.9 gal
Cooling System Fluid Capacity	11.4 gal
Transmission Fluid Capacity	10.1 gal

Axles

Rear Axle Oscillation	13 degrees
Axle Oil Front	9.6 gal
Axle Oil Rear	10.9 gal

Hydraulic System

Working Pressure	Pump 1 - 27 MPa, Pump 2 - 29 MPa, Pump 3 - 21 MPa
Engine Speed	1900 rpm

Axles

Front	Volvo AWB 31
Rear	Volvo AWB 30

Compare similar models

Manufacturer/Model	Gross Power
Liebherr L566 XPOWER	272 hp
Doosan DL350-5	271 hp
Case 921B	270 hp

Compare

Find Volvo L120H Wheel Loader for Sale

2014 Volvo L120H Wheel Loader

8465

COLUMBUS, OH

2016 Volvo L120H Wheel Loader

–

AUSTRIA

See Volvo Wheel Loader for sale rbauction.com

See Volvo Wheel Loader for sale ironplanet.com

See Volvo Wheel Loader for sale mascus.com

ATTACHMENT 7.2

Tier 2 Test Data

Weaver Consultants Group

February 11, 2021

Via electronic transmission

New Mexico Environment Department
525 Camino de los Marques, Suite 1
Santa Fe, New Mexico 87505

Re: 2020 Tier 2 Non-Methane Organic Compound Emission Rate Report
San Juan County Landfill
Operating Permit No. 9264L
AI No. 4544
Project No. 0086-741-50-00-03

To Whom It May Concern:

On behalf of our client, Waste Management of New Mexico, Inc, Weaver Consultants Group (WCG) is submitting the attached 2020 Tier 2 Non-Methane Organic Compound (NMOC) Emission Rate Report for the San Juan County Landfill (SJCLF), located in Aztec, New Mexico.

SJCLF is an existing municipal solid waste (MSW) landfill, as defined in the New Source Performance Standards (NSPS) for MSW landfills located in 40 Code of Federal Regulations (CFR) Part 60, Subpart Cf. NSPS Cf requires facilities to test and submit a Tier 2 report containing the site-specific NMOC concentration every 5 years.

The Tier 2 test was performed from December 16, 2020 through December 18, 2020. The Tier 2 test was performed to determine the current site-specific concentration of NMOC for use in calculating the landfill's NMOC emission rate. Using the site-specific NMOC concentration of 738.33 parts per million by volume as hexane as determined by the Tier 2 test results, the United States Environmental Protection Agency's (EPA) Landfill Gas Emissions Model (LandGEM) was used to calculate the NMOC emission rate for the facility.

The Tier 2 results indicate that the NMOC emission rate is 43.97 megagrams/year (Mg/yr) for 2021. Therefore, in accordance with NSPS 40 CFR §60.35f(a)(3)(iv), the facility must either:

- Submit a gas collection and control system (GCCS) design plan within 1 year
- Determine a site-specific methane generation rate constant and recalculate the NMOC emission rate using the site-specific methane generation rate using the Tier 3 procedures
- Conduct a surface emission monitoring demonstration using the Tier 4 procedures

Also, as allowed by the EPA, SJCLF may elect to perform an additional Tier 2 sampling event. In advance of any additional NMOC sampling, the New Mexico Environment Department (NMED)

will be notified. Should subsequent NMOC test results show that the facility is below 34 Mg/yr before the 30-month timeline to install a GCCS is complete, NMED will be notified, and a new timeline will be established.

A written response to this submittal is requested.

If you should have any questions or comments regarding this letter, please do not hesitate to contact us.

Sincerely,
Weaver Consultants Group

Melissa Green
Senior Project Manager

John C. Briest, P.E.
Principal

Attachment

cc: Josh Vinzant, Waste Management of New Mexico, Inc. *(via email)*
Mark Franc, Waste Management of New Mexico, Inc. *(via email)*

SAN JUAN COUNTY LANDFILL

2020 TIER 2 NON-METHANE ORGANIC COMPOUND EMISSION RATE REPORT

PREPARED FOR

WASTE MANAGEMENT OF NEW MEXICO, INC.

February 11, 2021

PREPARED BY

Weaver
Consultants
Group

REPORT CERTIFICATION

Tier 2 NMOC Emission Rate Report
San Juan County Landfill
Aztec, New Mexico

I have reviewed this document and agree that the information contained herein is true, accurate, and complete, to the best of my knowledge. The material and data in this report were prepared under the supervision and direction of the undersigned.

Vista GeoScience
Ted Stockwell
Test Team Leader

Weaver Consultants Group
Melissa Green
Project Manager/Report Preparation

Waste Management of New Mexico, Inc.
Josh Vinzant
Responsible Official

TABLE OF CONTENTS

TABLES

APPENDICES

1 INTRODUCTION

The New Source Performance Standards (NSPS), 40 Code of Federal Regulations (CFR) Part 60, Subpart Cf, require facilities to test and submit a Tier 2 report containing the site-specific non-methane organic compound (NMOC) concentration every 5 years. Weaver Consultants Group (WCG) conducted a Tier 2 NMOC test at the San Juan County Landfill (SJCLF) from December 16, 2020 through December 18, 2020.

The Tier 2 test was performed to determine the current site-specific concentration of NMOC for use in calculating the landfill's NMOC emission rate. Using the site-specific NMOC concentration of 738.33 parts per million by volume (ppmv) as hexane as determined by the Tier 2 test results, the United States Environmental Protection Agency's (EPA) Landfill Gas Emissions Model (LandGEM) was used to calculate the NMOC emission rate for the facility.

The Tier 2 results indicate that the NMOC emission rate is 43.97 megagrams/year (Mg/yr) for 2021. Therefore, in accordance with NSPS 40 CFR §60.35f(a)(3)(iv), the facility must either:

- Submit a gas collection and control system (GCCS) design plan within 1 year
- Determine a site-specific methane generation rate constant and recalculate the NMOC emission rate using the site-specific methane generation rate using the Tier 3 procedures
- Conduct a surface emission monitoring demonstration using the Tier 4 procedures

Also, as allowed by the EPA, SJCLF may elect to perform an additional Tier 2 sampling event. In advance of any additional NMOC sampling, the New Mexico Environment Department (NMED) will be notified. Should subsequent NMOC test results show that the facility is below 34 Mg/yr before the 30-month timeline to install a GCCS is complete, NMED will be notified, and a new timeline will be established.

This report includes a description of the field procedures used to collect the landfill gas (LFG) samples for laboratory analysis, the laboratory results, the completed Tier 2 NMOC emission rate calculations, and a discussion of the Tier 2 test results.

2 SAMPLING PROCEDURES

In accordance with NSPS requirements, two samples must be collected for every hectare of landfill in which refuse has been in place for more than 2 years, to a maximum of 50 samples. Approximately 64.9 acres (26.3 hectares) of landfill has had refuse in place for more than 2 years. As such, 50 LFG samples were required.

Field sampling involved using a direct-push sampling unit to push a sampling probe through the landfill surface, approximately 10 to 15 feet into the refuse. Once the probe was driven, a field technician purged the sampling apparatus and collected a LFG sample in a Summa® passivated canister, using the required methods. Once the sample was collected, the temporary sampling probe was removed. The sampling locations were determined according to field conditions.

During field sampling, a portable LFG monitoring instrument was used to field measure and record the concentration of methane, carbon dioxide, oxygen, and balance gas (assumed to be nitrogen) in each LFG sample. The field data is provided in Appendix A.

Once the samples were collected, the canisters were sent by overnight delivery to Air Technology Laboratories for analysis. The canisters were analyzed using EPA Method 25C for the NMOC analysis, with the nitrogen and oxygen concentration of each sample being determined by EPA Method 3C. A copy of the chain-of-custody form used during shipment of the canisters is included within Appendix B.

3 LABORATORY RESULTS

The analytical results for the Tier 2 testing are presented in Appendix B. Air Technology Laboratories used the equations in Section 12 of Method 25C to correct for dilution of the samples by water vapor, oxygen, and pressurization of the canister in the lab.

Landfill samples were taken as composite samples. Two or three samples were collected and analyzed with the results averaged. The summary of the Method 3C results are presented in Table 1. The average of the analytical results for each composite sample is presented below in Table 2 and is expressed as total NMOC ppmv as carbon.

On October 7, 2020, EPA updated the Federal Register for determination of NMOC in LFG. Per 12.5.2 of the Federal Register, if the 3-year average annual rainfall is less than 20 inches the NMOC concentration should be corrected for oxygen concentration. Therefore, the NMOC corrected for oxygen was used to determine the site-specific NMOC concentration.

Table 1
Summary of Laboratory Method 3C Results

Lab Number	Field Locations	Oxygen (%)	Nitrogen (%)	Methane (%)	Carbon Dioxide (%)
L122401-01	47, 46, 48	ND	6.7	52	43
L122401-02	50, 49, 45	ND	ND	52	46
L122401-03	44, 43, 42	ND	ND	56	43
L122401-04	41, 36, 37	ND	4.7	52	41
L122401-05	39, 38, 40	ND	ND	48	47
L122401-06	35, 34, 33	ND	ND	54	43
L122401-07	32, 31, 27	ND	5.8	52	43
L122401-08	26, 21, 16	ND	4.5	56	41
L122401-09	11, 6, 1	ND	3.7	56	38
L122401-10	2, 7, 12	ND	4.2	52	40
L122401-11	17, 22, 28	ND	11	47	42
L122401-12	23, 18, 13	ND	ND	57	38
L122401-13	8, 3, 4	ND	7.4	50	42
L122401-14	14, 9, 19	2.7	16	36	45
L122401-15	24, 29, 30	ND	11	50	36
L122401-16	25, 20, 15	ND	ND	54	40
L122401-18	5, 10	2.8	12	46	33

Table 2
Summary of Laboratory Method 25C Results

Lab Number	Field Locations	Oxygen Corrected NMOC as Carbon (ppmv)	Oxygen Corrected NMOC as Hexane (ppmv)[1]	Weighting Factor	Weighted Contribution to Average NMOC as Hexane (ppmv)
L122401-01	47, 46, 48	3,400	566.67	3/50	34.00
L122401-02	50, 49, 45	4,600	766.67	3/50	46.00
L122401-03	44, 43, 42	3,900	650.00	3/50	39.00
L122401-04	41, 36, 37	5,200	866.67	3/50	52.00
L122401-05	39, 38, 40	5,400	900.00	3/50	54.00
L122401-06	35, 34, 33	5,400	900.00	3/50	54.00
L122401-07	32, 31, 27	3,500	583.33	3/50	35.00
L122401-08	26, 21, 16	5,100	850.00	3/50	51.00
L122401-09	11, 6, 1	4,300	716.67	3/50	43.00
L122401-10	2, 7, 12	4,600	766.67	3/50	46.00
L122401-11	17, 22, 28	4,200	700.00	3/50	42.00
L122401-12	23, 18, 13	5,100	850.00	3/50	51.00
L122401-13	8, 3, 4	3,900	650.00	3/50	39.00
L122401-14	14, 9, 19	6,700	1,116.67	3/50	67.00
L122401-15	24, 29, 30	4,000	666.67	3/50	40.00
L122401-16	25, 20, 15	2,400	400.00	3/50	24.00
L122401-18	5, 10	3,200	533.33	2/50	21.33
				Weighted Average:	**738.33**

Notes: [1] Weaver Consultants Group divided the non-methane organic compound (NMOC) concentration, as carbon, by six to obtain NMOC as hexane.

4 NMOC EMISSION RATE RESULTS

4.1 NMOC Emission Rate Results

The NMOC emission rate was calculated using an average annual refuse acceptance rate for years in which the actual acceptance was unknown (1988-1997), actual refuse acceptance rates for years in which they were known (1998-2020), and a site-specific NMOC concentration of 738.33 ppmv as hexane, as determined by the Tier 2 test results from the site.

In accordance with the NSPS, a methane generation potential (Lo) of 170 cubic meters per megagram was used in the NMOC calculations. As per the NSPS requirements within §60.35(f) a methane generation rate constant (k) of 0.02 per year was used. The estimated 2021 NMOC emission rate for the SJCLF was calculated to be 43.97 Mg/yr. The average annual refuse acceptance rate, actual refuse acceptance rates, and Tier 2 NMOC emission rate calculations for the landfill are provided within Appendix C.

4.2 NMOC Emission Rate Projections

The Tier 2 results indicate that the NMOC emission rate is 43.97 megagrams/year (Mg/yr) for 2021. Therefore, in accordance with NSPS 40 CFR §60.35f(a)(3)(iv), the facility must either:

- Submit a gas collection and control system (GCCS) design plan within 1 year
- Determine a site-specific methane generation rate constant and recalculate the NMOC emission rate using the site-specific methane generation rate using the Tier 3 procedures
- Conduct a surface emission monitoring demonstration using the Tier 4 procedures

Also, as allowed by the EPA, SJCLF may elect to perform an additional Tier 2 sampling event. In advance of any additional NMOC sampling, the NMED will be notified. Should subsequent NMOC test results show that the facility is below 34 Mg/yr before the 30-month timeline to install a GCCS is complete, NMED will be notified, and a new timeline will be established.

The NMOC emission rates for the next 5 years are shown on Table 3 – Summary of Estimated 5-Year NMOC Emission Rates. The supporting calculations are provided in Appendix C.

Table 3
Summary of Estimated 5-Year NMOC Emission Rates

Year	Annual Waste Inflow Rate (tons)	NMOC Emission Rate (Mg/yr)
2021	125,000	43.97
2022	125,000	45.13
2023	125,000	46.26
2024	125,000	47.37
2025	125,000	48.46

APPENDIX A

FIELD DATA

Vista GeoScience

Expert Environmental Support Services for Site Investigation & Remediation

January 19, 2020

Melissa Green
Weaver Consultants Group
7340 East Caley Avenue, Suite 110
Centennial, CO 80111
Phone: (541) 760-0499
E-Mail: mgreen@wcgrp.com

RE: Vista Project #: 20173.06
Final Field Collection Data Report
Waste Management San Juan Landfill Gas Survey
Site Address: 78 Rd 3140, Aztec, NM 87410

Melissa,

Enclosed is a report for the landfill gas survey conducted in December of 2020 at the above referenced landfill. Please feel free to contact us if you have any questions or concerns regarding the information described herein.

Sincerely,

Matthew Berkes
Environmental Scientist / Subsurface Imaging Specialist
Vista GeoScience

Reviewed by:
Ted Stockwell
Field Operations Manager
Vista GeoScience

Landfill Soil Gas Survey
Field Collection Data Report

Waste Management San Juan County Landfill

78 Rd 3140, Aztec, NM 87410

Prepared for:

Weaver Consultants Group

December 14, 2020

Table of Contents

1 DAILY ACTIVITY SUMMARY

Vista Geoscience arrived at the Waste Management San Juan Landfill on December 13, 2020 to meet with the onsite representative of Waste Management. After meeting with the landfill representative, the crew began its landfill gas sampling activities. Each morning, the Landtec GEM 5000 was calibrated onsite prior to sample collection. For collection of each landfill gas sample, 1.50-inch probe rod was pushed with expendable points to depth and pulled up to create a sampling void for each location. The post run tubing method used for sampling utilizes Teflon lined 3/8" polyethylene tubing with a threaded PRT adapter which threads into the point holder to make a down-hole seal. The downhole line was purged with the GEM 5000 until gas levels stabilized, at which point the corresponding values were recorded. After the gas readings were recorded, the sampling tree was switched to the summa canister and the sample was taken at a rate of equal to or less than 200 mL/min. Once a minimum of 1 liter was taken, the sampling rod was pulled, and the borehole was backfilled with bentonite crumbles. All 53 sampling locations were completed utilizing this method over the course of three days onsite. Three extra samples were completed at the request of the Waste Management representative onsite. Lab analysis will not be completed on these three locations unless requested by either Weaver or Waste Management.

The crew initially planned to drill to 10' below ground surface (bgs) and pull the drill rod up to 8' bgs to create the sampling void, but due to high Oxygen readings on the first few attempts, the crew decided to push to 15' bgs and pull up to 10' bgs for the majority of the investigation. Some locations had to be drilled deeper like SJ-9 and SJ-19 due to poor Oxygen readings. The depths drilled to and pulled to can be seen for each sampling location in the Sampling Log later in this report.

Some of the sampling locations should be noted at the San Juan Landfill. At the top of the Landfill, near the southern end, there is a bioremediation area. SJ-44 was drilled near the edge of the bioremediation area and Weaver and Vista representatives agreed that moving SJ-43 off of the bioremediation was a good idea. SJ-23, SJ-18 and SJ-13 were relocated slightly due to snow on a steep hill. The drill rig could not gain traction far up the hill. The rig was tracked as far up the snowy slope as possible and sampled once traction was lost.

There was an active landfill on the northeast end of the San Juan Landfill and a row of points was located on the inside of the fence, separating older cells from the active face. These locations near the active face experienced higher than average Oxygen readings and had to be re-drilled deeper in order to get the Oxygen readings under 5%. Before drilling in this area, the crew contacted Weaver and Waste Management representatives to discuss these locations being on an active area and the crew was concerned about the age of the trash. Trash sampled needed to be older than 2 years old to be relevant to the investigation. Both off-site representatives assured the onsite crew that the locations on the inside of the fence were older than 2 years old. Once Vista made it to SJ-24, re-pushing and drilling deeper did not seem to affect the high percentage of Oxygen in the sample. Vista and Weaver representatives discussed the high Oxygen percentage in the area and agreed to move the locations elsewhere. SJ-29, SJ-30, SJ-25, SJ-20, SJ-15, SJ-5 and SJ-10 were all relocated to areas without nearby sample locations.

2 SAMPLE LOCATION MAP

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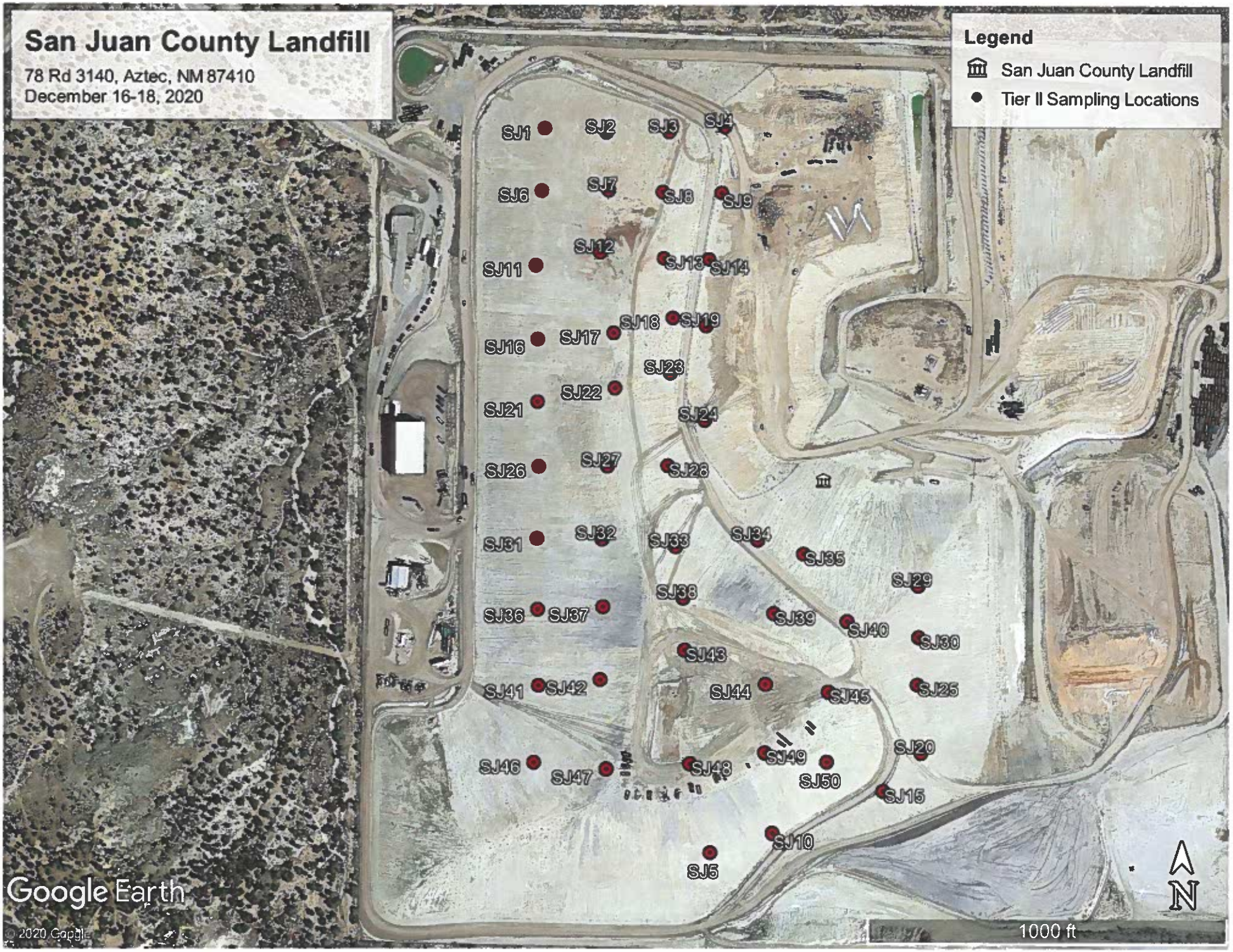
San Juan County Landfill
78 Rd 3140, Aztec, NM 87410
December 16-18, 2020
Legend
San Juan County Landfill
Tier II Sampling Locations
SJ1
SJ2
SJ3
SJ4
SJ6
SJ7
SJ8
SJ9
SJ11
SJ12
SJ13
SJ14
SJ16
SJ17
SJ18
SJ19
SJ21
SJ22
SJ23
SJ24
SJ26
SJ27
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SJ40
SJ30
SJ43
SJ41
SJ42
SJ44
SJ45
SJ25
SJ46
SJ47
SJ48
SJ49
SJ20
SJ50
SJ15
SJ10
SJ5
Google Earth
© 2020 Google
1000 ft
N

4 LANDFILL GAS SAMPLING DATA LOGS

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Location	Date	Latitude	Longitude
SJ1	12/17/2020	36.76815	-108.04802
SJ2	12/17/2020	36.76811	-108.04740
SJ3	12/18/2020	36.76812	-108.04678
SJ4	12/18/2020	36.76817	-108.04623
SJ5	12/18/2020	36.76254	-108.04642
SJ6	12/17/2020	36.76764	-108.04804
SJ7	12/17/2020	36.76763	-108.04738
SJ8	12/18/2020	36.76762	-108.04685
SJ9	12/18/2020	36.76764	-108.04626
SJ10	12/18/2020	36.76267	-108.04582
SJ11	12/17/2020	36.76705	-108.04810
SJ12	12/17/2020	36.76714	-108.04746
SJ13	12/17/2020	36.76709	-108.04684
SJ14	12/18/2020	36.76710	-108.04639
SJ15	12/18/2020	36.76299	-108.04476
SJ16	12/17/2020	36.76647	-108.04808
SJ17	12/17/2020	36.76650	-108.04733
SJ18	12/17/2020	36.76662	-108.04676
SJ19	12/18/2020	36.76657	-108.04643
SJ20	12/18/2020	36.76328	-108.04440
SJ21	12/17/2020	36.76597	-108.04808
SJ22	12/17/2020	36.76607	-108.04732
SJ23	12/17/2020	36.76619	-108.04678
SJ24	12/18/2020	36.76582	-108.04645
SJ25	12/18/2020	36.76380	-108.04443
SJ26	12/17/2020	36.76546	-108.04806
SJ27	12/17/2020	36.76546	-108.04739
SJ28	12/17/2020	36.76547	-108.04681
SJ29	12/18/2020	36.76455	-108.04440
SJ30	12/18/2020	36.76416	-108.04441
SJ31	12/17/2020	36.76491	-108.04808
SJ32	12/17/2020	36.76490	-108.04744
SJ33	12/16/2020	36.76485	-108.04674
SJ34	12/16/2020	36.76490	-108.04595
SJ35	12/16/2020	36.76479	-108.04551
SJ36	12/16/2020	36.76437	-108.04807
SJ37	12/16/2020	36.76439	-108.04744
SJ38	12/16/2020	36.76446	-108.04667
SJ39	12/16/2020	36.76434	-108.04581
SJ40	12/16/2020	36.76428	-108.04511
SJ41	12/16/2020	36.76379	-108.04805
SJ42	12/16/2020	36.76384	-108.04746
SJ43	12/16/2020	36.76407	-108.04666
SJ44	12/16/2020	36.76381	-108.04589
SJ45	12/16/2020	36.76375	-108.04529
SJ46	12/16/2020	36.76321	-108.04810
SJ47	12/16/2020	36.76317	-108.04740
SJ48	12/16/2020	36.76321	-108.04661
SJ49	12/16/2020	36.76329	-108.04590
SJ50	12/16/2020	36.76322	-108.04531

EPA TEST METHOD 25C TIER-2 LANDFILL GAS SAMPLING LOG

Page ___ of ___

Vista GeoScience
www.VistaGeoScience.com
130 Capital Drive, Suite C
Golden, CO 80401
PH: 303-277-1694

Project No.: 20173.01 | **Sampling Technician:** Matt Berkes | **Signature:**_____

CLIENT: Weaver | **Gas Meter:** | **Calibration Check** (date/time): 12/16 12/17 12/18

CLIENT FIELD REP: | **Rig/Probe:** 7822 DT | **Flowmeter** (ml/min):

LANDFILL NAME: San Juan Landfill | **Gas Meter:** Gem 5000+ | **Vacuum Guage:**

LANDFILL ADDRESS:

			SYSTEM PRE-PURGE TIME				IR GAS METER ANALYSIS					SUMMA CANNISTER PRESSURE- VOLUME								Depth (ft.)		Temp.	Temp.	
Date	Sample Location Number	Canister Lab I.D.	Start Time	End Time	Flow (ml/min)	Est. Vol. (Liters)	CH_4 %	CO_2 %	O_2 %	N_2 % Bal.	Total Check	Start Time	End Time	Start Flow	End Flow	Initial P. (mm Hg)	Final P. (mm Hg)	Δ Press. mmHg	Est. Δ Vol. Calc. (Liters)	Top	Btm	Bottom °F	Ambient °F	Ambient Press. (IN HG)
12/16/20	47	4697	9:26	9:31	400	2	54.5	45.4	0.0	0.0	99.9	9:31	9:36	200	200	-401.5	-286.6	-114.9	1	8	10	58	20	24.36
12/16/20	46	4697	9:39	9:45	400	2	55.4	35.6	2.2	6.4	99.6	9:45	9:50	200	200	-285.9	-170.9	-115	1	14	15	63	20	24.36
12/16/20	48	4697	10:02	10:07	400	2	53.7	46.3	0.0	0.0	100.0	10:07	10:12	200	200	-169.4	-54.7	-114.7	1	14	15	69	22	24.30
12/16/20	50	1362	10:31	10:36	400	2	54.3	45.8	0.0	0.0	100.1	10:36	10:41	200	200	-405.1	-290.7	-114.4	1	13	15	68	27	24.32
12/16/20	49	1362	10:43	10:48	400	2	56.3	43.8	0.0	0	100.1	10:48	10:53	200	200	-291.2	-176.6	-114.6	1	13	15	54	28	24.30
12/16/20	45	1362	10:56	11:01	400	2	49.3	50.7	0.0	0.0	100.0	11:01	11:06	200	200	-171.8	-56.3	-115.5	1	13	15	59	28	24.32
12/16/20	44	1394	11:20	11:25	400	2	58.9	41.1	0.0	0.0	100.0	11:25	11:30	200	200	-401.7	-286.5	-115.2	1	14	15	59	28	24.32
12/16/20	43	1394	11:33	11:38	400	2	58.6	40.4	0.0	0.0	99.0	11:38	11:43	200	200	-284.6	-169.1	-115.5	1	14	15	56	29	24.30
12/16/20	42	1394	11:57	12:03	400	2	52.6	47.3	0.0	0	99.9	12:03	12:08	200	200	-175.7	-60.6	-115.1	1	14	15	54	29	24.33
12/16/20	41	1234	12:45	12:50	400	2	56.7	43.3	0.0	0.0	100.0	12:50	12:55	200	200	-397.4	-282.4	-115.0	1	14	15	61	31	24.34
12/16/20	36	1234	12:58	13:03	400	2	59.3	40.8	0.0	0.0	100.1	13:03	13:08	200	200	-284.4	-169.6	-114.8	1	9	10	61	31	24.35
12/16/20	37	1234	13:11	13:16	400	2	56.4	43.6	0.0	0.0	100.0	13:16	13:21	200	200	-164.9	-49.8	-115.1	1	14	15	66	31	24.34
12/16/20	39	5436	13:40	13:45	400	2	48.8	51.3	0.0	0.0	100.1	13:45	13:50	200	200	-398.2	-283.6	-114.6	1	14	15	54	31	24.27
12/16/20	38	5436	13:56	14:01	400	2	56.4	43.1	0.0	0.0	99.5	14:01	14:06	200	200	-286.7	-168.4	-118.3	1	9	15	60	31	24.27
12/16/20	40	5436	14:29	14:34	400	2	48.1	51.9	0.0	0.0	100.0	14:34	14:39	200	200	-163.7	-48	-115.7	1	14	15	62	34	24.29
12/16/20	35	1412	14:57	15:02	400	2	55.9	43.8	0.4	0.0	100.1	15:02	15:07	200	200	-401.4	-284.2	-117.2	1	14	15	58	33	24.30
12/16/20	34	1412	15:10	15:15	400	2	54.0	46.0	0.0	0.0	100.0	15:15	15:20	200	200	-281.5	-166.1	-115.4	1	14	15	59	30	24.28
12/16/20	33	1412	15:33	15:35	400	2	58.3	41.7	0.0	0.0	100.0	15:38	15:43	200	200	-168.8	-53.8	-115.0	1	14	15	60	28	24.25
12/17/20	32	3647	8:22	8:27	400	2	52.7	47.3	<<<	0.0	100.0	8:27	8:32	200	200	-400.1	-285.5	-114.6	1	14	15	62	19	24.31
12/17/20	31	3647	8:36	8:41	400	2	35.2	41.7	<<<	4.5	81.4	8:41	8:46	200	200	-288.8	-173.8	-115.0	1	14	15	64	19	24.34
12/17/20	27	3647	10:14	10:19	400	2	54.7	45.4	<<<	0.0	100.1	10:19	10:24	200	200	-163.2	-48.4	-114.8	1	14	15	65	27	24.25
12/17/20	26	5947	10:40	10:45	400	2	55.6	44.4	<<<	0.0	100.0	10:45	10:50	200	200	-398.9	-283.3	-115.6	1	9	15	53	28	24.29

EPA TEST METHOD 25C TIER-2 LANDFILL GAS SAMPLING LOG

Page ___ of ___

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130 Capital Drive, Suite C
Golden, CO 80401
PH: 303-277-1694

Project No.: 20173.01 | **Sampling Technician:** Matt Berkes | **Signature:**_____

CLIENT: Weaver | **Gas Meter:** | **Calibration Check** (date/time): 12/16 12/17 12/18

CLIENT FIELD REP: | **Rig/Probe:** 7822 DT | **Flowmeter** (ml/min):

LANDFILL NAME: San Juan Landfill | **Gas Meter:** Gem 5000+ | **Vacuum Guage:**

LANDFILL ADDRESS:

			SYSTEM PRE-PURGE TIME				IR GAS METER ANALYSIS					SUMMA CANNISTER PRESSURE- VOLUME								Depth (ft.)		Temp.	Temp.	
Date	Sample Location Number	Canister Lab I.D.	Start Time	End Time	Flow (ml/min)	Est. Vol. (Liters)	CH_4 %	CO_2 %	O_2 %	N_2 % Bal.	Total Check	Start Time	End Time	Start Flow	End Flow	Initial P. (mm Hg)	Final P. (mm Hg)	Δ Press. mmHg	Est. Δ Vol. Calc. (Liters)	Top	Btm	Bottom °F	Ambient °F	Ambient Press. (IN HG)
12/17/20	21	5947	10:55	10:58	400	2	57.3	42.7	<<<	0.0	100.0	10:58	11:03	200	200	285.3	170.5	-114.8	1	14	15	61	28	24.29
12/17/20	16	5947	11:08	11:13	400	2	58.4	41.5	<<<	0.0	99.9	11:13	11:18	200	200	169.8	54.6	-115.2	1	9	15	69	28	24.29
12/17/20	11	1390	11:47	11:52	400	2	59.1	41.0	<<<	0.0	100.1	11:52	11:57	200	200	400.6	295.4	-105.2	1	14	15	62	30	24.28
12/17/20	6	1390	11:59	12:04	400	2	57.6	42.5	<<<	0.0	100.1	12:04	12:09	200	200	295.8	180.5	-115.3	1	14	15	58	31	24.27
12/17/20	1	1390	12:11	12:16	400	2	58.5	39.5	<<<	2.4	100.4	12:16	12:21	200	200	182.4	67.7	-114.7	1	14	15	56	31	24.28
12/17/20	2	3752	12:33	12:38	400	2	55.3	44.8	<<<	0.0	100.1	12:38	12:43	200	200	397.5	282.7	-114.8	1	14	15	69	31	24.26
12/17/20	7	3752	12:49	12:54	400	2	53.4	43.0	<<<	3.5	99.9	12:54	12:59	200	200	282.0	167.8	-114.2	1	14	15	66	31	24.23
12/17/20	12	3752	13:15	13:20	400	2	56.1	43.8	<<<	0.0	99.9	13:20	13:25	200	200	167.1	52.4	-114.7	1	14	15	58	35	24.25
12/17/20	17	3681	13:46	13:51	400	2	54.1	46.0	<<<	0.0	100.1	13:51	13:56	200	200	395.2	283.6	-111.6	1	14	15	59	33	24.17
12/17/20	22	3681	13:58	14:03	400	2	55.8	44.2	<<<	0.0	100.0	14:03	14:08	200	200	283.2	168.1	-115.1	1	14	15	54	34	24.17
12/17/20	28	3681	14:12	14:18	400	2	48.3	45.2	<<<	8.8	102.3	14:18	14:23	200	200	170.1	55	-115.1	1	14	15	64	34	24.15
12/17/20	23	5483	15:00	15:05	400	2	57.6	42.4	<<<	0.0	100.0	15:05	15:10	200	200	396.8	281.5	-115.3	1	14	15	58	34	24.17
12/17/20	18	5483	15:23	15:28	400	2	57.9	42.1	<<<	0.0	100.0	15:28	15:33	200	200	282.2	167.2	-115.0	1	14	15	61	33	24.17
12/17/20	13	5483	15:46	15:51	400	2	59.0	41.0	<<<	0.0	100.0	15:51	15:56	200	200	167.8	52.7	-115.1	1	14	15	61	33	24.17
12/18/20	8	1424	8:35	8:40	400	2	58.9	41.1	<<<	0.0	100.0	8:40	8:45	200	200	400.3	285.6	-114.7	1	14	15	56	28	24.25
12/18/20	3	1424	8:47	8:52	400	2	56.6	55.4	0.7	6.1	118.8	8:52	8:57	200	200	290.2	175.7	-114.5	1	9	15	54	29	24.29
12/18/20	4	1424	9:22	9:27	400	2	36.3	49.6	3.1	11.1	100.1	9:27	9:32	200	200	167.9	52.7	-115.2	1	9	10	54	32	24.29
12/18/20	14	3747	9:53	9:58	400	2	94.7	45.4	1.8	7.5	149.4	9:58	10:03	200	200	395.0	279.9	-115.1	1	14	15	69	33	24.29
12/18/20	9	3747	10:06	10:11	400	2	26.9	48.9	3.7	20.1	99.6	10:11	10:16	200	200	278.2	163.7	-114.5	1	19	20	60	34	24.28
12/18/20	19	3747	10:36	10:41	400	2	49.3	33.6	2.6	13.5	99.0	10:41	10:46	200	200	160.0	45.3	-114.7	1	19	20	58	34	24.29
12/18/20	24	3179	11:30	11:35	400	2	92.4	38.3	3.5	25.3	159.5	11:35	11:40	200	200	397.1	282.3	-114.8	1	14	15	54	34	24.29
12/18/20	29	3179	12:09	12:14	400	2	58.7	41.3	<<<	0.4	100.4	12:14	12:19	200	200	283.8	168.6	-115.2	1	14	15	55	35	24.29

EPA TEST METHOD 25C TIER-2 LANDFILL GAS SAMPLING LOG

Page ___ of ___

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130 Capital Drive, Suite C
Golden, CO 80401
PH: 303-277-1694

Project No.: 20173.01 | **Sampling Technician:** Matt Berkes | **Signature:**_____

CLIENT: Weaver | **Gas Meter:** | **Calibration Check** (date/time): 12/16 12/17 12/18

CLIENT FIELD REP: | **Rig/Probe:** 7822 DT | **Flowmeter** (ml/min):

LANDFILL NAME: San Juan Landfill | **Gas Meter:** Gem 5000+ | **Vacuum Guage:**

LANDFILL ADDRESS:

			SYSTEM PRE-PURGE TIME				IR GAS METER ANALYSIS					SUMMA CANNISTER PRESSURE- VOLUME								Depth (ft.)		Temp.	Temp.	
Date	Sample Location Number	Canister Lab I.D.	Start Time	End Time	Flow (ml/min)	Est. Vol. (Liters)	CH_4 %	CO_2 %	O_2 %	N_2 % Bal.	Total Check	Start Time	End Time	Start Flow	End Flow	Initial P. (mm Hg)	Final P. (mm Hg)	Δ Press. mmHg	Est. Δ Vol. Calc. (Liters)	Top	Btm	Bottom °F	Ambient °F	Ambient Press. (IN HG)
12/18/20	30	3179	12:22	12:27	400	2	56.2	43.7	0.0	0.0	99.9	12:27	12:32	200	200	163.3	47.6	-115.7	1	14	15	53	35	24.29
12/18/20	28	5485	12:51	12:56	400	2	56.7	43.6	0.0	0.0	100.3	12:56	13:01	200	200	393.1	278.5	-114.6	1	14	15	56	37	24.32
12/18/20	25	N4795	13:01	13:06	400	2	56.3	43.7	0.0	0.0	100.0	13:06	13:11	200	200	393.0	278.6	-114.4	1	14	15	54	37	24.32
12/18/20	20	N4795	13:12	13:17	400	2	57.5	42.6	0.0	0.0	100.1	13:17	13:22	200	200	278.8	163.6	-115.2	1	14	15	52	38	24.29
12/18/20	20	5485	13:22	13:27	400	2	57.5	42.6	0.0	0.0	100.1	13:27	13:32	200	200	280.3	165.8	-114.5	1	14	15	52	38	24.28
12/18/20	15	5485	13:33	13:38	400	2	57.3	42.9	<<<	0.0	100.2	13:38	13:43	200	200	171.5	56.3	-115.2	1	14	15	55	38	24.27
12/18/20	15	N5485	13:43	13:48	400	2	57.3	42.7	<<<	0.0	100.0	13:48	13:53	200	200	166.5	51.4	-115.1	1	14	15	55	39	24.26
12/18/20	5	6014	14:19	14:24	400	2	54.2	38.2	0.0	6.9	99.3	14:24	14:29	200	200	390.0	275.6	-114.4	1	14	15	57	39	24.26
12/18/20	10	6014	14:37	14:42	400	2	48.8	36.9	2.4	11.9	100.0	14:41	14:47	200	200	276.7	161.3	-115.4	1	14	15	59	39	24.25

5 DAILY REPORTS

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Vista GeoScience Daily Drilling Services Report

This is NOT an invoice, but the information will be used for invoicing purposes.
To be completed at the end of each day and signed by Vista GeoScience and Client Representatives.

PROJECT INFORMATION	VISTA Project#: 20197	DATE: 12/16/2020	RIG: 7822
Vista Field Engineers: TS MB		Utility Locate Ticket Number:	
Client: Waste Management		Site Manager:	
Client Project Name: San Juan Landfill		Client Project Number:	
Site Description:		Site Address:	

DAILY TIME REPORT (use 24-hour clock)			Time Exceeded 4 Hr Min: YES / NO
Day Number:	Total Hours on Site: 9		Mobilization Mileage:
Time Requested on Location: 730	Client's Standby Hours:		To Site: 15
Time on Location: 730	- Vista's Standby Hours:		Return: 15
Time off Location: 1630	- Lunch / Break Hours:		Total: 30
Lunch Break - From: — To: —	= Total Bill Hours @ Level: [D]: 9		Drive Hours: 1/2

Standby Sessions (describe):

EXPENDABLES USED AND DAMAGED TOOLS (circle or fill in bracketed items)

QTY	ITEM
LINERS/TUBING	
	[ ]" Soil Core Liners (ea) Type:
	[ ]" Soil Core Liners (ea) Type:
	Other Liners:[ ]
	[1/4"], [3/8"] or [1/2"] Polyethylene Tubing (ft)
	3/8" Silicone Tubing (ft)
	Other Tubing:[ ]
EXPENDABLES/PVC	
19	[ ]" Expendable Points (ea)
	[ ]" [Grip Anchor Point] or [Expendable Cutting Shoe] (circle)
	[ ]" x 5' PVC Riser (section) Sch [ ]
	[ ]" x 10' PVC Riser (section) Sch [ ]
	[ ]" x 5' PVC Screen (section) Sch [ ]
	[ ]" x 10' PVC Screen (section) Sch [ ]
	[ ]" TFJ PVC Plug/Cap (ea)
	[ ]" PVC Slip Cap (ea)
SUPPLIES	
	[ ]" J-Plug and Lock (set)
	[ ]" x [ ]' Prepacked Screen (ea)
	Flush-Mount Traffic Cover ["] Diameter
	4" x 4" x 5' Sq. Steel Protective Well Cover/Riser
	Concrete Anchor Bolts
	[30] or [55] gallon Drum, each

QTY	ITEM
ABANDONMENT MATERIALS	
4	Bentonite [Granular], [Chip], [Powder] (50# bag)
	Silica Sand (50# bag)
	Portland Cement (94# bag)
	[Asphalt Patch], [Concrete] (lb. bag)
RENTAL EQUIPMENT/CONTRACT:	
	Pump: [ ]
1	[PID/OVM] or [LandTec] Gem 5000
	Exhaust Fan / Ductwork / CO Monitor
	Subcontracted Concrete Coring / Barricading
	3.25" Casing and Auger Add-On
	[Decon] or [Support] Trailer / Truck
	Gamma Logger
	Core Drill: [ ]" x [ ]" x [ ]"
	Generator
Additional Items Used / Damaged Tools / PPE:	
1	Tyvek gas free suit
1	GPS

APPROVALS & SIGNATURES

Vista Field Engineer: [signature] Client's Supervisor:

NOTES: 18 locations completed — Samples Returned to Vista Lab ☐

OPS DPT footage:[ ] OPS 1" Well Material Footage:[ ] OPS Auger Footage:[ ] OPS 2" Well Material Footage:[ ]

#Total Test Holes:[ ] #Cores:[ ] H2O Samples:[ ] Gamma Log Ft:[ ] Total Drilled Ft:[ ] Well Ft:[ ] #Wells:[ ]

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Vista GeoScience Daily Drilling Services Report

This is NOT an invoice, but the information will be used for invoicing purposes.
To be completed at the end of each day and signed by Vista GeoScience and Client Representatives.

PROJECT INFORMATION	VISTA Project#: 20197	DATE: 12/17/2020	RIG: 7822
Vista Field Engineers: TB, MB	Utility Locate Ticket Number:		
Client: Waste Management	Site Manager:		
Client Project Name:	Client Project Number:		
Site Description:	Site Address:		

DAILY TIME REPORT	(use 24-hour clock)	Time Exceeded 4 Hr Min: YES / NO
Day Number: 2	Total Hours on Site: 9	**Mobilization Mileage:**
Time Requested on Location: 730	Client's Standby Hours:	To Site: 15
Time on Location: 730	- Vista's Standby Hours:	Return: 15
Time off Location: 1630	- Lunch / Break Hours:	Total: 30
Lunch Break - From: — To: —	= Total Bill Hours @ Level: [1]: 9	Drive Hours: 1/2

Standby Sessions (describe):

EXPENDABLES USED AND DAMAGED TOOLS (circle or fill in bracketed items)

QTY	ITEM	QTY	ITEM
LINERS/TUBING		**ABANDONMENT MATERIALS**	
	[ ]' Soil Core Liners (ea) Type:	4	Bentonite [Granular], [Chip], [Powder] (50# bag)
	[ ]' Soil Core Liners (ea) Type:		Silica Sand (50# bag)
	Other Liners:[ ]		Portland Cement (94# bag)
	[1/4"], [3/8"] or [1/2"] Polyethylene Tubing (ft)		[Asphalt Patch], [Concrete] (lb. bag)
	3/8" Silicone Tubing (ft)		
	Other Tubing:[ ]		
EXPENDABLES/PVC		**RENTAL EQUIPMENT/CONTRACT:**	
20	[1]" Expendable Points (ea):		Pump: [ ]
	[ ]" [Grip Anchor Point] or [Expendable Cutting Shoe] (circle)	1	[PID/OVM] or ~~[Land Tec]~~ Ion 5000
	[ ]" x 5' PVC Riser (section) Sch [ ]		Exhaust Fan / Ductwork / CO Monitor
	[ ]" x 10' PVC Riser (section) Sch [ ]		Subcontracted Concrete Coring / Barricading
	[ ]" x 5' PVC Screen (section) Sch [ ]		3.25" Casing and Auger Add-On
	[ ]" x 10' PVC Screen (section) Sch [ ]		[Decon] or [Support] Trailer / Truck
	[ ]" TFJ PVC Plug/Cap (ea)		Gamma Logger
	[ ]" PVC Slip Cap (ea)		Core Drill: [ ]" x [ ]" x [ ]"
			Generator
SUPPLIES			
	[ ]" J-Plug and Lock (set)		
	[ ]" x [ ]' Prepacked Screen (ea)	**Additional Items Used / Damaged Tools / PPE:**	
	Flush-Mount Traffic Cover ["] Diameter	1	Tyvek Tree
	4" x 4" x 5' Sq. Steel Protective Well Cover/Riser	1	LPS
	Concrete Anchor Bolts		
	[30] or [55] gallon Drum, each		

APPROVALS & SIGNATURES

Vista Field Engineer: Ted Stockwell Client's Supervisor:

NOTES: 18 locations completed Samples Returned to Vista Lab ☐

OPS DPT footage:['] OPS 1" Well Material Footage:['] OPS Auger Footage:['] OPS 2" Well Material Footage:[']

#Total Test Holes:[ ] #Cores:[ ] H2O Samples:[ ] Gamma Log Ft:[ ] Total Drilled Ft:[ ] Well Ft:[ ] #Wells:[ ]

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Vista GeoScience Daily Drilling Services Report

This is NOT an invoice, but the information will be used for invoicing purposes.
To be completed at the end of each day and signed by Vista GeoScience and Client Representatives.

PROJECT INFORMATION	VISTA Project#: 20197.01	DATE: 12/18/2020	RIG: 7822
Vista Field Engineers: TS MB		Utility Locate Ticket Number:	
Client: Waste Management		Site Manager:	
Client Project Name:		Client Project Number:	
Site Description:		Site Address:	

DAILY TIME REPORT	(use 24-hour clock)	Time Exceeded 4 Hr Min: ~~YES~~ / NO
Day Number: 3	Total Hours on Site: 9	**Mobilization Mileage:**
Time Requested on Location: 730	Client's Standby Hours:	To Site: 15
Time on Location: 730	- Vista's Standby Hours:	Return: 15
Time off Location: 1630	- Lunch / Break Hours:	Total: 30
Lunch Break - From: — To: —	= Total Bill Hours @ Level: [D]: 9	Drive Hours: 1/2
Standby Sessions (describe):		

EXPENDABLES USED AND DAMAGED TOOLS (circle or fill in bracketed items)

QTY	ITEM	QTY	ITEM
LINERS/TUBING		**ABANDONMENT MATERIALS**	
	[ ]' Soil Core Liners (ea) Type:	3	Bentonite [~~Granular~~] [Chip], [Powder] (50# bag)
	[ ]' Soil Core Liners (ea) Type:		Silica Sand (50# bag)
	Other Liners:[ ]		Portland Cement (94# bag)
	[1/4"], [3/8"] or [1/2"] Polyethylene Tubing (ft)		[Asphalt Patch], [Concrete] (____lb. bag)
	3/8" Silicone Tubing (ft)		
	Other Tubing:[ ]		
EXPENDABLES/PVC		**RENTAL EQUIPMENT/CONTRACT:**	
18	[ ]" Expendable Points (ea):		Pump: [ ]
	[ ]" [Grip Anchor Point] or [Expendable Cutting Shoe] (circle)	1	[~~PID/OVM~~] or [LandTec] 6cm 5000
	[ ]" x 5' PVC Riser (section) Sch [ ]		Exhaust Fan / Ductwork / CO Monitor
	[ ]" x 10' PVC Riser (section) Sch [ ]		Subcontracted Concrete Coring / Barricading
	[ ]" x 5' PVC Screen (section) Sch [ ]		3.25" Casing and Auger Add-On
	[ ]" x 10' PVC Screen (section) Sch [ ]		[Decon] or [Support] Trailer / Truck
	[ ]" TFJ PVC Plug/Cap (ea)		Gamma Logger
	[ ]" PVC Slip Cap (ea)		Core Drill: [ ]" x [ ]" x [ ]"
			Generator
SUPPLIES			
	[ ]" J-Plug and Lock (set)		
	[ ]" x [ ]' Prepacked Screen (ea)	**Additional Items Used / Damaged Tools / PPE:**	
	Flush-Mount Traffic Cover ["] Diameter	1	Tier II free
	4" x 4" x 5' Sq. Steel Protective Well Cover/Riser	1	6B
	Concrete Anchor Bolts		
	[30] or [55] gallon Drum, each		

APPROVALS & SIGNATURES

Vista Field Engineer: [signature] Client's Supervisor:

NOTES: 14 locations completed Samples Returned to Vista Lab ☐

OPS DPT footage:['] OPS 1" Well Material Footage:['] OPS Auger Footage:['] OPS 2" Well Material Footage:[']

#Total Test Holes:[ ] #Cores:[ ] H2O Samples:[ ] Gamma Log Ft:[ ] Total Drilled Ft:[ ] Well Ft:[ ] #Wells:[ ]

Vista GeoScience Daily Drilling Services Report

This is NOT an invoice, but the information will be used for invoicing purposes.
To be completed at the end of each day and signed by Vista GeoScience and Client Representatives.

PROJECT INFORMATION	VISTA Project#: 20173	DATE: 12/19/2020	RIG: 7822DT
Vista Field Engineers: TS, MB	Utility Locate Ticket Number:		
Client: Weaver	Site Manager:		
Client Project Name:	Client Project Number:		
Site Description: San Juan Landfill	Site Address:		

DAILY TIME REPORT (use 24-hour clock)		Time Exceeded 4 Hr Min: YES / NO
Day Number: 4	Total Hours on Site:	Mobilization Mileage:
Time Requested on Location:	Client's Standby Hours:	To Site: —
Time on Location:	- Vista's Standby Hours:	Return: 425
Time off Location:	- Lunch / Break Hours:	Total: 425
Lunch Break - From: To:	= Total Bill Hours @ Level: [ ]:	Drive Hours: 8
Standby Sessions (describe):		

EXPENDABLES USED AND DAMAGED TOOLS (circle or fill in bracketed items)

QTY	ITEM	QTY	ITEM
LINERS/TUBING		**ABANDONMENT MATERIALS**	
	[ ]' Soil Core Liners (ea) Type:		Bentonite [Granular], [Chip], [Powder] (50# bag)
	[ ]' Soil Core Liners (ea) Type:		Silica Sand (50# bag)
	Other Liners:[ ]		Portland Cement (94# bag)
	[1/4"] , [3/8"] or [1/2"] Polyethylene Tubing (ft)		[Asphalt Patch], [Concrete] (lb. bag)
	3/8" Silicone Tubing (ft)		
	Other Tubing:[ ]		
EXPENDABLES/PVC		**RENTAL EQUIPMENT/CONTRACT:**	
	[ ]" Expendable Points (ea):		Pump: [ ]
	[ ]" [Grip Anchor Point] or [Expendable Cutting Shoe] (circle)		[PID/OVM] or [LandTec]
	[ ]" x 5' PVC Riser (section) Sch [ ]		Exhaust Fan / Ductwork / CO Monitor
	[ ]" x 10' PVC Riser (section) Sch [ ]		Subcontracted Concrete Coring / Barricading
	[ ]" x 5' PVC Screen (section) Sch [ ]		3.25" Casing and Auger Add-On
	[ ]" x 10' PVC Screen (section) Sch [ ]		[Decon] or [Support] Trailer / Truck
	[ ]" TFJ PVC Plug/Cap (ea)		Gamma Logger
	[ ]" PVC Slip Cap (ea)		Core Drill: [ ]" x [ ]" x [ ]"
			Generator
SUPPLIES			
	[ ]" J-Plug and Lock (set)		
	[ ]" x [ ]' Prepacked Screen (ea)	**Additional Items Used / Damaged Tools / PPE:**	
	Flush-Mount Traffic Cover ["] Diameter		
	4" x 4" x 5' Sq. Steel Protective Well Cover/Riser		
	Concrete Anchor Bolts		
	[30] or [55] gallon Drum, each		

APPROVALS & SIGNATURES

Vista Field Engineer: Ted Hoekstra Client's Supervisor:

NOTES: Mobilization back to Vista Geoscience Samples Returned to Vista Lab ☐

OPS DPT footage:['] OPS 1" Well Material Footage:['] OPS Auger Footage:['] OPS 2" Well Material Footage:[']

#Total Test Holes:[ ] #Cores:[ ] H2O Samples:[ ] Gamma Log Ft:[ ] Total Drilled Ft:[ ] Well Ft:[ ] #Wells:[ ]

Landtec GEM 2000 (+) Calibration Log							
Date/Time				12/16 800			
Technician				MB			
VGS Project Number				20173			
Ambient Air Readings							
CH4	**CO2**	**O2**	**Balance**				
41.7	35.5	0.0					
Pre-Calibration Gas Reading (Tank 1)							
CH4	**CO2**						
50.0	35.0	0.0					
Post-Calibration Gas Reading (Tank 1)							
CH4	**CO2**						
Pre-Calibration Gas Reading (Tank 2)							
CH4	**O2**	**H2S**	**CO**				
2.6	~~16.3~~ 0.2	450	51				
Pre-Calibration Gas Reading (Tank 2)							
CH4	**O2**	**H2S**	**CO**				
2.5	18.0	456	50				
Pre-Calibration Gas Reading (Tank 3)							
O2							
4.2							
Pre-Calibration Gas Reading (Tank 3)							
O2							
4.0							
Calibration Gas % Used							
	CH4	**CO2**	**O2**	**Nitrogen Balance**		**H2S**	**CO**
Tank 1	50.0	35.0	N/A	BAL		N/A	N/A
Tank 2	2.5	N/A	18.0	BAL		10ppm	50ppm
Tank 3	N/A	N/A	4	BAL		N/A	N/A
Comments							

***Note:** For a complete calibration, zero Oxygen using Tank 1 and zero Methane using Tank 2. Carbon Dioxide cannot be zeroed using a GEM model 2000 or 2000 plus.

Landtec GEM 2000 (+) Calibration Log							
Date/Time				12/17/20 7:45			
Technician				MD			
VGS Project Number				20173			
Ambient Air Readings							
CH4	**CO2**	**O2**	**Balance**				
Pre-Calibration Gas Reading (Tank 1)							
CH4	**CO2**						
47.1	34.4						
Post-Calibration Gas Reading (Tank 1)							
CH4	**CO2**						
50.0	35.0						
Pre-Calibration Gas Reading (Tank 2)							
CH4	**O2**	**H2S**	**CO**				
2.6	17.2	410	55				
Pre-Calibration Gas Reading (Tank 2)							
CH4	**O2**	**H2S**	**CO**				
2.5	18.2	416	50				
Pre-Calibration Gas Reading (Tank 3)							
O2							
3.7							
Pre-Calibration Gas Reading (Tank 3)							
O2							
~~4.0~~ 4.0							
Calibration Gas % Used							
	CH4	**CO2**	**O2**	**Nitrogen Balance**		**H2S**	**CO**
Tank 1	50.0	35.0	N/A	BAL		N/A	N/A
Tank 2	2.5	N/A	18.0	BAL		10ppm	50ppm
Tank 3	N/A	N/A	4	BAL		N/A	N/A
Comments	H2S extremely high, which is just typical for tank 2.						

***Note:** For a complete calibration, zero Oxygen using Tank 1 and zero Methane using Tank 2. Carbon Dioxide cannot be zeroed using a GEM model 2000 or 2000 plus.

Landtec GEM 2000 (+) Calibration Log							
Date/Time				2/8/20			
Technician				MLS			
VGS Project Number				20173			
Ambient Air Readings							
CH4	CO2	O2	Balance				
Pre-Calibration Gas Reading (Tank 1)							
CH4	CO2						
49.2	55.0						
Post-Calibration Gas Reading (Tank 1)							
CH4	CO2						
50.0	55.0						
Pre-Calibration Gas Reading (Tank 2)							
CH4	O2	H2S	CO				
2.7	17.8	304	51				
Pre-Calibration Gas Reading (Tank 2)							
CH4	O2	H2S	CO				
2.5	18.0	505	50				
Pre-Calibration Gas Reading (Tank 3)							
O2							
4.5							
Pre-Calibration Gas Reading (Tank 3)							
O2							
4.0							

Calibration Gas % Used						
	CH4	CO2	O2	Nitrogen Balance	H2S	CO
Tank 1	50.0	35.0	N/A	BAL	N/A	N/A
Tank 2	2.5	N/A	18.0	BAL	10ppm	50ppm
Tank 3	N/A	N/A	4	BAL	N/A	N/A

Comments H2S reading were higher than tank 2 H2S concentration.

***Note:** For a complete calibration, zero Oxygen using Tank 1 and zero Methane using Tank 2. Carbon Dioxide cannot be zeroed using a GEM model 2000 or 2000 plus.

APPENDIX B

LABORATORY RESULTS AND INFORMATION

Air TECHNOLOGY Laboratories, Inc.

January 27, 2021

LA Cert #04140
EPA Methods TO3, TO14A, TO15, 25C/3C, RSK-175
TX Cert T104704450-14-6
EPA Methods TO14A, TO15
UT Cert CA0133332015-3
EPA Methods TO3, TO14A, TO15, RSK-175

Vista Geoscience
ATTN: Ted Stockwell
130 Capital Dr., Suite A
Golden, CO 80401

LABORATORY TEST RESULTS

Project Reference: San Juan Landfill Tier II
Project Number: 20173
Lab Number: L122401-01/18

Enclosed are **revised** results for sample(s) received 12/24/20 by Air Technology Laboratories. This revision replaces the report dated 1/19/21 in its entirety. Samples were received intact. Analyses were performed according to specifications on the chain of custody provided with the sample(s).

Report Narrative:

- Report revised to only include results for samples requested, per client's request.
- Unless otherwise noted in the report, sample analyses were performed within method performance criteria and meet all requirements of the TNI Standards.
- The enclosed results relate only to the sample(s).

Preliminary results were e-mailed to Ted Stockwell on 1/18/21.

ATL appreciates the opportunity to provide testing services to your company. If you have any questions regarding these results, please call me at (626) 964-4032.

Sincerely,

Mark Johnson
Operations Manager
MJohnson@AirTechLabs.com

Note: The cover letter is an integral part of this analytical report.

AirTECHNOLOGY Laboratories, Inc.
18501 E. Gale Ave., Suite 130
City of Industry, CA 91748
Ph: 626-964-4032
Fx: 626-964-5832

CHAIN OF CUSTODY RECORD

TURNAROUND TIME
Standard [X] 48 hours [ ]
Same Day [ ] 72 hours [ ]
24 hours [ ] 96 hours [ ]
Other:

DELIVERABLES
EDD [ ]
EDF [ ]
LEVEL 3 [ ]
LEVEL 4 [ ]

PAGE: 1 OF 2

Condition upon receipt:
Sealed Yes [ ] No [ ]
Intact Yes [ ] No [ ]
Chilled _____ deg C

Project No.:	20173
Project Name:	San Juan Landfill Tier II
Report To:	Ted Stockwell
Company:	Vista GeoScience
Street:	130 Capital Drive, Suite A
City/State/Zip:	Golden, CO 80401
Phone& Fax:	303-277-1614
e-mail:	tstockwell@vistageoscience.com

BILLING
P.O. No.: 1797
Bill to: Vista Geoscience

ANALYSIS REQUEST
25C/13C ind. ethane and propane

LAB USE ONLY	SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	MATRIX	CONTAINER TYPE	25C/13C ind. ethane and propane					
L122401-01	4697 47, 46, 48	12/16/20	0931	Gas	Summa	X					
-02	1362 50, 49, 45	12/16/20	1036	Gas	Summa	X					
-03	1394 44, 43, 42	12/16/20	1125	Gas	Summa	X					
-04	1234 41, 36, 37	12/16/20	1250	Gas	Summa	X					
-05	5436 39, 38, 40	12/16/20	1345	Gas	Summa	X					
-06	1412 35, 34, 33	12/16/20	1502	Gas	Summa	X					
-07	3647 32, 31, 27	12/17/20	0827	Gas	Summa	X					
-08	5947 26, 21, 16	12/17/20	1045	Gas	Summa	X					
-09	1390 11, 6, 1	12/17/20	1152	Gas	Summa	X					
-10	5752 2, 7, 12	12/17/20	1258	Gas	Summa	X					

SAMPLED BY	COMPANY	DATE/TIME
Matthew Berkes	Vista GeoScience	12/16-12/17/20

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
NAME/COMPANY	12/22/20	NAME/COMPANY	
Ted Stockwell/Vista Geoscience	11:30		
NAME/COMPANY		NAME/COMPANY	
UPS	12/24/20	[illegible]	12/24/20 1104
NAME/COMPANY		NAME/COMPANY	

COMMENTS

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CHAIN OF CUSTODY RECORD

AirTECHNOLOGY Laboratories, Inc.
18501 E. Gale Ave., Suite 130
City of Industry, CA 91748
Ph: 626-964-4032
Fx: 626-964-5832

PAGE: 2 OF 2

TURNAROUND TIME
Standard [X] 48 hours [ ]
Same Day [ ] 72 hours [ ]
24 hours [ ] 96 hours [ ]
Other:

DELIVERABLES
EDD [ ]
EDF [ ]
LEVEL 3 [ ]
LEVEL 4 [ ]

Condition upon receipt:
Sealed Yes [ ] No [ ]
Intact Yes [ ] No [ ]
Chilled _____ deg C

Project No.:	20175
Project Name:	San Juan Landfill Tier II
Report To:	Ted Stockwell
Company:	Vista GeoScience
Street:	150 Capital Drive, Suite A
City/State/Zip:	Golden, CO 80401
Phone& Fax:	303-277-1694
e-mail:	tstockwell@vistageoscience.com

BILLING
P.O. No.: 1292
Bill to: Vista GeoScience

ANALYSIS REQUEST

LAB USE ONLY	SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	MATRIX	CONTAINER TYPE	25C/3C incl. canister equipment	Hold for Duplicate				
L122401-11	3681 17, 22, 28	12/17/20	1351	Gas	Summa	X					
-12	5483 25, 18, 13	12/17/20	1505	Gas	Summa	X					
-13	1424 8, 3, 4	12/18/20	0840	Gas	Summa	X					
-14	3747 14, 9, 19	12/18/20	0958	Gas	Summa	X					
-15	379 24, 29, 30	12/18/20	1135	Gas	Summa	X					
-16	5485 25, 20, 15	12/18/20	1256	Gas	Summa	X					
-17	N4775 25, 20, 15	12/18/20	1506	Gas	Summa		X				
-18	6014 5, 10	12/18/20	1424	Gas	Summa	X					

SAMPLED BY	COMPANY	DATE/TIME
Matthew Bokes	Vista GeoScience	12/17-12/18/20

RELINQUISHED BY	DATE/TIME	RECEIVED BY	DATE/TIME
NAME/COMPANY: Ted Stockwell/Vista	12/22/2020 11:30	NAME/COMPANY:	
NAME/COMPANY: MS	12/24/20	NAME/COMPANY: DHT	12/24/20 1105
NAME/COMPANY:		NAME/COMPANY:	

COMMENTS

DISTRIBUTION: White & Yellow - Lab Copies / Pink - Customer Copy

Client:	**Vista Geoscience**
Attn:	**Ted Stockwell**
Project Name:	**San Juan Landfill Tier II**
Project No.:	**20173**
Date Received:	**12/24/2020**
Matrix:	**Air**

TNMOC by EPA METHOD 25C
Fixed Gases by EPA METHOD 3C

Lab No.:	L122401-01		L122401-02		L122401-03		L122401-04	
Client Sample I.D.:	47, 46, 48		50, 49, 45		44, 43, 42		41, 36, 37	
Date/Time Sampled:	12/16/20 9:31		12/16/20 10:36		12/16/20 11:25		12/16/20 12:50	
Date/Time Analyzed:	1/6/21 17:49		1/6/21 18:33		1/6/21 19:16		1/6/21 20:00	
QC Batch No.:	210106GC8A2		210106GC8A2		210106GC8A2		210106GC8A2	
Analyst Initials:	CM		CM		CM		CM	
Dilution Factor:	3.4		3.4		3.4		3.4	
ANALYTE (Units)	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
TNMOC N2 corrected (ppmv-C)	3,400	34	4,600	34	3,900	34	5,400	34
TNMOC O2 corrected (ppmv-C)	3,400	34	4,600	34	3,900	34	5,200	34
TNMOC uncorrected (ppmv-C)	3,000	34	4,400	34	3,700	34	4,900	34
Nitrogen (% v/v)	6.7	3.4	ND	3.4	ND	3.4	4.7	3.4
Oxygen/Argon (% v/v)	ND	1.7	ND	1.7	ND	1.7	ND	1.7
Carbon Dioxide (% v/v)	43	0.034	46	0.034	43	0.034	41	0.034
Methane (% v/v)	52	0.0034	52	0.0034	56	0.0034	52	0.0034

RL = Reporting Limit
ND = Not detected at or above the RL.
TNMOC = Total Non-Methane Organic Compounds
ppmv-C = parts per million by volume as carbon
TNMOC N2 corrected (applicable if N2 < 20%)
TNMOC O2 corrected (applicable if N2 > 20% and O2 < 5%)
TNMOC uncorrected = not corrected for N2, O2 or moisture

Reviewed/Approved By: _____ Date 1/15/21
Mark Johnson
Operations Manager

The cover letter is an integral part of this analytical report

Client:	**Vista Geoscience**
Attn:	**Ted Stockwell**
Project Name:	**San Juan Landfill Tier II**
Project No.:	**20173**
Date Received:	**12/24/2020**
Matrix:	**Air**

TNMOC by EPA METHOD 25C
Fixed Gases by EPA METHOD 3C

Lab No.:	L122401-05		L122401-06		L122401-07		L122401-08	
Client Sample I.D.:	39, 38, 40		35, 34, 33		32, 31, 27		26, 21, 16	
Date/Time Sampled:	12/16/20 13:45		12/16/20 15:02		12/17/20 8:27		12/17/20 10:45	
Date/Time Analyzed:	1/6/21 20:43		1/6/21 21:27		1/6/21 22:39		1/6/21 23:37	
QC Batch No.:	210106GC8A2		210106GC8A2		210106GC8A2		210106GC8A2	
Analyst Initials:	CM		CM		CM		CM	
Dilution Factor:	3.3		3.3		3.3		3.4	
ANALYTE (Units)	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
TNMOC N2 corrected (ppmv-C)	5,500	33	5,500	33	3,600	33	5,300	34
TNMOC O2 corrected (ppmv-C)	5,400	33	5,400	33	3,500	33	5,100	34
TNMOC uncorrected (ppmv-C)	5,100	33	5,200	33	3,300	33	4,900	34
Nitrogen (% v/v)	ND	3.3	ND	3.3	5.8	3.3	4.5	3.4
Oxygen/Argon (% v/v)	ND	1.6	ND	1.6	ND	1.6	ND	1.7
Carbon Dioxide (% v/v)	47	0.033	43	0.033	43	0.033	41	0.034
Methane (% v/v)	48	0.0033	54	0.0033	52	0.0033	56	0.0034

RL = Reporting Limit
ND = Not detected at or above the RL.
TNMOC = Total Non-Methane Organic Compounds
ppmv-C = parts per million by volume as carbon
TNMOC N2 corrected (applicable if N2 < 20%)
TNMOC O2 corrected (applicable if N2 > 20% and O2 < 5%)
TNMOC uncorrected = not corrected for N2, O2 or moisture

Reviewed/Approved By: _____ Date 1/15/21
Mark Johnson
Operations Manager

The cover letter is an integral part of this analytical report

Client:	**Vista Geoscience**
Attn:	**Ted Stockwell**
Project Name:	**San Juan Landfill Tier II**
Project No.:	**20173**
Date Received:	**12/24/2020**
Matrix:	**Air**

TNMOC by EPA METHOD 25C
Fixed Gases by EPA METHOD 3C

Lab No.:	L122401-09		L122401-10		L122401-11		L122401-12	
Client Sample I.D.:	11, 6, 1		2, 7, 12		17, 22, 28		23, 18, 13	
Date/Time Sampled:	12/17/20 11:52		12/17/20 12:38		12/17/20 13:51		12/17/20 15:05	
Date/Time Analyzed:	1/7/21 0:34		1/7/21 1:32		1/7/21 2:30		1/7/21 3:13	
QC Batch No.:	210106GC8A2		210106GC8A2		210106GC8A2		210106GC8A2	
Analyst Initials:	CM		CM		CM		CM	
Dilution Factor:	3.4		3.3		3.4		3.3	
ANALYTE (Units)	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**	**Result**	**RL**
TNMOC N2 corrected (ppmv-C)	4,500	34	4,800	33	4,800	34	5,100	33
TNMOC O2 corrected (ppmv-C)	4,300	34	4,600	33	4,200	34	5,100	33
TNMOC uncorrected (ppmv-C)	4,100	34	4,400	33	4,000	34	4,900	33
Nitrogen (% v/v)	3.7	3.4	4.2	3.3	11	3.4	ND	3.3
Oxygen/Argon (% v/v)	ND	1.7	ND	1.6	ND	1.7	ND	1.6
Carbon Dioxide (% v/v)	38	0.034	40	0.033	42	0.034	38	0.033
Methane (% v/v)	56	0.0034	52	0.0033	47	0.0034	57	0.0033

RL = Reporting Limit
ND = Not detected at or above the RL.
TNMOC = Total Non-Methane Organic Compounds
ppmv-C = parts per million by volume as carbon
TNMOC N2 corrected (applicable if N2 < 20%)
TNMOC O2 corrected (applicable if N2 > 20% and O2 < 5%)
TNMOC uncorrected = not corrected for N2, O2 or moisture

Reviewed/Approved By: _____ Date 1/15/21
Mark Johnson
Operations Manager

The cover letter is an integral part of this analytical report

Client:	Vista Geoscience
Attn:	Ted Stockwell
Project Name:	San Juan Landfill Tier II
Project No.:	20173
Date Received:	12/24/2020
Matrix:	Air

TNMOC by EPA METHOD 25C
Fixed Gases by EPA METHOD 3C

Lab No.:	L122401-13		L122401-14		L122401-15		L122401-16	
Client Sample I.D.:	8, 3, 4		14, 9, 19		24, 29, 30		25, 20, 15	
Date/Time Sampled:	12/18/20 8:40		12/18/20 9:58		12/18/20 11:35		12/18/20 12:56	
Date/Time Analyzed:	1/7/21 4:26		1/7/21 5:23		1/7/21 6:21		1/7/21 7:19	
QC Batch No.:	210106GC8A2		210106GC8A2		210106GC8A2		210106GC8A2	
Analyst Initials:	CM		CM		CM		CM	
Dilution Factor:	3.4		3.4		3.4		3.4	
ANALYTE (Units)	Result	RL	Result	RL	Result	RL	Result	RL
TNMOC N2 corrected (ppmv-C)	4,000	34	7,400	34	4,300	34	2,400	34
TNMOC O2 corrected (ppmv-C)	3,900	34	6,700	34	4,000	34	2,400	34
TNMOC uncorrected (ppmv-C)	3,500	34	5,600	34	3,600	34	2,300	34
Nitrogen (% v/v)	7.4	3.4	16	3.4	11	3.4	ND	3.4
Oxygen/Argon (% v/v)	ND	1.7	2.7	1.7	ND	1.7	ND	1.7
Carbon Dioxide (% v/v)	42	0.034	45	0.034	36	0.034	40	0.034
Methane (% v/v)	50	0.0034	36	0.0034	50	0.0034	54	0.0034

RL = Reporting Limit
ND = Not detected at or above the RL.
TNMOC = Total Non-Methane Organic Compounds
ppmv-C = parts per million by volume as carbon
TNMOC N2 corrected (applicable if N2 < 20%)
TNMOC O2 corrected (applicable if N2 > 20% and O2 < 5%)
TNMOC uncorrected = not corrected for N2, O2 or moisture

Reviewed/Approved By: _____ Date 1/15/21
Mark Johnson
Operations Manager

The cover letter is an integral part of this analytical report

Client:	**Vista Geoscience**
Attn:	**Ted Stockwell**
Project Name:	**San Juan Landfill Tier II**
Project No.:	**20173**
Date Received:	**12/24/2020**
Matrix:	**Air**

TNMOC by EPA METHOD 25C
Fixed Gases by EPA METHOD 3C

Lab No.:	L122401-18
Client Sample I.D.:	5, 10
Date/Time Sampled:	12/18/20 14:24
Date/Time Analyzed:	1/7/21 8:55
QC Batch No.:	210106GC8A2
Analyst Initials:	CM
Dilution Factor:	4.8

ANALYTE	(Units)	Result	RL
TNMOC N2 corrected	(ppmv-C)	3,300	48
TNMOC O2 corrected	(ppmv-C)	3,200	48
TNMOC uncorrected	(ppmv-C)	2,600	48
Nitrogen	(% v/v)	12	4.8
Oxygen/Argon	(% v/v)	2.8	2.4
Carbon Dioxide	(% v/v)	33	0.048
Methane	(% v/v)	46	0.0048

RL = Reporting Limit
ND = Not detected at or above the RL.
TNMOC = Total Non-Methane Organic Compounds
ppmv-C = parts per million by volume as carbon
TNMOC N2 corrected (applicable if N2 < 20%)
TNMOC O2 corrected (applicable if N2 > 20% and O2 < 5%)
TNMOC uncorrected = not corrected for N2, O2 or moisture

Reviewed/Approved By: _____ Date 1/27/21
Mark Johnson
Operations Manager

The cover letter is an integral part of this analytical report

ATTACHMENT 7.3

Emission Factors: EPA AP-42

2.4 Municipal Solid Waste Landfills

2.4.1 General [1-4]

A municipal solid waste (MSW) landfill unit is a discrete area of land or an excavation that receives household waste, and that is not a land application unit, surface impoundment, injection well, or waste pile. An MSW landfill unit may also receive other types of wastes, such as commercial solid waste, nonhazardous sludge, and industrial solid waste. In addition to household and commercial wastes, the other waste types potentially accepted by MSW landfills include (most landfills accept only a few of the following categories):

- Municipal sludge,
- Municipal waste combustion ash,
- Infectious waste,
- Small-quantity generated hazardous waste;
- Waste tires,
- Industrial non-hazardous waste,
- Conditionally exempt small quantity generator (CESQG) hazardous waste,
- Construction and demolition waste,
- Agricultural wastes,
- Oil and gas wastes, and
- Mining wastes.

The information presented in this section applies only to landfills which receive primarily MSW. This information is not intended to be used to estimate emissions from landfills which receive large quantities of other waste types such as industrial waste, or construction and demolition wastes. These other wastes exhibit emissions unique to the waste being landfilled.

In the United States in 2006, approximately 55 percent of solid waste was landfilled, 13 percent was incinerated, and 32 percent was recycled or composted. There were an estimated 1,754 active MSW landfills in the United States in 2006. These landfills were estimated to receive 138 million tons of waste annually, with 55 to 60 percent reported as household waste, and 35 to 45 percent reported as commercial waste.[79]

2.4.2 Process Description [2,5]

The majority of landfills currently use the "area fill" method which involves placing waste on a landfill liner, spreading it in layers, and compacting it with heavy equipment. A daily soil cover is spread over the compacted waste to prevent wind-blown trash and to protect the trash from scavengers and vectors. The landfill liners are constructed of soil (i.e., recompacted clay) and synthetics (i.e., high density polyethylene) to provide an impermeable barrier to leachate (i.e., water that has passed through the landfill) and gas migration from the landfill. Once an area of the landfill is completed, it is covered with a "cap" or "final cover" composed of various combinations of clay, synthetics, soil and cover vegetation to control the incursion of precipitation, the erosion of the cover, and the release of gases and odors from the landfill.

2.4.3 Control Technology[2,5,6]

The New Source Performance Standards (NSPS) and Emission Guidelines for air emissions from MSW landfills for certain new and existing landfills were published in the Federal Register on March 1, 1996. Current versions of the NSPS and Emission Guidelines can

be found at 40 CFR 60 subparts WWW and Cb, respectively. The regulation requires that Best Demonstrated Technology (BDT) be used to reduce MSW landfill emissions from affected new and existing MSW landfills if (1) the landfill has a design capacity of 2.5 million Mg (2.75 million tons) and 2.5 million cubic meters or more, and (2) the calculated uncontrolled emissions from the landfill are greater than or equal to 50 Mg/yr (55 tons/yr) of nonmethane organic compounds (NMOCs). The MSW landfills that are affected by the NSPS/Emission Guidelines are each new MSW landfill, and each existing MSW landfill that has accepted waste since November 8, 1987 or that has capacity available for future use. Control systems require: (1) a well-designed and well-operated gas collection system, and (2) a control device capable of reducing non-methane organic compounds (NMOCs) in the collected gas by 98 weight-percent (or to 20 ppmv, dry basis as hexane at 3% oxygen for an enclosed combustion device). Other compliance options include use of a flare that meets specified design and operating requirements or treatment of landfill gas (LFG) for use as a fuel. The National Emission Standards for Hazardous Air Pollutants (NESHAP) for MSW landfills was published in the Federal Register on January 16, 2003. It requires control of the same landfills, and the same types of gas collection and control systems as the NSPS. The NESHAP also requires earlier control of bioreactor landfills and contains a few additional reporting requirements for MSW landfills.

Landfill gas collection systems consist of a series of vertical or horizontal perforated pipes that penetrate the waste mass and collect the gases produced by the decaying waste. These collection systems are classified as either active or passive systems. Active collection systems use mechanical blowers or compressors to create a vacuum in the collection piping to optimize the collection of LFG. Passive systems use the natural pressure gradient established between the encapsulated waste and the atmosphere to move the gas through the collection system.

LFG control and treatment options include: (1) combustion of the LFG, and (2) treatment of the LFG for subsequent sale or use. Combustion techniques include techniques that do not recover energy (i.e., flares and thermal incinerators), and techniques that recover energy and generate electricity from the combustion of the LFG (i.e., gas turbines and reciprocating engines). Boilers can also be employed to recover energy from LFG in the form of steam. Flares combust the LFG without the recovery of energy, and are classified by their burner design as being either open or enclosed. Purification techniques are used to process raw LFG to either a medium-BTU gas using dehydration and filtration or as a higher-BTU gas by removal of inert constituents using adsorption, absorption, and membranes.

2.4.4 Emissions[2,7]

Methane (CH_4) and carbon dioxide (CO_2) are the primary constituents of LFG, and are produced by microorganisms within the landfill under anaerobic conditions. Transformations of CH_4 and CO_2 are mediated by microbial populations that are adapted to the cycling of materials in anaerobic environments. Landfill gas generation proceeds through four phases. The first phase is aerobic [i.e., with oxygen (O_2) available from air trapped in the waste] and the primary gas produced is CO_2. The second phase is characterized by O_2 depletion, resulting in an anaerobic environment, where large amounts of CO_2 and some hydrogen (H_2) are produced. In the third phase, CH_4 production begins, with an accompanying reduction in the amount of CO_2 produced. Nitrogen (N_2) content is initially high in LFG in the first phase, and declines sharply as the landfill proceeds through the second and third phases. In the fourth phase, gas production of CH_4, CO_2, and N_2 becomes fairly steady. The duration of each phase and the total time of gas generation vary with landfill conditions (i.e., waste composition, design management, and anaerobic state).

Typically, LFG also contains NMOC and volatile organic compounds (VOC). NMOC result from either decomposition by-products or volatilization of biodegradable wastes. Although NMOC are considered trace constituents in LFG, the NMOC and VOC emission rates could be "major" with respect to Prevention of Significant Deterioration (PSD) and New Source Review (NSR) requirements. This NMOC fraction often contains various organic hazardous air pollutants (HAP), greenhouse gases (GHG), compounds associated with stratospheric ozone depletion and volatile organic compounds (VOC). However, in MSW landfills where contaminated soils from storage tank cleanups are used as daily cover, much higher levels of NMOC have been observed. As LFG migrates through the contaminated soil, it adsorbs the organics, resulting in the higher concentrations of NMOC and any other contaminant in the soil. In one landfill where contaminated soil was used as daily cover, the NMOC concentration in the LFG was 5,870 ppm as compared to the AP-42 average value of 838 ppm. While there is insufficient data to develop a factor or algorithm for estimating NMOC from contaminated daily cover, the emissions inventory developer should be aware to expect elevated NMOC concentrations from these landfills.

Other emissions associated with MSW landfills include combustion products from LFG control and utilization equipment (i.e., flares, engines, turbines, and boilers). These include carbon monoxide (CO), oxides of nitrogen (NO_X), sulfur dioxide (SO_2), hydrogen chloride (HCl), particulate matter (PM) and other combustion products (including HAPs). PM emissions can also be generated in the form of fugitive dust created by mobile sources (i.e., garbage trucks) traveling along paved and unpaved surfaces. The reader should consult AP-42 Volume I Sections 13.2.1 and 13.2.2 for information on estimating fugitive dust emissions from paved and unpaved roads.

One pollutant that can very greatly between landfills is hydrogen sulfide (H_2S). H_2S is normally present in LFG at levels ranging from 0 to 90 ppm, with an average concentration of 33 ppm. However, a recent trend at some landfills has been the use of construction and demolition waste (C&D) as daily cover. Under certain conditions that are not well understood, some microorganisms will convert the sulfur in the wall-board of C&D waste to H_2S. At these landfills, H_2S concentrations can be significantly higher than at landfills that do not use C&D waste as daily cover. While H_2S measurements are not available for landfills using C&D for daily cover, the State of New Hampshire among others have noted elevated H_2S odor problems at these landfills and have assumed that H_2S concentrations have increased, similarly. In a series of studies at 10 landfills in Florida where a majority of the waste is composed of C&D material, the concentration of H_2S concentration spanned a range from less than the detection limit of the instrument (0.003 ppmv) up to 12,000 ppmv.[8] Another study that was conducted used flux boxes to measure uncontrolled emissions of H_2S at five landfills in Florida. This study reported a range of H_2S emissions between 0.192 and 1.76 mg/(m^2-d).[9] At any MSW landfill where C&D waste was used as daily cover or was comingled with the MSW, it is recommended that direct H_2S measurements be used to develop specific H_2S emissions for the landfill.

The rate of emissions from a landfill is governed by gas production and transport mechanisms. Production mechanisms involve the production of the emission constituent in its vapor phase through vaporization, biological decomposition, or chemical reaction. Transport mechanisms involve the transportation of a volatile constituent in its vapor phase to the surface of the landfill, through the air boundary layer above the landfill, and into the atmosphere. The three major transport mechanisms that enable transport of a volatile constituent in its vapor phase are diffusion, convection, and displacement.

Although relatively uncommon, fires can occur on the surface of the landfill or underground. The smoke from a landfill fire frequently contains many dangerous chemical

compounds, including: carbon monoxide, particulate matter and hazardous gases that are the products of incomplete combustion, and very elevated concentrations of the many gaseous constituents normally occurring in LFG. Of particular concern in landfill fires is the emission of dioxins/furans. Accidental fires at landfills and the uncontrolled burning of residential waste are considered the largest sources of dioxin emissions in the United States.[10] The composition of the gases from landfill fires is highly variable and dependent on numerous site specific factors, including: the composition of the material burning, the composition of the surrounding waste, the temperature of the burning waste, and the presence of oxygen. The only reliable method for estimating the emissions from a landfill fire involves testing the emissions directly. More information is available on landfill fires and their emissions from reference 11.

2.4.4.1 Uncontrolled Emissions -

Several methods have been developed by EPA to determine the uncontrolled emissions of the various compounds present in LFG. The newest measurement method is optical remote sensing with radial plume mapping (ORS-RPM). This method uses an optical emission detector such as open-path Fourier transform infrared spectroscopy (FTIR), ultraviolet differential absorption spectroscopy (UV-DOAS), or open-path tunable diode laser absorption spectroscopy (OP-TDLAS); coupled with radial plume mapping software that processes path-integrated emission concentration data and meteorological data to yield an estimate of uncontrolled emissions. More information on this newest method is described in *Evaluation of Fugitive Emissions Using Ground-Based Optical Remote Sensing Technology* (EPA/600/R-07/032).[12] Additional research is ongoing to provide additional guidance on the use of optical remote sensing for application at landfills. Evaluating uncontrolled emissions from landfills can be a challenge. This is due to the changing nature of landfills, scale and complexity of the site, topography, and spatial and temporal variability in emissions. Additional guidance is being developed for application of EPA's test method for area sources emissions. This is expected to be released by the spring of 2009. For more information, refer to the Emission Measurement Center of EPA's Technology Transfer Network (http://www.epa.gov/ttn/emc/tmethods.html). Additional information on ORS technology can also be found on EPA's website for Measurement and Monitoring Technologies for 21st Century ($21M^2$) which provided funding to identify improved technologies for quantifying area source emissions (http://www.clu-in.org/programs/21m2/openpath/).

Often flux data are used to evaluate LFG collection efficiency. The concern with the use of this data is that it does not capture emission losses from header pipes or extraction wells. The other concern is that depending upon the design of the study, the emission variability across a landfill surface is not captured. Emission losses can occur from cracks and fissures or difference in landfill cover material. Often, alternative cover material is used to help promote infiltration, particularly for wet landfill operation. This can result in larger loss of fugitive emissions. Another loss of landfill gas is through the leachate collection pumps and wells. For many of these potential losses, a flux box is not considered adequate to capture the total loss of fugitive gas. The use of ORS technology is considered more reliable.

When direct measurement data are not available, the most commonly used EPA method to estimate the uncontrolled emissions associated with LFG is based on a biological decay model. In this method, the generation of CH_4 must first be estimated by using a theoretical first-order kinetic model of CH_4 production developed by the EPA[13]:

$$Q_{CH_4} = 1.3 L_o R (e^{-kc} - e^{-kt})$$

(1)

where:

Q_{CH_4} = Methane generation rate at time t, m^3/yr;
L_o = Methane generation potential, m^3 CH_4/Mg of "wet" or "as received" refuse;
R = Average annual refuse acceptance rate during active life, Mg of "wet" or "as received" refuse /yr;
e = Base log, unitless;
k = Methane generation rate constant, yr^{-1};
c = Time since landfill closure, yrs (c = 0 for active landfills); and
t = Time since the initial refuse placement, yrs.

When annual refuse acceptance data is available, the following form of Equation (1) is used. This is the general form of the equation that is used in EPA's Landfill Gas Emissions Model (LandGEM). Due to the complexity of the double summation, Equation (1alt) is normally implemented within a computer model. Equation (1 alt.) is more accurate because it accounts for the varying annual refuse flows and it calculates each year's gas flow in $^1/_{10th}$ year increments.

$$Q_{CH_4} = 1.3 \sum_{i=1}^{n} \sum_{j=0.1}^{1} k L_o \frac{R_i}{10} e^{-kt_{ij}}$$

(1 alternate)

where:

Q_{CH_4} = Methane generation rate at time t, m^3/yr;
L_o = Methane generation potential, m^3 CH_4/Mg of "wet" or "as received" refuse;
R_i = Annual refuse acceptance rate for year i, Mg of "wet" or "as received" refuse /yr;
e = Base log, unitless;
k = Methane generation rate constant, yr^{-1};
c = Time since landfill closure, yrs (c = 0 for active landfills); and
t = Time since the initial refuse placement, yrs.
i = year to life of the landfill
j = $^1/_{10th}$ year increment in the calculation.

It should be noted that Equation (1) is provided for estimating CH_4 emissions to the atmosphere. Other fates may exist for the gas generated in a landfill, including capture and subsequent microbial degradation within the landfill's surface layer. Currently, there are no data that adequately address this fate. It is generally accepted that the bulk of the CH_4 generated will be emitted through cracks or other openings in the landfill surface and that Equation (1) can be used to approximate CH_4 emissions from an uncontrolled landfill. It should also be noted that Equation (1) is different from the equation used in other models such as LandGEM by the addition of the constant 1.3 at the front of the equation. This constant is included to compensate for L_O which is typically determined by the amount of gas collected by LFG collection systems. The design of these systems will typically result in a gas capture efficiency of only 75%. Therefore, 25% of the gas generated by the landfill is not captured and included in the development of L_O. The ratio of total gas to captured gas is a ratio of 100/75 or equivalent to 1.3.

Site-specific landfill information is generally available for variables R, c, and t. When refuse acceptance rate information is scant or unknown, R can be determined by dividing the refuse in place by the age of the landfill. If a facility has documentation that a certain segment

(cell) of a landfill received *only* nondegradable refuse, then the waste from this segment of the landfill can be excluded from the calculation of R. Nondegradable refuse includes concrete, brick, stone, glass, plaster, wallboard, piping, plastics, and metal objects. The average annual acceptance rate should only be estimated by this method when there is inadequate information available on the actual average acceptance rate. The time variable, t, includes the total number of years that the refuse has been in place (including the number of years that the landfill has accepted waste and, if applicable, has been closed).

Values for variables L_o and k are normally estimated. Estimation of the potential CH_4 generation capacity of refuse (L_o) is generally treated as a function of the moisture and organic content of the refuse. Estimation of the CH_4 generation constant (k) is a function of a variety of factors, including moisture, pH, temperature, and other environmental factors, and landfill operating conditions.

Recommended AP-42 defaults for k are:

k Value	Landfill Conditions
0.02	**Areas receiving <25 inches/yr rainfall**
0.04	**Areas receiving >25 inches/yr rainfall**
0.3	**Wet landfills[14]**

For the purpose of the above table, wet landfills are defined as landfills which add large amounts of water to the waste. This added water may be recycled landfill leachates and condensates, or may be other sources of water such as treated wastewater.

The CH_4 generation potential, L_o, has been observed to vary from 6 to 270 m^3/Mg (200 to 8670 ft3/ton), depending on the organic content of the waste material. A higher organic content results in a higher L_o. Food, textiles, paper, wood, and horticultural waste have the highest L_o value on a dry basis, while inert materials such as glass, metal and plastic have no L_o value.[2] Since moisture does not contribute to the value of L_o, a high moisture content waste, such as food or organic sludge, will have a lower L_o on an "as received" basis. When using Equation 1 to estimate emissions for typical MSW landfills in the U.S., a mean L_o value of 100 m^3/Mg refuse (3,530 ft^3 /ton, "as received" basis) is recommended.

There is a significant level of uncertainty in Equation 2 and its recommended defaults values for k and L_o. The recommended defaults k and L_o for conventional landfills, based upon the best fit to 40 different landfills, yielded predicted CH_4 emissions that ranged from ~30 to 400% of measured values and had a relative standard deviation of 0.73 (Table 2-2). The default values for wet landfills were based on a more limited set of data and are expected to contain even greater uncertainty.

When gas generation reaches steady state conditions, LFG consists of approximately equal volumes of CO_2 and CH_4. LFG also typically contains as much as five percent N_2 and other gases, and trace amounts of NMOCs. Since the flow of CO_2 is approximately equal to the flow of CH_4, the estimate derived for CH_4 generation using Equation (1) can also be used to estimate CO_2 generation. Addition of the CH_4 and CO_2 emissions will yield an estimate of total LFG emissions. If site-specific information is available on the actual CH_4 and CO_2 contents of the LFG, then the site-specific information should be used.

Most of the NMOC emissions from landfills result from the volatilization of organic compounds contained in the landfilled waste. Small amounts may also be created by biological

processes and chemical reactions within the landfill. Available data show that the range of values for total NMOC in LFG is from 31 ppmv to over 5,387 ppmv, and averages 838 ppmv. The proposed regulatory default of 4,000 ppmv for NMOC concentration was developed for regulatory compliance purposes and is considered more conservative. For emissions inventory purposes, site-specific information should be taken into account when determining the total NMOC concentration, whenever available. Measured pollutant concentrations (i.e., as measured by EPA Reference Method 25C), must be corrected for air infiltration which can occur by two different mechanisms: LFG sample dilution and air intrusion into the landfill. These corrections require site-specific data for the LFG CH_4, CO_2, N_2, and O_2 content. If the ratio of N_2 to O_2 is less than or equal to 4.0 (as found in ambient air), then the total pollutant concentration is adjusted for sample dilution by assuming that CO_2 and CH_2 are the primary constituents of LFG (assumed to account for 100% of the LGF), and the following equation is used:

$$C_P \text{ (corrected for air infiltration)} = \frac{C_P \times (1 \times 10^6)}{C_{CO_2} + C_{CH_4}} \quad (2)$$

where:

C_P = Concentration of pollutant P in LFG (i.e., NMOC as hexane), ppmv;
C_{CO2} = CO_2 concentration in LFG, ppmv;
Q_{CH4} = CH_4 Concentration in LFG, ppmv; and
1×10^6 = Constant used to correct concentration of P to units of ppmv.

If the ratio of N_2 to O_2 concentrations (i.e., C_{N2}, C_{O2}) is greater than 4.0, then the total pollutant concentration should be adjusted for air intrusion into the landfill by using Equation (2) and adding the concentration of N_2 (i.e., C_{N2}) to the denominator. Values for C_{CO2}, C_{CH4}, C_{N2}, C_{O2}, can usually be found in the source test report for the particular landfill along with the total pollutant concentration data.

To estimate uncontrolled emissions of NMOC or other LFG constituents, the following equation should be used:

$$Q_P = \frac{Q_{CH4} \times C_P}{C_{CH_4} \times (1 \times 10^6)} \quad (3)$$

where:

Q_P = Emission rate of pollutant P (i.e., NMOC), m^3/yr;
Q_{CH4} = CH_4 generation rate, m^3/yr (from Equation 1);
C_P = Concentration of pollutant P in LFG, ppmv; and
C_{CH4} = Concentration of CH_4 in the LFG (assumed to be 50% expressed as 0.5)

Uncontrolled mass emissions per year of total NMOC (as hexane) and speciated organic and inorganic compounds can be estimated by the following equation:

$$UM_P = Q_P \times \frac{MW_P \times 1 \text{ atm}}{(8.205 \times 10^{-5} \text{ m}^3 - \text{atm/gmol} - {}^\circ\text{K}) \times (1000 \text{g/kg}) \times (273 + T)} \quad (4)$$

where:

UM_P = Uncontrolled mass emissions of pollutant P (i.e., NMOC), kg/yr;
MW_P = Molecular weight of P, g/gmol (i.e., 86.18 for NMOC as hexane);
Q_P = Emission rate of pollutant P, m^3/yr; and
T = Temperature of LFG, °C.

This equation assumes that the operating pressure of the system is approximately 1 atmosphere. If the temperature of the LFG is not known, a temperature of 25 °C (77 °F) is recommended.

Uncontrolled default concentrations of VOC, NMOC and speciated compounds are presented in Table 2.4-1 for landfills having a majority of the waste in place on or after 1992 and in Table 2.4-2 for landfills having a majority of the waste in place before 1992. These default concentrations have already been corrected for air infiltration and can be used as input parameters to Equation (3) for estimating emissions from landfills when site-specific data are not available. An analysis of the data, based on the co-disposal history (with non-residential wastes) of the individual landfills from which the concentration data were derived, indicates that for benzene, NMOC, and toluene, there is a difference in the uncontrolled concentrations.

It is important to note that the compounds listed in Tables 2.4-1 and 2.4-2 are not the only compounds likely to be present in LFG. The listed compounds are those that were identified through a review of the available landfill test reports. The reader should be aware that additional compounds are likely present, such as those associated with consumer or industrial products. Given this information, extreme caution should be exercised in the use of the default emission concentrations given in Tables 2.4-1 and 2.4-2. Available data have shown that there is a range of over two orders of magnitude in many of the pollutant concentrations among gases from various MSW landfills.

2.4.4.2 Controlled Emissions

Emissions from landfills are typically controlled by installing a gas collection system, and either combusting the collected gas through the use of internal combustion engines, flares, or turbines, or by purifying the gas for direct use in place of a fuel such as natural gas. Gas collection systems are not 100% efficient in collecting LFG, so emissions of CH_4 and NMOC at a landfill with a gas recovery system still occur. To estimate controlled emissions of CH_4, NMOC, and other constituents in LFG, the collection efficiency of the system must first be estimated. Reported collection efficiencies typically range from 50 to 95%, with a default efficiency of 75% recommended by EPA for inventory purposes. The lower collection efficiencies are experienced at landfills with a large number of open cells, no liners, shallow soil covers, poor collection system and cap maintenance programs and/or a large number of cells without gas collection. The higher collection efficiencies may be achieved at closed sites employing good liners, extensive geomembrane-clay composite caps in conjunction with well engineered gas collection systems, and aggressive operation and maintenance of the cap and collection system. If documented site-specific collection efficiencies are available (i.e., through a comprehensive surface sampling program), then they may be used instead of the 75% average. An analysis showing a range in the gas collection system taking into account delays from gas collection from initial waste placement is provided in Section 2.0.

Estimates of controlled emissions may also need to account for the control efficiency of the control device. Control efficiencies for NMOC and VOC based on test data for the combustion of LFG with differing control devices are presented in Table 2.4-3. As noted in the table, these control efficiencies may also be applied to other LFG constituents. Emissions from

the control devices need to be added to the uncollected emissions to estimate total controlled emissions.

Controlled CH_4, NMOC, VOC, and speciated emissions can be determined by either of two methods developed by EPA. The newest method is the optical remote sensing with radial plume mapping (ORS-RPM). This method uses an optical emission detector such as open-path Fourier transform infrared spectroscopy (FTIR), ultraviolet differential absorption spectroscopy (UV-DOAS), or open-path tunable diode laser absorption spectroscopy (OP-TDLAS); coupled with radial plume mapping software that processes path-integrated emission concentration data and meteorological data to yield an estimate of uncontrolled emissions. More information on this newest method is described in *Evaluation of Fugitive Emissions Using Ground-Based Optical Remote Sensing Technology* (EPA/600/R-07/032).[12]

Historically, controlled emissions have been calculated with Equation 5. In this equation it is assumed that the LFG collection and control system operates 100 percent of the time. Minor durations of system downtime associated with routine maintenance and repair (i.e., 5 to 7 percent) will not appreciably effect emission estimates. The first term in Equation 5 accounts for emissions from uncollected LFG, while the second term accounts for emissions of the pollutant that were collected but not fully combusted in the control or utilization device:

$$CM_P = \left[UM_P \times \left(1 - \frac{\eta_{col}}{100} \right) \right] + \left[UM_P \times \frac{\eta_{col}}{100} \times \left(1 - \frac{\eta_{cnt}}{100} \right) \right] \quad (5)$$

where:

CM_P = Controlled mass emissions of pollutant P, kg/yr;
UM_P = Uncontrolled mass emissions of P, kg/yr (from Equation 4);
η_{col} = Efficiency of the LFG collection system, % (recommended default is 75%); and
η_{cnt} = Efficiency of the LFG control or utilization device, %.

Emission factors for the secondary compounds, CO, PM, NO_x and dioxins/furans exiting the control device are presented in Table 2.4-4. These emission factors should be used when equipment vendor emission guarantees are not available.

Controlled emissions of CO_2 and sulfur dioxide (SO_2) are best estimated using site-specific LFG constituent concentrations and mass balance methods.[15] If site-specific data are not available, the data in Tables 2.4-1 and 2.4-2 can be used with the mass balance methods that follow.

Controlled CO_2 emissions include emissions from the CO_2 component of LFG and additional CO_2 formed during the combustion of LFG. The bulk of the CO_2 formed during LFG combustion comes from the combustion of the CH_4 fraction. Small quantities will be formed during the combustion of the NMOC fraction. However, this typically amounts to less than 1 percent of total CO_2 emissions by weight. Also, the formation of CO through incomplete combustion of LFG will result in small quantities of CO_2 not being formed. This contribution to the overall mass balance picture is also very small and does not have a significant impact on overall CO_2 emissions.[15]

The following equation which assumes a 100% combustion efficiency for CH_4 can be used to estimate CO_2 emissions from controlled landfills:

$$CM_{CO_2} = UM_{CO_2} + \left(UM_{CH_4} \times \frac{\eta_{col}}{100} \times 2.75 \right) \quad (6)$$

where:

CM_{CO_2} = Controlled mass emissions of CO_2, kg/yr;
UM_{CO_2} = Uncontrolled mass emissions of CO_2, kg/yr (from Equation 4);
UM_{CH_4} = Uncontrolled mass emissions of CH_4, kg/yr (from Equation 4);
η_{col} = Efficiency of the LFG collection system, % (recommended default is 75%);
and
2.75 = Ratio of the molecular weight of CO_2 to the molecular weight of CH_4.

To prepare estimates of SO_2 emissions, data on the concentration of reduced sulfur compounds within the LFG are needed. The best way to prepare this estimate is with site-specific information on the total reduced sulfur content of the LFG. Often these data are expressed in ppmv as sulfur (S). Equations 3 and 4 should be used first to determine the uncontrolled mass emission rate of reduced sulfur compounds as sulfur. Then, the following equation can be used to estimate SO_2 emissions:

$$CM_{SO_2} = UM_S \times \frac{\eta_{col}}{100} \times 2.0 \quad (7)$$

where:

CM_{SO_2} = Controlled mass emissions of SO_2, kg/yr;
UM_S = Uncontrolled emissions of reduced sulfur compounds as sulfur, kg/yr (from Equations 3 and 4);
η_{col} = Efficiency of the LFG collection system, %; and
2.0 = Ratio of the molecular weight of SO_2 to the molecular weight of S.

The next best method to estimate SO_2 concentrations, if site-specific data for total reduced sulfur compounds as sulfur are not available, is to use site-specific data for speciated reduced sulfur compound concentrations. These data can be converted to ppmv as S with Equation 8. After the total reduced sulfur as S has been obtained from Equation 8, then Equations 3, 4, and 7 can be used to derive SO_2 emissions.

$$C_S = \sum_{i=1}^{n} C_P \times S_P \quad (8)$$

where:

C_S = Concentration of total reduced sulfur compounds, ppmv as S (for use in Equation 3);
C_P = Concentration of each reduced sulfur compound, ppmv;
S_P = Number of moles of S produced from the combustion of each reduced sulfur compound (i.e., 1 for sulfides, 2 for disulfides); and
n = Number of reduced sulfur compounds available for summation.

If no site-specific data are available, values of 47 and 33 ppmv can be used for C_S in the gas from landfills having a majority of the waste in place before 1992 and from landfills having a majority of the waste in place after 1992, respectively. These values were obtained by using the default concentrations presented in Tables 2.4-1 and 2.4-2 for reduced sulfur compounds and Equation 8.

Hydrochloric acid [Hydrogen Chloride (HCl)] emissions are formed when chlorinated compounds in LFG are combusted in control equipment. The best methods to estimate HCl emissions are mass balance methods that are analogous to those presented above for estimating SO_2 emissions. Hence, the best source of data to estimate HCl emissions is site-specific LFG data on total chloride [expressed in ppmv as the chloride ion (Cl^-)]. However, emission estimates may be underestimated, since not every chlorinated compound in the LFG will be represented in the site test report (i.e., only those that the analytical method specifies). If these data are not available, then total chloride can be estimated from data on individual chlorinated species using Equation 9 below.

$$C_{Cl} = \sum_{i=1}^{n} C_P \times Cl_P \qquad (9)$$

where:

C_{Cl} = Concentration of total chloride, ppmv as Cl^- (for use in Equation 3);
C_P = Concentration of each chlorinated compound, ppmv;
Cl_P = Number of moles of Cl^- produced from the combustion of each mole of chlorinated compound (i.e., 3 for 1,1,1-trichloroethane); and
n = Number of chlorinated compounds available for summation.

After the total chloride concentration (C_{Cl}) has been estimated, Equations 3 and 4 should be used to determine the total uncontrolled mass emission rate of chlorinated compounds as chloride ion (UM_{Cl}). This value is then used in Equation 10, below, to derive HCl emission estimates:

$$CM_{HCl} = UM_{Cl} \times \frac{\eta_{col}}{100} \times 1.03 \times \frac{\eta_{cnt}}{100} \qquad (10)$$

where:

CM_{HCl} = Controlled mass emissions of HCl, kg/yr;
UM_{Cl} = Uncontrolled mass emissions of chlorinated compounds as chloride, kg/yr (from Equations 3 and 4);
η_{col} = Efficiency of the LFG collection system, percent;
1.03 = Ratio of the molecular weight of HCl to the molecular weight of Cl^-; and
η_{cnt} = Control efficiency of the LFG control or utilization device, percent.

In estimating HCl emissions, it is assumed that all of the chloride ion from the combustion of chlorinated LFG constituents is converted to HCl. If an estimate of the control efficiency, η_{cnt}, is not available, then the control efficiency for the equipment listed in Table 2.4-3 should be used. This assumption is recommended to assume that HCl emissions are not under-estimated.

If site-specific data on total chloride or speciated chlorinated compounds are not available, then default values of 42 and 74 ppmv can be used for C_{Cl} in the gas from landfills having a majority of the waste in place before 1992 and from landfills having a majority of the

waste in place after 1992, respectively. These values were derived from the default LFG constituent concentrations presented in Tables 2.4-1 and 2.4-2. As mentioned above, use of this default may produce underestimates of HCl emissions since it is based only on those compounds for which analyses have been performed. The constituents listed in Table 2.4-1 and 2.4-2 are likely not all of the chlorinated compounds present in LFG.

The reader is referred to AP-42 Volume I, Sections 13.2.1 and 13.2.2 for information on estimating fugitive dust emissions from paved and unpaved roads, and to Section 13.2.3 for information on estimating fugitive dust emissions from heavy construction operations; and to AP-42 Volume II Section II-7 for estimating exhaust emissions from construction equipment.

2.4.5 Updates Since the Fifth Edition

The Fifth Edition was released in January 1995. The November 1998 revision includes major revisions of the text and recommended emission factors contained in the section. The most significant revisions to this section since publication in the Fifth Edition are summarized below.

- The equations to calculate the CH_4, CO_2 and other constituents were simplified.
- The default L_0 and k were revised based upon an expanded base of gas generation data.
- The default ratio of CO_2 to CH_4 was revised based upon averages observed in available source test reports.
- The default concentrations of LFG constituents were revised based upon additional data. References 16-148 are the emission test reports from which data were obtained for this section.
- Additional control efficiencies were included and existing efficiencies were revised based upon additional emission test data.
- Revised and expanded the recommended emission factors for secondary compounds emitted from typical control devices.

The current (i.e., 2008) update includes text revisions and additional discussion, as well as revised recommended emission factors contained within the section. The more significant revisions are summarized below:

- Default concentrations of LFG constituents were developed for landfills with the majority of their waste in place on or after 1992 (proposal of RCRA Subtitle D). The LFG constituent list from the last update reflects data from landfills with waste in place prior to 1992, so Table 2.4-2 was renamed to reflect this.
- Control efficiencies were updated to incorporate additional emission test data and the table was revised to show the NMOC and VOC control efficiencies.
- Revised and expanded the recommended emission factors for secondary compounds emitted from typical control devices.
- The description of modern landfills and statistics about waste disposition in the U.S. were updated with 2006 information.

- EPA's newest measurement method for determining landfill emissions, Optical Remote Sensing with Radial Plume Mapping (ORS-RPM), was added to the discussion of available options for measuring landfill emissions.

- A factor of 1.3 was added to Equation (1) to account for the fact that L_0 is typically determined by the amount of CH_4 collected at landfills using equipment that typically has a capture efficiency of only 75%.

- A k value of 0.3 was added to the list of recommended k values for use in Equation (1).

Table 2.4-1. DEFAULT CONCENTRATIONS FOR LFG CONSTITUENTS FOR LANDFILLS WITH WASTE IN PLACE ON OR AFTER 1992

Compound	CAS Number	Molecular Weight	Default Concentration (ppmv)	Recommended Emission Factor Rating
NMOC (as hexane)[a]		86.18	8.38E+02	A
VOC[b]		NA	8.35E+02	A
1,1,1-Trichloroethane[c]	71556	133.40	2.43E-01	A
1,1,2,2-Tetrachloroethane[c]	79345	167.85	5.35E-01	E
1,1,2,3,4,4-Hexachloro-1,3-butadiene (Hexachlorobutadiene)[c]	87683	260.76	3.49E-03	D
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon 113)	76131	187.37	6.72E-02	C
1,1,2-Trichloroethane[c]	79005	133.40	1.58E-01	D
1,1-Dichloroethane[c]	75343	98.96	2.08E+00	A
1,1-Dichloroethene (1,1-Dichloroethylene)[c]	75354	96.94	1.60E-01	A
1,2,3-Trimethylbenzene	526738	120.19	3.59E-01	D
1,2,4-Trichlorobenzene[c]	120821	181.45	5.51E-03	C
1,2,4-Trimethylbenzene	95636	120.19	1.37E+00	B
1,2-Dibromoethane (Ethylene dibromide)[c]	106934	187.86	4.80E-03	B
1,2-Dichloro-1,1,2,2-tetrafluoroethane (Freon 114)	76142	170.92	1.06E-01	B
1,2-Dichloroethane (Ethylene dichloride)[c]	107062	98.96	1.59E-01	A
1,2-Dichloroethene	540590	96.94	1.14E+01	E
1,2-Dichloropropane[c]	78875	112.99	5.20E-02	D
1,2-Diethylbenzene	135013	134.22	1.99E-02	D
1,3,5-Trimethylbenzene	108678	120.19	6.23E-01	C
1,3-Butadiene (Vinyl ethylene)[c]	106990	54.09	1.66E-01	C
1,3-Diethylbenzene	141935	134.22	6.55E-02	D
1,4-Diethylbenzene	105055	134.22	2.62E-01	D
1,4-Dioxane (1,4-Diethylene dioxide)[c]	123911	88.11	8.29E-03	D
1-Butene / 2-Methylbutene	106989 / 513359	56.11 / 70.13	1.22E+00	D
1-Butene / 2-Methylpropene	106989 / 115117	56.11	1.10E+00	E

Table 2.4-1 (CONTINUED). DEFAULT CONCENTRATIONS FOR LFG CONSTITUENTS FOR LANDFILLS WITH WASTE IN PLACE ON OR AFTER 1992

Compound	CAS Number	Molecular Weight	Default Concentration (ppmv)	Recommended Emission Factor Rating
1-Ethyl-4-methylbenzene (4-Ethyl toluene)	622968	120.19	9.89E-01	C
1-Ethyl-4-methylbenzene (4-Ethyl toluene) + 1,3,5-Trimethylbenzene	622968 / 108678	120.19	5.79E-01	D
1-Heptene	592767	98.19	6.25E-01	E
1-Hexene / 2-Methyl-1-pentene	592416 / 763291	84.16	8.88E-02	D
1-Methylcyclohexene	591491	96.17	2.27E-02	D
1-Methylcyclopentene	693890	82.14	2.52E-02	D
1-Pentene	109671	70.13	2.20E-01	D
1-Propanethiol (n-Propyl mercaptan)	107039	76.16	1.25E-01	A
2,2,3-Trimethylbutane	464062	100.20	9.19E-03	D
2,2,4-Trimethylpentane[c]	540841	114.23	6.14E-01	D
2,2,5-Trimethylhexane	3522949	128.26	1.56E-01	D
2,2-Dimethylbutane	75832	86.18	1.56E-01	D
2,2-Dimethylpentane	590352	100.20	6.08E-02	D
2,2-Dimethylpropane	463821	72.15	2.74E-02	E
2,3,4-Trimethylpentane	565753	114.23	3.12E-01	D
2,3-Dimethylbutane	79298	86.18	1.67E-01	D
2,3-Dimethylpentane	565593	100.20	3.10E-01	D
2,4-Dimethylhexane	589435	114.23	2.22E-01	D
2,4-Dimethylpentane	108087	100.20	1.00E-01	D
2,5-Dimethylhexane	592132	114.23	1.66E-01	D
2,5-Dimethylthiophene	638028	112.19	6.44E-02	E
2-Butanone (Methyl ethyl ketone)[c]	78933	72.11	4.01E+00	C
2-Ethyl-1-butene	760214	84.16	1.77E-02	D
2-Ethylthiophene	872559	112.19	6.29E-02	E
2-Ethyltoluene	611143	120.19	3.23E-01	D
2-Hexanone (Methyl butyl ketone)	591786	100.16	6.13E-01	E
2-Methyl-1-butene	563462	70.13	1.79E-01	D
2-Methyl-1-propanethiol (Isobutyl mercaptan)	513440	90.19	1.70E-01	E
2-Methyl-2-butene	513359	70.13	3.03E-01	D
2-Methyl-2-propanethiol (tert-Butylmercaptan)	75661	90.19	3.25E-01	E
2-Methylbutane	78784	72.15	2.26E+00	D
2-Methylheptane	592278	114.23	7.16E-01	D
2-Methylhexane	591764	100.20	8.16E-01	D
2-Methylpentane	107835	86.18	6.88E-01	D
2-Propanol (Isopropyl alcohol)	67630	60.10	1.80E+00	C

Table 2.4-1 (CONTINUED). DEFAULT CONCENTRATIONS FOR LFG CONSTITUENTS FOR LANDFILLS WITH WASTE IN PLACE ON OR AFTER 1992

Compound	CAS Number	Molecular Weight	Default Concentration (ppmv)	Recommended Emission Factor Rating
3,6-Dimethyloctane	15869940	142.28	7.85E-01	D
3-Ethyltoluene	620144	120.19	7.80E-01	D
3-Methyl-1-pentene	760203	84.16	6.99E-03	D
3-Methylheptane	589811	114.23	7.63E-01	D
3-Methylhexane	589344	100.20	1.13E+00	D
3-Methylpentane	96140	86.18	7.40E-01	D
3-Methylthiophene	616444	98.17	9.25E-02	E
4-Methyl-1-pentene	691372	84.16	2.33E-02	E
4-Methyl-2-pentanone (MIBK)[c]	108101	100.16	8.83E-01	C
4-Methylheptane	589537	114.23	2.49E-01	D
Acetaldehyde[c]	75070	44.05	7.74E-02	D
Acetone	67641	58.08	6.70E+00	C
Acetonitrile[c]	75058	41.05	5.56E-01	A
Acrylonitrile[c,d]	107131	53.06	BDL	
Benzene[c]	71432	78.11	2.40E+00	A
Benzyl chloride[c]	100447	126.58	1.81E-02	A
Bromodichloromethane	75274	163.83	8.78E-03	E
Bromomethane (Methyl bromide)[c]	74839	94.94	2.10E-02	C
Butane	106978	58.12	6.22E+00	C
Carbon disulfide[c]	75150	76.14	1.47E-01	A
Carbon monoxide	630080	28.01	2.44E+01	C
Carbon tetrachloride[c]	56235	153.82	7.98E-03	A
Carbon tetrafluoride (Freon 14)	75730	88.00	1.51E-01	E
Carbonyl sulfide (Carbon oxysulfide)[c]	463581	60.08	1.22E-01	A
Chlorobenzene	108907	112.56	4.84E-01	A
Chlorodifluoromethane (Freon 22)[c]	75456	86.47	7.96E-01	D
Chloroethane (Ethyl chloride)[c]	75003	64.51	3.95E+00	B
Chloromethane (Methyl chloride)[c]	74873	50.49	2.44E-01	B
cis-1,2-Dichloroethene	156592	96.94	1.24E+00	B
cis-1,2-Dimethylcyclohexane	2207014	112.21	8.10E-02	D
cis-1,3-Dichloropropene	10061015	110.97	3.03E-03	D
cis-1,3-Dimethylcyclohexane	638040	112.21	5.01E-01	D
cis-1,4-Dimethylcyclohexane / trans-1,3-Dimethylcyclohexane	624293 / 2207036	112.21	2.48E-01	D
cis-2-Butene	590181	56.11	1.05E-01	D
cis-2-Heptene	6443921	98.19	2.45E-02	E
cis-2-Hexene	7688213	84.16	1.72E-02	D
cis-2-Octene	7642048	112.21	2.20E-01	D
cis-2-Pentene	627203	70.13	4.79E-02	D

Table 2.4-1 (CONTINUED). DEFAULT CONCENTRATIONS FOR LFG CONSTITUENTS FOR LANDFILLS WITH WASTE IN PLACE ON OR AFTER 1992

Compound	CAS Number	Molecular Weight	Default Concentration (ppmv)	Recommended Emission Factor Rating
cis-3-Methyl-2-pentene	922623	84.16	1.79E-02	D
Cyclohexane	110827	84.16	1.01E+00	B
Cyclohexene	110838	82.14	1.84E-02	D
Cyclopentane	287923	70.13	2.21E-02	D
Cyclopentene	142290	68.12	1.21E-02	D
Decane	124185	142.28	3.80E+00	D
Dibromochloromethane	124481	208.28	1.51E-02	D
Dibromomethane (Methylene dibromide)	74953	173.84	8.35E-04	E
Dichlorobenzene[c,e]	106467	147.00	9.40E-01	A
Dichlorodifluoromethane (Freon 12)	75718	120.91	1.18E+00	B
Dichloromethane (Methylene chloride)[c]	75092	84.93	6.15E+00	A
Diethyl sulfide	352932	90.19	8.62E-02	E
Dimethyl disulfide	624920	94.20	1.37E-01	A
Dimethyl sulfide	75183	62.14	5.66E+00	A
Dodecane (n-Dodecane)	112403	170.33	2.21E-01	D
Ethane	74840	30.07	9.05E+00	D
Ethanol	64175	46.07	2.30E-01	D
Ethyl acetate	141786	88.11	1.88E+00	C
Ethyl mercaptan (Ethanediol)	75081	62.14	1.98E-01	A
Ethyl methyl sulfide	624895	76.16	3.67E-02	E
Ethylbenzene[c]	100414	106.17	4.86E+00	B
Formaldehyde[c]	50000	30.03	1.17E-02	D
Heptane	142825	100.20	1.34E+00	B
Hexanec	110543	86.18	3.10E+00	B
Hydrogen sulfide	7783064	34.08	3.20E+01	A
Indane (2,3-Dihydroindene)	496117	34.08	6.66E-02	D
Isobutane (2-Methylpropane)	75285	58.12	8.16E+00	D
Isobutylbenzene	538932	134.22	4.07E-02	D
Isoprene (2-Methyl-1,3-butadiene)	78795	68.12	1.65E-02	D
Isopropyl mercaptan	75332	76.16	1.75E-01	A
Isopropylbenzene (Cumene)[c]	98828	120.19	4.30E-01	D
Mercury (total)[c]	7439976	200.59	1.22E-04	B
Mercury (elemental)[c]	7439976	200.59	7.70E-05	C
Mercury (monomethyl)[c]	51176126	216.63	3.84E-07	C
Mercury (dimethyl)[c]	627441	258.71	2.53E-06	B
Methanethiol (Methyl mercaptan)	74931	48.11	1.37E+00	A
Methyl tert-butyl ether (MTBE)[c]	1634044	88.15	1.18E-01	D
Methylcyclohexane	108872	98.19	1.29E+00	D

Table 2.4-1 (CONTINUED). DEFAULT CONCENTRATIONS FOR LFG CONSTITUENTS FOR LANDFILLS WITH WASTE IN PLACE ON OR AFTER 1992

Compound	CAS Number	Molecular Weight	Default Concentration (ppmv)	Recommended Emission Factor Rating
Methylcyclopentane	96377	84.16	6.50E-01	D
Naphthalene[c]	91203	128.17	1.07E-01	D
n-Butylbenzene	104518	134.22	6.80E-02	D
Nonane	111842	128.26	2.37E+00	D
n-Propylbenzene (Propylbenzene)	103651	120.19	4.13E-01	D
Octane	111659	114.23	1.08E+00	D
p-Cymene (1-Methyl-4-Isopropylbenzene)	99876	134.22	3.58E+00	D
Pentane	109660	72.15	4.46E+00	C
Propane	74986	44.10	1.55E+01	C
Propene	115071	42.08	3.32E+00	D
Propyne	74997	40.06	3.80E-02	E
sec-Butylbenzene	135988	134.22	6.75E-02	D
Styrene (Vinylbenzene)[c]	100425	104.15	4.11E-01	B
Tetrachloroethylene (Perchloroethylene)[c]	127184	165.83	2.03E+00	A
Tetrahydrofuran (Diethylene oxide)	109999	72.11	9.69E-01	C
Thiophene	110021	84.14	3.49E-01	E
Toluene (Methyl benzene)[c]	108883	92.14	2.95E+01	A
trans-1,2-Dichloroethene	156605	96.94	2.87E-02	C
trans-1,2-Dimethylcyclohexane	6876239	112.21	4.04E-01	D
trans-1,3-Dichloropropene	10061026	110.97	9.43E-03	D
trans-1,4-Dimethylcyclohexane	2207047	112.21	2.05E-01	D
trans-2-Butene	624646	56.11	1.04E-01	D
trans-2-Heptene	14686136	98.19	2.50E-03	E
trans-2-Hexene	4050457	84.16	2.06E-02	D
trans-2-Octene	13389429	112.21	2.41E-01	D
trans-2-Pentene	646048	70.13	3.47E-02	D
trans-3-Methyl-2-pentene	616126	84.16	1.55E-02	D
Tribromomethane (Bromoform)[c]	75252	252.73	1.24E-02	D
Trichloroethylene (Trichloroethene)[c]	79016	131.39	8.28E-01	A
Trichlorofluoromethane (Freon 11)	91315616	137.37	2.48E-01	B
Trichloromethane (Chloroform)[c]	8013545	119.38	7.08E-02	A
Undecane	1120214	156.31	1.67E+00	D
Vinyl acetate[c]	85306269	86.09	2.48E-01	C
Vinyl chloride (Chloroethene)[c]	75014	62.50	1.42E+00	A
Xylenes (o-, m-, p-, mixtures)	8026093	106.17	9.23E+00	A

NOTE: This is not an all-inclusive list of potential LFG constituents, only those for which test data were available at multiple sites. References 83-148.

[a] For NSPS/Emission Guideline compliance purposes, the default concentration for NMOC as specified in the final rule must be used.

[b] Calculated as 99.7% of NMOC, based on speciated emission test data.

[c] Hazardous Air Pollutant listed in Title III of the 1990 Clean Air Act Amendments.

[d] All tests below detection limit. Method detection limits are available for three tests, and are as follows: MDL = 2.00E-04, 4.00E-03, and 2.00E-02 ppm

[e] Many source tests did not indicate whether this compound was the ortho-, meta-, or para- isomer. The para isomer is a Title III listed HAP.

Table 2.4-2. DEFAULT CONCENTRATIONS FOR LFG CONSTITUENTS FOR LANDFILLS WITH WASTE IN PLACE PRIOR TO 1992

Compound	Molecular Weight	Default Concentration (ppmv)	Emission Factor Rating
NMOC (as hexane)[c]	86.18		
Co-disposal (SCC 50300603)		2,420	D
No or Unknown co-disposal (SCC 50100402)		595	B
1,1,1-Trichloroethane (methyl chloroform)[a]	133.42	0.48	B
1,1,2,2-Tetrachloroethane[a]	167.85	1.11	C
1,1-Dichloroethane (ethylidene dichloride)[a]	98.95	2.35	B
1,1-Dichloroethene (vinylidene chloride)[a]	96.94	0.20	B
1,2-Dichloroethane (ethylene dichloride)[a]	98.96	0.41	B
1,2-Dichloropropane (propylene dichloride)[a]	112.98	0.18	D
2-Propanol (isopropyl alcohol)	60.11	50.1	E
Acetone	58.08	7.01	B
Acrylonitrile[a]	53.06	6.33	D
Benzene[a]	78.11		
Co-disposal (SCC 50300603)		11.1	D
No or Unknown co-disposal (SCC 50100402)		1.91	B
Bromodichloromethane	163.83	3.13	C
Butane	58.12	5.03	C
Carbon disulfide[a]	76.13	0.58	C
Carbon monoxide[b]	28.01	141	E
Carbon tetrachloride[a]	153.84	0.004	B
Carbonyl sulfide[a]	60.07	0.49	D
Chlorobenzene[a]	112.56	0.25	C
Chlorodifluoromethane	86.47	1.30	C
Chloroethane (ethyl chloride)[a]	64.52	1.25	B
Chloroform[a]	119.39	0.03	B
Chloromethane	50.49	1.21	B
Dichlorobenzene[c]	147	0.21	E
Dichlorodifluoromethane	120.91	15.7	A
Dichlorofluoromethane	102.92	2.62	D
Dichloromethane (methylene chloride)[a]	84.94	14.3	A
Dimethyl sulfide (methyl sulfide)	62.13	7.82	C
Ethane	30.07	889	C

Table 2.4-2 (CONTINUED). DEFAULT CONCENTRATIONS FOR LFG CONSTITUENTS FOR LANDFILLS WITH WASTE IN PLACE PRIOR TO 1992

Compound	Molecular Weight	Default Concentration (ppmv)	Emission Factor Rating
Ethanol	46.08	27.2	E
Ethyl mercaptan (ethanethiol)	62.13	2.28	D
Ethylbenzene[a]	106.16	4.61	B
Ethylene dibromide	187.88	0.001	E
Fluorotrichloromethane	137.38	0.76	B
Hexane[a]	86.18	6.57	B
Hydrogen sulfide	34.08	35.5	B
Mercury (total)[a,d]	200.61	2.92×10^{-4}	E
Methyl ethyl ketone[a]	72.11	7.09	A
Methyl isobutyl ketone[a]	100.16	1.87	B
Methyl mercaptan	48.11	2.49	C
Pentane	72.15	3.29	C
Perchloroethylene (tetrachloroethylene)[a]	165.83	3.73	B
Propane	44.09	11.1	B
t-1,2-dichloroethene	96.94	2.84	B
Toluene[a]	92.13		
Co-disposal (SCC 50300603)		165	D
No or Unknown co-disposal (SCC 50190402)		39.3	A
Trichloroethylene (trichloroethene)[a]	131.38	2.82	B
Vinyl chloride[a]	62.50	7.34	B
Xylenes[a]	106.16	12.1	B

NOTE: This is not an all-inclusive list of potential LFG constituents, only those for which test data were available at multiple sites. References 16-82. Source Classification Codes in parentheses.

[a] Hazardous Air Pollutants listed in Title III of the 1990 Clean Air Act Amendments.

[b] Carbon monoxide is not a typical constituent of LFG, but does exist in instances involving landfill (underground) combustion. Therefore, this default value should be used with caution. Of 18 sites where CO was measured, only 2 showed detectable levels of CO.

[c] Source tests did not indicate whether this compound was the para- or ortho- isomer. The para isomer is a Title III-listed HAP.

[d] No data were available to speciate total Hg into the elemental and organic forms.

[e] For NSPS/Emission Guideline compliance purposes, the default concentration for NMOC as specified in the final rule must be used. For purposes not associated with NSPS/Emission Guideline compliance, the default VOC content at co-disposal sites can be estimated by 85 percent by weight (2,060 ppmv as hexane); at No or Unknown sites can be estimated by 39 percent by weight 235 ppmv as hexane).

Table 2.4-3. CONTROL EFFICIENCIES FOR LFG NMOC and VOC[a]

Control Device	Control Efficiency (%)[b]		
	Typical	Range	Rating
Boiler/Steam Turbine (50100423)	98.6	96-99+	D
Flare[c] (50100410) (50300601)	97.7	86-99+	A
Gas Turbine (50100420)	94.4	92-97	E
IC Engine (50100421)	97.2	95-99+	D

[a] References 16-148. Source Classification Codes in parentheses.
[b] Control efficiency may also be applied to LFG constituents in Tables 2-4.1 and 2.4-2, except for mercury. For any combustion equipment, the control efficiency for mercury should be assumed to be 0.
[c] Where information on equipment was given in the reference, test data were taken from enclosed flares. Control efficiencies are assumed to be equally representative of open flares.

Table 2.4-4. EMISSION FACTORS FOR SECONDARY COMPOUNDS EXITING CONTROL DEVICES[a]

Control Device	Pollutant[b]	Typical Rate, kg/10^6 dscm CH_4	Typical Rate, lb/10^6 dscf CH_4	Emission Factor Rating
Flare[c] (50100410) (50300601)	Nitrogen dioxide	631	39	A
	Carbon monoxide	737	46	A
	Particulate matter	238	15	A
	Dioxin/Furan	$6.7x10^{-6}$	$4.2x10^{-7}$	E
IC Engine (50100421)	Nitrogen dioxide	11,620	725	C
	Carbon monoxide	8,462	528	C
	Particulate matter	232	15	D
Boiler/Steam Turbine[d] (50100423)	Nitrogen dioxide	677	42	D
	Carbon monoxide	116	7	D
	Particulate matter	41	3	D
	Dioxin/Furan	$5.1x10^{-6}$	$3.2x10^{-7}$	D
Gas Turbine (50100420)	Nitrogen dioxide	1,400	87	D
	Carbon monoxide	3,600	230	E
	Particulate matter	350	22	E

[a] Source Classification Codes in parentheses.
[b] No data on PM size distributions were available, however for other gas-fired combustion sources, most of the particulate matter is less than 2.5 microns in diameter. Hence, this emission factor can be used to provide estimates of PM-10 or PM-2.5 emissions. See section 2.4.4.2 for methods to estimate CO_2, SO_2, and HCl.
[c] Where information on equipment was given in the reference, test data were taken from enclosed flares. Control efficiencies are assumed to be equally representative of open flares.
[d] All source tests were conducted on boilers, however emission factors should also be representative of steam turbines. Emission factors are representative of boilers equipped with low-NO_x burners and flue gas recirculation. No data were available for uncontrolled NO_x emissions.

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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 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:

$$E = k\,(s/12)^a (W/3)^b \qquad (1a)$$

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

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

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:

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

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 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 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. Vehicle restrictions that limit the speed, weight or number of vehicles on the road;

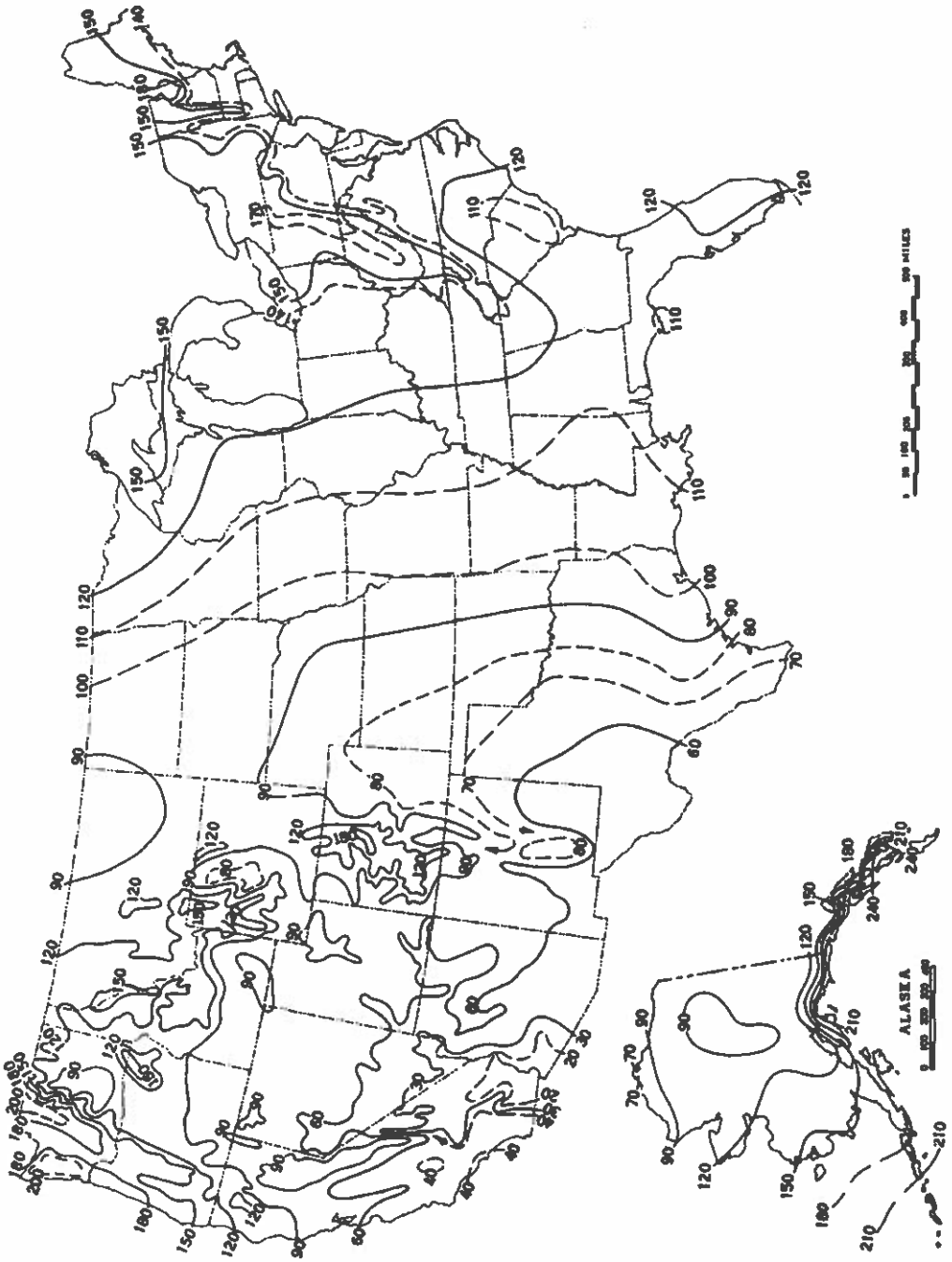

Figure 13.2.2-1. Mean number of days with 0.01 inch or more of precipitation in United States.

Table 13.2.3-1 (cont.).

Construction Phase	Dust-generating Activities	Recommended Emission Factor	Comments	Rating Adjustment[b]
II. Site Preparation (earth moving)	1. Bulldozing	Dozer equation (overburden) in Tables 11.9-1 and 11.9-2		-1/-2[c]
	2. Scrapers unloading topsoil	Scraper unloading factor in Table 11.9-4		-1
	3. Scrapers in travel	Scraper (travel mode) expression in Tables 11.9-1 and 11.9-2		-0/-1[c]
	4. Scrapers removing topsoil	5.7 kg/vehicle kilometer traveled (VKT) (20.2 lb/vehicle mile traveled [VMT])		E[d]
	5. Loading of excavated material into trucks	Material handling emission factor equation in Section 13.2.4		-0/-1[c]
	6. Truck dumping of fill material, road base, or other materials	Material handling emission factor equation in Section 13.2.4	May occur offsite	-0/-1[c]
	7. Compacting	Dozer equation in Tables 11.9-1 and 11.9-2	Emission factor downgraded because of differences in operating equipment	-1/-2[c]
	8. Motor grading	Grading equation in Tables 11.9-1 and 11.9-2		-1/-2[c]

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]

$$E = k(0.0016) \frac{\left(\frac{U}{2.2}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}} \text{ (kg/megagram [Mg])} \quad (1)$$

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

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

ATTACHMENT 7.4

Emission Factors: Western Industry Air Coalition or Recent Landfill Gas Analysis (WIAC)

Waste Industry Air Coalition
Comparison of Recent Landfill Gas Analyses with Historic AP-42 Values

by

Ray Huitric, County Sanitation Districts of Los Angeles County
Patrick Sullivan, SCS Engineers
Amy Tinker, SCS Engineers

January 2001

Summary

The Waste Industry Air Coalition (WIAC) is comprised of the Solid Waste Association of North America (SWANA) and the National Solid Wastes Management Association. Members of these associations have reported that the AP-42 landfill gas (LFG) defaults, derived from analyses made on average 13 years ago, overestimate the current trace LFG constituent levels.

The WIAC previously submitted three reports addressing LFG trace constituents. An initial report submitted in August 1999[1] showed a continuous long term hazardous air pollutants (HAP) decline at six California landfills (see LFG Constituent Declines below). HAP levels typically declined five fold or more over a ten year period. A second WIAC report was submitted November 1999[2] showing that Hydrogen Chloride levels in recent source tests are more than four times less that the AP-42 default. A third WIAC report was submitted in May 2000[3] showing that the average of recent non-methane organic compound (NMOC) analyses at 144 landfills was 30% less than the current AP-42 defaults.

This fourth report presents a nationwide WIAC survey of recent trace LFG constituent analyses. The WIAC obtained test results from 75 landfills that were made on average within the last two years. The WIAC survey found that the current trace constituent levels are two to four times less than the AP-42 defaults. For the compounds associated with greater health risk at high concentrations, the differences were yet larger. These findings support those from the previous three reports that the AP-42 defaults substantially overstate current LFG constituent levels.

The decline in LFG constituent levels over time may be due to a variety of factors including:

- improvement of analytical methodologies that better identify and quantify trace constituents;
- federal introduction of waste management regulations that strictly regulate hazardous waste disposal;
- federal introduction of municipal solid waste landfill regulations that detect and prevent disposal of unacceptable hazardous wastes; and
- industry transition to processes and products requiring less or no hazardous materials.

In view of the detected decline, it is strongly recommended that the AP-42 defaults be revised to reflect the current LFG constituent levels. From the California landfill results, showing a continuous long term declining trend in the LFG constituents, it can be reasonably anticipated that additional declines will occur. As a result, two further recommendations are offered. First, older AP-42 data should be purged, to eliminate unrepresentative results, and replaced with current data. The most recent AP-42 revision in 1995 only added new but did not purge older values. Second, U.S. EPA should recognize landfills as a unique source for which its AP-42 defaults will need to change over time. U.S. EPA should consider additional future updates of the AP-42 to address the anticipated declines.

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[1] "Documentation of Large MSW Landfill Gas Constituent Declines From US EPA AP-42 Default Values", Ray Huitric, County Sanitation Districts of Los Angeles County, and submitted by John Skinner, Executive Director and CEO, SWANA, on August 30, 1999.

[2] Correspondence titled "Submission of Hydrogen Chloride Test Data from Landfill Gas Fired Combustion Devices" dated November 1999 from Edwin P. Valis, Jr., Project Manager, EMCON to Roy Huntley, Emission Factor and Inventory Group, OAQPS, U.S. Environmental Protection Agency.

[3] Correspondence titled "Preliminary Data on Non-Methane Organic Compound (NMOC) Concentrations in Landfill Gas" dated May 9, 2000 from Edward W. Repa, Director of Environmental Programs, NSWMA to Roy Huntley, Emission Factor and Inventory Group, OAQPS, U.S. Environmental Protection Agency.

The WIAC will provide the analyses it collected to U.S. EPA for use in developing new AP-42 values. Since it is recognized that this process will require time, it is recommended that the U.S. EPA make the results contained in this report available on its Internet site as an interim reference.

Report Objectives

This report documents actual landfill gas concentrations for compounds of concern using a national database derived from laboratory analyses employing U.S. EPA standard methods. Herein we establish that differences between the data presented in this report and the current AP-42 default values warrant their full-scale review by U.S. EPA. WIAC believes that the data presented here far better represent current conditions for many compounds and that such a review is well warranted.

Procedures and Results

AP-42 data management procedures were applied to the portion of the WIAC data set having AP-42 default values. The data management procedures address, for example, data screening, air dilution, and data averaging methods. The results of these procedures follow.

Data Collection and Screening

WIAC collected LFG analyses from 75 landfills in sixteen states. This information was processed using U.S. EPA's AP-42 data management procedures. U.S. EPA uses a screening process to remove analytically unacceptable, poorly documented or questionable results.[4] A review of the collected data indicated that the sample analyses would likely pass the AP-42 data screening process. The reported samples were normal, untreated LFG derived from typical gas collection systems. The analytical methodologies appeared to be consistent with those accepted by U.S. EPA.

The analytical results were corrected for air dilution using fixed gas analyses (specifically, methane and carbon dioxide). Several samples lacked either or both methane and carbon dioxide and were excluded. Additionally, some results appeared to be default values (e.g., 50% methane and 50% carbon dioxide) or were unusually high; these were excluded as well. In all, analyses from 27 landfills were omitted from subsequent evaluations.

Data Rating

The data for compounds from the remaining 48 landfills were rated from "A" (strongest) to "E" (weakest) using U.S. EPA's rating system. This process largely depends on the number of 'good' results (A for 20 and up, B for 10 to 19, C for 6 to 9, D for 3 to 5, E for 1 to 2). U.S. EPA also adjusts the rating for a compound's variability. If the arithmetic standard deviation is twice or greater than EPA's default value, then the rating is decreased by one letter. Table 1 summarizes the WIAC rating results and compares these with U.S. EPA's AP-42 data set for 43 compounds.

[4] "EMISSION FACTOR DOCUMENTATION FOR AP-42 SECTION 2.4 MUNICIPAL SOLID WASTE LANDFILLS REVISED" Office of Air Quality Planning and Standards, Office of Air and Radiation, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina 27711, August 1997; see Table 4-1

Table 1. Count of AP-42 compounds at each rating level (A is strongest; total of 43 compounds).

	Count	
Rating	WIAC	AP-42
A	12	4
B	14	21
C	2	8
D	6	6
E	9	4

The overall rating of the WIAC database is essentially the same as that for U.S. EPA's. For example when the letter grade is expressed as a numeric value (e.g., A = 1, B =2, etc.), the average ratings for the WIAC and U.S. EPA data sets are identical.

Nondetects

AP-42 directs that in general nondetect values should be halved then treated as "real" data. However if a nondetect exceeds by two times the maximum of the detects for a compound, then it should be discarded. It appears that the AP-42 guidance directs that this should be done on a facility-by-facility basis as well as on an emission category basis. However the guidance is unclear. A conservative approach was taken by eliminating only nondetects that were more than double the maximum detection among all facilities.

AP-42 also directs that if all values are nondetects then the result should be clearly indicated as such. U.S. EPA does not indicate which values reported within the LFG portion of AP-42 are nondetects.

Data Averaging

AP-42 specifies that data from a single landfill are to be arithmetically averaged. The result from each landfill is then further averaged using an arithmetic average, geometric mean, or median depending on whether the landfill data are normally distributed, lognormally distributed, or neither, respectively. The distribution type was determined for each compound using the probability plot correlation coefficient method.[5] Where fewer than four landfills reported a compound, the distribution type could not be determined. Instead, the distribution type originally used by U.S. EPA in AP-42 was employed. The distribution type was found to differ from U.S. EPA's for sixteen compounds.

The WIAC data set was averaged using both U.S. EPA's original and the newer WIAC's distribution types (see Table 2). The original distribution types were applied so that an "apples to apples" comparison was possible. Doing otherwise could either create or obscure differences between the data sets. The averages calculated based on U.S. EPA's and WIAC's averaging types are shown in the WIAC column labeled "1" and "2", respectively. Values in WIAC column 2 having a different distribution type are highlighted in gray. The results using the two data averaging methods are discussed in Data Summary below.

Codisposal Landfills

Because of detected statistical differences, EPA developed separate codisposal and municipal solid waste (MSW) only default AP-42 levels for toluene and benzene. All other default values

[5] This test was developed by J.J. Filliben in 1975 as reported in "Statistical Training Course for Ground-Water Monitoring Data Analysis", sponsored by the U.S. Environmental Protection Agency Office of Solid Waste, 1992.

were developed from the combined data sets. WIAC surveyed five codisposal sites and 70 MSW-only sites. The WIAC toluene and benzene data were separately analyzed by disposal site type. No significant differences were found between types of disposal sites for other compounds with one exception. Carbon tetrachloride was detected at one codisposal site but at none of the MSW-only disposal sites. The WIAC value for carbon tetrachloride includes the codisposal sites as these had only a slight effect on the calculated value. The value is reported in Table 2 as a 'nondetect' with a footnote indicating that it was found at one codisposal site.

Data Summary

The WIAC results are compared with AP-42 default concentrations in Table 2. WIAC 1 and 2 show the data prepared using past AP-42 and WIAC updated averaging methods, respectively (see Data Averaging above). The WIAC 1 and 2 concentrations are similarly reduced from AP-42 values by 76% and 80%, respectively. However simple alkane and alcohol compounds for which relatively few analyses were available disproportionately skewed the results. Omitting these compounds shows identical 56% overall reductions. Nearly identical reductions are also noted for aromatic (58%) and chlorinated (79%) compounds. Even though the AP-42 and WIAC averaging methods do not have any large overall effect, the two methods did lead to very significant differences for individual compounds (e.g., note those for 1,1,2,2-Tetrachloroethane).

Discussion

AP-42 and WIAC Differences

The differences between the AP-42 default values and the WIAC survey results may be traced to various factors. It was noted above that there are differences in the age of analyses between the AP-42 and WIAC data sets. Trends in LFG constituents have been well documented and are addressed in the next section. Apart from differences in the age of analyses, it was found that procedures used in U.S. EPA's preparation of the AP-42 defaults departed from the AP-42 guidance[6] in its use of nondetects and the minimum number of sources used for developing default values.

The guidance specifies that nondetects should be used in the development of default values. However all nondetects were discarded in at least one AP-42 update.[7] Nondetects may be discarded under certain circumstances specified by the guidance where these are much greater in magnitude than detects (doing otherwise would bias the default values high). However, the AP-42 documentation does not identify which values are detects or nondetects making it impossible to implement this procedure. Finally, the guidance states that default values developed entirely from nondetects should be clearly identified as such. Since nondetects are not documented, this procedure cannot be carried out.

[6] "Procedures for Preparing Emission Factor Documents" Office of Air quality Planning and Standards, Office of Air and Radiation, U.S. Environmental Protection Agency, Research Triangle Park, NC, November 1997 (EPA-454/R-95-015 REVISED).

[7] Phone communication (June 2000) with Stephen Roe, U.S. EPA contractor for past AP-42 revisions.

Table 2. WIAC results compared with AP-42 defaults. WIAC-1 values use AP-42 averaging methods. Some WIAC-2 values, grayed in column 2, use different methods (see text).

Compound	WIAC Sites	Concentration, ppmv		
		AP-42	WIAC-1	WIAC-2
1,1,1-Trichloroethane (methyl chloroform)	46	0.48	0.168	0.168
1,1,2,2-Tetrachloroethane	19	1.11	0.070	0.005
1,1-Dichloroethane (ethylidene dichloride)	45	2.35	0.741	0.741
1,1-Dichloroethene (vinylidene chloride)	45	0.2	0.092	0.092
1,2-Dichloroethane (ethylene dichloride)	47	0.41	0.120	0.120
1,2-Dichloropropane (propylene dichloride)	17	0.18	0.023	0.023
2-Propanol (isopropyl alcohol)	3	50.1	7.908	7.908
Acetone	8	7.01	6.126	7.075
Acrylonitrile	3	6.33	<0.036	<0.036
Benzene (Co-Disposal)	3	11.1	10.376	10.376
Benzene (No Co-Disposal)	44	1.91	0.972	0.972
Bromodichloromethane	7	3.13	<0.311	<0.264
Carbon disulfide	31	0.58	0.320	0.221
Carbon tetrachloride	37	0.004	<0.007*	<0.007*
Carbonyl sulfide	29	0.49	0.183	0.183
Chlorobenzene	46	0.25	0.227	0.227
Chlorodifluoromethane (Freon 22)	1	1.3	0.355	0.355
Chloroethane (ethyl chloride)	21	1.25	0.239	0.448
Chloroform	45	0.03	0.021	0.010
Chloromethane	8	1.21	0.249	0.136
Dichlorobenzene	34	0.21	1.607	1.448
Dichlorodifluoromethane (Freon 12)	19	15.7	1.751	0.964
Dichloromethane (Methylene Chloride)	47	14.3	3.395	3.395
Dimethyl sulfide (methyl sulfide)	34	7.82	6.809	6.809
Ethane	1	889	7.943	7.943
Ethanol	4	27.2	118.618	64.425
Ethyl mercaptan (Ethanethiol)	36	2.28	1.356	0.226
Ethylbenzene	26	4.61	6.789	6.789
Ethylene dibromide	30	0.001	<0.046	<0.005
Fluorotrichloromethane (Freon 11)	25	0.76	0.327	0.327
Hexane	4	6.57	2.324	2.063
Hydrogen sulfide	40	35.5	23.578	23.578
Methyl ethyl ketone	8	7.09	10.557	12.694
Methyl isobutyl ketone	7	1.87	0.750	0.750
Methyl mercaptan	36	2.49	1.292	1.266
Perchloroethylene (tetrachloroethylene)	48	3.73	1.193	1.193
Propane	1	11.1	14.757	19.858
Toluene (Co-Disposal)	3	165	37.456	37.456
Toluene (No Co-Disposal)	43	39.3	25.405	25.405
trans-1,2 Dichlorethene	1	2.84	0.051	0.051
Trichloroethylene (trichloroethene)	48	2.82	0.681	0.681
Vinyl Chloride	46	7.34	1.077	1.077
Xylenes	45	12.1	16.582	16.582

The guidance also states that a minimum of ten sources should be used in developing a default value (use of fewer sources results in unreliable values). However several of the AP-42 defaults were developed from many fewer samples and sometimes just one sample. In view of the high variability observed between landfill test results, it is recommended that U.S. EPA carefully review its practices in developing AP-42 defaults with fewer than ten samples. At a minimum, defaults derived from limited data should be clearly identified and users cautioned as to their questionable reliability.

LFG Constituent Declines

Large, long term declines in LFG HAP values were documented in the August 1999 WIAC report. This report focused on four active and two closed landfills in Southern California. The decline at the active landfills was concurrent with implementation of waste-screening programs that prevented the disposal of incidental amounts of hazardous wastes present in the municipal solid waste stream starting in the early 1980's. U.S. EPA's Resource Conservation and Recovery Act (RCRA) rules for MSW landfills, implemented starting October 9, 1991 (40 CFR 258.20) also began requiring such exclusion programs on a nationwide basis. Additionally, the U.S. EPA established Subtitle C requirements per the 1984 RCRA amendments that set minimum treatment standards for listed wastes. This program ensured that the treatment residuals were placed in Subtitle C landfills. The combination of these programs likely reduced or eliminated incidental hazardous waste disposal in active MSW landfills.

An attempt was made to determine whether a similar long term decline could be detected at other active landfills represented in the AP-42 database. A comparison was made of those sites that were reported by both EPA and WIAC. However it was found that many of the AP-42 landfills had coded names. The only active sites identifiably the same were those already reported in the August 1999 report. It is recommended that U.S. EPA identify the coded AP-42 landfills so that a meaningful comparison could be made with the WIAC results.

The LFG HAP decline for the two closed landfills in the August 1999 report would be unrelated to improved hazardous waste management practices. However the anaerobic decomposition processes at these sites are likely to have brought about such declines through one or more mechanism. HAP compounds will tend to volatilize into newly generated anaerobic gases; the gases together with the trace constituents will ultimately exit the landfill, removing the HAP compounds. Additionally, anaerobic processes may destroy or transform some HAP compounds.

Another factor to consider in the decline of HAP compounds is the effect of improved laboratory methodologies in recent years. Areas of improvement include utilization of more sophisticated equipment and adoption of standardized procedures for all analytical aspects. Some of the improved procedures include sample container preparation, instrument calibration, and quality assurance acceptance criteria.

Equipment and procedure improvements reduce the scatter of data, increase data reliability, minimize compound misidentifications, and lower detection limits. Detection limits are especially important since several of the AP-42 compounds have few or no detections; improved detection limits would tend to lower the calculated AP-42 defaults. One laboratory submitting data for this report indicated that detection limits were more than halved in the last five years.

Urban Air Toxics Strategy

The U.S. EPA used AP-42 defaults for the recently completed Urban Air Toxics (UAT) Strategy. A review of the UAT findings based on the newer WIAC results is presented in Table 3. For all compounds detected in LFG, municipal landfills dropped in rank among industrial sources. The

drop was typically from sixth to at least thirteenth or more. Four of the nine compounds dropped from the ranking and rank no more than 17th. The average MSW landfill contribution per compound dropped from 13% to 1.5%. One of the more dramatic findings concerns U.S. EPA's original attribution of 84% of all 1,1,2,2-Tetrachloroethane emissions to landfills; the WIAC findings show that the landfill emission level is about 2% of all sources. These findings indicate that municipal landfills have markedly less emissions, compared to other industrial sources, than U.S. EPA previously estimated.

Table 3. Summary of changes to Urban Air Toxic (UAT) emission estimates based on changes from AP-42 defaults to current compound levels measured by WIAC.

Compound	Annual Tons		Portion of UAT Inventory		Rank		Number of Sources
	AP-42	WIAC	AP-42	WIAC	AP-42	WIAC	
1,1,2,2-Tetrachloroethane	216	1.0	84.08%	2.37%	1	5	16
1,2-Dichloropropane	23.6	3.0	3.59%	1.48%	6	8	12
Acrylonitrile	389	2.2	15.28%	0.10%	3	15	17
Benzene	173	87.9	3.86%	2.00%	11	13	17
Chloroform	4.17	1.3	4.94%	1.63%	6	9	17
Ethylene Dichloride	47	13.7	1.15%	0.34%	10	*	17
Methylene Chloride	1550	367	1.67%	0.40%	11	*	17
Tetrachloroethylene	717	229	0.59%	0.19%	6	*	17
Trichloroethylene	429	104	0.64%	0.16%	13	*	17
Vinyl Chloride	531	77.9	19.65%	3.46%	2	4	17
Vinylidene Chloride	22.5	10.3	10.10%	3.45%	4	5	14

* Landfill emissions are less than for other ranked sources.

Conclusions

WIAC conducted a national survey of recent LFG analyses. Recent results from 75 landfills were analyzed using AP-42 methodologies. The AP-42 defaults were found to typically overestimate current levels by two to four hundred percent. For some of the more health significant compounds, the differences were larger yet. The overestimated AP-42 values may potentially misdirect U.S. EPA's policy development. For example, the recently completed Urban Air Toxics Strategy appears to have substantially overestimated actual landfill emissions. Furthermore, the existing AP-42 default values may adversely impact individual landfills required to use these values.

As a result, WIAC believes that the AP-42 defaults should be revised to reflect the decline in LFG constituents. The most recent AP-42 revision in 1995 added new data to older values and averaged the combined data sets. This approach is appropriate only for data that does not trend. It is recommended that older data be purged and replaced using current data presented in this paper.

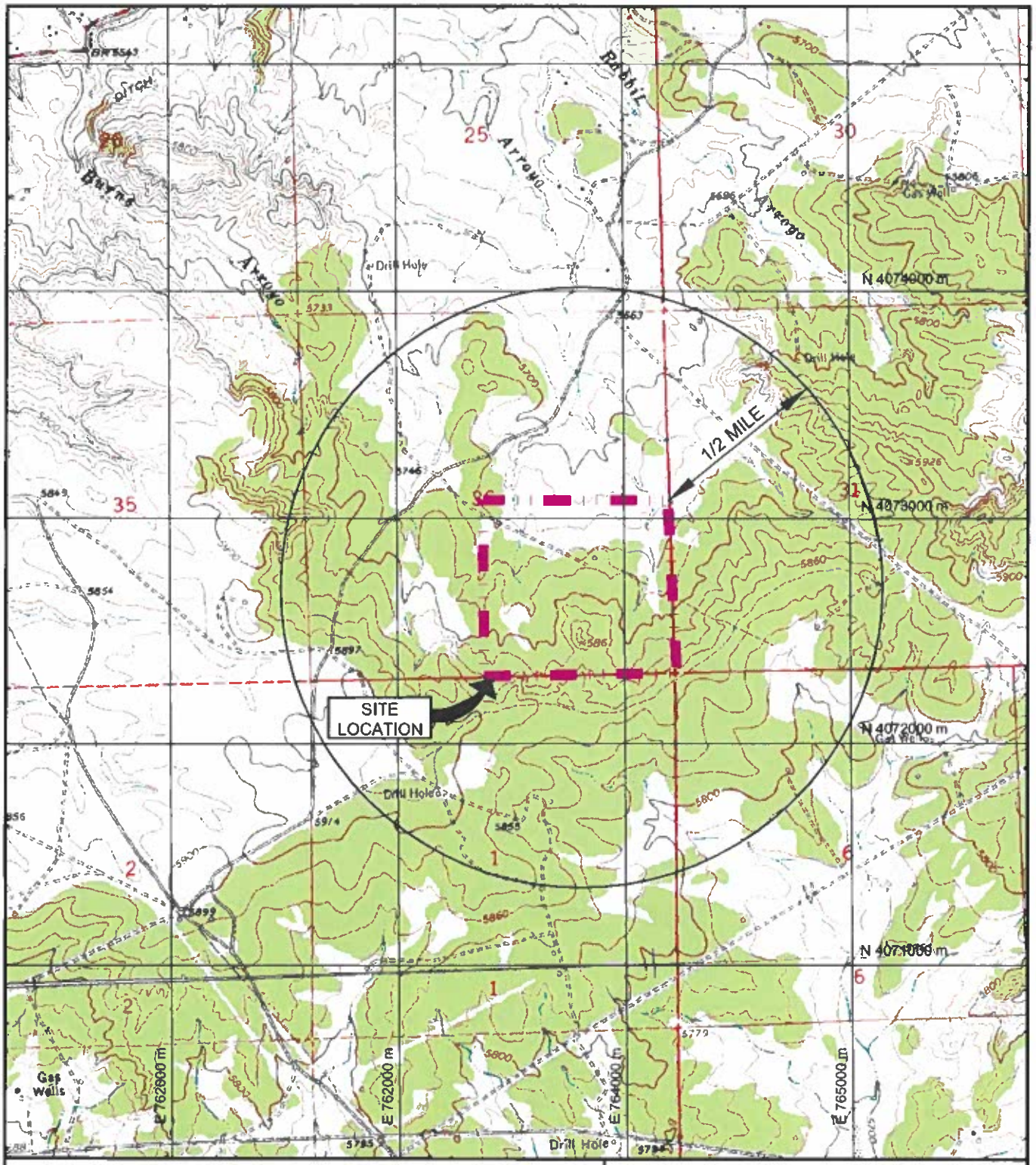
Section 8

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	

The map is included in this Section.



Based on Flora Vista, NM (1963, Photorevised 1979); Horn Canyon, NM (1965, Photorevised 1979) Quadrangles, USGS 7.5' Series (1:24,000 Scale).

NORTH

0' 1000' 2000'

SITE LOCATION MAP

SAN JUAN COUNTY REGIONAL LANDFILL
FLORA VISTA, NEW MEXICO

Gordon Environmental, Inc.
Consulting Engineers
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DATE: 05/09/12	CAD: SJLF SITE QUAD.dwg	PROJECT #: 122.02.08
DRAWN BY: JFP	REVIEWED BY: ANY	
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Drawing:P:\acad 2003\122.02.08\2012 TITLE VIDWGS\JLF SITE QUAD.dwg
Date/Time:May. 09, 2012-13:55:50

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")

✓ **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). Not Applicable
4. ☐ A sample of the letters sent to the owners of record. Not Applicable
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.

Public notification do not need to be performed by the Applicant for Title V Permit Applications/Renewals.

Section 10

Written Description of the Routine Operations of the Facility

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.

Section 4 provides the process flow diagram for the facility.

As shown on the flow diagrams, incoming waste is delivered either to the Convenience Center or directly to the landfill face. The traffic of refuse delivery vehicles on landfill roads creates particulate emissions. The network of roads is addressed as Emission Unit No. 1. The general landfill operations, including the moving, placing, compacting, and covering of refuse with intermediate cover is addressed under Emission Unit 2. This Emission Unit also addresses the wind-blown emissions from disturbed areas. The surface migration of the uncollectable landfill gas through the landfill surface is addressed under Unit 3. Unit 4 covers the BTEX emissions from petroleum contaminated soils that is placed in thin layers and turned on a routine basis. Unit 5 is the combustion of the collected landfill gas.

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)**:**

The SJCRL and all associated emission-producing activities that occur on-site within the property boundaries of the facility are owned and operated by the Applicant.

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

Section 12.A
PSD Applicability Determination for All Sources

(Submitting under 20.2.72, 20.2.74 NMAC)

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:

- [X] **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.**

As shown on Table 2E, the emissions at SJCRL remains a minor source under the provisions of 20.2.70 NMAC; therefore, SJCRL is not subject to the requirements of either 20.2.72 NMAC or 20.2.74 NMAC.

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/

Applicable STATE REGULATIONS:

STATE REGU-LATIONS CITATION	Title	Applies to Entire Facility	Applies to Unit No(s).	JUSTIFICATION: Identify the applicability criteria, numbering each (i.e. 1. Post 7/23/84, 2. 75 m^3, 3. VOL)
20.2.1 NMAC	General Provisions	Y	3 & 5	General Provisions apply to Notice of Intent, Construction, and Title V permit applications.
20.2.3 NMAC	Ambient Air Quality Standards NMAAQS	Y	All	Compliance with Ambient Air Quality Standards discussed in the Air Dispersion Modeling Analysis Report Facility submitted under separate cover an air dispersion modeling waiver 3/9/22
20.2.7 NMAC	Excess Emissions	Y	3&5	Records kept of any excess emission periods and notifications provided to NMED. Verbal (< 24 hrs) and written (< 10 days) notice of excess emissions.
20.2.33 NMAC	Gas Burning Equipment - Nitrogen Dioxide	N	N/A	No affected facilities
20.2.34 NMAC	Oil Burning Equipment: NO_2	N	N/A	No affected facilities
20.2.35 NMAC	Natural Gas Processing Plant – Sulfur	N	N/A	No affected facilities
20.2.38 NMAC	Hydrocarbon Storage Facil.	N	N/A	No significant hydrocarbon storage tanks at this facility
20.2.39 NMAC	Sulfur Recovery Plant - Sulfur	N	N/A	No affected facilities
20.2.60 NMAC	Open Burning	Y	All (108)	Open burning is prohibited at the facility
20.2.61.109 NMAC	Smoke & Visible Emissions	Y	5	Visible emissions per EPA Method 22
20.2.64 NMAC	Municipal Solid Waste Landfills	Y	3&5	This Application satisfies applicable requirements
20.2.65 NMAC	Smoke Management	N	N/A	No affected facilities
20.2.70.200. D NMAC	Operating Permits	Y	All	The facility currently has an operating permit, Permit No. P246L-R2. This application is for a construction permit.
20.2.71.109 NMAC	Operating Permit Fees	Y	All	Will submit required fees when assessed by NMED
20.2.72 NMAC	Construction Permits	N	3&5	NSR permit was submitted and approved in 2022.
20.2.73 NMAC	NOI & Emissions Inventory Requirements	Y	All (300.A.3)	Will submit an emissions inventory when requested by NMED

STATE REGU-LATIONS CITATION	Title	Applies to Entire Facility	Applies to Unit No(s).	JUSTIFICATION: Identify the applicability criteria, numbering each (i.e. 1. Post 7/23/84, 2. 75 m^3, 3. VOL)
20.2.74 NMAC	Permits – PSD	N	N/A	The facility is not a new major source or major modification to an existing source.
20.2.75 NMAC	Construction Permit Fees	Y	5	Will submit required fees when assessed by NMED
20.2.77 NMAC	New Source Performance	Y	5	See discussion of NSPS below (40 CFR 60)
20.2.78 NMAC	Emission Standards for HAPS	N	5	See discussion of NESHAPS below (40 CFR 61 & 63)
20.2.79 NMAC	Permits – Nonattainment Areas	N	N/A	No affected facilities
20.2.80 NMAC	Stack Heights	Y	5	Non-enclosed height (28') does not exceed the height allowed by 40 CFR 51.100(ii)1
20.2.82 NMAC	MACT Standards for source categories of HAPS	Y	All	This application satisfies applicable requirements

Applicable FEDERAL REGULATIONS:

FEDERAL REGU-LATIONS CITATION	Title	Applies to Entire Facility	Applies to Unit No(s).	JUSTIFICATION:
40 CFR 50	NAAQS	Y	All	Compliance with NAAQS was demonstrated in application for NSR Permit 9648
NSPS 40 CFR 60, Subpart A	General Provisions	Y	5, All	Facility will comply with applicable sections
NSPS 40 CFR Part 60 Subpart XXX	NSPS – Standards of Performance for Municipal Waste Solid Landfills	Y	5, All	Construction Permit satisfied NSPS Subpart XXX requirements
NESHAP 40 CFR 61 Subpart J	NESHAPS Benzene Fugitives	N	N/A	No affected facilities
NESHAP 40 CFR 61 Subpart FF	National Emission Standards for Benzene waste operations	N	N/A	No affected facilities
40 CFR 62	State Plans	N	N/A	Requirements for NMED only

FEDERAL REGULATIONS CITATION	Title	Applies to Entire Facility	Applies to Unit No(s).	JUSTIFICATION:
40 CFR 63 Subpart A Subpart AAAA	National Emission Standards for Hazardous Air Pollutants for Source Categories	Y	5	The monitoring, operational, recordkeeping, and reporting requirements of 40 CFR 63 Subpart AAAA for Municipal Solid Waste Landfills apply to this device and will be complied with.
40 CFR 64	Compliance Assurance Monitoring	N	N/A	No affected facilities
40 CFR 65	Consolidated Federal Air Rule	N	N/A	The owner has not chosen alternatives to the provisions of 40 CFR 60, Subpart Cf
40 CFR 66	Non Compliance Penalties	N	N/A	Not under a compliance order
40 CFR 67	State Noncompliance Penalty Plan	N	N/A	Requirements for NMED only
40 CFR 68	Chemical Accident Prevention	Y	All (68.10)	A Risk Management Plan is not required.
40 CFR 69	Exemption from CAA	N	N/A	Not pertinent to sources within the US
40 CFR 70	Operating Permit	Y	All (70.3.a)	Operating Permit Program – is not applicable – New Mexico State has full delegated authority and Title V is administered under 20.2.70 NMAC. The facility has an operating permit, P246L-R2. This application services as an application for a construction permit.
40 CFR 71	Federal Operating Permit Program	N	N/A	Facility regulated by SIP
Title IV – Acid Rain 40 CFR 72	Acid Rain	N	N/A	Not an affected source under 40 CFR 72
Title IV – Acid Rain 40 CFR 73	Sulfur Dioxide Allowance Emissions	N	N/A	Not an affected source under 40 CFR 73
40 CFR 74	SO_2 Opt-In	N	N/A	Not an affected source under 40 CFR 74
40 CFR 75	Continuous Emissions Monitoring	N	N/A	Not an affected source under 40 CFR 75
Title VI – 40 CFR 82	Protection of Stratospheric Ozone	N	N/A	Facility does not produce, transfer, destroy, import or export substances controlled under this regulation
40 CFR 98 Subpart HH	Greenhouse Gas Reporting Requirements	Y	All (98.343)	Greenhouse gas emission calculations are being submitted annually.
CAA Section 112(r)	Chemical Accident Prevention	N	N/A	The facility does not store or use any of the chemicals listed in Section 112(r) in or above the threshold quantities specified in this section

FEDERAL REGULATIONS CITATION	Title	Applies to Entire Facility	Applies to Unit No(s).	JUSTIFICATION:
	Provisions			

Section 14

Operational Plan to Mitigate Emissions

(Submitting under 20.2.70, 20.2.72, 20.2.74 NMAC)

X 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.

☐ **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.

SJCRLF has prepared and submitted a Dust Control Plan, and Gas Collection and Control System Design Plan. These plans provide guidance on monitoring, controlling, and addressing emissions from waste disposal operations, traffic over roads, and landfill gas generation and combustion. Additionally, periods of startup shutdown and malfunction are addressed within these plans.

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.

SJCRL as part of this permit renewal application is not requesting an alternative operating scenarios.

Section 16

Air Dispersion Modeling

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.

Air dispersion modeling was submitted as part of the NSR Permit Application process in October 2021.The calculated emissions for the next permit period, through 2029, will not exceed those modeled for the NSR application.

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.

SJCRL affirms that it is in compliance with applicable Title V regulatory requirements at the time this Application is submitted.

Performance Testing, specified in NSR Permit 9648, Section A704 and 40 CFR 60.18 and §60.767 (d)(2), will be conducted as required within 180 days of the start-up of the GCCS system.

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.

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 SJCRL does not operate an emissions source that is subject to 40 CFR Part 64 (Compliance Assurance Monitoring). Since the facility is subject to a NSPS rule, they are exempt from CAM. Therefore, compliance assurance monitoring is not performed.

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.

The SJCRL is committed to comply with applicable regulatory requirements federal and state. SJCRL submits the compliance status of the facility with the current Title V Permit semi-annually to the New Mexico Air Quality Board. These reports indicate compliance with the permit requirements.

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.

Consistent with historical monitoring and reporting practices, SJCRL hereby commits to remain in compliance with applicable local, state, and federal regulations at the time of this Application for Permit Renewal. Compliance will be maintained for those regulatory elements where compliance is required, and will, in a timely manner or at such schedule expressly required by the applicable requirement, meet additional applicable requirements that become effective 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.

SJCRL will continue to submit the required reports at the current reporting cycle identified in the current Title V Operation Permit P246-R2.

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? **X Yes** **☐ No**

There are several air conditioning units on site for personal comfort and four refrigerators for employee use. The office trailer has a ground unit used for both cooling and heating, two window units and one refrigerator. The Scalehouse has a ground unit, two window units and a small refrigerator. The Material Recycling Facility also has a window unit and a refrigerator. The Repair shop also has a portable ground unit, one window unit, and a refrigerator used for personal comfort of employees. There are also three small refrigerators (one in the Scalehouse and two in the Employee Break Room) that utilize R-22 Freon. A limited number of heavy equipment vehicles and company-owned pick-up trucks operated by landfill staff are also equipped with on-board air conditioners

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

The SJCRL has an EPA 608 Certified mechanic to service motor vehicle air conditioners (MVACs). Appliances for disposal must have certification stating that the refrigerant has been removed before being accepted at the landfill.

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

Requirements of 40 CFR Part 82 Subparts B and F apply to SJCRL for the maintenance of MVACs. MVAC maintenance is performed by an EPA 608 Certified mechanic

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**.

SJCRL complied with applicable regulatory requirements at the time this application is submitted. Additional compliance requirements, if any, which may be imposed by virtue of new regulations, will be addressed in accordance with applicable regulatory schedules.

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.

SJCRL does not store or use any of the chemicals identified in Section 112(r).

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.)

The Colorado state boundary is located approximately 27.4 km (17 miles) north of the SJCRL. The Navajo Nation is located 19.3 km (12 miles) to the west, the Ute Mountain Indian Reservation 23.3 km (14.5 miles) to the north, the Southern Ute Mountain Indian Reservation 27.4 km (17 miles) to the north, and the Jicarilla Apache Indian Reservation 64.4 km (40 miles) to the east of the SJCRLF. The nearest Class I area, Mesa Verde National Park, is situated 56.2 km (35 miles) north of the facility.

19.9 - Responsible Official

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

Pursuant to 20.2.70.7.AD NMAC, the responsible official at SJCRLF is Mr. Damon De Frates, the Director of Post Collections Operations for Waste Management of New Mexico, Inc.

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 other relevant information is necessary for this application.

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? **Expected life of landfill is 61 years.**			
2	Maximum operational hours per year: **4038**			
3	Landfill Operating hours (open to the public) M-F: **7 am to 7 pm**		Sat. **9 am to 5 pm**	Sun. **9 am to 5 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. **1988**			
5	Landfill Design Capacity. Enter all 3	Tons: **13,793,560**	Megagrams (Mg): **12,513,311**	Cubic meters: **19,174,378**
6	Landfill NMOC Emission Rate (NSPS XXX)	☐ 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)	☐ Less than 500 ppm using Tier 4	☐ Equal to or Greater than 500 ppm using Tier 4	
	Landfill NMOC Emission Rate (NSPS WWW)	**X*** Less than 50 Mg/yr *Could surpass 50 Mg/year by end of next permit period, 2029	☐ Equal to or Greater than 50 Mg/yr	
7	Annual Waste Acceptance Rate: Varies; annual acceptance rates has ranged from 69.465 to 213,682 short tons.			
8	Is Petroleum Contaminated Soil Accepted? **Yes**		If so, what is the annual acceptance rate? **Annual acceptance rate of PCS is limited by BTEX concentration and calculated HAP emissions**	
9	NM Solid Waste Bureau (SWB) Permit No.: **SWM-0424366 and SWM-0424367 (SP)**		SWB Permit Date: **October 13, 2016**	
10	Describe the NM Solid Waste Bureau Permit, Status, and Type of waste deposited at the landfill. **The SJCRL has been in operation and permitted since 1988. SJCRL disposes of municipal solid waste (MSW), construction and demolition (C&D) debris, ash, industrial solid waste, offal, petroleum contaminated soils (PCS), sludge, special waste not otherwise specified, spill of a chemical substance or commercial product, and treated formerly characteristic hazardous waste.**			
11	Describe briefly any process(es) or any other operations conducted at the landfill. **SJCRLF operates a Public Convenience Station for residential self-haul customers from Aztec, Bloomfield,**			

	Farmington, Flora Vista, NM, and surrounding areas of San Juan County. In 2012, SJCRLF also constructed and opened a single-stream Materials Recovery Facility (MRF) located north of the site's Maintenance Facility. The MRF is used primarily by commercial trucks, which will transport recyclable materials from locations within San Juan County. Recyclable materials deposited at the Public Convenience Center are transported to the MRF by Waste Management of New Mexico, Inc. (WMNM) vehicles as sufficient volumes are collected.

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):
2	Tier 2 Sampling: **February 2021 – 40 CFR 60.35(f)(3)**
3	Tier 3 Rate Constant:
4	Tier 4 Surface Emissions Monitoring:
5	Attach all Tier Procedure calculations, procedures, and results used to determine the Gas Collection and Control System (GCCS) requirements.

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

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

1	Was the GCCS design certified by a Professional Engineer? **Yes**
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. **January 5 2022 - 34 Mg/yr.**
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? **Yes**
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)? **Yes, the GCCS Plan complies with 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. **Unit 5 – 700 Scfm Non-enclosed Flare**
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)? **Yes**

Section 22: Certification

Company Name: **Waste Management of New Mexico, Inc.**

I, **Damon De Frates**, 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 7 day of AUGUST, 2023 upon my oath or affirmation, before a notary of the State of ARIZONA.

*Signature

Date 8/7/2023

DAMON DE FRATES
Printed Name

DIRECTOR OF OPERATIONS
Title

Scribed and sworn before me on this 7 day of August, 2023

My authorization as a notary of the State of Arizona expires on the

30 day of June, 2026.

Notary's Signature

Date 8-7-23

Kathaleen Shaner
Notary's Printed Name

KATHALEEN SHANER
Notary Public - Arizona
Maricopa County
My Commission Expires
June 30, 2026
Commission # 633153

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