

December 17, 2019
File No. 16218001.00.T2

Ms. Cember Hardison
Air Quality Bureau, New Mexico Environmental Department
Permitting Section
525 Camino de los Marquez, Suite 1
Santa Fe, NM 87505

Subject: Title V Permit Significant Modification Application
Operating Permit No. P185LR3
Caja del Rio Landfill
Santa Fe, New Mexico

Dear Ms. Hardison:

On behalf of the Santa Fe Solid Waste Management Agency (SFSWMA), SCS Engineers is pleased to submit this Title V significant permit modification application pursuant to 20.2.70.400 NMAC for the Caja del Rio Landfill. The landfill currently operates under Title V Operating Permit P185LR3, issued August 30, 2017. During a regulatory inspection by NMED on June 11, 2019, it was noted that the Godwin water pump (engine) was not permitted based on its maximum possible horsepower (hp) rating. As such, this application is being submitted to incorporate that correction, as well as the following changes which had been noted during various internal permit reviews over the past year:

- Include Godwin water pump engine (Unit Id: Godwin) in the list of regulated sources (currently listed as an insignificant source) since it is subject to 40 CFR 63, Subpart ZZZZ;
- Update the emissions from compost screening operations (Unit Ids: TROM and TROM-eng) for an operation of 800 hours/year and the maximum rating (70 hp) for consistency within the application calculations (prior permit's emissions had conservative, but varying, operating hours for the various backup pages and utilized a lower hp for recommended, not maximum, hp);
- Update the flare stack attributes reported in Table 2-H; and
- Update the maximum uncontrolled and allowable emissions based on the maximum engine horsepower (HP) rating as noted from the inspection mentioned above.

Supporting documentation that has been updated or added, including revised emissions calculations are attached with this application. There are no changes proposed to the regulatory applicability with this revision application. Please note that some of the replacement pages include calculations for the Green waste chipper (Unit Id: G1); these were not revised from prior application but included on the pages that included revised compost emissions calculations. Lastly, only those sections from the permit application that required updating from the past application have been included.

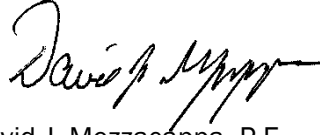
If you have any questions, please do not hesitate to contact David Mezzacappa, P.E. at (817) 358-6108.

Ms. Cember Hardison
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Sincerely,



Joseph D. Krasner, P.E.
Project Manager
SCS Engineers



David J. Mezzacappa, P.E.
Vice President
SCS Engineers

Attachment

cc: Randall Kippenbrock, P.E., SFSWMA (e-copy)
Danita Boettner, P.E., SFSWMA

Mail Application To: 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		For Department use only: AIRS No.:
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Universal Air Quality Permit Application

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

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

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

Acknowledgements:

- ☒ I acknowledge that a pre-application meeting is available to me upon request. ☐ Title V Operating, Title IV Acid Rain, and NPR applications have no fees.
- ☐ \$500 NSR application Filing Fee enclosed **OR** ☐ The full permit fee associated with 10 fee points (required w/ streamline applications).
- ☐ Check No.: [redacted] in the amount of [redacted]
- ☒ 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.
- ☐ This facility qualifies to receive assistance from the Small Business Environmental Assistance program (SBEAP) and qualifies for 50% of the normal application and permit fees. Enclosed is a check for 50% of the normal application fee which will be verified with the Small Business Certification Form for your company.
- ☐ This facility qualifies to receive assistance from the Small Business Environmental Assistance Program (SBEAP) but does not qualify for 50% of the normal application and permit fees. To see if you qualify for SBEAP assistance and for the small business certification form go to https://www.env.nm.gov/aqb/sbap/small_business_criteria.html).

Citation: Please provide the **low level citation** under which this application is being submitted: **20.2.70.404.C 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 1 st 3 to 5 #s of permit IDEA ID No.): 1484	Updating Permit/NOI #: P185LR3
1	Facility Name: Caja del Rio 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): 149 Wildlife Way, Santa Fe, NM 87506		
2	Plant Operator Company Name: Santa Fe Solid Waste Management Agency	Phone/Fax: (505) 424-1850/ (505) 424-1839	
a	Plant Operator Address: 149 Wildlife Way, Santa Fe, NM 87506		

b	Plant Operator's New Mexico Corporate ID or Tax ID: State Tax ID 02-331303-000	
3	Plant Owner(s) name(s): Santa Fe Solid Waste Management Agency	Phone/Fax: (505) 424-1850/ (505) 424-1839
a	Plant Owner(s) Mailing Address(s): 149 Wildlife Way, Santa Fe, NM 87506	
4	Bill To (Company): Santa Fe Solid Waste Management Agency	Phone/Fax: (505) 424-1850/ (505) 424-1839
a	Mailing Address: 149 Wildlife Way, Santa Fe, NM 87506	E-mail: RKippenbrock@sfswwa.org
5	☒ Consultant: SCS Engineers, Inc., David Mezzacappa, PE; Air Quality Services, Inc, Bruce Nicholson, PE	Phone/Fax: 817.358.6108/ 817.571-2188 Phone/Fax: (505) 982-2737
a	Mailing Address: SCS Engineers, 1901 Central Dr., Suite 550, Bedford, TX 76021 Air Quality Services, PO Box 6324, Santa Fe, NM 87502	E-mail: DMezzacappa@SCSEngineers.com , Brucnichol@aol.com
6	Plant Operator Contact: Mr. Randall Kippenbrock, P.E.	Phone/Fax: (505) 424-1850 x100/(505) 424-1839
a	Address: 149 Wildlife Way, Santa Fe, NM 87506	E-mail: RKippenbrock@sfswwa.org
7	Air Permit Contact: Mr. Randall Kippenbrock, P.E.	Title: Executive Director
a	E-mail: RKippenbrock@sfswwa.org	Phone/Fax: (505) 424-1850 x100/(505) 424-1839
b	Mailing Address: 149 Wildlife Way, Santa Fe, NM 87506	
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-185LR3
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:
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 Landfill solid waste capacity = 7,900,184 cubic meters. A landfill does not have an input and production capacity.

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

b	Proposed	Hourly:	Daily:	Annually:
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Section 1-D: Facility Location Information

1	Section: portions of 21,22,27,28	Range: 8E	Township: 17N	County: Santa Fe	Elevation (ft): 6430
2	UTM Zone: ☐ 12 or ☒ 13			Datum: ☒ NAD 27 ☐ NAD 83 ☐ WGS 84	
a	UTM E (in meters, to nearest 10 meters): 401148 m			UTM N (in meters, to nearest 10 meters): 3949023 m	
b	AND Latitude (deg., min., sec.): 35 40 55.04			Longitude (deg., min., sec.): 106 5 32.55	
3	Name and zip code of nearest New Mexico town: Santa Fe NM 87506				
4	Detailed Driving Instructions from nearest NM town (attach a road map if necessary): from 599 turn onto the north frontage road and follow west to Caja del Rio rd, proceed north to Wildlife Way, turn left onto Wildlife Way and proceed to the entrance of the landfill.				
5	The facility is 3.3 miles NW (direction) of Santa Fe (nearest town).				
6	Status of land at facility (check one): ☐ Private ☐ Indian/Pueblo ☐ Federal BLM ☐ Federal Forest Service ☒ Other (specify) Government				
7	List all municipalities, Indian tribes, and counties within a ten (10) mile radius (20.2.72.203.B.2 NMAC) of the property on which the facility is proposed to be constructed or operated: City of Santa Fe, Santa Fe County, Tesuque Pueblo 6.3 mi				
8	20.2.72 NMAC applications only: Will the property on which the facility is proposed to be constructed or operated be closer than 50 km (31 miles) to other states, Bernalillo County, or a Class I area (see www.env.nm.gov/aqb/modeling/classIareas.html)? ☐ Yes ☐ No (20.2.72.206.A.7 NMAC) If yes, list all with corresponding distances in kilometers:				
9	Name nearest Class I area: Bandelier Wilderness				
10	Shortest distance (in km) from facility boundary to the boundary of the nearest Class I area (to the nearest 10 meters): 16.4 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: Approx 2/3 miles (1070m) – Golf Course club house				
12	Method(s) used to delineate the Restricted Area: Bermed and natural barriers plus fenced and gated. “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? Del Hur Industries, NSR permit #GCP2-2976				

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 ($\frac{\text{hours}}{\text{day}}$): See Sec 20	($\frac{\text{days}}{\text{week}}$): See Sec 20	($\frac{\text{weeks}}{\text{year}}$): See Sec 20	($\frac{\text{hours}}{\text{year}}$): See Sec 20
2	Facility's maximum daily operating schedule (if less than 24 $\frac{\text{hours}}{\text{day}}$)? Start: See sec 20		☐ AM ☐ PM	End: ☐ AM ☐ PM
3	Month and year of anticipated start of construction: N/A			
4	Month and year of anticipated construction completion: N/A			
5	Month and year of anticipated startup of new or modified facility: N/A			
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: Area of concern to correct permit from Journey Nolan (pump HP)		
a	If yes, NOV date or description of issue: 06/11/2019 (Update permit/Godwin Pump HP)	NOV Tracking No: 35-049-0032	
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: Post-Inspection Notification Form and follow-up email 06/21/19	Date: 06/11/19 and 06/21/19	Requirement # (or page # and paragraph #): Area of Concern #6
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.)
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Section 1-H: Current Title V Information - Required for all applications from TV Sources

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

1	Responsible Official (R.O.) (20.2.70.300.D.2 NMAC): Mr. Randall Kippenbrock, P.E.		Phone: (505) 424-1850 x100
a	R.O. Title: Executive Director	R.O. e-mail: RKippenbrock@sfswwa.org	
b	R. O. Address: 149 Wildlife Way, Santa Fe, NM 87506		
2	Alternate Responsible Official (20.2.70.300.D.2 NMAC):		Phone:
a	A. R.O. Title:	A. R.O. e-mail:	
b	A. R. O. Address:		
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): None		
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.): N/A		
a	Address of Parent Company: N/A		
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. Randall Kippenbrock, (505) 424-1850 x100		
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: Yes – see section 19.8		

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-toe 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.

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Note:

¹There are no changes proposed to this section with this Title V significant revision application. Please refer to Title V renewal application submitted to NMED on December 31, 2015.

Table 2-A: Regulated Emission Sources

Unit and stack numbering must correspond throughout the application package. If applying for a NOI under 20.2.73 NMAC, equipment exemptions under 2.72.202 NMAC do not apply.												
Unit Number ¹	Source Description	Manufacturer	Model #	Serial #	Maximum or Rated Capacity (Specify Units)	Requested Permitted Capacity (Specify Units)	Date of Manufacture or Reconstruction ²	Controlled by Unit #	Source Classification Code (SCC)	For Each Piece of Equipment, Check One	Applicable State & Federal Regulation(s) (i.e. 20.2.X, JJJJ, ...)	Replacing Unit No.
							Date of Installation /Construction ²	Emissions vented to Stack #				
Flare	Enclosed Gas Collection flare	John Zink	ZTOF	BF-9099773	120-1200 cfm	500 cfm	1-Apr-10	none	501004	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	40 CFR 60, Subpart WWW	NA
							10-Apr-10	F-1		☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
										☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
PCS	Petroleum contaminated soil landfarming	NA	NA	NA		10,000 cuyd/yr	NA	NA		☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
							NA	NA		☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
ACC1	Active customer disposal cell, compaction	NA	NA	NA	NA	NA	NA	NA	501004	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	none	NA
ACG1	Active customer disposal cell, grading	NA	NA	NA	NA	NA	NA	NA	501004	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	none	NA
ACF1	Active customer disposal cell, face cover	NA	NA	NA	NA	NA	NA	NA	501004	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	none	NA
C2	Cell construction	NA	NA	NA	NA	NA	NA	NA	501004	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	none	NA
R1	Customer paved road	NA	NA	NA	NA	NA	NA	NA	501004	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	none	NA
R2	Customer unpaved road	NA	NA	NA	NA	NA	NA	NA	501004	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	none	NA
R3	Green waste cold mill road	NA	NA	NA	NA	NA	NA	NA	501004	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	none	NA
R4	Green waste unpaved road	NA	NA	NA	NA	NA	NA	NA	501004	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	none	NA
G0	Green waste chipper	Smoracy, LLC	3680 Beast	1436	500 cu yd/hr	500 cu yd/hr	6/27/2002	NA	501004	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	none	NA
							11/26/2003	NA	02	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		

¹ Unit numbers must correspond to unit numbers in the previous permit unless a complete cross reference table of all units in both permits is provided.² Specify dates required to determine regulatory applicability.³ To properly account for power conversion efficiencies, generator set rated capacity shall be reported as the rated capacity of the engine in horsepower, not the kilowatt capacity of the generator set.

Table 2-A: Regulated Emission Sources

Unit and stack numbering must correspond throughout the application package. If applying for a NOI under 20.2.73 NMAC, equipment exemptions under 2.72.202 NMAC do not apply.													
Unit Number ¹	Source Description	Manufacturer	Model #	Serial #	Maximum or Rated Capacity (Specify Units)	Requested Permitted Capacity (Specify Units)	Date of Manufacture or Reconstruction ²		Controlled by Unit #	Source Classification Code (SCC)	For Each Piece of Equipment, Check One	Applicable State & Federal Regulation(s) (i.e. 20.2.X, JJJJ, ...)	Replacing Unit No.
							Date of Installation /Construction ²	Emissions vented to Stack #					
C3	Cell top cover, load & unload	NA	NA	NA	NA	NA	NA	NA	NA	50100402	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	None	NA
HF	Scraper haul road, face cover	NA	NA	NA	NA	NA	NA	NA	NA	50100401	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	None	NA
HS	Scraper haul road, stockpile	NA	NA	NA	NA	NA	NA	NA	NA	500401	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	None	NA
HT	Scraper haul road, top cover	NA	NA	NA	NA	NA	NA	NA	NA	500401	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	None	NA
W1	Wind erosion all active areas	NA	NA	NA	NA	NA	NA	NA	NA	50100402	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	None	NA
											☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
Trom	Duratech Trommel Screen	Duratech	7216	30-6-FI-0111	15 tph	15 tph	6/23/2003	NA	NA	50100402	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	None	NA
G1	Green waste chipper engine	Caterpillar	C-15	BEM01329	525 hp	525 hp	6/27/2002	none	none	20200102	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	20.2.61	NA
Godwin	Water pump diesel engine	John Deere	4045DF270B	PE4045D477472	80 hp	80 hp	6/27/2005	none	none	20200107	☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced	40 CFR 63 Subpart ZZZZ	NA
											☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
											☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
											☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
											☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
											☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		

¹ Unit numbers must correspond to unit numbers in the previous permit unless a complete cross reference table of all units in both permits is provided.

² Specify dates required to determine regulatory applicability.

³ To properly account for power conversion efficiencies, generator set rated capacity shall be reported as the rated capacity of the engine in horsepower, not the kilowatt capacity of the generator set.

Table 2-B: Insignificant Activities¹ (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.nmenv.state.nm.us/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 20.2.72.300.D.4 NMAC Auxiliary Equipment for Streamline applications in Table 2-A. The List of Insignificant Activities (for TV) can be found online at <http://www.nmenv.state.nm.us/aqb/forms/InsignificantListTitleV.pdf>. TV sources may elect to enter both TV Insignificant Activities and Part 72 Exemptions on this form.

Unit Number	Source Description	Manufacturer	Model No.	Max Capacity	List Specific 20.2.72.202 NMAC Exemption (e.g. 20.2.72.202.B.5)	Date of Manufacture /Reconstruction ²	For Each Piece of Equipment, Check One
			Serial No.	Capacity Units	Insignificant Activity citation (e.g. 1A List Item #1.a)	Date of Installation /Construction ²	
diesel fuel tank	Diesel fuel storage tank(vp= 0.38 mm Hg)			6000			☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
				gallons	5		
gasoline fuel dispensing tank	gasoline fuel dispensing tank			500			☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
				gallons	8		
lube oil tank	lube oil tank(Vp= 0.003 mm Hg)			275			☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
				gallons	5		
Antifreeze tank	Antifreeze tank(vp = 0.047mm Hg)			275			☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
				gallons	5		
Hydraulic oil	Hydraulic oil tank(vp=0.003mm Hg)			275			☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
				gallons	5		
Used motor oil tank	Used motor oil tank(vp=0.003 mmHg)			500 or 1000			☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
				gallons	5		
							☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
Trom-eng	Trommel screen drive engine	Isuzu	4JB1	70			☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
				hp	6	23-Jun-03	
individual closed 55 gal drums new motor oil or antifreeze	individual closed 55 gal drums new motor oil or antifreeze	NA		55			☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
				gallons	5		
solvent closed tanks	solvent closed tanks	NA		5			☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
				gallons	5 or trivial 24		
Maint bldg space heating	Maint bldg space heating			0.11			☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
				million BTU/hr	3		
Maint bldg hot water heter	Maint bldg hot water heter			0.7			☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
				million BTU/hr	3		

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 March 24, 2005. Emissions from these insignificant activities do not need to be reported, unless specifically requested.

² Specify dates required to determine regulatory applicability.

Table 2-B: Insignificant Activities¹ (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 20.2.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.nmenv.state.nm.us/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 20.2.72.300.D.4 NMAC Auxiliary Equipment for Streamline applications in Table 2-A. The List of Insignificant Activities (for TV) can be found online at <http://www.nmenv.state.nm.us/aqb/forms/InsignificantListTitleV.pdf>. TV sources may elect to enter both TV Insignificant Activities and Part 72 Exemptions on this form.

Unit Number	Source Description	Manufacturer	Model No.	Max Capacity	List Specific 20.2.72.202 NMAC Exemption (e.g. 20.2.72.202.B.5)	Date of Manufacture /Reconstruction ²	For Each Piece of Equipment, Check One
			Serial No.	Capacity Units	Insignificant Activity citation (e.g. IA List Item #1.a)	Date of Installation /Construction ²	
Scale house heat/AC	Scale house heat/AC			0.115			☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
				million BTU/hr	3		
Scale house domestic hot water	Scale house domestic hot water			0.03			☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
				million BTU/hr	3		
Admin bldg-space heater	Admin bldg-space heater			0.065			☒ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
				million BTU/hr	3		
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced

¹ Insignificant activities exempted due to size or production rate are defined in 20.2.70.300.D.6, 20.2.70.7.Q NMAC, and the NMED/AQB List of Insignificant Activities, dated March 24, 2005. Emissions from these insignificant activities do not need to be reported, unless specifically requested.

² Specify dates required to determine regulatory applicability.

Table 2-D: Maximum Uncontrolled Emissions (under normal operating conditions)¹

☐ 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 with a minimum of two significant figures¹. If there are any significant figures to the left of a decimal point, there shall be no more than one significant figure to the right of the decimal point.

Unit No.	NO _x		CO		VOC		SO _x		TSP ²		PM10 ²		PM2.5 ²		H ₂ S		NMOC	
	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
Flare	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G1	6.9	6.8	0.69	0.68	0.09	0.09	0.19	0.19	0.08	0.08	0.08	0.08	0.08	0.08				
Landfill Operations (ACC1, ACG1, ACF1, HF, HS, HT, W1)									126.2	154.2	32.9	40.6	3.4	4.1				
Customer Roads (R1-R4)									44.9	83.9	11.3	21.4	1.1	2.1				
Green Waste (G0, Trom)									1.6	1.4	0.8	0.7	0.2	0.2				
Landfill					8.4	36.9									0.24	1.1	21.6	94.7
PCS ³					3.6	15.7												
Godwin	1.32	1.45	0.88	0.96	0.20	0.22	0.03	0.04	0.07	0.08	0.07	0.08	0.07	0.08				
Totals	8.22	8.25	1.57	1.64	12.3	52.9	0.22	0.23	172.9	239.6	45.1	62.8	4.9	6.5	0.24	1.1	21.6	94.7

¹ Significant Figures Examples: One significant figure – 0.03, 3, 0.3. Two significant figures – 0.34, 34, 3400, 3.4

² Condensables: Include condensable particulate matter emissions in particulate matter calculations.

³ VOC as total petroleum hydrocarbons

Table 2-E: Requested Allowable Emissions¹

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 with a minimum of two significant figures¹. If there are any significant figures to the left of a decimal point, there shall be no more than one significant figure to the right of the decimal point. Please do not change the column widths on this table.

Unit No.	NOx		CO		VOC		SOx		TSP ²		PM10 ²		PM2.5 ²		H ₂ S		NMOC	
	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
Flare	0.9	3.9	3.0	13.1	0.034	0.15	0.234	1.0	0.25	1.1	0.25	1.1	0.25	1.1			0.09	0.38
G1	6.9	6.8	0.69	0.68	0.09	0.09	0.19	0.19	0.08	0.08	0.08	0.08	0.08	0.08				
Landfill Operations (ACC1,ACG1, ACF1,HF,HS, HT,W1)									74.6	84.4	19.8	22.8	2.1	2.3				
Customer Roads (R1-R4)									22.5	40.9	5.6	10.4	0.56	1.0				
Green Waste (G0, Trom)									1.6	1.4	0.8	0.7	0.2	0.2				
Landfill					4.2	18.5									0.12	0.54	10.8	47.3
PCS ³					3.6	15.7												
Godwin	1.32	1.45	0.88	0.96	0.20	0.22	0.03	0.04	0.07	0.08	0.07	0.08	0.07	0.08				
Totals	9.1	12.2	4.6	14.8	8.1	34.6	0.46	1.3	99.0	127.9	26.6	35.1	3.2	4.8	0.12	0.54	10.9	47.7

¹ **Significant Figures Examples:** One significant figure – 0.03, 3, 0.3. Two significant figures – 0.34, 34, 3400, 3.4

² **Condensables:** Include condensable particulate matter emissions in particulate matter calculations.

³ VOC as total petroleum hydrocarbons

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		Largest HAP, HCL ☒ HAP or ☐ TAP		Largest HAP, formaldehyde ☒ HAP or ☐ TAP		Benzene ☒ HAP or ☐ TAP		Ethylbenzene ☒ HAP or ☐ TAP		Toluene ☒ HAP or ☐ TAP		Xylene ☒ 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
F-1	flare	0.12	0.536	0.12	0.522														
G-1	G1	0.014	0.014			0.0043	0.004												
PCS ¹	PCS	0.753	3.3					0.023	0.10	0.091	0.4	0.228	1.00	0.411	1.80				
Godwin	Godwin	0.003	0.003			7.70E-04	0.0008												
Totals:		0.890	3.853	0.12	0.522	0.0051	0.0048	0.023	0.10	0.091	0.4	0.228	1.00	0.411	1.80				

¹ PCS landfarming emissions. These are not emissions from stacks but are fugitive emissions.

[illegible]

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 effect the facility's operations and emissions, de-bottlenecking impacts, and changes to the facility's major/minor status (both PSD & Title V).

Routine or predictable emissions during Startup, Shutdown, and Maintenance (SSM): 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.nmenv.state.nm.us/aqb/permit/app_form.html) for more detailed instructions on SSM emissions.

This facility is a landfill that accepts municipal solid waste from commercial and residential customers to be disposed of in the currently active cell. Activities at the landfill include truck weighing of incoming loads, truck travel to the active landfill cell on a paved road up to the edge of the active cell fill area, truck travel on unpaved surfaces into and on the active cell area, dumping of waste, compaction of waste, and end of day earth covering of the day's waste material using an earth scraper. Additionally, there may be coincidental new cell construction activities. New cell construction involves excavation and overburden stockpiling. There may be temporary landfill work that includes road maintenance, creating new roads, drainage diversion to direct rainwater runoff and similar types of work.

The landfill operations include a gas collection system as currently required under NSPS Subpart WWW – Standards of Performance for Municipal Solid Waste Landfills. The gas collection system uses an enclosed flare to combust the collected landfill gas. The enclosed flare operates intermittently and may continue to until there is sufficient collected gas to operate according to the NSPS requirements. The Bureau has approved intermittent operation. EPA has promulgated new rules (40 CFR 60, Subpart XXX) that will replace Subpart WWW. The landfill meets the definition of a new facility under the Subpart XXX rule. This rule will slowly replace Subpart WWW as the provisions of Subpart XXX become applicable per the new rule's timeline milestones. These milestones are as follows:

- October 28, 2016 - 40 CFR, Subpart XXX Rules become effective 60 days after publication;
- November 28, 2016 - New Design Capacity Report and NMOC Emissions Rate Reports due under Subpart XXX;
- November 28, 2017 - GCCS Design Plan will be due under Subpart XXX (since NMOC emissions will be over 34 Mg/yr when reported November 28, 2016; and
- May 28, 2019 – Within 30 months of reporting NMOC emissions over 34 Mg/yr on November 28, 2016, full Subpart XXX control requirements commence in-place of Subpart WWW requirements.

The landfill has indicated that they will purchase any dirt or rock liner materials. There may be petroleum contaminated soil land farming at this landfill. There is an option for tires to enter the landfill where they would be cut and disposed of while some would be baled and either used on-site or sold. Any scrap metal is removed from site to a commercial recycler. There is an option for clean green waste to be accepted but green waste would not enter the landfill. Instead, the green waste would be chipped in the green waste composting area, composted, screened and periodically sold. Currently, there is no green waste chipping, tire cutting/baling, scrap metal acceptance, or PCS activities at the landfill. Already chipped green waste is transported to the landfill's composting area where a contractor conducts composting, compost screening and transports composted material from the landfill.

This application is submitted as a Title V permit revision per 20.2.70.400. The landfill currently operates under Title V Operating Permit P185LR3, issued August 30, 2017. During a regulatory inspection by NMED on June 11, 2019, it was noted that the Godwin water pump (engine) was not permitted based on its maximum possible horsepower (hp) rating. As such, this application is being submitted to incorporate that correction, as well as the following changes which had been noted during various internal permit reviews over the past year:

- Include Godwin water pump engine (Unit Id: Godwin) in the list of regulated sources (currently listed as an insignificant source) since it is subject to 40 CFR 63, Subpart ZZZZ;
- Update the emissions from compost screening operations (Unit Ids: TROM and TROM-eng) for an operation of 800 hours/year and the maximum rating (70 hp) for consistency within the application calculations (prior permit's emissions had conservative, but varying, operating hours for the various backup pages and utilized a lower hp for recommended, not maximum, hp);
- Update the flare stack attributes reported in Table 2-H; and
- Update the maximum uncontrolled and allowable emissions based on the maximum engine horsepower (HP) rating as noted from the inspection mentioned above.

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.nmenv.state.nm.us/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 for Godwin water pump engine are updated based on the rated engine horsepower of 80 hp. Emissions from the Godwin pump were estimated based on the US EPA Tier 2 non-road diesel engine emissions standards (g/KW-hr or g/hp-hr). However, VOC emissions factor was based on AP-42, Table 3.3-1 (industrial diesel engines) since Tier 2 does not provide a VOC emissions standard.

Additionally, the emissions from compost screening operations (Unit Ids: TROM and TROM-eng) were updated for an operation of 800 hours/year and the maximum rating (70 hp) for consistency within the application calculations (prior permit's emissions had conservative, but varying, operating hours for the various backup pages and utilized a lower hp for recommended, not maximum, hp).

**For Permit
Purposes**



ID	Description	hr/dy	dy/yr	hr/yr	Control	Green Trips	TSP lb/hr	ton/yr	PM10 lb/hr	ton/yr	PM2.5 lb/hr	ton/yr	NOx lb/hr	ton/yr	CO lb/hr	ton/yr	SO2 lb/hr	ton/yr	VOC lb/hr	ton/yr
Cell construction																				
15 hr/day, 365 d/yr, 5475 hr/yr																				
C2	scraper loading	15	365	5,475	0%		11.60	31.76	3.55	9.72	0.35	0.96								
	scraper unloading stockpile	13	365	4,745	0%		0.40	0.95	0.122	0.29	0.012	0.03								
Active cell activity																				
11 hr/day, 365 day/yr, 4745 hr/yr																				
ACC1	compaction	11	365	4,015	0%		2.02	4.06	0.2	0.40	0.031	0.06								
ACG1	grading	1	365	365	0%		0.027	0.005	0.0148	0.0027	0.0009	0.0002								
ACF1	face cover	2	365	730	0%		0.40	0.146	0.122	0.045	0.012	0.004								
Inactive cell top cover																				
Occurs only when cell goes inactive; annual included in C2																				
C3	scraper loading ¹	0	365	0	0%		5.80	0.00	1.77	0.00	0.27	0.00								
	scraper unloading ¹	0	365	0	0%		0.20	0.00	0.061	0.00	0.006	0.00								
Scraper haul roads																				
HF	Haul rd face cover	2	365	730	60%		17.47	6.38	4.45	1.62	0.45	0.16								
HS	Haul road stockpile	13	365	4,745	60%		16.92	40.14	4.31	10.23	0.43	1.02								
HT	Haul road top cover ¹	0	365	0	60%		19.26	0.00	4.91	0.00	0.49	0.00								
Wind erosion																				
W1	active cell	24	365	8,760	0%		0.0372	0.16	0.0201	0.09	0.0012	0.01								
	Stockpile	24	365	8,760	0%		0.048	0.21	0.026	0.11	0.001	0.00								
	Cell construction	24	365	8,760	0%		0.13	0.57	0.07	0.31	0.004	0.02								
	Top cover borrow area ¹	0	365	0	0%		0.13	0.00	0.07	0.00	0.004	0.00								
	top cover area ¹	0	365	0	0%		0.13	0.00	0.07	0.00	0.004	0.00								
Total Landfill Operation							74.57	84.37	19.77	22.81	2.07	2.27								
Customer travel																				
11 hr/day, 365 day/yr, 4745 hr/yr																				
R1	Paved rd to active cell	11	365	4,015	95%		5.83	11.70	1.49	2.99	0.15	0.30								
R2	Unpaved rd to cell top&on top	11	365	4,015	60%		14.12	28.35	3.6	7.23	0.36	0.72								
R3	green waste cold mill road	11	365	4,015	80%	700	1.64	0.57	0.29	0.10	0.029	0.010								
R4	green waste unpaved road	11	365	4,015	60%	700	0.855	0.30	0.218	0.08	0.022	0.008								
Total customer travel PM							22.45	40.92	5.60	10.40	0.56	1.04								
Green waste chipper and Composting																				
G0	chipper	11	180	1,980	0%		1.24	1.23	0.587	0.58	0.185	0.18								
TROM	Compost screening operation	8	100	800	0%		0.38	0.15	0.19	0.08	0.02	0.008								
Total Green Waste PM							1.62	1.38	0.78	0.66	0.21	0.19								

ID	Description	hr/dy	dy/yr	hr/yr	Control	Green Trips	TSP lb/hr	ton/yr	PM10 lb/hr	ton/yr	PM2.5 lb/hr	ton/yr	NOx lb/hr	ton/yr	CO lb/hr	ton/yr	SO2 lb/hr	ton/yr	VOC lb/hr	ton/yr
Engines																				
G1	green waste chipper engine ³	11	180	1,980	0%		0.08	0.08	0.08	0.08	0.08	0.08	6.89	6.82	0.69	0.68	0.187	0.19	0.09	0.09
Godwin	Water jump engine ⁴	6	365	2,190	0%		0.07	0.08	0.07	0.08	0.07	0.08	1.32	1.45	0.88	0.96	0.03	0.04	0.20	0.22
Trom-eng	Trommel drive engine	8	100	800	0%		0.15	0.06	0.15	0.06	0.15	0.06	1.42	0.57	0.47	0.19	0.03	0.01	0.17	0.07
Total Engines							0.30	0.22	0.30	0.22	0.30	0.22	9.63	8.84	2.04	1.83	0.25	0.23	0.46	0.37
Flare	Landfill Control Flare ⁵	24	365	8,760			0.25	1.11	0.25	1.11	0.25	1.11	0.90	3.94	3.00	13.14	0.23	1.03	0.03	0.15
Grand Total Emissions⁶ ==>							99.26	128.08	26.77	35.27	3.46	4.91	11.85	14.23	5.92	15.94	0.51	1.29	0.69	0.74

Footnotes:

¹ Activities for top cover of inactive cells only occur when a cell first becomes inactive. When top cover emissions occur, the corresponding active cell emissions do not occur.

³ The green waste chipper is no longer located at the landfill, but conceivably could return. The emissions are a placeholder in case it does return. Emissions based on Mfg Data.

⁴ The Godwin water jump engine is used in the warm weather months and stored during winter and for maintenance.

⁵ The flare hourly emissions were calculated from the annual amount based on 8760 hours per year operation, but the flare operates only on an intermittent basis.

⁶ The grand total emissions are overstated as noted in the above footnotes #3, 4, 5.

Maximum Short-Term lb/hr and Annual Ton/year Emissions
Uncaptured Fugitive and Stack Particulate Emissions from the Duratech Trommel Green Waste Screening Operations

Permit Identification ID	Process/Source Description	Throughput (TPH)	TSP (PM30) Emission Factor lb/ton	PM10 Emission Factor lb/ton	PM2.5 Emission Factor lb/ton	Uncontrolled TSP (PM30) Emission Rate lb/hr	Uncontrolled PM10 Emission Rate lb/hr	Uncontrolled PM2.5 Emission Rate lb/hr	Control Measure	Control Efficiency (%)	TSP (PM30) Emission Rate (lb/hr)	PM10 Emission Rate (lb/hr)	PM2.5 Emission Rate (lb/hr)	Annual TSP (PM30) (ton/yr)	Annual PM10 (ton/yr)	Annual PM2.5 (ton/yr)
	Green Waste Screen Operations ¹															
T-Load	Screen loading	15	0.00660	0.00312	0.00047	0.0990	0.0468	0.0071	None	0	0.099	0.047	0.0071	0.040	0.019	0.0028
T-SCN	Trommel screen	15	0.01650	0.00870	0.00059	0.25	0.13	0.01	None	0	0.248	0.131	0.0089	0.099	0.052	0.0035
T-STK	Stackers - Total	15	0.00210	0.00110	0.00031	0.0315	0.0165	0.0047	None	0	0.0315	0.0165	0.0047	0.0126	0.0066	0.0019

PM30/PM10/PM2.5 Uncaptured plus Stack Emissions											0.38	0.19	0.021	0.151	0.078	0.008
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Notes:

¹ The screen is used to screen green chipped and composted waste and only operates occasionally. It has not operated for several years but may in the future.

Operating Hours for Annual Emissions				
Operation	Days/week	Weeks per year	Hours/day	Annual Hours/year
Duratech Trommel Green Compost screen	5	20	8	800

Table 1 Duratech Trommel Emission Factors

Activity	Emission Factors (lb/Ton)		
	TSP (PM-30)	PM-10	PM-2.5
Loading ²	0.0066	0.00312	0.00047
Conveyor transfer ¹	0.0021	0.0011	0.00031
Screening ¹	0.0165	0.0087	0.00059

Table Footnotes Notes:

¹ AP-42 Chapter 11.19.2 Uncontrolled Emissions from Table 11.19.2-2. TSP (PM30) is interpolated from Total PM and PM-10 values.

² AP-42 Chapter 13.2.4, 11/06

Trommel Screen
Aggregate Handling Emission Factors
(Loading to Screen Feed Hopper)

$$E = k \times (0.0032) \times (U/5)^{1.3} / (M/2)^{1.4} \text{ lb per ton}$$

AP-42 Chapter 13.2.4, 11/06

k = particle size multiplier	0.74	AP-42, TSP
k = particle size multiplier	0.35	AP-42, PM-10
k = particle size multiplier	0.053	AP-42, PM-2.5
U = mean wind speed	11	mph (default)
M = material moisture content	2	% (default)

Base Emission Factor

E =	0.006600	TSP	lb/ton
E =	0.003122	PM-10	lb/ton
E =	0.000473	PM-2.5	lb/ton

Trommel Screen - Diesel Drive Engine

Model	Type	Size (hp)	Type of Screen System	Emission Factors (lb/hp-hr) ^a					
				NOx	CO	PM-10	SO ₂ ^b	TOC	CO ₂
4JB1	Isuzu diesel	70	Powerscreen driver engine	0.0203	0.00668	0.0022	0.000374	0.00247	1.15

^a Emissions Factors are from AP-42. The NOx Emissions Factor is a Tier I factor converted from 9.2 gm/hp-hr to lb/hp-hr. SO₂ emissions are mass balance.

^b SO₂ calculated based on fuel rate of 26.24 lb/hr at 70 hp and sulfur at 0.05%. The resultant in lb/hr divided by 70 hp for units in lb/hp-hr.

Engine	Size(hp)	Engine Emissions (lb/hr)					
		NOx	CO	PM-10	SO ₂	TOC	CO ₂
Isuzu 4JB1	70	1.42	0.47	0.15	0.03	0.17	80.50

AP-42, 10/1996, Chapter 3.3 Gasoline and Diesel Industrial Engines

Engine	Size(hp)	Engine Emissions (tons/yr)					
		NOx	CO	PM-10	SO ₂	TOC	CO ₂
Isuzu 4JB1	70	0.57	0.19	0.06	0.01	0.07	32.20

Operating Hours for Annual Emissions				
	Days/week	Weeks per year	Hours/day	Annual Hours/year
	5	20	8	800

Diesel Engine Emissions

Pollutants: **PM, SO₂, CO, NO_x, VOC**Category: **Godwin pump and green waste chipper Drive Engines**

Operation	Chipper engine		Godwin engine	
Hours of Operation:	7 day/wk	183 day/yr	7 day/wk	365 day/yr
	10.8 hr/day	1976.4 Hours/year	6 hr/day	2190 Hours/year
	26 wk/yr		52 wk/yr	

Diesel Engine Emissions

Diesel Engine #3-green waste chipper - G1 ²			MFG Data					
			* lb/hp-hr	lb/hr	ton/yr	gm/hp-hr	lb/hr**	ton/yr
make	Cat	TSP				NA	0.080	0.08
model	C-15	PM-10				NA	0.080	0.08
horsepower	525	NOx				NA	6.890	6.81
weight % sulfur in fuel	0.05	CO				NA	0.690	0.68
fuel consumption, gal/hr	25.9	VOC				NA	0.090	0.09
lb/hr = lb/hp-hr X horsepower		SO ₂				NA	0.187	0.18

* Emission Factors for Industrial Diesel Engines, AP-42

Table 3.3-1 for engines up to 600 hp

** Caterpillar data for this engine

Diesel Engine #4 - Godwin water pump engine ³			lb/hp-hr	lb/hr	ton/yr	Tier II factors gm/hp-hr	lb/hr	ton/yr
make	John Deere	TSP				0.4	0.07	0.077
model	4045DF270B-Tier 2	PM-10				0.4	0.07	0.077
horsepower	80	NOx				7.5	1.32	1.447
weight % sulfur in fuel	0.05	CO				5.0	0.88	0.965
fuel consumption, lb fuel/hr ⁴	33.36	VOC*	0.0025	0.20	0.22		0.00	0.000
lb/hr = lb/hp-hr X horsepower		SO ₂					0.033	0.037

* VOC emissions factor for Industrial Diesel Engines, AP-42, Table 3.3-1 for engines up to 600 hp

Footnotes:

² The green waste chipper is not currently used at the landfill but might be used in the future.³ While the Godwin pump engine emissions are calculated based on 52 weeks per year, the Godwin pump is generally not used in the winter months (snow season). The Godwin pump is used to fill the water trucks that are used for dust suppression at the landfill. This engine is insignificant based on horsepower.⁴ Fuel rate based on the John Deere 4045DF270 engine sheet. Tier 2 Nox value is for Nox + NMHC. NOX will be less than this value.

Godwin Water Pump Engine HAP Emissions**Engine Fuel Operating Data**

Diesel Driver Engines, Total HP	80 hp	(Godwin water pump)
Diesel Engine Fuel Rate	33.36 lb/hr	
Fuel density	7.206 lb/gal	
Diesel Fuel Rate	4.629 Gal/hr	
Fuel HHV	141000 Btu/gal	
Diesel Engine Heat Input	0.6528 MMBtu/hr	

6 hr/day

7 d/wk

52 wk/yr

Annual Process Hours per Year **2,190** hours/year $\leq (\text{hr/d} \times \text{d/wk} \times \text{wk/yr})$ **Title 5 HAP Emission Summary**

	Tons/year	Major Limit
Largest HAP	0.0008	10
Total HAP	0.0027	25

Short Term Emission Summary**AP-42, 10/96, Table 3.3-2 Gasoline and Diesel Industrial Engines**

HAP Pollutant	Diesel Engine lb/MMbtu	lb/hr
non-PAH HAPs		
Acetaldehyde	7.67E-04	5.01E-04
Acrolein	9.25E-05	6.04E-05
Benzene	9.33E-04	6.09E-04
1,3-Butadiene	3.91E-05	
Formaldehyde	1.18E-03	7.70E-04
Propylene	2.58E-03	
Toluene	4.09E-04	2.67E-04
Xylenes	2.85E-04	1.86E-04
Total non-PAH HAPs	6.29E-03	2.39E-03
Max non-PAH HAPs		0.00077
PAH HAPs		
2-Methylnaphthalene		
Acenaphthene	1.42E-06	9.27E-07
Acenaphthylene	5.06E-06	3.30E-06
Anthracene	1.87E-06	1.22E-06
Benzo(a)anthracene	1.68E-06	1.10E-06
Benzo(a)pyrene	1.88E-07	1.23E-07
Benzo(b)fluoranthene	9.91E-08	6.47E-08
Benzo(e)pyrene		
Benzo(g,h,i)perylene	4.89E-07	3.19E-07
Benzo(k)fluoranthene	1.55E-07	1.01E-07
Chrysene	3.53E-07	2.30E-07
Dibenz(a,h)anthracene	5.83E-07	3.81E-07
Fluoranthene	7.61E-06	4.97E-06
Fluorene	2.92E-05	1.91E-05
Indeno(1,2,3-cd)pyrene	3.75E-07	2.45E-07
Naphthalene	8.48E-05	5.54E-05
Perylene		
Phenanthrene	2.94E-05	1.92E-05
Pyrene	4.78E-06	3.12E-06
Total PAH Haps	1.68E-04	1.10E-04
Total HAPs		2.50E-03
Max PAH Haps		5.53537E-05

Section 7

Information Used To Determine Emissions

Information Used to Determine Emissions shall include the following:

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

Nonroad Compression-Ignition Engines: Exhaust Emission Standards

	Rated Power (kW)	Tier	Model Year	NMHC (g/kW-hr)	NMHC + NOx (g/kW-hr)	NOx (g/kW-hr)	PM (g/kW-hr)	CO (g/kW-hr)	Smoke ^a (Percentage)	Useful Life (hours /years) ^b	Warranty Period (hours /years) ^b
Federal	kW < 8	1	2000-2004	-	10.5	-	1.0	8.0	20/15/50	3,000/5	1,500/2
		2	2005-2007	-	7.5	-	0.80	8.0			
		4	2008+	-	7.5	-	0.40 ^c	8.0			
	8 ≤ kW < 19	1	2000-2004	-	9.5	-	0.80	6.6		3,000/5	1,500/2
		2	2005-2007	-	7.5	-	0.80	6.6			
		4	2008+	-	7.5	-	0.40	6.6			
	19 ≤ kW < 37	1	1999-2003	-	9.5	-	0.80	5.5		5,000/7 ^d	3,000/5 ^e
		2	2004-2007	-	7.5	-	0.60	5.5			
		4	2008-2012	-	7.5	-	0.30	5.5			
			2013+	-	4.7	-	0.03	5.5			
	37 ≤ kW < 56	1	1998-2003	-	-	9.2	-	-		8,000/10	3,000/5
		2	2004-2007	-	7.5	-	0.40	5.0			
		3 ^f	2008-2011	-	4.7	-	0.40	5.0			
		4 (Option 1) ^g	2008-2012	-	4.7	-	0.30	5.0			
		4 (Option 2) ^g	2012	-	4.7	-	0.03	5.0			
		4	2013+	-	4.7	-	0.03	5.0			
	56 ≤ kW < 75	1	1998-2003	-	-	9.2	-	-			
		2	2004-2007	-	7.5	-	0.40	5.0			
		3	2008-2011	-	4.7	-	0.40	5.0			
		4	2012-2013 ^h	-	4.7	-	0.02	5.0			
			2014+ ⁱ	0.19	-	0.40	0.02	5.0			
	75 ≤ kW < 130	1	1997-2002	-	-	9.2	-	-			
		2	2003-2006	-	6.6	-	0.30	5.0			
		3	2007-2011	-	4.0	-	0.30	5.0			
		4	2012-2013 ^h	-	4.0	-	0.02	5.0			
			2014+	0.19	-	0.40	0.02	5.0			

Continued

	Rated Power (kW)	Tier	Model Year	NMHC (g/kW-hr)	NMHC + NOx (g/kW-hr)	NOx (g/kW-hr)	PM (g/kW-hr)	CO (g/kW-hr)	Smoke ^a (Percentage)	Useful Life (hours /years) ^b	Warranty Period (hours /years) ^b
Federal	130 ≤ kW < 225	1	1996-2002	1.3 ^j	-	9.2	0.54	11.4	20/15/50	8,000/10	3,000/5
		2	2003-2005	-	6.6	-	0.20	3.5			
		3	2006-2010	-	4.0	-	0.20	3.5			
		4	2011-2013 ^h	-	4.0	-	0.02	3.5			
			2014+ ⁱ	0.19	-	0.40	0.02	3.5			
	225 ≤ kW < 450	1	1996-2000	1.3 ^j	-	9.2	0.54	11.4			
		2	2001-2005	-	6.4	-	0.20	3.5			
		3	2006-2010	-	4.0	-	0.20	3.5			
		4	2011-2013 ^h	-	4.0	-	0.02	3.5			
			2014+ ⁱ	0.19	-	0.40	0.02	3.5			
	450 ≤ kW < 560	1	1996-2001	1.3 ^j	-	9.2	0.54	11.4			
		2	2002-2005	-	6.4	-	0.20	3.5			
		3	2006-2010	-	4.0	-	0.20	3.5			
		4	2011-2013 ^h	-	4.0	-	0.02	3.5			
			2014+ ⁱ	0.19	-	0.40	0.02	3.5			
	560 ≤ kW < 900	1	2000-2005	1.3 ^j	-	9.2	0.54	11.4			
		2	2006-2010	-	6.4	-	0.20	3.5			
		4	2011-2014	0.40	-	3.5	0.10	3.5			
			2015+ ⁱ	0.19	-	3.5 ^k	0.04 ^l	3.5			
	kW > 900	1	2000-2005	1.3 ^j	-	9.2	0.54	11.4			
		2	2006-2010	-	6.4	-	0.20	3.5			
		4	2011-2014	0.40	-	3.5 ^k	0.10	3.5			
			2015+ ⁱ	0.19	-	3.5 ^k	0.04 ^l	3.5			

Notes on following page.

Notes:

- For Tier 1, 2, and 3 standards, exhaust emissions of nitrogen oxides (NO_x), carbon monoxide (CO), hydrocarbons (HC), and non-methane hydrocarbons (NMHC) are measured using the procedures in 40 Code of Federal Regulations (CFR) Part 89 Subpart E. For Tier 1, 2, and 3 standards, particulate matter (PM) exhaust emissions are measured using the California Regulations for New 1996 and Later Heavy-Duty Off-Road Diesel Cycle Engines.
- For Tier 4 standards, engines are tested for transient and steady-state exhaust emissions using the procedures in 40 CFR Part 1039 Subpart F. Transient standards do not apply to engines below 37 kilowatts (kW) before the 2013 model year, constant-speed engines, engines certified to Option 1, and engines above 560 kW.
- Tier 2 and later model naturally aspirated nonroad engines shall not discharge crankcase emissions into the atmosphere unless these emissions are permanently routed into the exhaust. This prohibition does not apply to engines using turbochargers, pumps, blowers, or superchargers.
- In lieu of the Tier 1, 2, and 3 standards for NO_x, NMHC + NO_x, and PM, manufacturers may elect to participate in the averaging, banking, and trading (ABT) program described in 40 CFR Part 89 Subpart C.
- a** Smoke emissions may not exceed 20 percent during the acceleration mode, 15 percent during the lugging mode, and 50 percent during the peaks in either mode. Smoke emission standards do not apply to single-cylinder engines, constant-speed engines, or engines certified to a PM emission standard of 0.07 grams per kilowatt-hour (g/kW-hr) or lower. Smoke emissions are measured using procedures in 40 CFR Part 86 Subpart I.
- b** Useful life and warranty period are expressed hours and years, whichever comes first.
- c** Hand-startable air-cooled direct injection engines may optionally meet a PM standard of 0.60 g/kW-hr. These engines may optionally meet Tier 2 standards through the 2009 model years. In 2010 these engines are required to meet a PM standard of 0.60 g/kW-hr.
- d** Useful life for constant speed engines with rated speed 3,000 revolutions per minute (rpm) or higher is 5 years or 3,000 hours, whichever comes first.
- e** Warranty period for constant speed engines with rated speed 3,000 rpm or higher is 2 years or 1,500 hours, whichever comes first.
- f** These Tier 3 standards apply only to manufacturers selecting Tier 4 Option 2. Manufacturers selecting Tier 4 Option 1 will be meeting those standards in lieu of Tier 3 standards.
- g** A manufacturer may certify all their engines to either Option 1 or Option 2 sets of standards starting in the indicated model year. Manufacturers selecting Option 2 must meet Tier 3 standards in the 2008-2011 model years.
- h** These standards are phase-out standards. Not more than 50 percent of a manufacturer's engine production is allowed to meet these standards in each model year of the phase out period. Engines not meeting these standards must meet the final Tier 4 standards.
- i** These standards are phased in during the indicated years. At least 50 percent of a manufacturer's engine production must meet these standards during each year of the phase in. Engines not meeting these standards must meet the applicable phase-out standards.
- j** For Tier 1 engines the standard is for total hydrocarbons.
- k** The NO_x standard for generator sets is 0.67 g/kW-hr.
- l** The PM standard for generator sets is 0.03 g/kW-hr.

Citations: Code of Federal Regulations (CFR) citations:

- 40 CFR 89.112 = Exhaust emission standards
- 40 CFR 1039.101 = Exhaust emission standards for after 2014 model year
- 40 CFR 1039.102 = Exhaust emission standards for model year 2014 and earlier
- 40 CFR 1039 Subpart F = Exhaust emissions transient and steady state test procedures
- 40 CFR 86 Subpart I = Smoke emission test procedures
- 40 CFR 1065 = Test equipment and emissions measurement procedures

3.3 Gasoline And Diesel Industrial Engines

3.3.1 General

The engine category addressed by this section covers a wide variety of industrial applications of both gasoline and diesel internal combustion (IC) engines such as aerial lifts, fork lifts, mobile refrigeration units, generators, pumps, industrial sweepers/scrubbers, material handling equipment (such as conveyors), and portable well-drilling equipment. The three primary fuels for reciprocating IC engines are gasoline, diesel fuel oil (No.2), and natural gas. Gasoline is used primarily for mobile and portable engines. Diesel fuel oil is the most versatile fuel and is used in IC engines of all sizes. The rated power of these engines covers a rather substantial range, up to 250 horsepower (hp) for gasoline engines and up to 600 hp for diesel engines. (Diesel engines greater than 600 hp are covered in Section 3.4, "Large Stationary Diesel And All Stationary Dual-fuel Engines".) Understandably, substantial differences in engine duty cycles exist. It was necessary, therefore, to make reasonable assumptions concerning usage in order to formulate some of the emission factors.

3.3.2 Process Description

All reciprocating IC engines operate by the same basic process. A combustible mixture is first compressed in a small volume between the head of a piston and its surrounding cylinder. The mixture is then ignited, and the resulting high-pressure products of combustion push the piston through the cylinder. This movement is converted from linear to rotary motion by a crankshaft. The piston returns, pushing out exhaust gases, and the cycle is repeated.

There are 2 methods used for stationary reciprocating IC engines: compression ignition (CI) and spark ignition (SI). This section deals with both types of reciprocating IC engines. All diesel-fueled engines are compression ignited, and all gasoline-fueled engines are spark ignited.

In CI engines, combustion air is first compression heated in the cylinder, and diesel fuel oil is then injected into the hot air. Ignition is spontaneous because the air temperature is above the autoignition temperature of the fuel. SI engines initiate combustion by the spark of an electrical discharge. Usually the fuel is mixed with the air in a carburetor (for gasoline) or at the intake valve (for natural gas), but occasionally the fuel is injected into the compressed air in the cylinder.

CI engines usually operate at a higher compression ratio (ratio of cylinder volume when the piston is at the bottom of its stroke to the volume when it is at the top) than SI engines because fuel is not present during compression; hence there is no danger of premature autoignition. Since engine thermal efficiency rises with increasing pressure ratio (and pressure ratio varies directly with compression ratio), CI engines are more efficient than SI engines. This increased efficiency is gained at the expense of poorer response to load changes and a heavier structure to withstand the higher pressures.¹

3.3.3 Emissions

Most of the pollutants from IC engines are emitted through the exhaust. However, some total organic compounds (TOC) escape from the crankcase as a result of blowby (gases that are vented from the oil pan after they have escaped from the cylinder past the piston rings) and from the fuel tank and carburetor because of evaporation. Nearly all of the TOCs from diesel CI engines enter the

atmosphere from the exhaust. Evaporative losses are insignificant in diesel engines due to the low volatility of diesel fuels.

The primary pollutants from internal combustion engines are oxides of nitrogen (NO_x), total organic compounds (TOC), carbon monoxide (CO), and particulates, which include both visible (smoke) and nonvisible emissions. Nitrogen oxide formation is directly related to high pressures and temperatures during the combustion process and to the nitrogen content, if any, of the fuel. The other pollutants, HC, CO, and smoke, are primarily the result of incomplete combustion. Ash and metallic additives in the fuel also contribute to the particulate content of the exhaust. Sulfur oxides (SO_x) also appear in the exhaust from IC engines. The sulfur compounds, mainly sulfur dioxide (SO_2), are directly related to the sulfur content of the fuel.²

3.3.3.1 Nitrogen Oxides -

Nitrogen oxide formation occurs by two fundamentally different mechanisms. The predominant mechanism with internal combustion engines is thermal NO_x which arises from the thermal dissociation and subsequent reaction of nitrogen (N_2) and oxygen (O_2) molecules in the combustion air. Most thermal NO_x is formed in the high-temperature region of the flame from dissociated molecular nitrogen in the combustion air. Some NO_x , called prompt NO_x , is formed in the early part of the flame from reaction of nitrogen intermediary species, and HC radicals in the flame. The second mechanism, fuel NO_x , stems from the evolution and reaction of fuel-bound nitrogen compounds with oxygen. Gasoline, and most distillate oils have no chemically-bound fuel N_2 and essentially all NO_x formed is thermal NO_x .

3.3.3.2 Total Organic Compounds -

The pollutants commonly classified as hydrocarbons are composed of a wide variety of organic compounds and are discharged into the atmosphere when some of the fuel remains unburned or is only partially burned during the combustion process. Most unburned hydrocarbon emissions result from fuel droplets that were transported or injected into the quench layer during combustion. This is the region immediately adjacent to the combustion chamber surfaces, where heat transfer outward through the cylinder walls causes the mixture temperatures to be too low to support combustion.

Partially burned hydrocarbons can occur because of poor air and fuel homogeneity due to incomplete mixing, before or during combustion; incorrect air/fuel ratios in the cylinder during combustion due to maladjustment of the engine fuel system; excessively large fuel droplets (diesel engines); and low cylinder temperature due to excessive cooling (quenching) through the walls or early cooling of the gases by expansion of the combustion volume caused by piston motion before combustion is completed.²

3.3.3.3 Carbon Monoxide -

Carbon monoxide is a colorless, odorless, relatively inert gas formed as an intermediate combustion product that appears in the exhaust when the reaction of CO to CO_2 cannot proceed to completion. This situation occurs if there is a lack of available oxygen near the hydrocarbon (fuel) molecule during combustion, if the gas temperature is too low, or if the residence time in the cylinder is too short. The oxidation rate of CO is limited by reaction kinetics and, as a consequence, can be accelerated only to a certain extent by improvements in air and fuel mixing during the combustion process.²⁻³

3.3.3.4 Smoke and Particulate Matter -

White, blue, and black smoke may be emitted from IC engines. Liquid particulates appear as white smoke in the exhaust during an engine cold start, idling, or low load operation. These are formed in the quench layer adjacent to the cylinder walls, where the temperature is not high enough to ignite the fuel. Blue smoke is emitted when lubricating oil leaks, often past worn piston rings, into the combustion chamber and is partially burned. Proper maintenance is the most effective method of preventing blue smoke emissions from all types of IC engines. The primary constituent of black smoke is agglomerated carbon particles (soot) formed in regions of the combustion mixtures that are oxygen deficient.²

3.3.3.5 Sulfur Oxides -

Sulfur oxides emissions are a function of only the sulfur content in the fuel rather than any combustion variables. In fact, during the combustion process, essentially all the sulfur in the fuel is oxidized to SO_2 . The oxidation of SO_2 gives sulfur trioxide (SO_3), which reacts with water to give sulfuric acid (H_2SO_4), a contributor to acid precipitation. Sulfuric acid reacts with basic substances to give sulfates, which are fine particulates that contribute to PM-10 and visibility reduction. Sulfur oxide emissions also contribute to corrosion of the engine parts.²⁻³

3.3.4 Control Technologies

Control measures to date are primarily directed at limiting NO_x and CO emissions since they are the primary pollutants from these engines. From a NO_x control viewpoint, the most important distinction between different engine models and types of reciprocating engines is whether they are rich-burn or lean-burn. Rich-burn engines have an air-to-fuel ratio operating range that is near stoichiometric or fuel-rich of stoichiometric and as a result the exhaust gas has little or no excess oxygen. A lean-burn engine has an air-to-fuel operating range that is fuel-lean of stoichiometric; therefore, the exhaust from these engines is characterized by medium to high levels of O_2 . The most common NO_x control technique for diesel and dual-fuel engines focuses on modifying the combustion process. However, selective catalytic reduction (SCR) and nonselective catalytic reduction (NSCR) which are post-combustion techniques are becoming available. Controls for CO have been partly adapted from mobile sources.⁴

Combustion modifications include injection timing retard (ITR), preignition chamber combustion (PCC), air-to-fuel ratio adjustments, and derating. Injection of fuel into the cylinder of a CI engine initiates the combustion process. Retarding the timing of the diesel fuel injection causes the combustion process to occur later in the power stroke when the piston is in the downward motion and combustion chamber volume is increasing. By increasing the volume, the combustion temperature and pressure are lowered, thereby lowering NO_x formation. ITR reduces NO_x from all diesel engines; however, the effectiveness is specific to each engine model. The amount of NO_x reduction with ITR diminishes with increasing levels of retard.⁴

Improved swirl patterns promote thorough air and fuel mixing and may include a precombustion chamber (PCC). A PCC is an antechamber that ignites a fuel-rich mixture that propagates to the main combustion chamber. The high exit velocity from the PCC results in improved mixing and complete combustion of the lean air/fuel mixture which lowers combustion temperature, thereby reducing NO_x emissions.⁴

The air-to-fuel ratio for each cylinder can be adjusted by controlling the amount of fuel that enters each cylinder. At air-to-fuel ratios less than stoichiometric (fuel-rich), combustion occurs under conditions of insufficient oxygen which causes NO_x to decrease because of lower oxygen and lower temperatures. Derating involves restricting the engine operation to lower than normal levels of power production for the given application. Derating reduces cylinder pressures and temperatures, thereby lowering NO_x formation rates.⁴

SCR is an add-on NO_x control placed in the exhaust stream following the engine and involves injecting ammonia (NH_3) into the flue gas. The NH_3 reacts with NO_x in the presence of a catalyst to form water and nitrogen. The effectiveness of SCR depends on fuel quality and engine duty cycle (load fluctuations). Contaminants in the fuel may poison or mask the catalyst surface causing a reduction or termination in catalyst activity. Load fluctuations can cause variations in exhaust temperature and NO_x concentration which can create problems with the effectiveness of the SCR system.⁴

NSCR is often referred to as a three-way conversion catalyst system because the catalyst reactor simultaneously reduces NO_x , CO, and HC and involves placing a catalyst in the exhaust stream of the engine. The reaction requires that the O_2 levels be kept low and that the engine be operated at fuel-rich air-to-fuel ratios.⁴

The most accurate method for calculating such emissions is on the basis of "brake-specific" emission factors (pounds per horsepower-hour [lb/hp-hr]). Emissions are the product of the brake-specific emission factor, the usage in hours, the rated power available, and the load factor (the power actually used divided by the power available). However, for emission inventory purposes, it is often easier to assess this activity on the basis of fuel used.

Once reasonable usage and duty cycles for this category were ascertained, emission values were aggregated to arrive at the factors for criteria and organic pollutants presented. Factors in Table 3.3-1 are in pounds per million British thermal unit (lb/MMBtu). Emission data for a specific design type were weighted according to estimated material share for industrial engines. The emission factors in these tables, because of their aggregate nature, are most appropriately applied to a population of industrial engines rather than to an individual power plant. Table 3.3-2 shows unweighted speciated organic compound and air toxic emission factors based upon only 2 engines. Their inclusion in this section is intended for rough order-of-magnitude estimates only.

Table 3.3-3 summarizes whether the various diesel emission reduction technologies (some of which may be applicable to gasoline engines) will generally increase or decrease the selected parameter. These technologies are categorized into fuel modifications, engine modifications, and exhaust after-treatments. Current data are insufficient to quantify the results of the modifications. Table 3.3-3 provides general information on the trends of changes on selected parameters.

3.3.5 Updates Since the Fifth Edition

The Fifth Edition was released in January 1995. Revisions to this section since that date are summarized below. For further detail, consult the memoranda describing each supplement or the background report for this section.

Supplement A, February 1996

No changes.

Supplement B, October 1996

- Text was revised concerning emissions and controls.
- The CO₂ emission factor was adjusted to reflect 98.5 percent conversion efficiency.

Table 3.3-1. EMISSION FACTORS FOR UNCONTROLLED GASOLINE AND DIESEL INDUSTRIAL ENGINES^a

Pollutant	Gasoline Fuel (SCC 2-02-003-01, 2-03-003-01)		Diesel Fuel (SCC 2-02-001-02, 2-03-001-01)		EMISSION FACTOR RATING
	Emission Factor (lb/hp-hr) (power output)	Emission Factor (lb/MMBtu) (fuel input)	Emission Factor (lb/hp-hr) (power output)	Emission Factor (lb/MMBtu) (fuel input)	
NO _x	0.011	1.63	0.031	4.41	D
CO	6.96 E-03 ^d	0.99 ^d	6.68 E-03	0.95	D
SO _x	5.91 E-04	0.084	2.05 E-03	0.29	D
PM-10 ^b	7.21 E-04	0.10	2.20 E-03	0.31	D
CO ₂ ^c	1.08	154	1.15	164	B
Aldehydes	4.85 E-04	0.07	4.63 E-04	0.07	D
TOC					
Exhaust	0.015	2.10	2.47 E-03	0.35	D
Evaporative	6.61 E-04	0.09	0.00	0.00	E
Crankcase	4.85 E-03	0.69	4.41 E-05	0.01	E
Refueling	1.08 E-03	0.15	0.00	0.00	E

^a References 2,5-6,9-14. When necessary, an average brake-specific fuel consumption (BSFC) of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr. To convert from lb/hp-hr to kg/kw-hr, multiply by 0.608. To convert from lb/MMBtu to ng/J, multiply by 430. SCC = Source Classification Code. TOC = total organic compounds.

^b PM-10 = particulate matter less than or equal to 10 µm aerodynamic diameter. All particulate is assumed to be ≤ 1 µm in size.

^c Assumes 99% conversion of carbon in fuel to CO₂ with 87 weight % carbon in diesel, 86 weight % carbon in gasoline, average BSFC of 7,000 Btu/hp-hr, diesel heating value of 19,300 Btu/lb, and gasoline heating value of 20,300 Btu/lb.

^d Instead of 0.439 lb/hp-hr (power output) and 62.7 lb/mmBtu (fuel input), the correct emissions factors values are 6.96 E-03 lb/hp-hr (power output) and 0.99 lb/mmBtu (fuel input), respectively. This is an editorial correction. March 24, 2009

Table 3.3-2. SPECIATED ORGANIC COMPOUND EMISSION
FACTORS FOR UNCONTROLLED DIESEL ENGINES^a

EMISSION FACTOR RATING: E

Pollutant	Emission Factor (Fuel Input) (lb/MMBtu)
Benzene ^b	9.33 E-04
Toluene ^b	4.09 E-04
Xylenes ^b	2.85 E-04
Propylene 	2.58 E-03
1,3-Butadiene ^{b,c}	<3.91 E-05
Formaldehyde ^b	1.18 E-03
Acetaldehyde ^b	7.67 E-04
Acrolein ^b	<9.25 E-05
Polycyclic aromatic hydrocarbons (PAH)	
Naphthalene ^b	8.48 E-05
Acenaphthylene	<5.06 E-06
Acenaphthene	<1.42 E-06
Fluorene	2.92 E-05
Phenanthrene	2.94 E-05
Anthracene	1.87 E-06
Fluoranthene	7.61 E-06
Pyrene	4.78 E-06
Benzo(a)anthracene	1.68 E-06
Chrysene	3.53 E-07
Benzo(b)fluoranthene	<9.91 E-08
Benzo(k)fluoranthene	<1.55 E-07
Benzo(a)pyrene	<1.88 E-07
Indeno(1,2,3-cd)pyrene	<3.75 E-07
Dibenz(a,h)anthracene	<5.83 E-07
Benzo(g,h,i)perylene	<4.89 E-07
TOTAL PAH	1.68 E-04

^a Based on the uncontrolled levels of 2 diesel engines from References 6-7. Source Classification Codes 2-02-001-02, 2-03-001-01. To convert from lb/MMBtu to ng/J, multiply by 430.

^b Hazardous air pollutant listed in the *Clean Air Act*.

^c Based on data from 1 engine.

Table 3.3-3. EFFECT OF VARIOUS EMISSION CONTROL TECHNOLOGIES
ON DIESEL ENGINES^a

Technology	Affected Parameter	
	Increase	Decrease
Fuel modifications		
Sulfur content increase	PM, wear	
Aromatic content increase	PM, NO _x	
Cetane number		PM, NO _x
10% and 90% boiling point		PM
Fuel additives		PM, NO _x
Water/Fuel emulsions		NO _x
Engine modifications		
Injection timing retard	PM, BSFC	NO _x , power
Fuel injection pressure	PM, NO _x	
Injection rate control		NO _x , PM
Rapid spill nozzles		PM
Electronic timing & metering		NO _x , PM
Injector nozzle geometry		PM
Combustion chamber modifications		NO _x , PM
Turbocharging	PM, power	NO _x
Charge cooling		NO _x
Exhaust gas recirculation	PM, power, wear	NO _x
Oil consumption control		PM, wear
Exhaust after-treatment		
Particulate traps		PM
Selective catalytic reduction		NO _x
Oxidation catalysts		TOC, CO, PM

^a Reference 8. PM = particulate matter. BSFC = brake-specific fuel consumption.

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JOHN DEERE

ENGINE PERFORMANCE CURVE

Rating: Gross Power

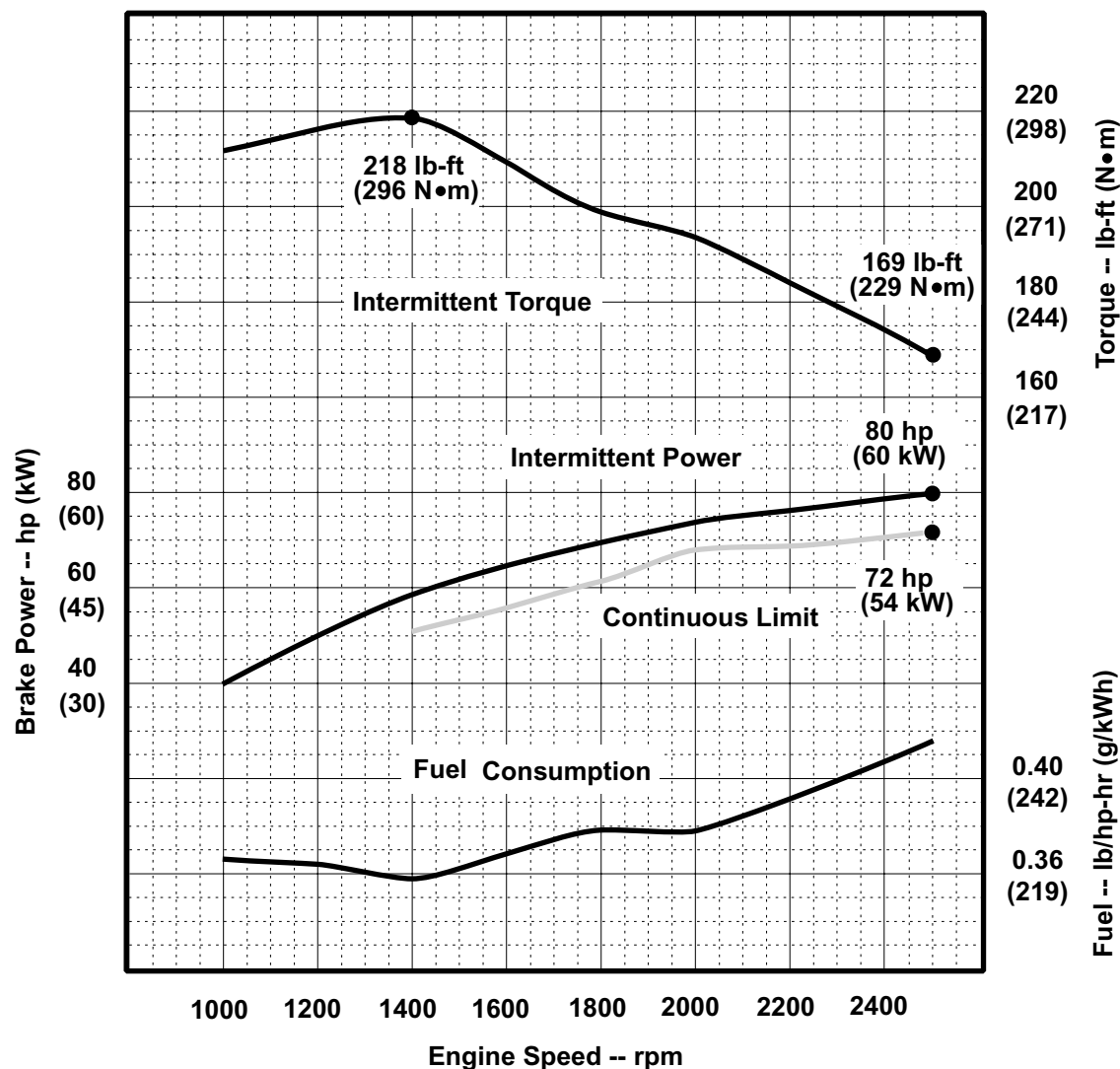
Application: Industrial
Intermittent / Continuous

PowerTech 4.5 L Engine

Model: 4045DF270

80 hp @ 2500 rpm

60 kW @ 2500 rpm



Air Intake Restriction 12 in.H₂O (3 kPa)
Exhaust Back Pressure 30 in.H₂O (7.5 kPa)

Gross power guaranteed within + or - 5% at SAE J1995 and ISO 3046 conditions:

77 °F (25 °C) air inlet temperature
29.31 in.Hg (99 kPa) barometer
104 °F (40 °C) fuel inlet temperature
0.853 fuel specific gravity @ 60 °F (15.5 °C)

Conversion factors:

Power: kW = hp x 0.746

Fuel: 1 gal = 7.1 lb, 1 L = 0.85 kg

Torque: N•m = lb-ft x 1.356

All values are from currently available data and are subject to change without notice.

Notes:

Tier-2 Emission Certifications:

Certified by:

CARB; EPA; EU
Ref: Engine Emission Label

Brian L. Carlson
16 Jan 03

* Revised Data

Curve: 4045DF27080I Sheet 1 of 2
January 2003

Common Specifications:

General Data

Model 4045DF270
Number of Cylinders 4
Bore and Stroke--in. (mm)..... 4.20 x 5.00 (106 x 127)
Displacement--in.³ (L)275 (4.5)
Compression Ratio 17.6 : 1
Valves per Cylinder--Intake/Exhaust 1 / 1
Firing Order 1-3-4-2
Combustion System Direct Injection
Engine Type In-line, 4-Cycle
Aspiration Naturally Aspirated
Engine Crankcase Vent System Open
Maximum Crankcase Pressure--in. H₂O (kPa)2 (0.5)

Physical Data

Length--in. (mm) 33.9 (861)*
Width--in. (mm)24.1 (612)
Height--in. (mm) 33.7 (856)*
Weight, dry--lb (kg).....851 (387)
(Includes flywheel housing, flywheel & electrics)
Center of Gravity Location
From Rear Face of Block (X-axis)--in. (mm)9.3 (235)
Right of Crankshaft (Y-axis)--in. (mm)0.3 (7)
Above Crankshaft (Z-axis)--in. (mm).....5.7 (144)
Max. Allow. Static Bending Moment at Rear
Face of Flywhl Hsg w/ 5-G Load--lb-ft (N•m) ...600 (814)
Thrust Bearing Load Limit (Forward)--lb (N)[I] ...900 (4003)
[C]...500 (2224)

Air System

Maximum Allowable Temp Rise--Ambient Air to
Engine Inlet--°F (°C).....15 (8)
Maximum Air Intake Restriction
Dirty Air Cleaner--in. H₂O (kPa)25 (6.25)
Clean Air Cleaner--in. H₂O (kPa)12 (3)
Engine Air Flow--ft³/min (m³/min) [I]162 (4.6)
[C].....162 (4.6)
Intake Manifold Pressure--psi (kPa) [I] Ambient
[C]..... Ambient
Recommended Intake Pipe Diameter--in. (mm).....3 (76.2)

Engine Specification Data

Cooling System

Engine Heat Rejection--BTU/min (kW) [I]..... 2277* (40*)
[C]..... 1878 (33)
Coolant Flow--gal/min (L/min) 54 (204)
Thermostat Start to Open--°F (°C) 180 (82)
Thermostat Fully Open--°F (°C)..... 201 (94)
Engine Coolant Capacity--qt (L) 9 (8.5)
Recommended Pressure Cap--psi (kPa)..... 10 (69)
Maximum Top Tank Temp--°F (°C) 221 (105)
Minimum Coolant Fill Rate--gal/min (L/min) 3 (11)
Minimum Air-to-Boil Temperature--°F (°C)..... 117 (47)

Electrical System

12 Volt 24 Volt

Rec'md. Battery Capacity (CCA)--amp 640 570
Max. Allow. Starting Circuit Resist.--Ohm 0.0012 0.002
Starter Rolling Current
At 32 °F (0 °C)--amp 780 600
At -22 °F (-30 °C)--amp 1000 700

Exhaust System

Exhaust Flow--ft³/min (m³/min) [I] 505 (14.3)
[C]..... 480 (13.6)
Exhaust Temperature--°F (°C) [I] 1256 (680)
[C]..... 1157 (625)
Max. Allowable Back Pressure--in. H₂O (kPa) 30 (7.5)
Rec'd. Exhaust Pipe Diameter--in. (mm) 4.0 (101.6)

Fuel System

Fuel Injection Pump Stanadyne DB2
Governor Regulation..... 7-10 %
Governor Type Mechanical
Total Fuel Flow--lb/hr (kg/hr) [I] 159 (72.0)
Fuel Consumption--lb/hr (kg/hr) [I]..... 34 (15.2)
[C]..... 31 (13.9)
Maximum Fuel Transfer Pump Suction--ft (m) fuel... 3 (0.9)
Maximum Fuel Inlet Temp.--°F (°C) 212 (100)
Fuel Filter Micron Size @ 98% Efficiency 2

Lubrication System

Oil Pressure at Rated Speed--psi (kPa) 50 (345)
Oil Pressure at Low Idle--psi (kPa) 15 (105)
In Pan Oil Temperature--°F (°C) 240.8 (116)
Engine Angularity Limits any direction--degrees
Intermittent..... 45
Continuous..... 20

Performance Data

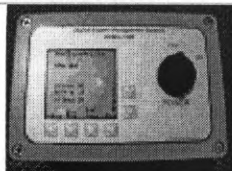
Rated Power--hp (kW) [I] 80 (60)
[C] 72 (54)
Rated Speed--rpm 2500
Peak Torque--lb-ft (N•m) [I] 218 (296)
[C] 196 (266)
Peak Torque Speed--rpm 1400
Low Idle Speed--rpm 850
BMEP--psi (kPa) [I] 92 (635)
[C] 83 (575)
Friction Power @ Rated Speed--hp (kW) N/A
Altitude Capability -- ft (m) 2000 (600)*
Ratio--Air : Fuel [I] 20.0:1
[C] 23.0:1
Smoke @ Rated Speed--Bosch No. [I] 2.1
[C] 1.5
Noise--dB(A) @ 1 m [I] 93.5*
[C] 93.1*

Engine Speed rpm	Contin. Limit hp(kW)	Intermit. Power hp(kW)	Intermit. Torque lb-ft(N•m)	BSFC lb/hp-hr (g/kWh)
2500	72 (54)	80 (60)	169 (229)	0.417 (254)
2200	68 (51)	76 (57)	184 (249)	0.391 (238)
2000	67 (50)	74 (55)	194 (263)	0.378 (230)
1800	62 (46)	68 (51)	198 (269)	0.379 (231)
1600	56 (42)	63 (47)	209 (284)	0.369 (225)
1400	52 (39)	58 (43)	218 (296)	0.359 (219)
1200	-----	50 (37)	215 (291)	0.364 (222)
1000	-----	40 (30)	212 (288)	0.366 (223)

All values at rated speed and power with standard options unless otherwise noted.

* Revised Data
Curve: 4045DF27080I Sheet 2 of 2
January 2003

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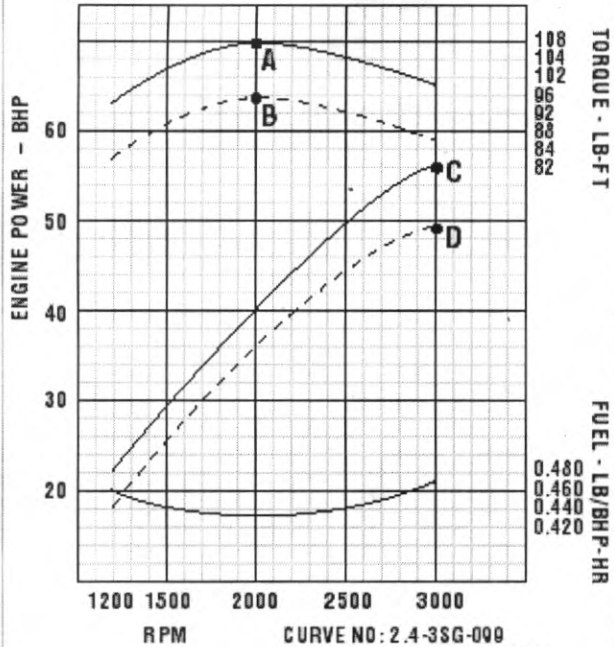
Isuzu J Series Engines

[Introduction](#) C240, 4JB1

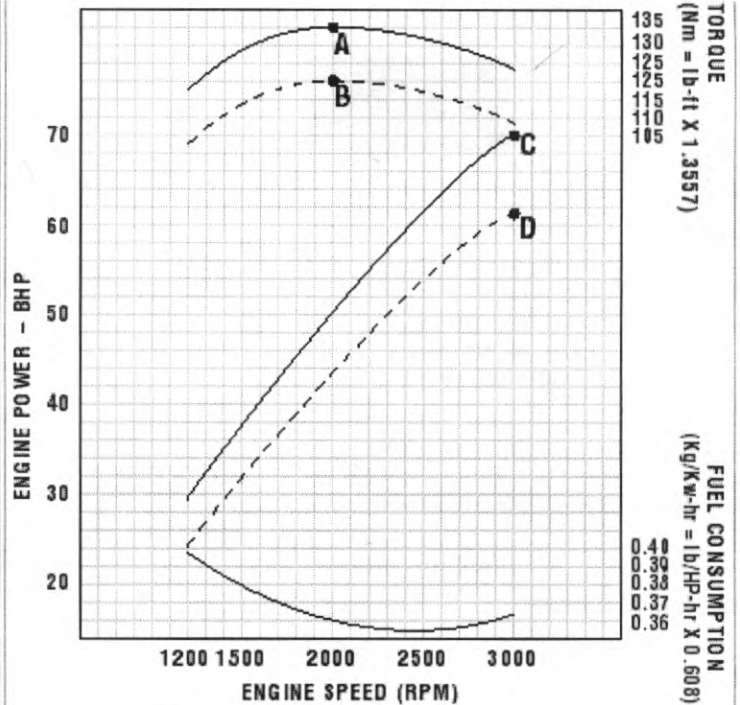
Engine Model	C240	4JB1
Engine Characteristics	4 Cycle, Water Cooled	
Valvetrain Configuration	Overhead Valve	
Type of Aspiration	Naturally Aspirated	
Type of Injection	Indirect	Direct
Number of Cylinders	4	4
Bore x Stroke	3.39 x 4.02 in (86mm x 102mm)	3.70 x 4.00 in (93mm x 102mm)
Displacement	144 cu in (2.4 liter)	169 cu in (2.8 liter)
Compression Ratio	20:1	18.2:1
Overall Dimensions		
Length	31.5" (800mm)	31.7" (805mm)
Width	21.1" (535mm)	23.3" (590mm)
Height	27.3" (694mm)	29.5" (750mm)
Dry Weight	491 lbs (223 kg)	524 lbs (238 kg)
Industrial Rating		
Intermittent	56 HP @ 3000 RPM	70 HP @ 3000 RPM
Continuous	49 HP @ 3000 RPM	61 HP @ 3000 RPM
Maximum Torque	108 lb-ft @ 2000 RPM	132 lb-ft @ 2000 RPM

Performace Curve

Isuzu C240	Isuzu 4JB1
A - 108 LB-FT INTERMITTENT B - 94 LB-FT CONTINUOUS C - 56 BHP INTERMITTENT D - 49 BHP CONTINUOUS	A - 132 LB-FT INTERMITTENT B - 116 LB-FT CONTINUOUS C - 70 BHP INTERMITTENT D - 61 BHP CONTINUOUS

**ENGINE PERFORMANCE CONDITIONS: SAE J1349
GROSS BHP**


Rated within 5% at ambient conditions of:
 Temperature: 77° F (25° C)
 Pressure: 29.31 "Hg (99kPa) DRY
 Fuel Specific Gravity: 0.825
 Intermittent Rating: (Solid Line)
 Continuous Rating: (Dashed Line)
 NOTE: Muffler & Air Cleaner not installed



Rated within 5% at ambient conditions of:
 Temperature: 77° F (25° C)
 Pressure: 29.31 "Hg (99kPa) DRY
 Fuel Specific Gravity: 0.825
 Intermittent Rating: (Solid Line)
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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”)

X I have read the AQB “Guidelines for Public Notification for Air Quality Permit Applications”

This document provides detailed instructions about public notice requirements for various permitting actions. It also provides public notice examples and certification forms. Material mistakes in the public notice will require a re-notice before issuance of the permit.

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

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

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

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

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

Section 16

Air Dispersion Modeling

NSR (20.2.72 NMAC) and PSD (20.2.74 NMAC) Modeling: Provide an air quality **dispersion modeling** demonstration (if applicable) as outlined in the Air Quality Bureau's Dispersion Modeling Guidelines. If air dispersion modeling has been waived for this permit application, attach the AQB Modeling Section modeling waiver documentation.

SSM Modeling: Applicants must conduct dispersion modeling for the total short term emissions 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.nmenv.state.nm.us/aqb/permit/app_form.html) for more detailed instructions on SSM emissions modeling requirements.

Title V (20.2.70 NMAC) Modeling: Title V applications must specify the NSR Permit number for which air quality dispersion modeling was last submitted. Additionally, Title V facilities reporting new SSM emissions require modeling or a modeling waiver to demonstrate compliance with standards.

No dispersion modeling is required to be submitted with this Title V revision. A request for a model waiver was submitted to the Bureau on December 4, 2019 and was approved on December 9, 2019 by Mr. Eric Peters.

Section 23: Certification

Company Name: Santa Fe Solid Waste Management Agency – Caja del Rio Landfill

I, Randall Kippenbrock, 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 17 day of December, 2019, upon my oath or affirmation, before a notary of the State of New Mexico.

Randall Kippenbrock
*Signature

12-17-19
Date

Randall Kippenbrock, PE
Printed Name

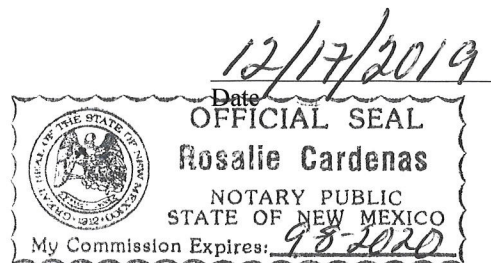
Executive Director
Title

Scribed and sworn before me on this 17th day of December, 2019.

My authorization as a notary of the State of New Mexico expires on the

8th day of September, 2020.

Rosalie Cardenas
Notary's Signature
Rosalie Cardenas
Notary's Printed Name



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