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Environmental Consulting Firm

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January 6, 2020

Texas Commission on Environmental Quality
Air Permit Initial Review Team (APIRT) – MC161
12100 Park 35 Circle, Building C, Third Floor, Room 300 W
Austin, TX, 78753

Submitted electronically via STEERS

RE: Registration for Permits by Rule
Blue Origin Texas, LLC, CN604092627
West Texas Launch Site, RN104961164
Culberson County, Texas
TCEQ Registration No. 102349

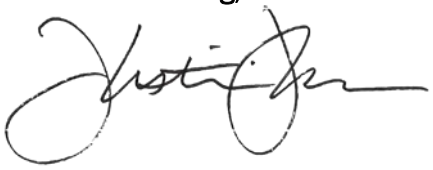
Dear APIRT:

On behalf of Blue Origin Texas, LLC, DiSorbo Consulting, LLC is submitting the attached PBR application to register revisions for facilities at the West Texas Launch Site (WTLS) in Culberson County, Texas under Permits by Rule §§106.261, 106.262, 106.263, 106.478, and 106.512.

If you have any questions or require additional information, please feel free to contact me at (512) 961-4965 or by email at kparsons@disorboconsult.com.

Sincerely,

DiSorbo Consulting, LLC



Kristin Parsons
Senior Staff Consultant

Attachments

Cc: Ms. Caroline Tulloh, EHS Engineer, Blue Origin Texas

Registration for Permits By Rule

§§106.261, 106.262, 106.263, 106.478, 106.512

TCEQ Registration No. 102349

BLUE ORIGIN

Blue Origin Texas, LLC
West Texas Launch Site
Van Horn, Culberson County, Texas

CN604092627
RN104961164

November 2019

DiSorbo
Environmental Consulting Firm

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Section 1
Project Information

1.1 Introduction

Blue Origin Texas, LLC (Blue Origin) operates the West Texas Launch Site (WTLS) in Culberson County, near Van Horn, Texas. The WTLS is an aerospace suborbital launch and engine testing facility and is currently authorized under Permit by Rule (PBR) Registration No. 102349. Blue Origin also operates various sources that do not require registration under PBRs §§106.183, 106.227, 106.412, 106.452, 106.473, 106.478, 106.492, 106.511, and 106.532.

1.2 Project Description

With this registration, Blue Origin is proposing to update represented emissions from the registered facilities associated with support equipment for the engine test stands at the WTLS. The existing registered facilities are registered under PBRs §§106.261, 106.262, 106.263, 106.478, and 106.512 and are as follows:

EPN	Emission Source	PBR
FUG	Fugitive emissions from piping components	§§106.261, 106.262
TEST STAND 2, TEST STAND 3	Rocket Engine Test Stands	§106.263
PUMP1, PUMP2, PUMP3, PUMP4, PUMP5, PUMP6	Cooling Water Pump Engines	§106.512
H2O2TK-1, H2O2TK-2	Hydrogen peroxide (H_2O_2) storage tanks	§106.478

Blue Origin proposes to update the existing registration with the following:

- Removal of emissions associated with Test Stand 2 (EPN: TEST STAND 2), which has been decommissioned. This includes the removal of the associated LNG Flare (EPN: FLARE-2), which was not registered.
- Addition of emissions from the GEEx rocket engine Test Stand 1 (EPN: TEST STAND 1) and associated emissions to the registration. This test stand is an existing structure, but did not

previously emit any air contaminants. The change is due to the use of helium as a coolant during engine testing, which is vented to atmosphere.

- Update to emissions from XEEx Test Stand 3 (EPN: TEST STAND 3) to account for updated propellants, helium used as a coolant and vented to atmosphere, vented LNG during testing, and engine testing frequency;
- Addition of a water pump engine at the GEEx Test Stand 1 (EPN: G-PUMP-4).
    - The FINs/EPNs of the existing pump engines (PUMP-1 through PUMP-6) are being renamed as follows to clarify their locations:

Former EPN	Updated EPN	Source Name
PUMP-1	G-PUMP-1	GEEx Test Stand 1 - Water Pump Engine 1
PUMP-2	G-PUMP-2	GEEx Test Stand 1 - Water Pump Engine 2
PUMP-3	G-PUMP-3	GEEx Test Stand 1 - Water Pump Engine 3
PUMP-4	X-PUMP-1	XEEx Test Stand 3 - Water Pump Engine 1
PUMP-5	X-PUMP-2	XEEx Test Stand 3 - Water Pump Engine 2
PUMP-6	X-PUMP-3	XEEx Test Stand 3 - Water Pump Engine 3

- Update to fugitive component counts and associated EPNs. The former EPN: FUG, which grouped all components, will be replaced by the EPNs: FUG-GEEx, FUG-XEEx, and FUG-LPAD.
    - Removal of fugitive components in triethyl aluminum/triethyl borate (TEA/TEB) service.
- Addition of vented emissions from existing pressurized liquefied natural gas (LNG) storage tanks (EPN: LNG-VENT) located at XEEx Test Stand 3 that occurs on non-test days. While the tanks are authorized under claimed PBR §106.473, the emissions are being registered under PBR §106.261.

This PBR registration application provides all of the information necessary for the TCEQ to confirm that operations at this site meet the requirements for registration under PBR. Table 1-1 includes an emission summary and associated PBR emission limits. Table 1-2 includes a demonstration of compliance with the specific emission limits of PBRs §106.261 and §106.262.

In addition, estimated emissions associated with unregistered sources authorized under PBRs and as de minimis that do not require registration are included in Table 1-1 and in Appendix B of this application to demonstrate compliance with site-wide PBR requirements under §106.4. These unregistered sources include portable and emergency generators; a wastewater system and

associated heater; diesel fueling equipment and storage tanks; pressurized LNG storage tanks, compressed natural gas (CNG), propane and helium tanks; hydrogen and LNG flares; a kerosene storage tank; and sand blasting and welding operations.

Emissions from nitrogen, hydrogen, methane and oxygen are not quantified for compliance with PBR emissions limits consistent with §106.4(a)(1)(E). Appendix B calculations are provided for emission estimation purposes only and are not to be considered enforceable representations. Blue Origin will maintain records as required by §106.8 to demonstrate continued compliance with these PBRs.

Blue Origin also operates facilities and sources that qualify as de minimis per §116.119. Specifically, these sources include water-based detergents in quantities less than 2,500 gallons per year, manual and hand-held application of stripping and coating solutions, and hand-held application of aerosol-propelled organic liquids in quantities less than four aerosol cans or 64 ounces per day.

1.3 Application Organization

This application is organized into the following sections:

Section 1 presents the application objectives and organization.

Section 2 contains the TCEQ Form PI-7-CERT.

Section 3 contains an Area Map showing the location of the facilities in this application.

Section 4 contains a process description for the facilities in this application.

Section 5 contains a discussion of the estimated emissions.

Section 6 addresses applicability of the Federal Nonattainment New Source Review (NNSR) and Prevention of Significant Deterioration (PSD) permitting requirements.

Section 7 contains a discussion of requirements met for each registered PBR; as well as, a TCEQ Rule Checklist for applicable PBRs.

Appendix A contains emission calculations for sources requested for registration.

Appendix B includes emission calculations for sources claimed under PBRs not requiring registration.

Appendix C contains TCEQ applicable rule text.

Appendix D includes TCEQ Equipment Tables, Table 1(a), and engine specifications.

Table 1-1
Permit by Rule Applicability Analysis Summary

Table 1-1 Site-Wide Emissions Summary

Blue Origin Texas, LLC - West Texas Launch Site

November 2019

EPN	FIN	Source Name	PBR	NOx		CO		SO_2		VOC		$PM/PM_{10}/PM_{2.5}$		HAPs		Helium		H_2O_2	
				lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
PBR Registered Sources - Project Sources: Revised Emissions to be Authorized under Registration No. 102349																			
TEST STAND 1	TEST STAND 1	Rocket Engine Test Stand 1	106.263													75.00	5.63		
TEST STAND 3	TEST STAND 3	Rocket Engine Test Stand 3	106.263	7.53	0.57	218.28	16.38	--	--	15.11	2.44	--	--	--	--	--	--	--	--
G-PUMP-4	G-PUMP-4	GEEx Test Stand 1 - Water Pump Engine 4	106.512	3.46	6.91	3.15	6.31	0.01	0.01	0.18	0.36	0.18	0.36	0.01	0.02	--	--	--	--
FUG-GEEx	FUG-GEEx	GEEx Fugitive Emissions	106.261, 106.262	--	--	--	--	--	--	1.03	4.53	--	--	--	--	2.27	9.92	--	--
FUG-XEEx	FUG-XEEx	XEEx Fugitive Emissions	106.261	--	--	--	--	--	--	0.19	0.83	--	--	--	--	0.21	0.94	--	--
FUG-LPAD	FUG-LPAD	Launch Pad Fugitive Emissions	106.261, 106.262	--	--	--	--	--	--	0.07	0.30	--	--	--	--	--	--	0.03	0.12
LNG-VENT	LNG-VENT	LNG Storage Tanks Vent	106.473, 106.261	--	--	--	--	--	--	5.28	1.49	--	--	--	--	--	--	--	--
PBR Registered Sources - Existing Sources: Unchanged and Authorized under Registration No. 102349																			
H2O2TK-1	H2O2TK-1	Hydrogen Peroxide Storage Tank	106.478, 106.262	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.15	3.96E-03
H2O2TK-2	H2O2TK-2	Hydrogen Peroxide Storage Tank	106.478, 106.262	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.15	3.96E-03
H2O2TK-3	H2O2TK-3	Hydrogen Peroxide Storage Tank	106.478, 106.262	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.15	3.96E-03
G-PUMP-1	G-PUMP-1	GEEx Test Stand 1 - Water Pump Engine 1	106.512	3.46	6.91	3.15	6.31	0.01	0.01	0.18	0.36	0.18	0.36	0.01	0.02	--	--	--	--
G-PUMP-2	G-PUMP-2	GEEx Test Stand 1 - Water Pump Engine 2	106.512	3.46	6.91	3.15	6.31	0.01	0.01	0.18	0.36	0.18	0.36	0.01	0.02	--	--	--	--
G-PUMP-3	G-PUMP-3	GEEx Test Stand 1 - Water Pump Engine 3	106.512	3.46	6.91	3.15	6.31	0.01	0.01	0.18	0.36	0.18	0.36	0.01	0.02	--	--	--	--
X-PUMP-1	X-PUMP-1	XEEx Test Stand 3 - Water Pump Engine 1	106.512	2.04	8.94	1.86	8.16	0.00	0.02	0.11	0.47	0.11	0.47	4.57E-03	0.02	--	--	--	--
X-PUMP-2	X-PUMP-2	XEEx Test Stand 3 - Water Pump Engine 2	106.512	2.04	8.94	1.86	8.16	0.00	0.02	0.11	0.47	0.11	0.47	4.57E-03	0.02	--	--	--	--
X-PUMP-3	X-PUMP-3	XEEx Test Stand 3 - Water Pump Engine 3	106.512	2.04	8.94	1.86	8.16	0.00	0.02	0.11	0.47	0.11	0.47	4.57E-03	0.02	--	--	--	--
Claimed PBR (Registration Not Required)																			
HTR-01	HTR-01	Water Maze Heater	106.183	0.04	0.17	0.03	0.14	2.57E-04	1.13E-03	2.10E-03	0.01	2.91E-03	0.01	--	--	--	--	--	--
WELD1	WELD1	Bulk Storage Facility - Welding	106.227	--	--	--	--	--	--	--	--	0.02	1.75E-04	--	--	--	--	--	--
GASTK-1	GASTK-1	Gasoline Fueling Storage Tank	106.412	--	--	--	--	--	--	14.19	0.22	--	--	--	--	--	--	--	--
GASTK-2	GASTK-2	Gasoline Fueling Storage Tank	106.412	--	--	--	--	--	--	14.19	0.22	--	--	--	--	--	--	--	--
DIESELTK-1	DIESELTK-1	Diesel Fueling Storage Tank	106.412	--	--	--	--	--	--	0.07	2.45E-04	--	--	--	--	--	--	--	--
DIESELTK-2	DIESELTK-2	Diesel Fueling Storage Tank	106.472	--	--	--	--	--	--	0.07	2.94E-04	--	--	--	--	--	--	--	--
DIESELTK-3	DIESELTK-3	Diesel Fueling Storage Tank	106.472	--	--	--	--	--	--	0.07	3.01E-04	--	--	--	--	--	--	--	--
SANDB	SANDB	Sand Blasting	106.452	--	--	--	--	--	--	--	--	25.43	0.15	--	--	--	--	--	--
KERTK-1	KERTK-1	Kerosene Storage Tank	106.472	--	--	--	--	--	--	2.76	0.01	--	--	--	--	--	--	--	--
FLARE-1	FLARE-1	Test Stand 1 Hydrogen Flare	106.492	0.29	0.28	0.57	1.08	0.00	0.00	5.24E-04	5.03E-04	--	--	--	--	--	--	--	--
FLARE-3	FLARE-3	Launch Pad Hydrogen Flare	106.492	1.42	0.14	2.82	0.54	0.01	0.00	5.24E-04	5.03E-05	--	--	--	--	--	--	--	--
FLARE-4	FLARE-4	Test Stand 3 LNG Flare	106.492	9.47	4.74	18.86	18.80	0.04	0.02	3.71E-01	1.85E-01	--	--	--	--	--	--	--	--
PORTGEN	PORTGEN	Portable Generator	106.511	1.47	0.07	0.08	0.00	0.00	0.00	0.44	0.02	0.01	0.00	1.51E-03	0.00	--	--	--	--
GENSET	GENSET	Emergency Generator	106.511	19.57	0.98	0.08	0.00	0.02	0.00	0.44	0.02	0.01	0.00	1.51E-03	0.00	--	--	--	--
SUMP1	SUMP1	Wastewater Sump	106.532	--	--	--	--	--	--	0.16	0.02	--	--	--	--	--	--	--	--
		Total Emission Rates[3,4,5]:		59.74	61.42	258.92	86.65	0.10	0.12	55.50	13.17	26.53	3.02	0.05	0.13	2.48	16.49	0.18	0.13
		PBR §106.4 Emission Limits[1]:			250		250		25		25		25/15/ 10		10/25		25		25
		PBR §106.263 Emission Limits (lb/24 hours)[2]:		5,000		5,000		100		5,000		–		–		100		–	
		Meets PBR Limits?		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	N/A	Yes	N/A	Yes	Yes	Yes	N/A	Yes

Notes:

1. See Table 1-2 for compliance demonstration for §106.261/262 emission limits.
2. Emissions from MSS PBR §106.263 authorized sources are limited to the reportable quantities (RQ) defined in 30 TAC §101.1(89). The maximum operation of the each test stand will not exceed 1 hour/day. The RQ for propane is represented as limit for VOC (LNG).
3. This site is not subject to PSD permitting level for any non-greenhouse gas pollutant; therefore, greenhouse gas emissions were not evaluated for this project.
4. VOC represented in this table includes HAP emissions
5. The H_2O_2 tanks will not operate simultaneously.

Table 1-2
PBR §106.261/262 Compliance Demonstration

Table 1-2

PBR §106.261/262 Demonstration

Blue Origin Texas, LLC - West Texas Launch Site

November 2019

PBR 106.261(a)(2)									
EPN	Air Contaminant	Emission Limit		Project Emissions		Previously Permitted Emissions		Emissions Increase	
		lb/hr	Tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
FUG-GEEx, FUG-XEEx, FUG-LPAD, LNG-VENT	Propane	6.00	10.00	6.33	6.12	0.41	1.79	**5.92**	**4.33**
	Helium	6.00	10.00	2.59	11.33	1.48	6.49	**1.11**	**4.84**
	Diesel	6.00	10.00	0.03	0.15	0.03	0.14	**0.00**	**0.01**
	Vegetable Oil - Hydraulic Oil	6.00	10.00	<0.18	<0.79	<0.18	<0.77	**0.00**	**0.02**
PBR 106.261(a)(3)									
EPN	Air Contaminant	Emission Limit		Project Emissions		Previously Permitted Emissions		Emissions Increase	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
FUG-GEEx	Hydraulic fluid—low viscosity oil	1.00	4.38	<0.18	<0.79	0.18	0.77	**0.00**	**0.02**
	2,6-di-tert- Butylphenol (<2.5% in oil)	1.00	4.38	<0.01	<0.01	<0.01	<0.01	**0.00**	**0.00**
	Hydraulic fluid – Solvent refined, hydrotreated heavy Paraffinic distillate	1.00	4.38	<0.18	<0.79	0.18	0.77	**0.00**	**0.02**
	Mineral Oil ------Hydraulic Oil	1.00	4.38	<0.18	<0.79	0.18	0.77	**0.00**	**0.02**
	Propylene glycol	1.00	4.38	<0.18	<0.79	0.18	0.77	**0.00**	**0.02**
	Organophosphates	1.00	4.38	<0.18	<0.79	0.18	0.77	**0.00**	**0.02**
	isopar	1.00	4.38	0.02	0.09	0.01	0.02	**0.01**	**0.07**
REMOVED	Triethyl Aluminum/ Triethyl Borate	1.00	4.38	0.00	0.00	0.08	0.33	–	–

PBR 106.262(a)(2)											
EPN	Air Contaminant	L	D	K	Emission Limit		Project Emissions		Previously Permitted Emissions		Emissions Increase	
		mg/m^3	ft		lb/hr	Tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
H202TK-1 - 3, FUG-GEEx, FUG-LPAD	Hydrogen Peroxide	1.4	3,000	8	0.18	0.77	0.18	0.13	0.18	0.12	**0.00**	**0.01**
	Ethylene glycol	26	3,000	8	3.25	5.00	<0.18	<0.79	<0.18	<0.77	**0.00**	**0.02**
	Silicone Oil	10	3,000	8	1.25	5.00	<0.18	<0.79	<0.18	<0.77	**0.00**	**0.02**

Section 2
Administrative Forms

This section contains the following forms and information:

- Form PI-7-CERT

Texas Commission on Environmental Quality
Certification and Registration for Permits by Rule
Form PI-7-CERT
(Page 1)

I. Registrant Information		
A. Company or Other Legal Customer Name: Blue Origin Texas, LLC		
B. Company Official Contact Information (☒ Mr. ☐ Mrs. ☐ Ms. ☐ Other _____)		
Name: Aaron Griffith		
Title: Senior Facility Manager		
Mailing Address: PO Box 1552		
City: Van Horn	State: TX	ZIP Code: 79855
Phone: 541-314-5422	Fax:	
E-mail Address: AGriffith@blueorigin.com		
All PBR registration responses will be sent via e-mail.		
C. Technical Contact Information (☐ Mr. ☐ Mrs. ☒ Ms. ☐ Other _____)		
Name: Caroline Tulloh		
Title: EHS Engineer		
Company Name: Blue Origin Texas, LLC		
Mailing Address: PO Box 1552		
City: Van Horn	State: TX	ZIP Code: 79855
Phone: 512-517-1160	Fax:	
E-mail: CTulloh@blueorigin.com		
II. Facility and Site Information		
A. Name and Type of Facility		
Facility Name: West Texas Launch Site		
Type of Facility:	☒ Permanent	☐ Temporary
For portable units, please provide the serial number of the equipment being authorized below.		
Serial No:	Serial No:	
B. Facility Location Information		
Street Address: 35961 State Hwy 54		
If there is no street address, provide written driving directions to the site and provide the closest city or town, county, and ZIP code for the site (attach description if additional space is needed).		
City: Van Horn	County: Culberson	ZIP Code: 79855

II. Facility and Site Information *(continued)*	
C. TCEQ Core Data Form	
Is the Core Data Form (TCEQ Form Number 10400) attached?	☐ YES ☒ NO
If "NO," provide customer reference number (CN) and regulated entity number (RN) below.	
Customer Reference Number (CN): CN604092627	
Regulated Entity Number (RN): RN104961164	
D. TCEQ Account Identification Number (if known):	
E. Type of Action:	
☐ Initial Application ☒ Change to Registration	
For Change to Registration provide the Registration Number: 102439	
F. PBR number(s) claimed under 30 TAC Chapter 106	
(List all the individual rule number(s) that are being claimed.)	
106.261	106.478
106.262	106.512
106.263	106.
G. Historical Standard Exemption or PBR	
Are you claiming a historical standard exemption or PBR?	☐ YES ☒ NO
If "YES," enter rule number(s) and associated effective date in the spaces provided below.	
Rule Number(s)	Effective Date
H. Previous Standard Exemption or PBR Registration Number	
Is this authorization for a change to an existing facility previously authorized under a standard exemption or PBR?	☐ YES ☒ NO
If "YES," enter previous standard exemption number(s) and PBR registration number(s), and associated effective dates in the spaces provided below.	
Standard Exemption and PBR Registration Number(s)	Effective Date

II. Facility and Site Information *(continued)*	
I. Other Facilities at this Site Authorized by Standard Exemption, PBR, or Standard Permit	
Are there any other facilities at this site that are authorized by an Air Standard Exemption, PBR, or Standard Permit?	☐ YES ☒ NO
If "YES," enter standard exemption number(s), PBR registration number(s), and Standard Permit registration number(s), and associated effective date in the spaces provided below.	
Standard Exemption, PBR Registration, and Standard Permit Registration Number(s)	Effective Date
J. Other Air Preconstruction Permits	
Are there any other air preconstruction permits at this site?	☐ YES ☒ NO
If "YES," enter permit number(s) in the spaces provided below.	
K. Affected Air Preconstruction Permits	
Does the PBR being claimed directly affect any permitted facility?	☐ YES ☒ NO
If "YES," enter the permit number(s) in the spaces provided below.	
L. Federal Operating Permit (FOP) Requirements (30 TAC Chapter 122 Applicability)	
1. Is this facility located at a site that is required to obtain an FOP pursuant to 30 TAC Chapter 122?	☐ YES ☒ NO ☐ To Be Determined
If the site currently has an existing FOP, enter the permit number:	
Check the requirements of 30 TAC Chapter 122 that will be triggered if this certification is accepted. *(check all that apply)* ☐ Initial Application for an FOP ☐ Significant Revision for an SOP ☐ Minor Revision for an SOP ☐ Operational Flexibility/Off Permit Notification for an SOP ☐ Revision for a GOP ☐ To be Determined ☒ None	
2. Identify the type(s) of FOP issued and/or FOP application(s) submitted/pending for the site. *(check all that apply)* ☐ SOP ☐ GOP ☐ GOP application/revision (submitted or under APD review) ☒ N/A ☐ SOP application/revision (submitted or under APD review)	

III.	**Fee Information (***See Section VII. for address to send fee or go to www.tceq.texas.gov/epay to pay online.)*	
A.	Fee Requirements	
Is a fee required per Title 30 TAC § 106.50?		☒ YES ☐ NO
If "NO," specify the exception. There are three exceptions to paying a PBR fee.	(*check all that apply*)	
1.	Registration is solely to establish a federally enforceable emission limit.	☐
2.	Registration is within six months of an initial PBR review, and it is addressing deficiencies, administrative changes, or other allowed changes.	☐
3.	Registration is for a remediation project (30 TAC § 106.533).	☐
B.	Fee Amount	
1.	A $100 fee is required if *any* of the answers in III.B.1 are "YES."	
This business has less than 100 employees.		☐ YES ☒ NO
This business has less than 1 million dollars in annual gross receipts.		☐ YES ☒ NO
This registration is submitted by a governmental entity with a population of less than 10,000.		☐ YES ☒ NO
This registration is submitted by a non-profit organization.		☐ YES ☒ NO
2.	A $450 fee is required for all other registrations.	
C.	Payment Information	
Check/money order/transaction or voucher number:		
Individual or company name on check:		
Fee Amount: $		
Was fee paid online?		☒ YES ☐ NO
IV.	**Technical Information Including State And Federal Regulatory Requirements** **Check the appropriate box to indicate what is included in your submittal.** **NOTE:** *Any technical or essential information needed to confirm that facilities are meeting the requirements of the PBR must be provided. Not providing key information could result in an automatic deficiency and voiding of the project.*	
A.	PBR requirements (Checklists are optional; however, your review will go faster if you provide applicable checklists.)	
Did you demonstrate that the general requirements in 30 TAC § 106.4 are met?		☒ YES ☐ NO
Did you demonstrate that the individual requirements of the specific PBR are met?		☒ YES ☐ NO
B.	Confidential Information Included (If confidential information is submitted with this registration, all confidential pages must be properly marked "CONFIDENTIAL.")	☐ YES ☒ NO

IV. Technical Information Including State and Federal Regulatory Requirements *(continued)* **Check the appropriate box to indicate what is included in your submittal.** **Note:** Any technical or essential information needed to confirm that facilities are meeting the requirements of the PBR must be provided. Not providing key information could result in an automatic deficiency and voiding of the project.		
C. Process Flow Diagram		☒ YES ☐ NO
D. Process Description		☒ YES ☐ NO
E. Maximum Emissions Data and Calculations		☒ YES ☐ NO
Note: *If the facilities listed in this registration are subject to the Mass Emissions Cap & Trade program under* ***30 TAC Chapter 101, Subchapter H, Division 3,*** *the owner/operator of these facilities must possess NO_x allowances equivalent to the actual NO_x, emissions from these facilities.*		
F. Is this certification being submitted to certify the emissions for the entire site?		☐ YES ☒ NO
If "NO," include a summary of the specific facilities and emissions being certified.		
G. Table 1(a) (Form 10153) Emission Point Summary		☒ YES ☐ NO
H. Distances from Property Line and Nearest Off-Property Structure		
Distance from this facility's emission release point to the nearest property line:	>450	feet
Distance from this facility's emission release point to the nearest off-property structure:	>450	feet
I. Project Status		
Has the company implemented the project or waiting on a response from TCEQ?		☒ Implemented ☐ Waiting
J. Projected Start of Construction and Projected Start of Operation Dates		
Projected Start of Construction (provide date):	2020	
Projected Start of Operation (provide date):	2020	
V. Delinquent Fees		
This form **will not be processed** until all delinquent fees and/or penalties owed to the TCEQ or the Office of the Attorney General on behalf of the TCEQ is paid in accordance with the Delinquent Fee and Penalty Protocol. For more information regarding Delinquent Fees and Penalties, go to the TCEQ website at: www.tceq.texas.gov/agency/financial/fees/delin/index.html.		

VI. Signature For Registration And Certification	
The signature below confirms that I have knowledge of the facts included in this application and that these facts are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project for which this application is made will not in any way violate any provision of the Texas Water Code (TWC), Chapter 7; the Texas Health and Safety Code, Chapter 382, the Texas Clean Air Act (TCAA); the air quality rules of the Texas Commission on Environmental Quality; or any local governmental ordinance or resolution enacted pursuant to the TCAA. I further state that I understand my signature indicates that this application meets all applicable nonattainment, prevention of significant deterioration, or major source of hazardous air pollutant permitting requirements. The signature further signifies awareness that intentionally or knowingly making or causing to be made false material statements or representations in the application is a criminal offense subject to criminal penalties.	
Name (printed):	
Aaron Griffith	
Signature (original signature required):	
(e-signed via STEERS)	
Date:	

VII. Submitting Copies of the Certification and Registration		
Copies must be sent as listed below: **Processing delays may occur if copies are not sent as noted.**		
Who	**Where**	**What**
Air Permits Initial Review Team (APIRT)	Regular, Certified, Priority Mail MC 161, P.O. Box 13087 Austin, Texas 78711-3087 Hand Delivery, Overnight Mail MC 161, 12100 Park 35 Circle, Building C, Third Floor Austin, Texas 78753	Originals Form PI-7-CERT, Core Data Form, and all attachments. Not required if using ePermits[1].
Revenue Section, TCEQ	Regular, Certified, Priority Mail MC 214, P.O. Box 13088 Austin, Texas 78711-3088 Hand Delivery, Overnight Mail MC 214, 12100 Park 35 Circle, Building A, Third Floor Austin, Texas 78753	Original Money Order or Check, Copy of Form PI-7-CERT, and Core Data Form. Not required if fee was paid using ePay[2].
Appropriate TCEQ Regional Office	To find your Regional Office address, go to the TCEQ website at www.tceq.texas.gov/agency/directory/region, or call (512) 239-1250.	Copy of Form PI-7-CERT, Core Data Form, and all attachments. Not required if using ePermits[1]
Appropriate Local Air Pollution Control Program(s)	To Find your local or Regional Air Pollution Control Programs go to the TCEQ, APD website at www.tceq.texas.gov/permitting/air/local_programs.html, or call (512)-239-1250	Copy of Form PI-7-CERT, Core Data Form, and all attachments.

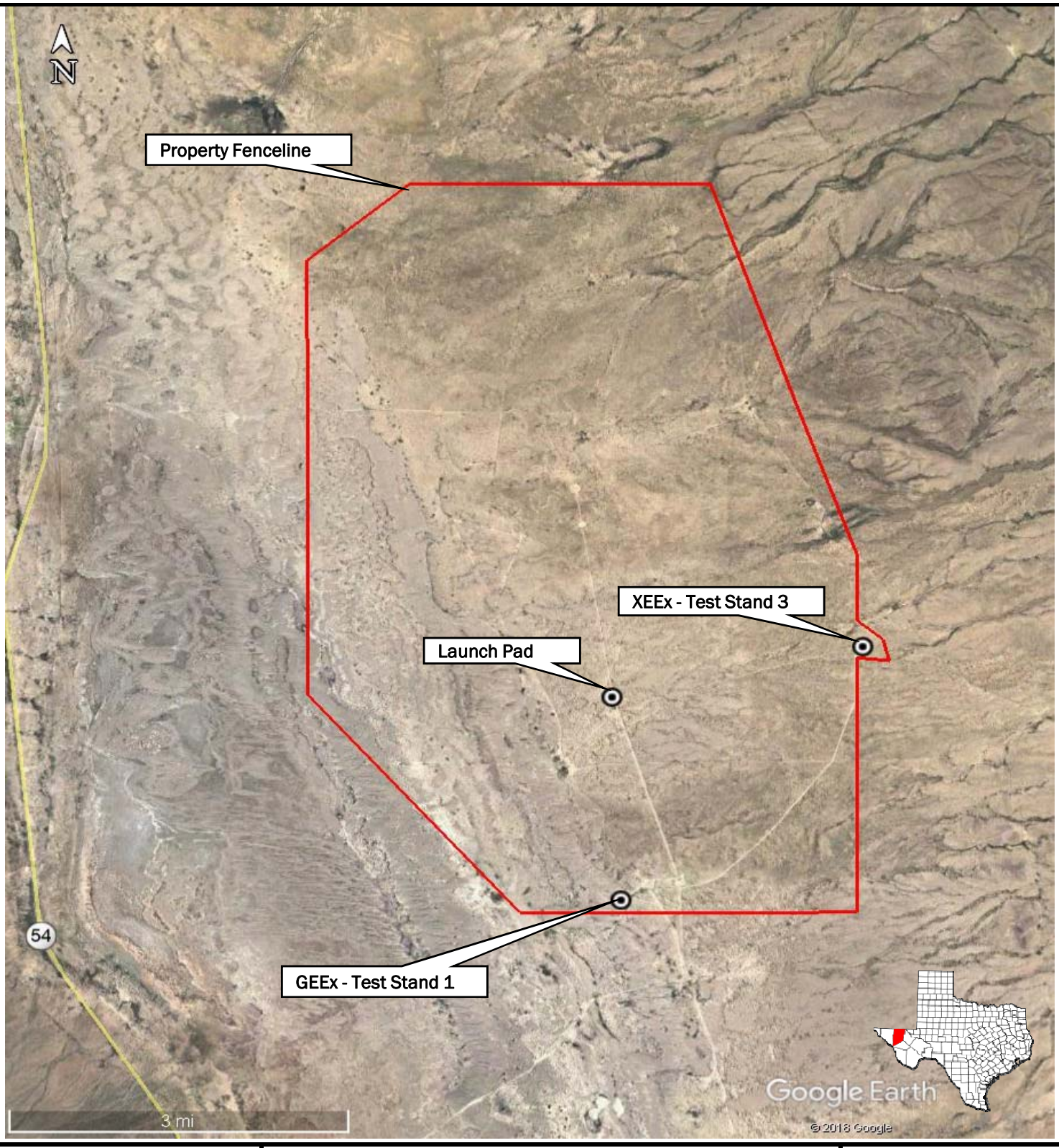
[1] ePermits located at www3.tceq.texas.gov/steers/
[2] ePay located at www.tceq.texas.gov/epay

Section 3
Location Information

Blue Origin's West Texas Launch Site is located in Culberson County, Texas. A site location map is included with this registration as Figure 3-1. There are no recreational areas, residences, or other structure not occupied or used solely by Blue Origin located within 100 feet from the facilities at the site.

Figure 3-1

Area Map



BLUE ORIGIN

Blue Origin Texas, LLC
West Texas Launch Site
Van Horn, Culberson County, Texas
31.396826°N, -104.752621 °W

Figure 3-1
Area Map

DiSorbo
Environmental Consulting Firm

Section 4
Process Description

Blue Origin operates an aerospace suborbital launch and engine testing facility in Culberson County near Van Horn, Texas. The site is used to assemble, test and maintain rocket engines towards achieving Blue Origin's missions for developing rocket-powered Vertical Takeoff and Vertical Landing vehicles for access to suborbital and orbital space.

Two test stands at the site are used for testing fully assembled rocket engines, Test Stand 1 (GEEx) and Test Stand 3 (XEEx). Test Stand 1 is used to test engines fired with liquid hydrogen and liquid oxygen, and purged with nitrogen and helium. Test Stand 3 is used to test engines fired with LNG and liquid oxygen, and is purged with nitrogen. Purge gases are vented to atmosphere. Test Stand 3 can also be used to test engine component parts. Fully assembled engines and components are not tested simultaneously.

Seven stationary diesel-fired internal combustion engines and four electric-driven engines are used to operate the fire deluge systems at Test Stand 1, Test Stand 3, and the launch pad. There are two generator engines on-site used for emergency and standby operation only.

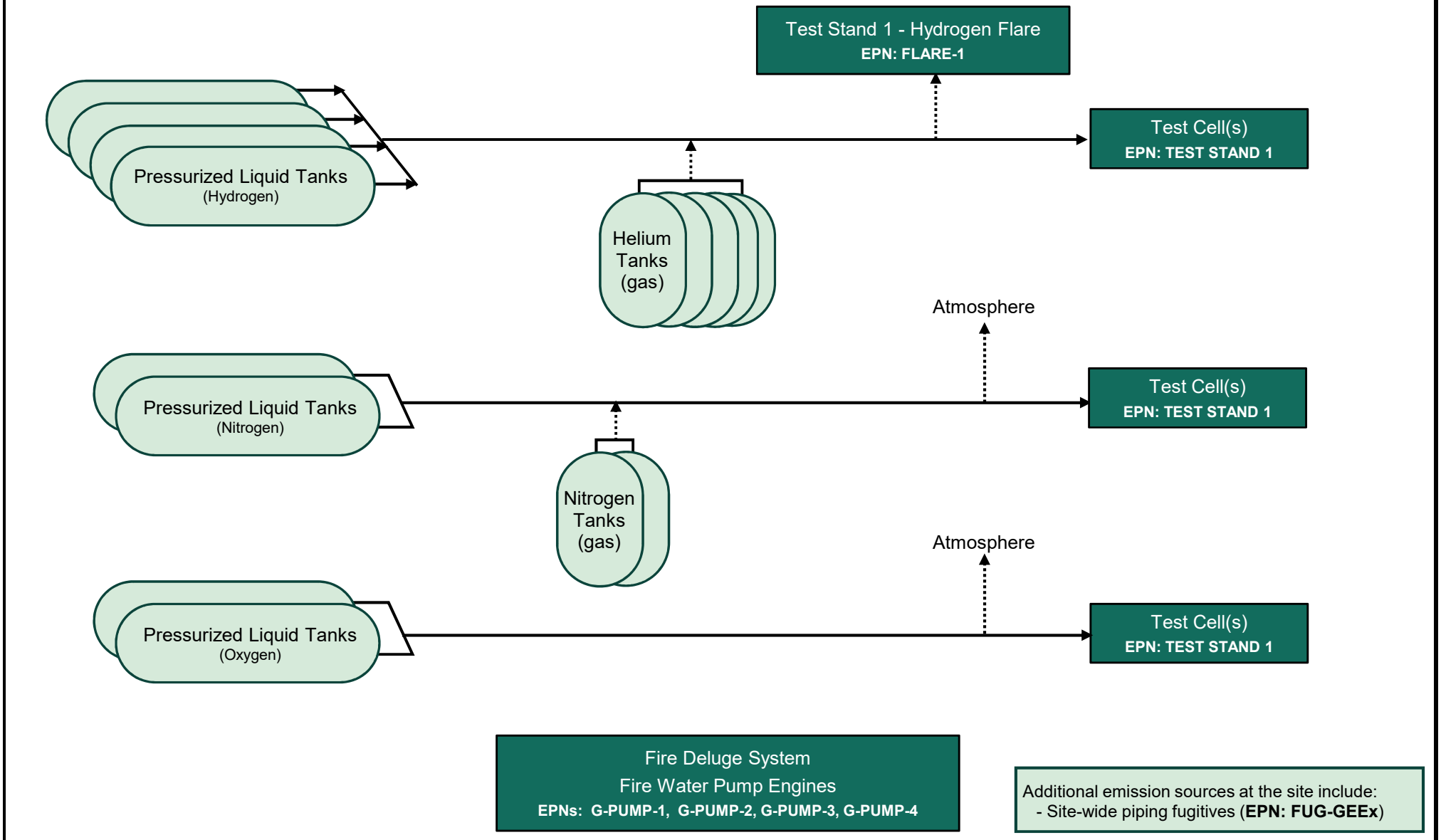
Atmospheric and pressurized tanks are also operated at the site. The atmospheric tanks are used to store H_2O_2; diesel, gasoline and kerosene used for on-site mobile vehicle refueling. Helium, LNG, liquid oxygen, nitrogen, and hydrogen are stored in pressurized tanks or canisters.

Three flares are used to burn residual hydrogen and LNG from facility piping, pressurized tanks, and boil-off during engine fueling and component testing. LNG may also be vented to atmosphere from the storage tanks.

Miscellaneous coating, degreasing, abrasive blasting and welding activities are also performed at the site. See Figure 4-1 for a simplified process flow diagram.

Figure 4-1

Process Flow Diagram – GEEx – Test Stand #1



BLUE ORIGIN

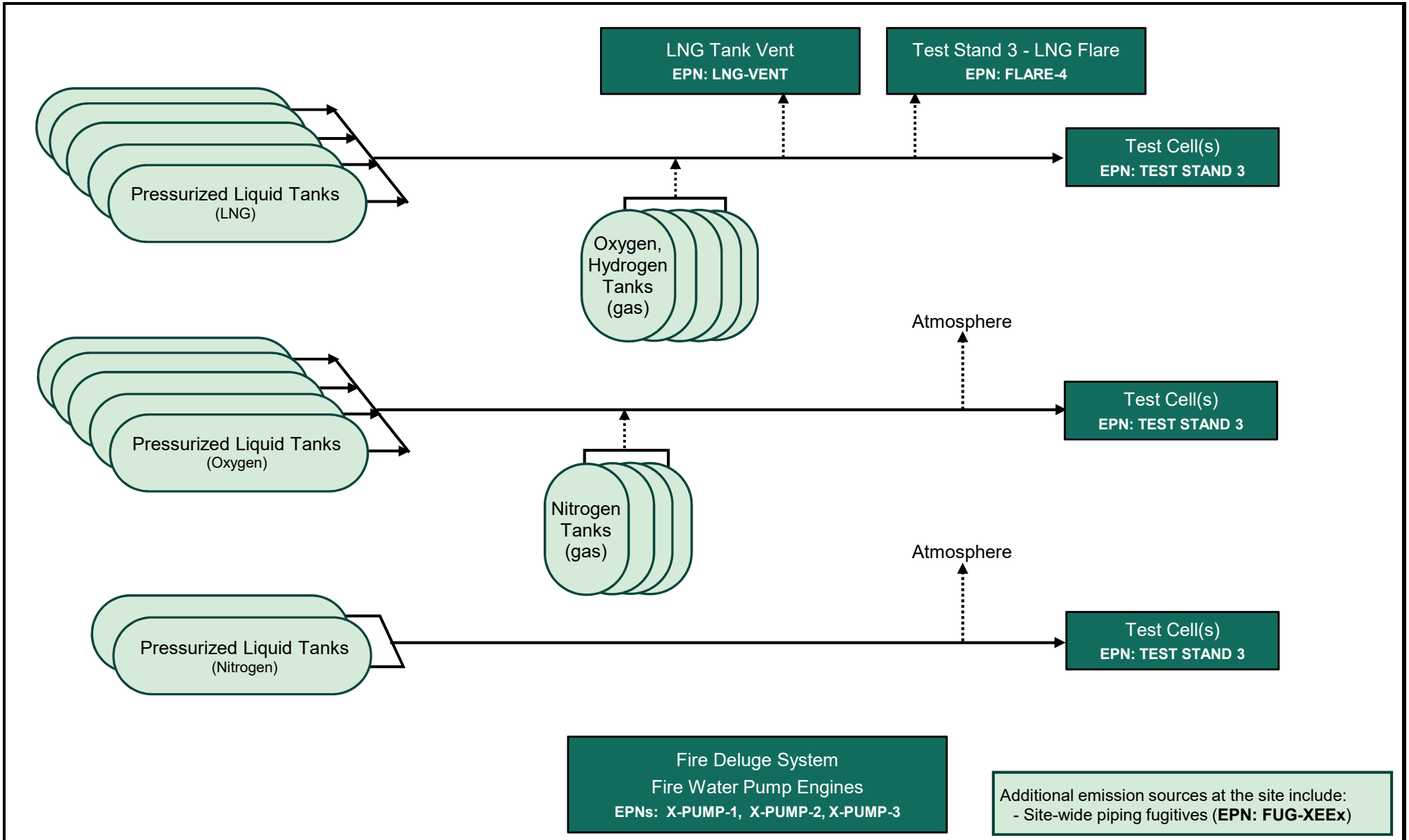
Blue Origin Texas, LLC
West Texas Launch Site
Culberson County, Texas

Figure 4-1
GEEx - Test Stand #1
Process Flow Diagram

DiSorbo
Environmental Consulting Firm

Figure 4-2

Process Flow Diagram –XEEx – Test Stand #3



BLUE ORIGIN

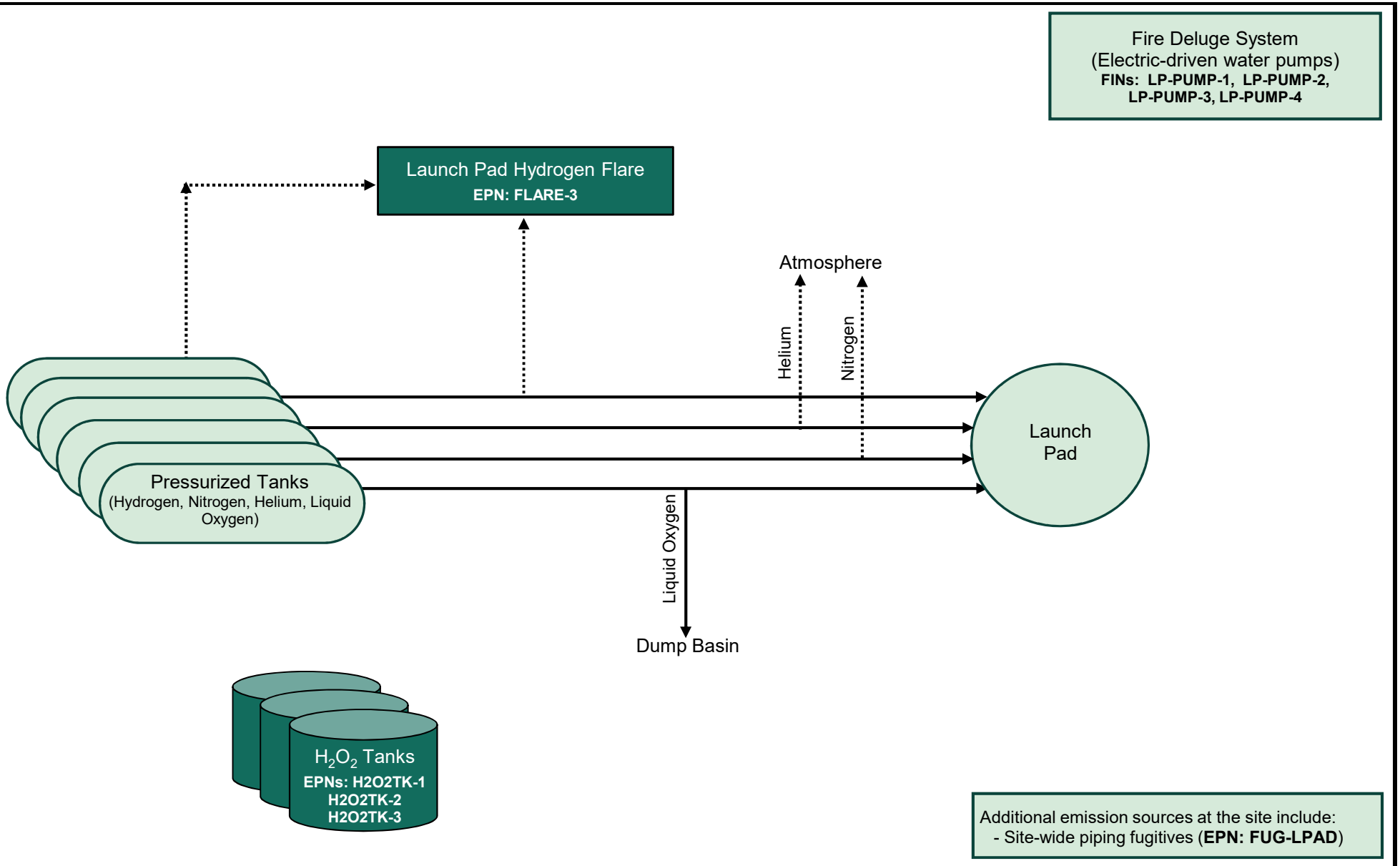
Blue Origin Texas, LLC
West Texas Launch Site
Culberson County, Texas

Figure 4-2
XEEx - Test Stand #3
Process Flow Diagram

DiSorbo
Environmental Consulting Firm

Figure 4-3

Process Flow Diagram – Launch Pad



BLUE ORIGIN

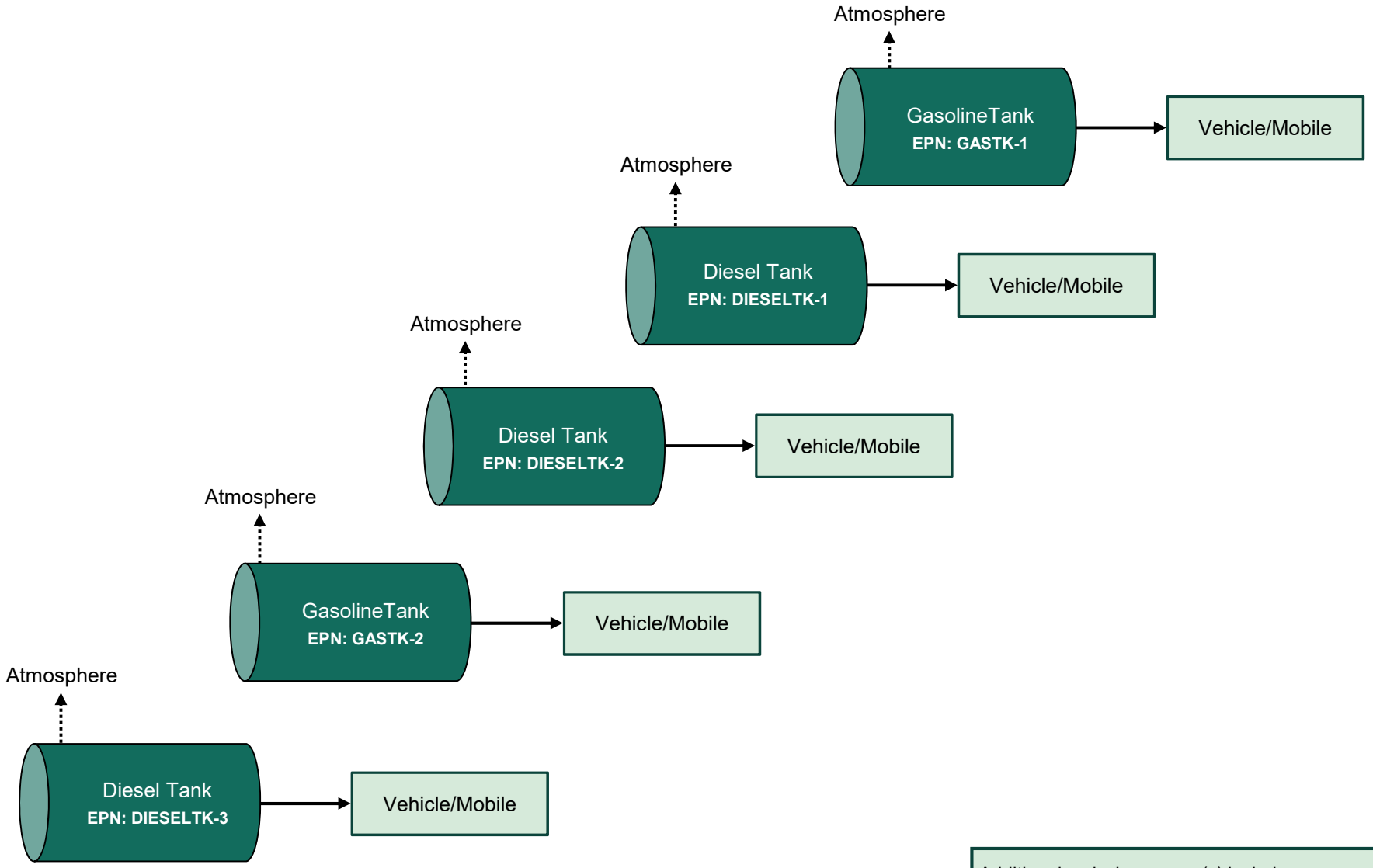
Blue Origin Texas, LLC
West Texas Launch Site
Culberson County, Texas

Figure 4-3
Launch Pad
Process Flow Diagram

DiSorbo
Environmental Consulting Firm

Figure 4-4

Process Flow Diagram –Vehicle Refueling Area



BLUE ORIGIN

Blue Origin Texas, LLC
West Texas Launch Site
Culberson County, Texas

Figure 4-4
Vehicle Refueling Area
Process Flow Diagram

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Section 5
Emission Calculations

5.1 Routine and Maintenance Facility Emissions

Emission factors and calculation methods for the sources requested for registration are addressed in this section. Emission rates are summarized in Table 1-1 in Section 1 of this application. Detailed emission calculations are provided in Appendix A.

5.1.1 Piping Component Fugitives

The fugitive emissions from piping components for each area: Test Stand 1 (EPN: FUG-GEEx), Test Stand 3 (EPN: FUG-XEEx), and the launch pad (EPN: FUG-LP) are estimated using methods outlined in the TCEQ's guidance web page for Equipment Leak Fugitives[1]. Each fugitive component is classified first by equipment type (flanges/connectors) and then by material type (gas/vapor, light liquid). Total emission rates are estimated by multiplying the number of fugitive components of a particular type by the appropriate emission factor per TCEQ guidance.

Detailed fugitive emission calculations are included in Appendix A as Tables A-1, A-2, and A-3.

5.1.2 Engine Test Stands

Liquid hydrogen and liquid oxygen are used as propellants in Test Stand 1 while LNG and liquid oxygen will be used as propellants for Test Stand 3. Firing of LNG and oxygen propellants will result in carbon monoxide (CO) and nitrogen oxide (NO_x) emissions. Estimated emissions for CO and NO_x are based on proprietary, industry-standard computer codes including the NASA Chemical Equilibrium with Applications (CEA) and Standard Plume Flowfield III used to calculate engine performance and exhaust gas composition. The calculations are based on the propellant flow rates into the engine, and the pressure in the combustion chamber where combustion takes place. Estimated helium emissions are the anticipated maximum mass flowrates vented during engine

[1] https://www.tceq.texas.gov/permitting/air/guidance/newsourcereview/fugitives/nsr_fac_eqfug.html

testing based on site-specific measurements. Emission outputs developed with these proprietary programs are provided in Appendix A, Tables A-4 and A-5.

5.1.3 LNG Storage Tank Venting

The LNG storage tanks located at Test Stand 3 can vent to atmosphere or to the LNG flare (EPN: FLARE-4) for control. Emissions from LNG vented to atmosphere are estimated using the Ideal Gas Law and site-specific maximum estimated volumes. Detailed emission calculations are included in Appendix A as Table A-6.

5.1.4 Cooling Water Pump, Emergency and Backup Engines

Diesel-fired engines (EPNs: G-PUMP-1 to 4 and X-PUMP-1 to 3) are used to power fire water pumps associated with the test stands. Emergency and portable generator engines (EPNs: GENSET and PORTGEN) have routine emissions associated with periodic maintenance checks and readiness testing and will not exceed 100 hours per year of non-emergency operation. Emissions for the pump engines are based on emission factors from EPA's Tier III non-road diesel limits and AP-42, Section 3.3 *Gasoline And Diesel Industrial Engines*. NO_X and VOC emissions breakdown are assumed per CARB Emission Factors for CI Diesel Engine - Percent HC in Relation to NMHC + NO_X, June 28, 2004. SO_2 emissions for all engines are based on maximum 15 ppm of Sulfur content as per 40 CFR 60.4207(b) and 40 CFR 80.510(b)(1)(i). Emissions from the emergency and portable generator are estimated based on vendor data and AP-42, Section 3.3, Table 3.3-1.

Detailed engine emissions are included in Appendix A as Table A-7.

5.1.5 Fixed Roof Storage Tanks

For purposes of determining vapor pressure of the liquid stored, the RVP method (Figure 1-13/14b from US EPA's AP-42 Ch. 7) is used for the storage tanks, based on measured properties of a representative liquid.

Annual emissions from the fixed roof storage tanks are the sum of the breathing and working total hydrocarbon losses calculated per US EPA's AP-42 Ch. 7. No flash occurs in these tanks.

Short-term emissions are the sum of the working loss rates calculated per TCEQ's Guidance APDG 6250, February 2018. Vapors from uncontrolled tanks are vented to atmosphere.

Section 6
Federal New Source Review

Non-attainment New Source Review (NNSR) permitting is required for sites in non-attainment areas that are new major emissions sources or for existing major sources in non-attainment areas with major modifications. Prevention of Significant Deterioration (PSD) permitting is required at new major sources for a regulated pollutant, or at an existing major source if the emissions increase equals or exceeds pollutant-specific significant emission rates.

The WTLS is located in Culberson County, which is designated attainment/unclassified for all criteria pollutants. As demonstrated in Table 1-1 in Section1, emissions will not exceed the PBR §106.4 emission limits, and by default PSD major source thresholds outlined in §116.12(19); therefore, PSD permitting is not applicable.

Section 7
PBR Applicability Analysis

7.1 Chapter 106 – Permits By Rule

In order to register a PBR, the general Requirements for Permitting by Rule (§106.4) and the specific requirements of the PBR must be met. The following is a description of how the proposed sources satisfy the requirements to be authorized under each applicable PBR.

7.1.1 Rule §106.4 – Requirements for Permitting By Rule

A completed §106.4 Checklist can be found at the end of this section. The total project emissions, shown on Table 1-1 are less than the limits listed in 106.4(a)(1) and (4).

7.1.2 Rule §106.261/262 – Facilities (Emission and Distance Limitations)

Completed §§106.261 and 106.262 Checklists can be found at the end of this section. The total increased emissions, shown in Table 1-2 in Section 1 are less than the limits listed in §106.261(a)(2) and (3), and §106.262(a)(2).

7.1.3 Rule §106.263 – Routine Maintenance, Start-up and Shutdown of Facilities, and Temporary Maintenance Facilities

PBR 106.263 is for routine MSS facilities and temporary maintenance facilities. Site-wide annual emissions from sources authorized under PBR 106.263 are less than 25/250 tpy. In accordance with §106.263(d), site-wide 24-hour emission totals from sources authorized under PBR 106.263 are less the reportable quantities defined in 30 TAC §101.1(89).

Blue Origin is claiming PBR §106.263(c)(3)(B) for temporary maintenance facilities used for testing of engines. Each engine is tested for less than 180 days. Blue Origin will keep records to demonstrate compliance as required under §106.263(g) and §106.8.

7.1.4 Rule §106.478 – Storage Tank and Change of Service

A completed §106.478 Checklist can be found at the end of this section. The construction of the H_2O_2 storage tanks is authorized under PBR 106.478. The emissions from the H_2O_2 storage tanks are authorized under PBR 106.261/262.

7.1.5 Rule §106.512 – Stationary Engines and Turbines

Completed §106.512 Checklists can be found at the end of this section. Compliance with the 1-hour nitrogen dioxide (NO_2) National Ambient Air Quality Standard (NAAQS) is demonstrated by facility emissions and property line distance and is included in Table A-3 in Appendix A of the registration. No changes to the existing water pump engines are being represented with this registration.

Texas Commission on Enviromental Quality
Title 30 Texas Administrative Code § 106.261
Permit By Rule (PBR) Checklist
Facilities (Emission Limitations)

The following checklist is designed to help you confirm that you meet Title 30 Texas Administrative Code § 106.261 (30 TAC § 106.261) requirements. If you do not meet all the requirements, you may alter the project design or operation in such a way that all the requirements of the PBR are met or you may obtain a construction permit. The PBR forms, tables, checklists, and guidance documents are available from the Texas Commission on Environmental Quality (TCEQ) Air Permits Division website at, www.tceq.texas.gov/permitting/air/air_permits.html

For additional assistance with your application, including resources to help calculate your emissions, please visit the Small Business and Local Government Assistance (SBLGA) webpage at the following link: www.TexasEnviroHelp.org

Check The Most Appropriate Answer		
	Is a description or checklist of how this claim meets the general requirements for the use of PBRs in 30 TAC § 106.4 attached?	☒ YES ☐ NO ☐ NA
b1	Is this claim for construction of a facility authorized in another section of this chapter or for which a standard permit is in effect? *If "YES," this PBR cannot be used to authorize emissions from the project.*	☐ YES ☒ NO ☐ NA
b2	Is this claim for any change to any facility authorized under another section of this chapter or authorized under a standard permit? *If "YES," this PBR cannot be used to authorize emissions from the project.*	☐ YES ☒ NO ☐ NA
a	Does this project represent a physical or operational change to an NSR permitted facility in which the result of the project is an increase in ***only*** annual emissions with no impact to the currently authorized hourly emission rate? [1]	☐ YES ☒ NO ☐ NA
a1	Are facilities or changes located at least 100 feet from any recreational area or residence or other structure not occupied or used solely by the owner or operator of the facilities or the owner of the property upon which the facilities are located?	☒ YES ☐ NO ☐ NA

[1] Project emission increases associated with a change to a facility that only result in an annual emissions increase can be authorized as part of the PBR claim if the following information is met: 1) the hourly emissions stay at or below current authorized emission limits; 2) there is not a change to any underlying air authorizations for the applicable units associated with BACT or health and environmental impacts; and 3) this claim is certified via PI-7-CERT. The annual emission increases associated with the PBR claim may not circumvent major new source review requirements under 30 TAC Chapter 116.

Texas Commission on Environmental Quality
Title 30 Texas Administrative Code § 106.261
Permit By Rule (PBR) Checklist
Facilities (Emission Limitations)

Check The Most Appropriate Answer *(continued)*

a2 Are total new or increased emissions, including fugitives, less than or equal to 6.0 pounds per hour (lb/hr) and ten tons per year of the following materials [2] ☒ YES ☐ NO ☐ NA

Check All That Apply

☐ acetylene	☐ cyclopentane	☐ kaolin	☒ propane
☐ alumina	☐ emery dust	☐ limestone	☐ propyl alcohol
☐ argon	☐ ethanol	☐ magnesite	☐ propyl ether
☐ butane	☐ ethyl acetate	☐ marble	☐ propylene
☐ calcium carbonate	☐ ethyl ether	☐ methyl acetylene	☐ silicon
☐ calcium silicate	☐ ethylene	☐ methyl chloroform	☐ silicon carbide
☐ carbon monoxide	☐ glycerin mist	☐ methyl cyclohexane	☐ starch
☐ cellulose fiber	☐ gypsum	☐ neon	☐ sucrose
☐ cement dust	☒ helium	☐ nonane	☐ sulfur dioxide
☐ crude oil	☐ iron oxide dust	☐ oxides of nitrogen	☐ zinc oxide
☐ cyclohexane	☐ isohexane	☐ pentaerythritol	☐ zinc stearate
☐ cyclohexene	☐ isopropyl alcohol	☐ plaster of paris	

☒ refinery petroleum fractions (except for pyrolysis naphthas and pyrolysis gasoline) containing less than ten volume percent benzene

☐ fluorocarbons Numbers 11, 12, 13, 14, 21, 22, 23, 113, 114, 115, and 116

[2] Any upstream and/or downstream actual emission increases that result from a project for which this PBR is claimed need to be authorized appropriately. Any associated upstream and/or downstream emissions authorized as part of the PBR claim will need to be included as part of the total new or increased emissions, unless: 1) these emissions stay at or below current authorized emission limits; 2) there is not a change to any underlying air authorizations for the applicable units associated with BACT, health and environmental impacts, or other representations (i.e. construction plans, operating procedures, throughputs, maximum emission rates, etc.); and 3) this claim is certified via PI-7 CERT. Notwithstanding the exclusion of any upstream and/or downstream emissions under this PBR claim, the total of all emission increases, including upstream and/or downstream actual emission increases, are required to be part of the PBR registration to determine major new source review applicability under Title 30 TAC Chapter 116. The emission increases associated with the PBR claim and all upstream and/or downstream actual emission increases may not circumvent major new source review requirements under 30 TAC Chapter 116.

Texas Commission on Environmental Quality
Title 30 Texas Administrative Code § 106.261
Permit By Rule (PBR) Checklist
Facilities (Emission Limitations)

Check The Most Appropriate Answer		
a3	Are total new or increased emissions, including fugitives, less than or equal to 1.0 lb/hr of any chemical having a limit value (L) greater than 200 milligrams per cubic meter (mg/m^3) as listed and referenced in Table 262 of 30 TAC § 106.262 of this title (relating to Facilities (Emission and Distance Limitations)? [3]	☐ YES ☐ NO ☒ NA
List chemical(s):	L value(s):	
	Are total new or increased emissions, including fugitives, less than or equal to 1.0 lb/hr of any chemical not listed or referenced in Table 262? [4] List chemical(s): Hydraulic fluid, Isopar	☒ YES ☐ NO ☐ NA
	Are total new or increased emissions, including fugitives, of a chemical with a limit value of less than 200 mg/m^3*?* [5] *If "YES" the authorization of the chemical is not allowed under this section. We suggest you use 30 TAC § 106.262 to authorize the emissions, if applicable.*	☐ YES ☐ NO ☒ NA
a4	Are there any changes to or additions of any existing air pollution abatement equipment?	☐ YES ☒ NO ☐ NA
a5	Will there be any visible emissions, except uncombined water, emitted to the atmosphere from any point or fugitive source in amounts greater than 5.0% opacity in any six-minute period?	☐ YES ☒ NO ☐ NA
a6	Are emission increases five tons per year or greater? *If "YES," this checklist must be attached to a Form PI-7 within ten days following the installation or modification of the facilities.* [**Note:** *The notification shall include a description of the project, calculations, data identifying specific chemical names, limit values, and a description of pollution control equipment if any.*]	☐ YES ☒ NO ☐ NA
a7	Are emission increases less than five tons per year? *If "YES," this checklist must be attached to a Form PI-7 and include a description of the project, calculations, data identifying specific chemical names, limit values, and a description of pollution control equipment if any. (pick one):* ☒ Within ten days following the installation or modification of the facilities. The notification shall include a description of the project, calculations, data identifying specific chemical names, limit values, and a description of pollution control equipment if any ☐ By March 31 of the following year summarizing all uses of this permit by rule in the previous calendar year.	☒ YES ☐ NO ☐ NA

[3] Same as [2]

[4] Same as [2]

[5] Same as [2]

Texas Commission on Environmental Quality
Title 30 Texas Administrative Code § 106.262
Permit by Rule (PBR) Checklist
Facilities (Emission and Distance Limitations)

The following checklist is designed to help you confirm that you meet Title 30 Texas Administrative Code § 106.262 (30 TAC § 106.262) requirements. If you do not meet all the requirements, you may alter the project design or operation in such a way that all the requirements of the PBR are met or you may obtain a construction permit. The PBR forms, tables, checklists, and guidance documents are available from the Texas Commission on Environmental Quality (TCEQ), Air Permits Division website at, www.tceq.texas.gov/nav/permits/air_permits.html.

For additional assistance with your application, including resources to help calculate your emissions, please visit the Small Business and Local Government Assistance (SBLGA) webpage at the following link: www.TexasEnviroHelp.org

	Check the Most Appropriate Answer			
	Is a description or checklist of how this claim meets the general requirements for the use of PBRs in 30 TAC § 106.4 attached?	☒ YES ☐ NO ☐ N/A		
a	Does this project represent a physical or operational change to an NSR permitted facility in which the result of the project is an increase in *only* annual emissions with no impact to the current authorized hourly emission rate? [1]	☐ YES ☒ NO ☐ N/A		
b1.	Is this claim for construction of a facility authorized in another section of this chapter or for which a standard permit is in effect? *If "YES," this PBR cannot be used to authorize emissions from the project.*	☐ YES ☒ NO ☐ N/A		
b2.	Is this claim for any change to any facility authorized under another section of this chapter or authorized under a standard permit? *If "YES," this PBR cannot be used to authorize emissions from the project.*	☐ YES ☒ NO ☐ N/A		
c.	Is the facility authorized under another section of this chapter or under a standard permit? *If "YES," subsection (a)(2) and (3) of this section may be used to qualify the use of other chemicals at the facility.*	☐ YES ☒ NO ☐ N/A		
a1.	Are facilities or changes located at least 100 feet from any recreational area or residence or other structure not occupied or used solely by the owner or operator of the facilities or the owner of the property upon which the facilities are located?	☒ YES ☐ NO ☐ N/A		
a2.	Are new or increased emissions, including fugitives, emitted in a quantity less than five tons per year or in a quantity less than E as determined by using the equation E=L/K? [2] See Table 262 Figures 1 and 2. *If "YES," the notification shall include a description of the project, calculations for all emissions being claimed under this PBR:*	☒ YES ☐ NO ☐ N/A		
Chemical: **H_2O_2, ethylene glycol, silicone oil**		L value: **1.4, 26, 10**	D: **3,000 ft**	K: **8**

[1] Project emission increases associated with a change to a facility that only result in an annual emissions increase can be authorized as part of the PBR claim if the following information is met: 1) the hourly emissions stay at or below current authorized emission limits; 2) there is not a change to any underlying air authorizations for the applicable units associated with BACT or health and environmental impacts; and 3) this claim is certified via PI-7-CERT. The annual emission increases associated with the PBR claim may not circumvent major new source review requirements under 30 TAC Chapter 116.

[2] Any upstream and/or downstream actual emission increases that result from a project for which this PBR is claimed need to be authorized appropriately. Any associated upstream and/or downstream emissions authorized as part of the PBR claim will need to be included as part of the total new or increased emissions, unless: 1) these emissions stay at or below current authorized emission limits; 2) there is not a change to any underlying air authorizations for the applicable units associated with BACT, health and environmental impacts, or other representations (i.e. construction plans, operating procedures, throughputs, maximum emission rates, etc.); and 3) this claim is certified via PI-7 CERT. Notwithstanding the exclusion of any upstream and/or downstream emissions under this PBR claim, the total of all emission increases, including upstream and/or downstream actual emission increases, are required to be part of the PBR registration to determine major new source review applicability under Title 30 TAC Chapter 116. The emission increases associated with the PBR claim and all upstream and/or downstream actual emission increases may not circumvent major new source review requirements under 30 TAC Chapter 116.

Title 30 Texas Administrative Code § 106.262
Permit by Rule (PBR) Checklist
Facilities (Emission and Distance Limitations)

Check the Most Appropriate Answer				
a3.	Is this checklist attached to a Form PI-7 within ten days following the installation or modification of the facilities? *If "YES," the notification shall include a description of the project, calculations, and data identifying specific chemical names, L values, and a description of pollution control equipment, if any.*			☒ YES ☐ NO ☐ N/A
a4.	Are one or more of the following chemicals is handled for this registration? (Check all that apply) *If "YES," answer the following four questions.*			☐ YES ☒ NO ☐ N/A
☐ acrolein	☐ diazomethane	☐ hydrogen sulfide	☐ ozone	
☐ allyl chloride	☐ diborane	☐ ketene	☐ pentabornev	
☐ ammonia (anhydrous)	☐ diglycidyl ether	☐ methylamine	☐ perchloromethyl mercaptan	
☐ arsine	☐ dimethylhydrazine	☐ methyl bromide	☐ perchloryl fluoride	
☐ boron trifluoride	☐ ethyleneimine	☐ methyl hydrazine	☐ phosgene	
☐ bromine	☐ ethyl mercaptan	☐ methyl isocyanate	☐ phosphine	
☐ carbon disulfide	☐ fluorine	☐ methyl mercaptan	☐ phosphorus trichloride	
☐ chlorine	☐ formaldehyde (anhydrous)	☐ nickel carbonyl	☐ selenium	
☐ chlorine dioxide	☐ hydrogen bromide	☐ nitric acid	☐ hexafluoride stibine	
☐ chlorine trifluoride	☐ hydrogen chloride	☐ nitric oxide	☐ liquefied sulfur dioxide	
☐ chloroacetaldehyde	☐ hydrogen cyanide	☐ nitrogen dioxide	☐ sulfur pentafluorid	
☐ chloropicrin	☐ hydrogen fluoride	☐ oxygen difluoride	☐ tellurium hexafluoride	
☐ chloroprene	☐ hydrogen selenide			
	Are all facilities are located at least 300 feet from the nearest property line and 600 feet from any off-plant receptor?			☐ YES ☐ NO ☐ N/A
	Are the cumulative amount of any of the following chemicals resulting from one or more authorizations under this section (but not including permit authorizations) less than or equal to 500 pounds on the plant property?			☐ YES ☐ NO ☐ N/A
	Are all listed chemicals handled only in unheated containers operated in compliance with the United States Department of Transportation regulation (49 Code of Federal Regulation, Parts 171-178)?			☐ YES ☐ NO ☐ N/A
a5.	Are there any changes to or additions of any existing air pollution abatement equipment?			☐ YES ☒ NO ☐ N/A
a6.	Will there be any visible emissions, except uncombined water, emitted to the atmosphere from any point or fugitive source in amounts greater that 5.0% opacity in any six-minute period?			☐ YES ☒ NO ☐ N/A

D (feet)	K	Value Description
100	326	E=maximum allowable hourly emission, and never to exceed 6 pounds per hour.
200	200	
300	139	
400	104	
600	65	
700	54	
800	46	K=value from the table on this page. (interpolate intermediate values)
900	39	
1,000	34	
2,000	14	D=distance to the nearest off-plant receptor
3,000 or more	8	

Table 262
Limit Values (L) for use with Exemptions from Permitting § 106.262

The values are not to be interpreted as acceptable health affects values relative to the issuance of any permits under Chapter 116 of this title (relating to Control of Air Pollution by Permits for new Construction or Modification).

Compound	Limit (L) Milligrams Per Cubic Meter
Acetone	590.
Acetaldehyde	9.
Acetone	4.
Acetonitrile	34.
Acetylene	2662.
N-Amyl Acetate	2.7
Sec-Amyl Acetate	1.1
Benzene	3.
Beryllium and Compounds	0.0005
Boron Trifluride, as HF	0.5
Butyl Alcohol,	76.
Butyl Acrylate	19.
Butyl Chromate	0.01
Butyl Glycidyl Ether	30.
Butyl Mercaptain	0.3
Butyraldehyde	1.4
Butyric Acid	1.8
Butyronitrile	22.
Carbon Tetrachloride	12.
Chloroform	10.
Chlorophenol	0.2
Chloroprene	3.6
Chromic Acid	0.01
Chromium Metal, Chromium II and III Compounds	0.1
Chromium VI Compounds	0.01
Coal Tar Pitch Volatiles	0.1
Creosote	0.1
Cresol	0.5
Cumene	50.
Dicyclopentadiene	3.1
Diethylaminoethanol	5.5

Table 262
Limit Values (L) for use with Exemptions from Permitting § 106.262

The values are not to be interpreted as acceptable health affects values relative to the issuance of any permits under Chapter 116 of this title (relating to Control of Air Pollution by Permits for new Construction or Modification).

Compound	Limit (L) Milligrams Per Cubic Meter
Diisobutyl Ketone	63.9
Dimethyl Aniline	6.4
Dioxane	3.6
Dipropylamine	8.4
Ethyl Acrylate	0.5
Ethylene Dibromide	0.38
Ethylene Glycol	26.
Ethylene Glycol Dinitrate	0.1
Ethylidene 2-norbornene, 5	7.
Ethyl Mercaptan	0.08
Ethyl Sulfide	1.6
Glycolonitrile	5.
Halothane	16.
Heptane	350.
Hexanediamine, 1, 6	0.32
Hydrogen Chloride	1.
Hydrogen Fluoride	0.5
Hydrogen Sulfide	1.1
Isoamyl Acetate	133.
Isoamyl Alcohol	15.
Isobutyronitrile	22.
Kepone	0.001
Kerosene	100.
Malononitrile	8.
Mesityl Oxide	40.
Methyl Acrylate	5.8
Methyl Amyl Ketone	9.4
Methyl-T-Butyl Ether	45.
Methyl Butyl Ketone	4.
Methyl Disulfide	2.2

Table 262
Limit Values (L) for use with Exemptions from Permitting § 106.262

The values are not to be interpreted as acceptable health affects values relative to the issuance of any permits under Chapter 116 of this title (relating to Control of Air Pollution by Permits for new Construction or Modification).

Compound	Limit (L) Milligrams Per Cubic Meter
Methylenebis (2-chloroaniline) (MOCA)	0.003
Methylene Chloride	26.
Methyl Isoamyl Ketone	5.6
Methyl Mercaptan	0.2
Merthyl Methacrylate	34.
Methyl Propyl Ketone	530.
Methyl Sulfide	0.3
Mineral Spirits	350.
Naphtha	350.
Nickel, Inorganic Compounds	0.015
Nitroglycerine	0.1
Nitropropane	5.
Octane	350.
Parathion	0.05
Pentane	350.
Perchloroethylene	33.5
Petroleum Ether	350.
Phenyl Mercaptan	0.4
Propionitrile	14.
Propyl Acetate	62.6
Propylene Oxide	20.
Propyl Mercaptan	0.23
Silica-amorphous-precipitated, silica gel	4.
Silicon Carbide	4.

Table 262
Limit Values (L) for use with Exemptions from Permitting § 106.262

The values are not to be interpreted as acceptable health affects values relative to the issuance of any permits under Chapter 116 of this title (relating to Control of Air Pollution by Permits for new Construction or Modification).

Compound	Limit (L) Milligrams Per Cubic Meter
Stoddard Solvent	350.
Styrene	21.
Succiononitrile	20.0
Tolidin	0.02
Trichloroethylene	135.
Trinethylamine	0.1
Valeric Acid	0.34
Vinyl Acetate	15.0
Vinyl Chloride	2.0

Note: The time weighted average (TWA) threshold Limit Value (TLV) published by the American Conference of Governmental Industrial Hygienists (AGGIH), in its TLVs and BEIs guide (1997 Edition) shall be used for compounds not included in the table. The Short-Term Exposure Level (STEL) or Ceiling Limit (annotated with a “C”) published by the ACGIH shall be used for compounds that do not have a published TWA TLV. This section cannot be used if the compound is not listed in the table or does not have a published TWA TLV, STEL, or Ceiling Limit in the ACGIH TLVs and BEIs guide.

Texas Commission on Environmental Quality
Permit by Rule Applicability Checklist
Title 30 Texas Administrative Code § 106.4

The following checklist was developed by the Texas Commission on Environmental Quality (TCEQ), **Air Permits Division**, to assist applicants in determining whether or not a facility meets all of the applicable requirements. Before claiming a specific Permit by Rule (PBR), a facility must first meet all of the requirements of **Title 30 Texas Administrative Code § 106.4** (30 TAC § 106.4), "Requirements for Permitting by Rule." Only then can the applicant proceed with addressing requirements of the specific Permit by Rule being claimed.

The use of this checklist is not mandatory; however, it is the responsibility of each applicant to show how a facility being claimed under a PBR meets the general requirements of 30 TAC § 106.4 and also the specific requirements of the PBR being claimed. If all PBR requirements cannot be met, a facility will not be allowed to operate under the PBR and an application for a construction permit may be required under 30 TAC § 116.110(a).

Registration of a facility under a PBR can be performed by completing **Form PI-7** (Registration for Permits by Rule) or **Form PI-7-CERT** (Certification and Registration for Permits by Rule). The appropriate checklist should accompany the registration form. Check the most appropriate answer and include any additional information in the spaces provided. If additional space is needed, please include an extra page and reference the question number. The PBR forms, tables, checklists, and guidance documents are available from the TCEQ, Air Permits Division website at: www.tceq.texas.gov/permitting/air/nav/air_pbr.html.

1. 30 TAC § 106.4(a)(1) and (4): Emission Limits	
List emissions in tpy for **each** facility (add additional pages or table if needed):	
• Are the SO_2, PM, VOC, or other air contaminant emissions claimed for **each** facility in this PBR submittal less than 25 tpy?	☒ YES ☐ NO
• Are the PM_{10} emission less than 15 TPY and are the $PM_{2.5}$ emissions less than 10 TPY for **each** claimed facility in the PBR submittal?	☒ YES ☐ NO
• Are the NO_x and CO emissions claimed for each facility in this PBR submittal less than 250 tpy?	☒ YES ☐ NO
*If the answer to both is "Yes," continue to the question below. If the answer to either question is "No," a **PBR cannot be claimed**.*	
• Has any facility at the property had public notice and opportunity for comment under 30 TAC Section 116 for a regular permit or permit renewal? (This does not include public notice for voluntary emission reduction permits, grandfathered existing facility permits, or federal operating permits.)	☐ YES ☒ NO
If "Yes," skip to Section 2. If "No," continue to the questions below.	

Texas Commission on Environmental Quality
Permit by Rule Applicability Checklist
Title 30 Texas Administrative Code § 106.4

1. 30 TAC § 106.4(a)(1) and (4): Emission Limits *(continued)*	
If the site has had no public notice, please answer the following:	
• Are the SO_2, PM_{10}, VOC, or other emissions claimed for **all** facilities in this PBR submittal less than 25 tpy?	☒ YES ☐ NO
• Are the PM_{10} emission less than 15 TPY and are the $PM_{2.5}$ emissions less than 10 TPY for **all** claimed facilities in this PBR submittal?	☒ YES ☐ NO
• Are the NO_x and CO emissions claimed for **all** facilities in this PBR submittal less than 250 tpy?	☒ YES ☐ NO
If the answer to both questions is "Yes," continue to Section 2.	
*If the answer to either question is "No," **a PBR cannot be claimed**. A permit will be required under Chapter 116.*	
2. 30 TAC § 106.4(a)(2): Nonattainment Check	
• Are the facilities to be claimed under this PBR located in a designated ozone nonattainment county?	☐ YES ☒ NO
If "Yes," please indicate which county by checking the appropriate box to the right.	
(Moderate) - Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller counties:	☐ HGB
(Moderate) - Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise counties:	☐ DFW
If "Yes," to any of the above, continue to the next question. If "No," continue to Section 3.	
• Does this project trigger a nonattainment review?	☐ YES ☐ NO
• Is the project's potential to emit (PTE) for emissions of VOC or NO_x increasing by 100 tpy or more? *PTE is the maximum capacity of a stationary source to emit any air pollutant under its worst-case physical and operational design unless limited by a permit, rules, or made federally enforceable by a certification.*	☐ YES ☐ NO
• Is the site an existing major nonattainment site and are the emissions of VOC or NO_x increasing by 40 tpy or more?	☐ YES ☐ NO
If needed, attach contemporaneous netting calculations per nonattainment guidance.	
Additional information can be found at: www.tceq.texas.gov/permitting/air/forms/newsourcereview/tables/nsr_table8.html and www.tceq.texas.gov/permitting/air/nav/air_docs_newsource.html	
*If "Yes," to any of the above, the project is a major source or a major modification and **a PBR may not be used**. A Nonattainment Permit review must be completed to authorize this project. If "No," continue to Section 3.*	

3. 30 TAC § 106.4(a)(3): Prevention of Significant Deterioration (PSD) Check	
Does this project trigger a review under PSD rules?	
To determine the answer, review the information below:	
• Are emissions of any regulated criteria pollutant increasing by 100 tpy of any criteria pollutant at a named source?	☐ YES ☒ NO
• Are emissions of any criteria pollutant increasing by 250 tpy of any criteria pollutant at an unnamed source?	☐ YES ☒ NO
• Are emissions increasing above significance levels at an existing major site?	☐ YES ☒ NO
PSD information can be found at: www.tceq.texas.gov/assets/public/permitting/air/Forms/NewSourceReview/Tables/10173tbl.pdf and www.tceq.texas.gov/permitting/air/nav/air_docs_newsource.html *If "Yes," to any of the above, **a PBR may not be used**. A PSD Permit review must be completed to authorize the project.* *If "No," continue to Section 4.*	
4. 30 TAC § 106.4(a)(6): Federal Requirements	
• Will all facilities under this PBR meet applicable requirements of Title 40 Code of Federal Regulations (40 CFR) Part 60, New Source Performance Standards (NSPS)?	☒ YES ☐ NO ☐ NA
If "Yes," which Subparts are applicable?	
Subpart IIII	
• Will all facilities under this PBR meet applicable requirements of 40 CFR Part 63, Hazardous Air Pollutants Maximum Achievable Control Technology (MACT) standards?	☒ YES ☐ NO ☐ NA
If "Yes," which Subparts are applicable?	
Subpart ZZZZ	
• Will all facilities under this PBR meet applicable requirements of 40 CFR Part 61, National Emissions Standards for Hazardous Air Pollutants (NESHAPs)?	☐ YES ☐ NO ☒ NA
If "Yes," which Subparts are applicable?	
If "Yes" to any of the above, please attach a discussion of how the facilities will meet any applicable standards.	

5. 30 TAC § 106.4(a)(7): PBR Prohibition Check	
• Are there any air permits at the site containing conditions which prohibit or restrict the use of PBRs?	☐ YES ☒ NO
If "Yes," PBRs may not be used or their use must meet the restrictions of the permit. A new permit or permit amendment may be required.	
• *List permit number(s):*	
6. 30 TAC § 106.4(a)(8): NO_x Cap and Trade	
• Is the facility located in Harris, Brazoria, Chambers, Fort Bend, Galveston, Liberty, Montgomery, or Waller County?	☐ YES ☒ NO
If "Yes," answer the question below. If "No," continue to Section 7.	
• Will the proposed facility or group of facilities obtain required allowances for NO_x if they are subject to 30 TAC Chapter 101, Subchapter H, Division 3 (relating to the Mass Emissions Cap and Trade Program)?	☐ YES ☐ NO
7. Highly Reactive Volatile Organic Compounds (HRVOC) Check	
• Is the facility located in Harris County?	☐ YES ☒ NO
If "Yes," answer the next question. If "No," skip to the box below.	
• Will the project be constructed after June 1, 2006?	☐ YES ☐ NO
If "Yes," answer the next question. If "No," skip to the box below.	
• Will one or more of the following HRVOC be emitted as a part of this project?	☐ YES ☐ NO
If "Yes," complete the information below:	

	lb/hr	**tpy**
► 1,3-butadiene		
► all isomers of butene (e.g., isobutene [2-methylpropene or isobutylene])		
► alpha-butylene (ethylethylene)		
► beta-butylene (dimethylethylene, including both cis- and transisomers)		
► ethylene		
► propylene		

7. **Highly Reactive Volatile Organic Compounds (HRVOC) Check *(continued)***		
• Is the facility located in Brazoria, Chambers, Fort Bend, Galveston, Liberty, Montgomery, or Waller County?		☐ YES ☒ NO
If "Yes," answer the next question. If "No," the checklist is complete.		
• Will the project be constructed after June 1, 2006?		☐ YES ☐ NO
If "Yes," answer the next question. If "No," the checklist is complete.		
• Will one or more of the following HRVOC be emitted as a part of this project?		☐ YES ☐ NO
If "Yes," complete the information below:		
	lb//hr	**tpy**
► ethylene		
► propylene		

Texas Commission on Enviromental Quality
Storage Tank and Change of Service
Air Permits by Rule (PBR) Checklist
Title 30 Texas Administrative Code § 106.478

Check the most appropriate answer and include any additional information in the spaces provided. If additional space is needed, please include an extra page and reference the rule number. The permit by rule (PBR) forms, tables, checklists, and guidance documents are available from the Texas Commission on Environmental Quality (TCEQ), Air Permits Division website at: www.tceq.texas.gov/permitting/air/nav/air_pbr.html.

This PBR (§ 106.478) requires registration for storage tanks with a capacity of 25,000 gallons or greater and located in a designated ozone non-attainment area with the commission's Office of Air in Austin before construction begins. The registration shall include a list of all tanks, calculated emissions for each compound in tons per year for each tank, and a Table 7 for each different tank design. The facility may be registered by completing Form PI-7, "Registration for Permits by Rule," or Form PI-7-CERT, "Registration and Certification for Permits by Rule." This checklist should accompany the registration form.

For additional assistance with your application, including resources to help calculate your emissions, please visit the Small Business and Local Government Assistance (SBLGA) webpage at the following link: www.TexasEnviroHelp.org

Questions/Description and Response	
Rule	**Applicability**
(7)	What is the capacity of the tank? ≤ 10,500 gallons
(1)	Is the tank located at least 500 feet from the nearest recreational area, residence, or other structure not occupied or used solely by the owner of the facility or the owner of the property? ☒ YES ☐ NO
Indicate the tank location from the nearest recreational area, residence, or other structure not occupied or used solely by the owner of the facility or the owner of the property: >500 feet	
(2)	Is the true vapor pressure of the compound being stored less than 11.0 psia? ☒ YES ☐ NO
Indicate the true vapor pressure: ≤ 0.145 psia	
(3)(A)	Will any storage tank with a capacity of 40,000 gallons or more used to store compounds with a true vapor pressure greater than 0.5 psia and less than 11.0 psia be equipped with an internal floating cover or equivalent control? ☐ YES ☐ NO ☒ N/A
Check the type of tank and control method used: ☐ Internal floating roof tank. ☐ External floating roof tank using double seal technology with a primary mechanical shoe seal. ☐ External floating roof tank using double seal technology with a primary liquid-mounted seal. ☐ An existing open top floating roof tank having a vapor-mounted primary seal, which is undergoing a change of service.	

Texas Commission on Enviromental Quality
Storage Tank and Change of Service
Air Permits by Rule (PBR) Checklist
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Questions/Description and Response		
Rule	**Applicability**	
(3)(B)	Does the floating roof or floating cover design of the tank incorporate sufficient flotation to conform to the requirements of American Petroleum Institute (API) Code 650, Appendix C or an equivalent degree of flotation?	☐ YES ☐ NO
Note: *If using an equivalent degree of flotation, please describe how the method used is equivalent to API Code 650, Appendix C.*		
(4)	If the compounds have a true vapor pressure of 0.5 psia or less at the maximum storage temperature, will each fixed or cone roof be equipped with a submerged fill pipe or use bottom loading?	☒ YES ☐ NO ☐ N/A
Indicate the loading method: ☒ submerged fill pipe ☒ bottom loading		
(5)	Is each fixed or cone roof tank not equipped with an internal floating roof painted chalk white, except where a dark color is necessary to help the tank absorb or retain heat in order to maintain the material in the tank in a liquid state?	☐ YES ☐ NO
(6)	Have the tank emissions been calculated using the methods specified in Section 4.3 of the United States Protection Agency Publication AP-42	☒ YES ☐ NO
(7)	If the capacity of the tank is 25,000 gallons or more, have you provided Form PI-7 or Form PI-7-CERT as part of this registration request?	☒ YES ☐ NO
☐ Form PI-7 ☒ Form PI-7-CERT		
(8)	Are the chemicals or mixtures of chemicals to be stored limited to those shown in Table 478?	☒ YES ☐ NO
If "NO," answer the next question.		
(8)	Do mixtures of chemicals listed in Table 478 contain more than a total of 1.0% percent by volume of all other chemicals not listed in Table 478?	☐ YES ☐ NO
If "YES," the facility does not qualify for this PBR.		
Indicate the actual percentage by volume of all unlisted chemicals:		

Chemical Name:	Percent Composition (percent):

Texas Commission on Enviromental Quality
Storage Tank and Change of Service
Air Permits by Rule (PBR) Checklist
Title 30 Texas Administrative Code § 106.478

Questions/Description and Response	
Other Applicable Rules and Regulations	
Is this facility subject to 30 TAC §§ 115.112-119?	☐ YES ☒ NO
Why or Why Not: The facility is not located in an affected county under this rule.	
Is this facility subject to 30 TAC §§ 115.120-129?	☐ YES ☒ NO
Why or Why Not: The facility is not located in an affected county under this rule.	
Is this facility subject to 40 CFR Part 60, NSPS Subpart K?	☐ YES ☒ NO
Why or Why Not: The facility was not constructed, reconstructed, or modified after June 11, 1973 and prior to May 19, 1978.	
Is this facility subject to 40 CFR Part 60, NSPS Subpart Kb?	☐ YES ☒ NO
Why or Why Not: The facility is not used for the storage of volatile organic liquids.	
Is this facility subject to 40 CFR Part 60, NSPS Subpart NNN?	☐ YES ☒ NO
Why or Why Not: The facility does not produce any of the chemicals listed in §60.667 as a product, co-product, by-product, or intermediate and is not source of VOC.	

Record Keeping: There are no additional record keeping requirements other than the general requirements specified in 30 TAC § 106.8. The records must be made available immediately upon request to the commission or any air pollution control program having jurisdiction. If you have any question about the type of records that should be maintained, contact the Air Program in the TCEQ Regional Office for the region in which the site is located.

Recommended Calculation Methods: In order to demonstrate compliance with this PBR, the registrant may use the emission factors for each air contaminant from the EPA Compilation of Air Pollutant Emission Factors (AP-42), Fifth Edition, Volume I, Chapter 7: "Liquid Storage Tanks" at: www.epa.gov/ttn/chief/ap42/index.html. The registrant may also use the calculation method for storage tanks that store chemical compounds as described in the TCEQ guidance for "Storage Tanks" at: www.tceq.texas.gov/permitting/air/guidance/newsourcereview/tanks/nsr_fac_tanks.html.

Texas Commission on Environmental Quality
Stationary Engines and Turbines
Air Permits by Rule (PBR) Checklist
Title 30 Texas Administrative Code § 106.512

(EPNs: G-PUMP-1, G-PUMP-2, G-PUMP-3, G-PUMP-4)

Questions/Description and Response		
Will the engine or turbine be used as a replacement at an oil and gas site and does it meet all the requirements of the policy memo entitled, "Replacement of All Engine and Turbine Components for Oil and Gas Production?"		☐ YES ☒ NO
If "YES," registration is not required for like-kind replacements of engine or turbine components. *If "NO," please continue.*		
Rule	**Introduction**	
(1)	Is the engine or turbine rated less than 240 hp?	☐ YES ☒ NO
If "YES," then registration is not required, but the facility must comply with conditions (5) and (6) of this rule. *If "NO," then registration is required and the facility must be registered by submitting a completed Form PI-7 and Table 29 or Table 31, as applicable, within 10 days after construction begins.*		
Indicate the type of equipment (pick one): ☒ Engine ☐ Turbine		
If an engine, continue to the questions regarding "Engines." *If a turbine, skip to the questions regarding "Gas Turbines."*		
Rule	**Engines**	
(2)	Is the engine rated at 500 hp or greater?	☒ YES ☐ NO
If "NO," the engine is between 240 hp and 500 hp. The engine must be registered by submitting a completed Form PI-7 and a Table 29 within 10 days after construction begins and must comply with the conditions in §§ 106.512(5) and (6). Skip to the questions regarding § 106.512(4). *If "YES," in addition to registration, the engine must operate in compliance with the following nitrogen (NO_x) emission limit(s). Check the limit(s) applicable to this engine by answering the following:*		
(2)(A)(i)	The engine is a gas-fired, rich-burn engine and will not exceed 2.0 grams per horsepower hour (g/hp-hr) under all operating conditions.	☐ YES ☐ NO
Indicate grams per horsepower hour NO_x:_____ (g/hp-hr)		
(2)(A)(ii)	The engine is a spark-ignited, gas-fired, lean-burn engine or any compression-ignited, dual fuel-fired engine manufactured new after June 18, 1992, and will not exceed 2.0 g/hp-hr NO_x at manufacturer's rated full load and speed at all times; except, the engine will not exceed 5.0 g/hp-hr NO_x under reduced speed and 80% and 100% of full torque conditions.	☐ YES ☐ NO
Indicate grams per horsepower hour NO_x:_____ (g/hp-hr)		

Texas Commission on Environmental Quality
Stationary Engines and Turbines
Air Permits by Rule (PBR) Checklist
Title 30 Texas Administrative Code § 106.512

Questions/Description and Response		
Rule	**Engines (*continued*)**	
(2)(A)(iii)	The engine is any spark-ignited, lean-burn two-cycle or four-cycle engine or any compression-ignited, dual fuel-fired engine rated 825 hp or greater and manufactured between September 23, 1982 and June 18, 1992, and will not exceed 5.0 g/hp-hr NO_x under all operating conditions.	☐ YES ☐ NO
Indicate grams per horsepower hour NO_x: _____ g/hp-hr		
(2)(A)(iv)	The engine is any spark-ignited, gas-fired, lean-burn, four-cycle engine or compression-ignited, dual-fuel-fired engine that was manufactured before June 18, 1992, and is rated less than 825 hp, or was manufactured before September 23, 1982, and will not exceed 5.0 g/hp-hr NO_x at manufacturer's rated full load and speed at all times; except, the engine will not exceed 8.0 g/hp-hr NO_x under reduced speed and 80% and 100% of full torque conditions.	☐ YES ☐ NO
Indicate grams per horsepower hour NO_x: _____ g/hp-hr		
(2)(A)(v)	The engine is any spark-ignited, gas-fired, two-cycle, lean-burn engine that was manufactured before June 18, 1992, and is rated less than 825 hp, or was manufactured before September 23, 1982, and will not exceed 8.0 g/hp-hr NO_x under all operating conditions.	☐ YES ☐ NO
Indicate grams per horsepower hour NO_x: _____ g/hp-hr		
(2)(A)(vi)	The engine is any compression-ignited, liquid-fired engine and will not exceed 11.0 g/hp-hr NO_x under all operating conditions.	☒ YES ☐ NO
Indicate grams per horsepower hour NO_x: 2.85 g/hp-hr		
(2)(B)	Does the engine require an automatic air-fuel ratio controller to meet the NO_x limit(s) above?	☐ YES ☒ NO
(2)(B)	For spark-ignited gas-fired or compression-ignited dual fuel-fired engines, is the engine required to have an automatic air-fuel ratio controller under condition (2)(B) of the PBR?	☐ YES ☐ NO
(2)(C)	Are you aware of and accept responsibility for the record and testing requirements as specified in (2)(C) of the PBR?	☒ YES ☐ NO

Texas Commission on Environmental Quality
Stationary Engines and Turbines
Air Permits by Rule (PBR) Checklist
Title 30 Texas Administrative Code § 106.512

Questions/Description and Response		
Rule	**Gas Turbines**	
(3)	Is the turbine rated 500 hp or more?	☐ YES ☐ NO
If "NO," the turbine is between 240 hp and 500 hp. The engine only needs to be registered by submitting a completed Form PI-7 and a Table 31 within 10 days after construction begins. *If "YES," in addition to registration, the turbine must operate in compliance with the following emission limit(s) and must comply with the conditions in §§ 106.512(5)(6). Skip to questions regarding "Additional Requirements."*		
(3)(A)	Will the emissions of NO_x exceed 3.0 g/hp-hr for gas firing?	☐ YES ☐ NO
(3)(B)	Will the turbine meet all applicable NO_x and sulfur dioxide (or fuel sulfur) emission limitations, monitoring requirements, and reporting requirements of 40 CFR Part 60, NSPS Subpart GG?	☐ YES ☐ NO
Rule	**Additional Requirements**	
(4)	Is the engine or turbine rated less than 500 hp or used for temporary replacement purposes?	☐ YES ☒ NO
If "NO," continue to next question. *If "YES," the equipment does not have to meet the emission limits of §§ 106.512(2) and (3). However, the temporary replacement equipment can only remain in service for a maximum of 90 days.*		
(5)	What type of fuel will be used and will the fuel meet the requirements of the PBR?	☒ YES ☐ NO
Indicate the fuel(s) used. ☐ Natural gas ☐ Liquid Petroleum gas ☐ Field gas ☒ Liquid fuel		
(6)	Does the installation comply with the National Ambient Air Quality Standards (NAAQS)?	☒ YES ☐ NO
Indicate which method is used and attach the modeling report and/or calculations and diagrams to support the selected method. ☒ Modeling ☒ Stack height ☒ Facility emissions and property line distance		
(6)	Have you included a modeling report and/or calculations and diagrams to support the selected NAAQS compliance determination method?	☒ YES ☐ NO
Rule	**Other Applicable Rules and Regulations**	
For the following four questions, please refer to the Electric Generators under Permit by Rule policy memo from October 2006.		
Is the engine or turbine used to generate electricity?		☐ YES ☒ NO
If "NO," the following do not apply.		

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Questions/Description and Response	
Rule	**Other Applicable Rules and Regulations (continued)**
Will the engine or turbine be used to generate electricity to operate facilities authorized by a New Source Review Permit? ☐ YES ☐ NO	
If "YES," the engine or turbine does not qualify for this PBR and authorization must be obtained through a permit amendment.	
If the engine or turbine is used to generate electricity, will it be exclusively for on-site use at locations which cannot be connected to an electric grid? ☐ YES ☐ NO	
If "YES," describe why access to the electric grid is not available. *If "NO," the engine or turbine does not qualify for this PBR.*	
Has an Electric Generating Unit Standard Permit been issued for one of the following activities for which the engine or turbine will only be used to generate electricity? ☐ YES ☐ NO	
☐ Engines or turbines used to provide power for the operation of facilities registered under the Air Quality Standard Permit for Concrete Batch Plants. ☐ Engines or turbines satisfying the conditions for facilities permitted by rule under 30 TAC Chapter 106, Subchapter E (relating to Aggregate and Pavement). ☐ Engines or turbines used exclusively to provide power to electric pumps used for irrigating crops	
If "NO," the engine or turbine does not qualify for this PBR.	
If the engine or turbine is located in the Houston/Galveston nonattainment area, is the site subject to the Mass Emission Cap and Trade Program? ☐ YES ☐ NO	
Why or Why Not:	
Is the facility subject to 30 TAC Chapter 115? ☐ YES ☒ NO	
Why or Why Not: The facility is not located in an affected county under Chapter 115.	
Is the facility subject to 30 TAC Chapter 117? ☐ YES ☒ NO	
Why or Why Not: The facility is not located in an affected county under Chapter 117.	

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Other Applicable Rules and Regulations (continued)	
Is the facility subject to 40 CFR Part 60, NSPS Subpart D?	☐ YES ☒ NO
Why or Why Not: The facility is not a fossil-fuel-fired steam generator.	
Is the facility subject to 40 CFR Part 60, NSPS Subpart Da?	☐ YES ☒ NO
Why or Why Not: The facility is not an electric utility steam generating unit.	
Is the facility subject to 40 CFR Part 60, NSPS Subpart Db?	☐ YES ☒ NO
Why or Why Not: The facility is not an industrial-commercial-institutional steam generating unit.	
Is the facility subject to 40 CFR Part 60, NSPS Subpart Dc?	☐ YES ☒ NO
Why or Why Not: The facility is not an industrial-commercial-institutional steam generating unit.	
Is the facility subject to 40 CFR Part 60, NSPS Subpart GG?	☐ YES ☒ NO
Why or Why Not: The facility is not a stationary gas turbine.	
Is the facility subject to 40 CFR Part 63, MACT Subpart YYYY?	☐ YES ☒ NO
Why or Why Not: The facility is not a stationary combustion turbine.	
Is the facility subject to 40 CFR Part 63, MACT Subpart ZZZZ	☒ YES ☐ NO
Why or Why Not: The facility is a stationary internal combustion engine > 500 hp located at an area source of HAP.	
Is the facility subject to 40 CFR Part 63, MACT Subpart PPPPP?	☐ YES ☒ NO
Why or Why Not: The facility is not an engine test cell/stand.	

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(EPNs: X-PUMP-1, X-PUMP-2, X-PUMP-3)

Questions/Description and Response		
Will the engine or turbine be used as a replacement at an oil and gas site and does it meet all the requirements of the policy memo entitled, "Replacement of All Engine and Turbine Components for Oil and Gas Production?"		☐ YES ☒ NO
If "YES," registration is not required for like-kind replacements of engine or turbine components. *If "NO," please continue.*		
Rule	**Introduction**	
(1)	Is the engine or turbine rated less than 240 hp?	☐ YES ☒ NO
If "YES," then registration is not required, but the facility must comply with conditions (5) and (6) of this rule. *If "NO," then registration is required and the facility must be registered by submitting a completed Form PI-7 and Table 29 or Table 31, as applicable, within 10 days after construction begins.*		
Indicate the type of equipment (pick one): ☒ Engine ☐ Turbine		
If an engine, continue to the questions regarding "Engines." *If a turbine, skip to the questions regarding "Gas Turbines."*		
Rule	**Engines**	
(2)	Is the engine rated at 500 hp or greater?	☐ YES ☒ NO
If "NO," the engine is between 240 hp and 500 hp. The engine must be registered by submitting a completed Form PI-7 and a Table 29 within 10 days after construction begins and must comply with the conditions in §§ 106.512(5) and (6). Skip to the questions regarding § 106.512(4). *If "YES," in addition to registration, the engine must operate in compliance with the following nitrogen (NO_x) emission limit(s). Check the limit(s) applicable to this engine by answering the following:*		
(2)(A)(i)	The engine is a gas-fired, rich-burn engine and will not exceed 2.0 grams per horsepower hour (g/hp-hr) under all operating conditions.	☐ YES ☐ NO
Indicate grams per horsepower hour NO_x:_____ (g/hp-hr)		
(2)(A)(ii)	The engine is a spark-ignited, gas-fired, lean-burn engine or any compression-ignited, dual fuel-fired engine manufactured new after June 18, 1992, and will not exceed 2.0 g/hp-hr NO_x at manufacturer's rated full load and speed at all times; except, the engine will not exceed 5.0 g/hp-hr NO_x under reduced speed and 80% and 100% of full torque conditions.	☐ YES ☐ NO
Indicate grams per horsepower hour NO_x:_____ (g/hp-hr)		

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Questions/Description and Response		
Rule	**Engines (*continued*)**	
(2)(A)(iii)	The engine is any spark-ignited, lean-burn two-cycle or four-cycle engine or any compression-ignited, dual fuel-fired engine rated 825 hp or greater and manufactured between September 23, 1982 and June 18, 1992, and will not exceed 5.0 g/hp-hr NO_x under all operating conditions.	☐ YES ☐ NO
Indicate grams per horsepower hour NO_x: _____ g/hp-hr		
(2)(A)(iv)	The engine is any spark-ignited, gas-fired, lean-burn, four-cycle engine or compression-ignited, dual-fuel-fired engine that was manufactured before June 18, 1992, and is rated less than 825 hp, or was manufactured before September 23, 1982, and will not exceed 5.0 g/hp-hr NO_x at manufacturer's rated full load and speed at all times; except, the engine will not exceed 8.0 g/hp-hr NO_x under reduced speed and 80% and 100% of full torque conditions.	☐ YES ☐ NO
Indicate grams per horsepower hour NO_x: _____ g/hp-hr		
(2)(A)(v)	The engine is any spark-ignited, gas-fired, two-cycle, lean-burn engine that was manufactured before June 18, 1992, and is rated less than 825 hp, or was manufactured before September 23, 1982, and will not exceed 8.0 g/hp-hr NO_x under all operating conditions.	☐ YES ☐ NO
Indicate grams per horsepower hour NO_x: _____ g/hp-hr		
(2)(A)(vi)	The engine is any compression-ignited, liquid-fired engine and will not exceed 11.0 g/hp-hr NO_x under all operating conditions.	☐ YES ☐ NO
Indicate grams per horsepower hour NO_x: _____ g/hp-hr		
(2)(B)	Does the engine require an automatic air-fuel ratio controller to meet the NO_x limit(s) above?	☐ YES ☐ NO
(2)(B)	For spark-ignited gas-fired or compression-ignited dual fuel-fired engines, is the engine required to have an automatic air-fuel ratio controller under condition (2)(B) of the PBR?	☐ YES ☐ NO
(2)(C)	Are you aware of and accept responsibility for the record and testing requirements as specified in (2)(C) of the PBR?	☐ YES ☐ NO

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Questions/Description and Response		
Rule	**Gas Turbines**	
(3)	Is the turbine rated 500 hp or more?	☐ YES ☐ NO
If "NO," the turbine is between 240 hp and 500 hp. The engine only needs to be registered by submitting a completed Form PI-7 and a Table 31 within 10 days after construction begins. *If "YES," in addition to registration, the turbine must operate in compliance with the following emission limit(s) and must comply with the conditions in §§ 106.512(5)(6). Skip to questions regarding "Additional Requirements."*		
(3)(A)	Will the emissions of NO_x exceed 3.0 g/hp-hr for gas firing?	☐ YES ☐ NO
(3)(B)	Will the turbine meet all applicable NO_x and sulfur dioxide (or fuel sulfur) emission limitations, monitoring requirements, and reporting requirements of 40 CFR Part 60, NSPS Subpart GG?	☐ YES ☐ NO
Rule	**Additional Requirements**	
(4)	Is the engine or turbine rated less than 500 hp or used for temporary replacement purposes?	☒ YES ☐ NO
If "NO," continue to next question. *If "YES," the equipment does not have to meet the emission limits of §§ 106.512(2) and (3). However, the temporary replacement equipment can only remain in service for a maximum of 90 days.*		
(5)	What type of fuel will be used and will the fuel meet the requirements of the PBR?	☒ YES ☐ NO
Indicate the fuel(s) used. ☐ Natural gas ☐ Liquid Petroleum gas ☐ Field gas ☒ Liquid fuel		
(6)	Does the installation comply with the National Ambient Air Quality Standards (NAAQS)?	☒ YES ☐ NO
Indicate which method is used and attach the modeling report and/or calculations and diagrams to support the selected method. ☒ Modeling ☒ Stack height ☒ Facility emissions and property line distance		
(6)	Have you included a modeling report and/or calculations and diagrams to support the selected NAAQS compliance determination method?	☒ YES ☐ NO
Rule	**Other Applicable Rules and Regulations**	
For the following four questions, please refer to the Electric Generators under Permit by Rule policy memo from October 2006.		
Is the engine or turbine used to generate electricity?		☐ YES ☒ NO
If "NO," the following do not apply.		

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Questions/Description and Response	
Rule	**Other Applicable Rules and Regulations (continued)**
Will the engine or turbine be used to generate electricity to operate facilities authorized by a New Source Review Permit? ☐ YES ☐ NO	
If "YES," the engine or turbine does not qualify for this PBR and authorization must be obtained through a permit amendment.	
If the engine or turbine is used to generate electricity, will it be exclusively for on-site use at locations which cannot be connected to an electric grid? ☐ YES ☐ NO	
If "YES," describe why access to the electric grid is not available. *If "NO," the engine or turbine does not qualify for this PBR.*	
Has an Electric Generating Unit Standard Permit been issued for one of the following activities for which the engine or turbine will only be used to generate electricity? ☐ YES ☐ NO	
☐ Engines or turbines used to provide power for the operation of facilities registered under the Air Quality Standard Permit for Concrete Batch Plants. ☐ Engines or turbines satisfying the conditions for facilities permitted by rule under 30 TAC Chapter 106, Subchapter E (relating to Aggregate and Pavement). ☐ Engines or turbines used exclusively to provide power to electric pumps used for irrigating crops	
If "NO," the engine or turbine does not qualify for this PBR.	
If the engine or turbine is located in the Houston/Galveston nonattainment area, is the site subject to the Mass Emission Cap and Trade Program? ☐ YES ☐ NO	
Why or Why Not:	
Is the facility subject to 30 TAC Chapter 115? ☐ YES ☒ NO	
Why or Why Not: The facility is not located in an affected county under Chapter 115.	
Is the facility subject to 30 TAC Chapter 117? ☐ YES ☒ NO	
Why or Why Not: The facility is not located in an affected county under Chapter 117.	

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Other Applicable Rules and Regulations (continued)	
Is the facility subject to 40 CFR Part 60, NSPS Subpart D?	☐ YES ☒ NO
Why or Why Not: The facility is not a fossil-fuel-fired steam generator.	
Is the facility subject to 40 CFR Part 60, NSPS Subpart Da?	☐ YES ☒ NO
Why or Why Not: The facility is not an electric utility steam generating unit.	
Is the facility subject to 40 CFR Part 60, NSPS Subpart Db?	☐ YES ☒ NO
Why or Why Not: The facility is not an industrial-commercial-institutional steam generating unit.	
Is the facility subject to 40 CFR Part 60, NSPS Subpart Dc?	☐ YES ☒ NO
Why or Why Not: The facility is not an industrial-commercial-institutional steam generating unit.	
Is the facility subject to 40 CFR Part 60, NSPS Subpart GG?	☐ YES ☒ NO
Why or Why Not: The facility is not a stationary gas turbine.	
Is the facility subject to 40 CFR Part 63, MACT Subpart YYYY?	☐ YES ☒ NO
Why or Why Not: The facility is not a stationary combustion turbine.	
Is the facility subject to 40 CFR Part 63, MACT Subpart ZZZZ	☒ YES ☐ NO
Why or Why Not: The facility is a stationary internal combustion engine located at an area source of HAP constructed after June 12, 2006.	
Is the facility subject to 40 CFR Part 63, MACT Subpart PPPPP?	☐ YES ☒ NO
Why or Why Not: The facility is not an engine test cell/stand.	

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Record Keeping: In order to demonstrate compliance with the general and specific requirements of this PBR, sufficient records must be maintained to demonstrate that all requirements are met at all times. If the engine or turbine is rated greater than 500 horsepower, all records must be maintained as required by 30 TAC § 106.512(2)(C). The registrant should also become familiar with the additional record keeping requirements in 30 TAC § 106.8. The records must be made available immediately upon request to the commission or any air pollution control program having jurisdiction. If you have any questions about the type of records that should be maintained or testing requirements, contact the Air Program in the TCEQ Regional Office for the region in which the site is located.

Recommended Calculation Method: In order to demonstrate compliance with this PBR, emission factors for each air contaminant from the EPA Compilation of Air Pollutant Emission Factors (AP-42), Fifth Edition, Volume 1, Section 3.1: Stationary Gas Turbines for Electricity Generation at: www.epa.gov/ttn/chief/ap42/index.html should be used, including, the specific air contaminant's emission limit listed on the table below.

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TCEQ Exemption 30 TAC §106.512 General Guidelines										
NO_X g/hp-hr Emission Limits										
Date Original Manufacture		N/A	NA	Before 09/23/82		09/23/82 to 06/18/92		After 06/18/92		
Mfg. Rated Horsepower		X < 240	240< X<500	X >500*		500 ≤ X ≤824*		X >825	X >500*	
Operating Speed		N/A	N/A	Full	Reduced	Full	Reduced	N/A	Full	Reduced
Operating Torque		N/A	N/A	N/A	80-100%	N/A	80-100%	N/A	N/A	80-100%
Ignition Type		*Engine Combustion Design*								
Spark	Rich Burn ††	N/A	N/A	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Spark	Lean Burn**	N/A	N/A	5.0	8.0	5.0	8.0	5.0	2.0	5.0
Spark	2-Cycle	N/A	N/A	8.0	8.0	8.0	8.0	5.0	2.0	5.0
Compression	Dual Fuel	N/A	N/A	5.0	8.0	5.0	8.0	5.0	2.0	5.0
Compression	Liquid Fuel	N/A	N/A	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Turbines†		NA	NA	3.0	3.0	3.0	3.0	3.0	3.0	3.0
PI-7 Registration		No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Emission Testing		No	No	Biennial	Biennial	Biennial	Biennial	Biennial	Biennial	Biennial

Notes:

* Lower emission rates apply to lean-burn engine operating: Full Speed & Any Torque or Any Speed & <80% or >100% Torque
† Turbine emissions are also regulated by EPA NSPS Standards for NO_X and SO_2
** Lean Burn > 4% exhaust 0_2
†† Rich Burn = ≤ 4% exhaust 0_2

Appendix A

Emission Calculations for Registered Sources

Table A-1
Fugitive Emissions - GEEx Test Stand
Blue Origin Texas, LLC - West Texas Launch Site
November 2019

EPN:	FUG-GEEx
Name:	GEEx Fugitive Emissions

Component Type	Stream Type	Service Type	Emission Factors [1] lb/hr/component	Component Count	Mass Flow Rates		VOC[2]	VOC Emission Rates	
			SOCMI Avg		lb/hr	tpy	(wt%)	lb/hr	tpy
Flanges/ Connectors	Gas/Vapor	Helium[3]	0.0039	581	2.27	9.92	0%	--	--
	Gas/Vapor	Propane	0.0039	106	0.41	1.81	100%	0.41	1.81
	Gas/Vapor	Natural Gas	0.0039	1,024	3.99	17.49	10%	0.40	1.75
	Gas/Vapor	CO_2[4]	0.0039	32	0.12	0.55	0%	--	--
	Gas/Vapor	Hydrogen[3,4]	0.0039	1,777	6.93	30.35	0%	--	--
	Gas/Vapor	Nitrogen[3,4]	0.0039	1,939	7.56	33.12	0%	--	--
	Gas/Vapor	Oxygen[3,4]	0.0039	1,059	4.13	18.09	0%	--	--
	Light Liquid	Water[3,4]	0.0005	908	0.45	1.99	0%	--	--
	Light Liquid	Hydraulic Fluid (FR282)	0.0005	363	0.18	0.79	100%	0.18	0.79
	Light Liquid	Isopar	0.0005	39	0.02	0.09	100%	0.02	0.09
	Light Liquid	Diesel	0.0005	40	0.02	0.09	100%	0.02	0.09
Totals				**7,868**	**26.10**	**114.30**		**1.03**	**4.53**

Notes:

1. Emission Factors based on TCEQ's Air Permit Technical Guidance Package for Chemical Sources: Fugitive Guidance, Uncontrolled SOCMI Average Fugitive Emission Factors, dated June 2018.

2. VOC content of service types is based on expected worst case. Natural gas is based on typical pipeline quality gas with non-methane, non-ethane hydrocarbons = 6.4 mol%

3. Emissions from components in helium, nitrogen, and oxygen service do not require quantification per TCEQ's Air Permit Technical Guidance Package for Chemical Sources: Fugitive Guidance, pg. 6 of 33 (Revised June 2018). Components containing only noble gases or are not considered an air contaminant do not need to be quantified.

4. The compounds associated with these service types are exempt from the emission limits of §106.4 per paragraph (a)(1)(E)(i)-(ii).

Table A-2
Fugitive Emissions - XEEx Test Stand
Blue Origin Texas, LLC - West Texas Launch Site
November 2019

EPN:	FUG-XEEx
Name:	XEEx Fugitive Emissions

Component Type	Stream Type	Service Type	Emission Factors [1] lb/hr/component	Component Count	Mass Flow Rates		VOC[2]	VOC Emission Rates	
			SOCMI Avg		lb/hr	tpy	(wt%)	lb/hr	tpy
Flanges/ Connectors	Gas/Vapor	Helium[3]	0.0039	55	0.21	0.94	0%	--	--
	Gas/Vapor	Propane	0.0039	28	0.11	0.47	100%	0.11	0.47
	Gas/Vapor	Natural Gas	0.0039	176	0.69	3.01	10%	0.07	0.30
	Gas/Vapor	Hydrogen[3,4]	0.0039	110	0.43	1.88	0%	--	--
	Gas/Vapor	Nitrogen[3,4]	0.0039	1,234	4.81	21.08	0%	--	--
	Gas/Vapor	Oxygen[3,4]	0.0039	583	2.27	9.96	0%	--	--
	Light Liquid	Water[3,4]	0.0005	266	0.13	0.58	0%	--	--
	Light Liquid	Diesel	0.0005	28	0.01	0.06	100%	0.01	0.06
Totals				**2,479**	**8.67**	**37.98**		**0.19**	**0.83**

Notes:

1. Emission Factors based on TCEQ's Air Permit Technical Guidance Package for Chemical Sources: Fugitive Guidance, Uncontrolled SOCMI Average Fugitive Emission Factors, dated June 2018.

2. VOC content of service types is based on expected worst case. Natural gas is based on typical pipeline quality gas with non-methane, non-ethane hydrocarbons = 6.4 mol%

3. Emissions from components in helium, nitrogen, and oxygen service do not require quantification per TCEQ's Air Permit Technical Guidance Package for Chemical Sources: Fugitive Guidance, pg. 6 of 33 (Revised June 2018). Components containing only noble gases or are not considered an air contaminant do not need to be quantified.

4. The compounds associated with these service types are exempt from the emission limits of §106.4 per paragraph (a)(1)(E)(i)-(ii).

Table A-3
Fugitive Emissions - Launch Pad
Blue Origin Texas, LLC - West Texas Launch Site
November 2019

EPN:	FUG-LPAD
Name:	Launch Pad Fugitive Emissions

Component Type	Stream Type	Service Type	Emission Factors [1] lb/hr/component	Component Count	Mass Flow Rates		VOC[2]	VOC Emission Rates	
			SOCMI Avg		lb/hr	tpy	(wt%)	lb/hr	tpy
Flanges/ Connectors	Gas/Vapor	Helium[3]	0.0039	28	0.11	0.47	0%	--	--
	Gas/Vapor	Natural Gas	0.0039	176	0.69	3.01	10%	0.07	0.30
	Gas/Vapor	Hydrogen[3,4]	0.0039	110	0.43	1.88	0%	--	--
	Gas/Vapor	Nitrogen[3,4]	0.0039	1,234	4.81	21.08	0%	--	--
	Gas/Vapor	Oxygen[3,4]	0.0039	583	2.27	9.96	0%	--	--
	Light Liquid	Water[3,4]	0.0005	266	0.13	0.58	0%	--	--
	Light Liquid	H_2O_2	0.0005	55	0.03	0.12	0%	--	--
Totals				**2,452**	**8.47**	**37.10**		**0.07**	**0.30**

Notes:

1. Emission Factors based on TCEQ's Air Permit Technical Guidance Package for Chemical Sources: Fugitive Guidance, Uncontrolled SOCMI Average Fugitive Emission Factors, dated June 2018.

2. VOC content of service types is based on expected worst case. Natural gas is based on typical pipeline quality gas with non-methane, non-ethane hydrocarbons = 6.4 mol%

3. Emissions from components in helium, nitrogen, and oxygen service do not require quantification per TCEQ's Air Permit Technical Guidance Package for Chemical Sources: Fugitive Guidance, pg. 6 of 33 (Revised June 2018). Components containing only noble gases or are not considered an air contaminant do not need to be quantified.

4. The compounds associated with these service types are exempt from the emission limits of §106.4 per paragraph (a)(1)(E)(i)-(ii).

Table A-4
Rocket Engine Test Stands
Blue Origin Texas, LLC - West Texas Launch Site
November 2019

Parameter	Units	Test Stand 1 (GEEx Main)	Test Stand 3 (XEEx)
EPN:		**TEST STAND 1**	**TEST STAND 3**
Engine Test Data			
Propellant Flow Rate (LNG)	lb/test	-	88,800
Propellant Flow Rate (Liquid H_2)	lb/test	11,360	-
Propellant Flow Rate (Liquid O_2)	lb/test	50,000	284,400
Propellant Flow Rate (Liquid N_2)	lb/test	1,500	
Coolant Usage (Gaseous He)	lb/test	75	
Test Duration	days/year	<180 consecutive	<180 consecutive
Max Duration for Each Test	Seconds	200	200
Test Frequency	tests/year	150	150
Component Test Data			
Test A Propellant Flow Rate (LNG)	lb/sec	--	6.70
Test A Propellant Flow Rate (Liquid O_2)	lb/sec	--	426.40
Test B Propellant Flow Rate (LNG)	lb/sec	--	22.20
Test B Propellant Flow Rate (Liquid O_2)	lb/sec	--	1,421.20
Component Test Duration	days/year	--	<180 consecutive
Test A Max Duration per Component	Seconds	--	30
Test B Max Duration per Component	Seconds	--	200
Component Test Frequency	tests/year/type	--	100

Engine Testing Emissions

Test Stand EPN:	TEST STAND 1		TEST STAND 3	
Pollutant/Component	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
NO_x	--	--	7.53	0.57
CO	--	--	218.28	16.38
CO_2	--	--	281,390.80	21,104.16
H	0.26	0.04	1.68	0.13
H_2	3,940.40	591.06	10.82	0.81
O	--	--	260.88	19.57
OH	0.36	0.05	1,071.03	83.34
H_2O	57,398.20	8,609.73	233,100.60	17,482.44
He	75.00	5.63	--	--
LNG (VOC)	--	--	15.11	2.44

Table A-4
Rocket Engine Test Stands
Blue Origin Texas, LLC - West Texas Launch Site
November 2019

Component Testing Emissions

Test Stand EPN:	TEST STAND 3		
Test Type:	Component Test A	Component Test B	Combined Component Tests
Pollutant/Component	lb/hr	lb/hr	tpy
CO_2	12,669.70	12,124.00	633.49
H_2O	10,558.80	10,104.00	527.94
O_2	278,452	266,452.00	13,922.60

Notes:
1. Emissions for component testing and engine testing do not occur simultaneously. And, component test types A and B do not occur concurrently.
2. Emissions are based on calculations from NASA and industry standard computer codes.
3. The testing duration and quantities are for emission estimation purposes only and are not to be considered enforceable representations. Blue Origin with manage activities to demonstrate ongoing compliance with the PBR emission limits.
4. LNG emissions during engine testing at TEST STAND 3 are based on venting 6,500 scf/day of LNG.
LNG composition is conservatively based on a Typical LNG sample (5.19 wt% propane and 94.81 wt% methane).

Table A-5
LNG Storage Tanks - Vented Emissions
Blue Origin Texas, LLC - West Texas Launch Site
November 2019

EPN:	TEST STAND 3
Name:	LNG Vented During Engine Testing

Basis		
Hourly Venting Volume During Engine Testing [1]	6,500	scf/day
Annual Events	150	tests/yr
Hourly Events	1	tests/hr
Total Annual Vented Volume	2,100,000	scf/yr
MW of Gas [2]	17.00	lb/lb-mol
Ideal Gas Law	379.48	scf/lb-mol

Emissions Calculations

Pollutant	Pollutant Wt.% [2]	Emission Rates	
		lb/hr	tpy
Total Emissions	100.0%	291.25	47.05
Total VOC	5.2%	15.11	2.44

Notes
1. Vented volume is during engine testing.
2. LNG composition is conservatively based on a Typical LNG sample (5.19 wt% propane and 94.81 wt% methane).

Table A-6
LNG Storage Tanks - Vented Emissions
Blue Origin Texas, LLC - West Texas Launch Site
November 2019

EPN:	LNG-VENT
Name:	LNG Storage Tank Vent

Basis		
Hourly Venting Volume [1]	2,270	scf/hr
Annual Events	566	event/yr
Hourly Events	1	event/hr
Total Annual Vented Volume	1,283,705	scf/yr
MW of Gas [2]	17.00	lb/lb-mol
Ideal Gas Law	379.48	scf/lb-mol

Emissions Calculations

Pollutant	Pollutant Wt.% [2]	Emission Rates	
		lb/hr	tpy
Total Emissions	100.0%	101.71	28.76
Total VOC	5.2%	5.28	1.49

Notes
1. Vented volume is during non-test days.
2. LNG composition is conservatively based on a Typical LNG sample (5.19 wt% propane and 94.81 wt% methane).

Table A-7
Engine Emissions
Blue Origin Texas, LLC - West Texas Launch Site
November 2019

Engine Data:

Engine ID No.	EPN >>	G-PUMP-1, 2, 3, 4	X-PUMP-1, 2, 3	GENSET	PORTGEN
Location/Identifier		GEEx Test Stand 1 - Water Pump Engine	XEEx Test Stand 3 - Water Pump Engine	Emergency Generator	Portable Generator
Number of engines		4	3	1	1
Engine manufacturer		John Deere	John Deere	Caterpillar	Wagner Caterpillar
Engine model number		6135HF485	6090HF485	3508B TA	XQ25P2
Serial Number		TBD	RG6090L118084; RG6090L118128; RG6090L119490	CNB01688	NPF01414
Manufacture Date		2011 or later	Dec 2013; Apr 2014	December 4, 2005	2002
Application		Water Pump	Water Pump	Emergency/Standby	Emergency/Standby
Engine power rating	kW	410	242	1,000	75
Engine power rating	HP	550	325	1341	101
Fuel Consumption	Btu/hp-hr	7,527	6,659	7,114	7,114
Hours of Operations	hours/yr	4,000	8,760	100	100
Engine Type		Diesel	Diesel	Diesel	Diesel
Discharge Parameters:					
Stack Height	ft	7.67	6.83	6.83	6.83
Stack Diameter	ft	0.5	0.417	0.417	0.417
Stage Temperature	°F	907	728	728	728
Exit Velocity	ft/sec	246	198	198	198

Emission Rates:

	NOx		CO		SO_2		PM		VOC		HAPs		PBR Authorization	Status
EPN	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy		
G-PUMP-1	3.46	6.91	3.15	6.31	0.01	0.01	0.18	0.36	0.18	0.36	0.01	0.02	§106.512	Existing
G-PUMP-2	3.46	6.91	3.15	6.31	0.01	0.01	0.18	0.36	0.18	0.36	0.01	0.02	§106.512	Existing
G-PUMP-3	3.46	6.91	3.15	6.31	0.01	0.01	0.18	0.36	0.18	0.36	0.01	0.02	§106.512	Existing
G-PUMP-4	3.46	6.91	3.15	6.31	0.01	0.01	0.18	0.36	0.18	0.36	0.01	0.02	§106.512	Added
X-PUMP-1	2.04	8.94	1.86	8.16	0.00	0.02	0.11	0.47	0.11	0.47	0.00	0.02	§106.512	Existing
X-PUMP-2	2.04	8.94	1.86	8.16	0.00	0.02	0.11	0.47	0.11	0.47	0.00	0.02	§106.512	Existing
X-PUMP-3	2.04	8.94	1.86	8.16	0.00	0.02	0.11	0.47	0.11	0.47	0.00	0.02	§106.512	Existing
GENSET	19.57	0.98	0.08	0.00	0.02	7.63E-04	0.01	0.00	0.44	0.02	0.00	0.00	§106.511	§106.511
PORTGEN	1.47	0.07	0.08	0.00	1.14E-03	5.72E-05	0.01	0.00	0.44	0.02	0.00	0.00	§106.511	§106.511
Total Emissions		**55.53**		**49.71**		**0.10**		**2.85**		**2.91**		**0.13**		

Table A-7
Engine Emissions
Blue Origin Texas, LLC - West Texas Launch Site
November 2019

Emission Factors:

Pollutant	Emission Factor g/kw-hr	Emission Factor g/hp-hr	Emission Factor lb/MMBtu	Source
EPN: PUMP-1,2,3,4,5,6				
NMHC + NOX	4.0	3.00	--	EPA Tier 3 Nonroad Diesel Engine Limit
NOX	3.8	2.85	--	See Note (1)
VOC	0.2	0.15	--	See Note (1)
CO	3.5	2.60	--	EPA Tier 3 Nonroad Diesel Engine Limit
SO_2	--		0.0016	Sulfur content of 15 ppmw (ULSD)
PM	0.2	0.15	--	EPA Tier 3 Nonroad Diesel Engine Limit
HAPs (2)	--	--	0.00211	AP42, Table 3.3-2
EPN: GENSET,PORTGEN				
NOx	--	6.62	--	Vendor Data
VOC	--	0.31	--	Vendor Data
CO	--	0.35	--	Vendor Data
SO_2	--		0.0016	Sulfur content of 15 ppmw (ULSD)
PM	--	0.064	--	Vendor Data
HAPs (2)	--	--	0.00211	AP42, Table 3.3-2

Notes:

(1) as per Policy: *CARB Emission Factors for CI Diesel Engine - Percent HC in Relation to NMHC + NOX, June 28, 2004* , when the non-methane hydrocarbon (NMHC) and NOX emission factor is combined, assume a breakdown of 5% and 95%, respectively

(2) HAPs = Formaldehyde + Benzene

Calculation example:

NO_x lb/hr:

2.85 g/hp-hr * 550 HP * 0.0022 lb/g = 3.45 lb/hr

NO_x tpy:

3.45 lb/hr * 8760 hr/yr * 1 ton/2000 lb = 6.90 tpy

Conversions:

1 hp-hr = 0.7457 kw-hr

1 lb = 453.59 g

Fuel Data:

Fuel Type:	Low sulfur diesel	
Heat Value (HHV)	19,300	Btu/lb
Heat Value (LHV)	18,700	Btu/lb
Sulfur Content	<10	grains/100 scf

Compliance Demonstration with NAAQS per §106.512(6):

Annual NO_X Limit		
Distance to nearest property line (D):	500	ft
NO_x tpy Limit: (0.3125 X D) =	156.25	tpy
Total NO_x from PBR 106.512 engines:	54.48	tpy
Meets annual NO_x limit?	**Yes**	
1-hour NO_2 NAAQS (188 µg/m^3)		
Generic Modeling Result(3) (>500 hp)	26	µg/m^3/(lb/hr)
Generic Modeling Result(4) (250 < hp ≤ 500)	34	µg/m^3/(lb/hr)
Total NO_x from PBR 106.512 engines:	19.95	lb/hr
NO_2 to NO_x Ratio, 106.512(6)(A), Fig.1	0.325	
Calculated 1-hour NO_2 Concentration:	184.75	µg/m^3
Concentration below the NAAQS limit?	**Yes**	

(3) Value from Table 5C of 30 TAC 106.352(m), based on an 8 ft stack height and 500 ft to nearest property line.

(4) Value from Table 5B of 30 TAC 106.352(m), based on an 8 ft stack height and 1,300 ft to nearest property line.

Table A-8
Fixed Roof Tank Emissions
Blue Origin Texas, LLC - West Texas Launch Site
November 2019

	Parameter Name & Variable		Units	Notes			
	EPN				**H202TK-1**	**H202TK-2**	**H202TK-3**
Tank Data	Material				Hydrogen Peroxide	Hydrogen Peroxide	Hydrogen Peroxide
	Material Type				Organic	Organic	Organic
	Tank Type				HFR	HFR	HFR
	Number of Tanks				1	1	1
	Continuous Level Tank		(Yes / No)		No	No	No
	Throughput	Q	bbl/yr		249	249	249
	Height	H_S	ft		22.00	22.00	22.00
	Average Liquid Height	H_L	ft	H_S / 2	11.00	11.00	11.00
	Diameter	D	ft		9.00	9.00	9.00
	Effective Diameter (for horizontal tanks)	De	ft		15.88	15.88	15.88
	Tank Liquid Volume	V_{LX}	ft3	(D/2)^2 * pi * H_S	1,400	1,400	1,400
	Tank Liquid Volume	T_{CG}	gal	VLX * 7.481	10,470	10,470	10,470
	Turnovers	N		5.614*Q / V_{LX}	1.00	1.00	1.00
	Maximum Filling Rate	FRm	bbl/hr		30	30	30
	Roof Slope	S_R	ft/ft		0.0625	0.0625	0.0625
	Paint Color				Light Grey	Light Grey	Light Grey
	Heated/Hot Product				No	No	No
	Paint Solar Absorptance	α	-		0.54	0.54	0.54
	Roof Outage	H_{RO}	ft	1/3*SR*De/2 for cone, or 0.137*De/2 for dome	0.17	0.17	0.17
	Vapor Space Outage	H_{VO}	ft	H_s-H_L+H_{RO} or D/2	4.5	4.5	4.5
	Breather Vent Pressure				0.03	0.03	0.03
	Breather Vent Vacuum				-0.03	-0.03	-0.03
Climatological Data	Month		-		Annual	Annual	Annual
	Daily Total Solar Insolation Factor	I	Btu/ft^2-d		1618.21	1618.21	1618.21
	Daily Maximum Ambient Temperature	T_{AX}	°F		73.45	73.45	73.45
	Daily Minimum Ambient Temperature	T_{AN}	°F		46.82	46.82	46.82
	Daily Ambient Temp. Change	DT_A	°F	T_{AX} - T_{AN}	26.633	26.633	26.633
	Daily Avg. Ambient Temperature	T_{AA}	°F	((T_{AX}+459.67)+(T_{AN}+459.67))/2	60.1	60.1	60.1
	Bulk Temperature Source				Ambient	Ambient	Ambient
	Liquid Bulk Temperature	T_b	°F	T_{AA} + 6α -1 or Input	62.4	62.4	62.4
	Insulated?			0.44T_{AA}+0.56$_{Tb}$+0.0079(α*I) if not insulated; otherwise	No	No	No
	Daily Avg. Liquid Surface Temp.	T_{LA}	°F	T_{LA} based on measurements from tank	68.3	68.3	68.3
	Daily Max. Avg. Liq. Surf. Temp.	**T_{LX}**	°F	T_{LA}+0.25*DT_V	79.2	79.2	79.2
	Daily Min. Avg. Liq. Surf. Temp.	T_{LN}	°F	T_{LA}-0.25*DT_V	57.4	57.4	57.4
	Daily Vapor Temperature Range	DT_V	°R	0.72*DT_A+0.028*α*I (zero for underground tanks)	43.64	43.64	43.64
Product Data	Liquid Molecular Wt.	M_L	lb/lb-mole		34.01	34.01	34.01
	Vapor Molecular Wt.	M_V	lb/lb-mole		34.01	34.01	34.01
	Vapor Pressure Method		-		TVPs	TVPs	TVPs
	Vapor Pressure @ 40°F		psia		0.000	0.000	0.000
	Vapor Pressure @ 50°F		psia		0.025	0.025	0.025
	Vapor Pressure @ 60°F		psia		0.036	0.036	0.036
	Vapor Pressure @ 70°F		psia		0.052	0.052	0.052
	Vapor Pressure @ 80°F		psia		0.073	0.073	0.073
	Vapor Pressure @ 90°F		psia		0.109	0.109	0.109
	Vapor Pressure @ 100°F		psia		0.145	0.145	0.145
	True Vapor Pressure @ T_{LA}	P_{VA}	psia @ **T_{LA}**		0.04949	0.04949	0.04949
	True Vapor Pressure @ T_{LX}	P_{VX}	psia @ **T_{LX}**		0.07090	0.07090	0.07090
	True Vapor Pressure @ T_{LN}	P_{VN}	psia @ **T_{LN}**		0.03322	0.03322	0.03322
	Daily Vapor Pressure Range	dPv	psia	P_{VX} - P_{VX}	0.038	0.038	0.038
	Vapor Pressure Function	P*	dimensionless	P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^0.5)^2	0.00191	0.00191	0.00191
Annual or Monthly Emissions	Vapor Space Expansion Factor	K_E		0.0018DT_V or (DT_V/T_{LA}) + (DP_V - DP_B)/(P_A-P_{VA}))	0.079	0.079	0.079
	Vented Vapor Saturation Factor	K_S		1/(1 + 0.053 * P_{VA} * H_{VO})	0.99	0.99	0.99
	Turnover Factor	K_N		turnovers < 36 = 1, turnovers > 36 = (180 + N)/6N	1.00	1.00	1.00
	Working Loss Product Factor	K_P		0.75 for crude oils, 1.0 all other organic liquids	1.00	1.00	1.00
	Vapor Space Volume	V_V	ft3	pi * (D/2)^2 * H_{VO}	891.45	891.45	891.45
	Vapor Density	Wv	lb/ft3	(M_V * P_{VA}) / (10.731*T_{LA})	0.00030	0.00030	0.00030
	Standing Losses	L_S	lb/yr	Number of Days * V_V * W_V * K_E * K_S	7.5	7.5	7.5
	Working Losses	L_W	lb/yr	0.0010 * M_V * P_{VA} * Q * K_N * K_P	0.4	0.4	0.4
	Total Losses	L_T	lb/yr	L_S + L_W	7.9	7.9	7.9
	Annual Emission Rate		tpy	L_T / 2000	0.0040	0.0040	0.0040
	Control Eff.	CE	%		0	0	0
	Annual Emission Rate		**tpy**		**3.96E-03**	**3.96E-03**	**3.96E-03**
Maximum Short-Term Emissions	Month		-		July	July	July
	Daily Total Solar Insolation Factor	I	Btu/ft^2-d		2205.34	2205.34	2205.34
	Daily Maximum Ambient Temperature	T_{AX}	°F		91.90	91.90	91.90
	Daily Minimum Ambient Temperature	T_{AN}	°F		68.00	68.00	68.00
	Daily Ambient Temp. Change	DT_A	°F	T_{AX} - T_{AN}	23.90	23.90	23.90
	Daily Avg. Ambient Temperature	T_{AA}	°F	((T_{AX}+459.67)+(T_{AN}+459.67))/2	79.95	79.95	79.95
	Max Liquid Bulk Temperature	T_b	°F	T_{AA} + 6α -1 or Input	82.2	82.2	82.2
	Insulated?			0.44T_{AA}+0.56$_{Tb}$+0.0079(α*I) if not insulated; otherwise	No	No	No
	Daily Avg. Liquid Surface Temp.	T_{LA}	°F	T_{LA} based on measurements from tank	90.61	90.61	90.61
	Daily Max. Avg. Liq. Surf. Temp.	**T_{LX}**	°F	T_{LA}+0.25*DT_V	103.25	103.25	103.25
	Daily Vapor Temperature Range	DT_V	°R	0.72*DT_A+0.028*α*I	50.55	50.55	50.55
	True Vapor Pressure @ T_{LX}	P_{VX}	psia @ **T_{LX}**		0.16	0.16	0.16
	Max. Emission Rate	**L_{MAX}**	**lb/hr**	**(M_V* P_{VA}) / (R * T) * FR_M**	**0.15**	**0.15**	**0.15**

Notes:

1. Annual emission rate calculations taken from AP-42 5th Ed., Section 7.
2. Calculated using TCEQ equation from Storage Tank Guidance Document.
3. The hydrogen peroxide tanks are not operated simultaneously.

Appendix B

Emission Calculations for PBR Claims

Table B-1
Heater Emissions
Blue Origin Texas, LLC - West Texas Launch Site
November 2019

EPN:	HTR-01
Name:	Water Maze Heater

Basis		
Fuel Type:	Natural Gas	
Total Heaters:	1	
Heating Value:	1,020	btu/scf
Standard Volume:	379	scf/lbmol
Fuel Gas F-Factor:	8,710	dscf/MMbtu
Max Firing Rate:	0.39	MMbtu/hr
Annual Operation:	8,760	hrs/yr
H2S in Natural Gas:	0.25	gr H2S / 100 scf

Heater Emission Rates

Pollutant	Emission Factor		Emission Rates	
			lb/hr	tpy
NOX	lb/MMScf	100	0.04	0.17
CO	lb/MMScf	84	0.03	0.14
$PM/PM_{10}/PM_{2.5}$	lb/MMScf	7.6	0.00	0.01
VOC	lb/MMScf	5.5	0.00	0.01
SO2	lb/MMScf	0.67	0.00	0.00

NOTES:

1. NOx, CO, PM, and VOC emissions are based on emission factors from AP-42, Section 1.4 - Natural Gas Combustion.
2. SO2 emissions were calculated based on 0.25 gr H2S/100 scf for nominal pipeline quality natural gas.

Table B-2
Welding Emissions
Blue Origin Texas, LLC - West Texas Launch Site
November 2019

Emission Rates

Parameter	Units	WELD1
Units	-	1
Usage Rate	hr/yr	20
Total Mass Consumed	lb/yr	10
Emission Factor (Bar/Wire)	%, lb/lb	3.5%
PM Emission Rates	lb/hr	0.02
	tpy	1.75E-04

NOTES:

1. Emission factors developed by American Welding Society (AWS) from the report:
Guide For Estimating Welding Emissions for EPA and Ventilation Permit Reporting AWS F1.6:2003.

2. Total Mass Consumed and Usage Rate obtained from Contractors.

Table B-3
Fixed Roof Tank Emissions
Blue Origin Texas, LLC - West Texas Launch Site
November 2019

	Parameter Name & Variable		Units	Notes			
	FIN				**DIESELTK-1**	**DIESELTK-2**	**DIESELTK-3**
	EPN				**DIESELTK-1**	**DIESELTK-2**	**DIESELTK-3**
Tank Data	Material				Diesel (Clear)	Diesel (Dyed)	Diesel (Dyed)
	Material Type				Petroleum	Petroleum	Petroleum
	Tank Type				HFR	HFR	HFR
	Number of Tanks				1	1	1
	Continuous Level Tank		(Yes / No)		No	No	No
	Throughput	Q	bbl/yr		14	95	95
	Height	H_S	ft		11.08	12.33	12.13
	Average Liquid Height	H_L	ft	H_S / 2	5.54	6.17	6.06
	Diameter	D	ft		3.92	3.75	3.83
	Effective Diameter (for horizontal tanks)	De	ft		7.44	7.68	7.69
	Tank Liquid Volume	V_{LX}	ft3	(D/2)^2 * pi * H_S	134	136	140
	Tank Liquid Volume	T_{CG}	gal	VLX * 7.481	999	1,019	1,047
	Turnovers	N		5.614*Q / V_{LX}	0.60	3.93	3.82
	Maximum Filling Rate	FRm	bbl/hr		24	24	25
	Roof Slope	S_R	ft/ft		0.0625	0.0625	0.0625
	Paint Color				Light Grey	Light Grey	Light Grey
	Heated/Hot Product				No	No	No
	Paint Solar Absorptance	α	-		0.54	0.54	0.54
	Roof Outage	H_{RO}	ft	1/3*SR*De/2 for cone, or 0.137*De/2 for dome	0.08	0.08	0.08
	Vapor Space Outage	H_{VO}	ft	H_s-H_L+H_{RO} or D/2	2.0	1.9	1.9
	Breather Vent Pressure				0.03	0.03	0.03
	Breather Vent Vacuum				-0.03	-0.03	-0.03
Climatological Data	Month		-		Annual	Annual	Annual
	Daily Total Solar Insolation Factor	I	Btu/ft^2-d		1618.21	1618.21	1618.21
	Daily Maximum Ambient Temperature	T_{AX}	°F		73.45	73.45	73.45
	Daily Minimum Ambient Temperature	T_{AN}	°F		46.82	46.82	46.82
	Daily Ambient Temp. Change	DT_A	°F	T_{AX} - T_{AN}	26.633	26.633	26.633
	Daily Avg. Ambient Temperature	T_{AA}	°F	((T_{AX}+459.67)+(T_{AN}+459.67))/2	60.1	60.1	60.1
	Bulk Temperature Source				Ambient	Ambient	Ambient
	Liquid Bulk Temperature	T_b	°F	T_{AA} + 6α -1 or Input	62.4	62.4	62.4
	Insulated?			0.44T_{AA}+0.56$_{Tb}$+0.0079(α*I) if not insulated;	No	No	No
	Daily Avg. Liquid Surface Temp.	T_{LA}	°F	otherwise T_{LA} based on measurements from tank	68.3	68.3	68.3
	Daily Max. Avg. Liq. Surf. Temp.	**T_{LX}**	°F	T_{LA}+0.25*DT_V	79.2	79.2	79.2
	Daily Min. Avg. Liq. Surf. Temp.	T_{LN}	°F	T_{LA}-0.25*DT_V	57.4	57.4	57.4
	Daily Vapor Temperature Range	DT_V	°R	0.72*DT_A+0.028*α*I (zero for underground tanks)	43.64	43.64	43.64
Product Data	Liquid Molecular Wt.	M_L	lb/lb-mole		188.00	188.00	188.00
	Vapor Molecular Wt.	M_V	lb/lb-mole		130.00	130.00	130.00
	Vapor Pressure Method		-		A&B Constant	A&B Constant	A&B Constant
	Reid Vapor Pressure	RVP	psi		NA	NA	NA
	Slope	Sl	°F/vol %		NA	NA	NA
	VP Constant A	A	dimensionless		12.10	12.10	12.10
	VP Constant B	B	°C		8907.00	8907.00	8907.00
	VP Constant C	C	°C		NA	NA	NA
	True Vapor Pressure @ T_{LA}	P_{VA}	psia @ **T_{LA}**		0.00848	0.00848	0.00848
	True Vapor Pressure @ T_{LX}	P_{VX}	psia @ **T_{LX}**		0.01194	0.01194	0.01194
	True Vapor Pressure @ T_{LN}	P_{VN}	psia @ **T_{LN}**		0.00594	0.00594	0.00594
	Daily Vapor Pressure Range	dPv	psia	P_{VX} - P_{VX}	0.006	0.006	0.006
	Vapor Pressure Function	P*	dimensionless	P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^0.5)^2	0.00032	0.00032	0.00032
Annual or Monthly Emissions	Vapor Space Expansion Factor	K_E		0.0018DT_V or (DT_V/T_{LA}) + (DP_V - DP_B)/(P_A-P_{VA}))	0.079	0.079	0.079
	Vented Vapor Saturation Factor	K_S		1/(1 + 0.053 * P_{VA} * H_{VO})	1.00	1.00	1.00
	Turnover Factor	K_N		turnovers < 36 = 1, turnovers > 36 = (180 + N)/6N	1.00	1.00	1.00
	Working Loss Product Factor	K_P		0.75 for crude oils, 1.0 all other organic liquids	1.00	1.00	1.00
	Vapor Space Volume	V_V	ft3	pi * (D/2)^2 * H_{VO}	85.05	86.76	89.13
	Vapor Density	Wv	lb/ft3	(M_V * P_{VA}) / (10.731*T_{LA})	0.00019	0.00019	0.00019
	Standing Losses	L_S	lb/yr	Number of Days * V_V * W_V * K_E * K_S	0.5	0.5	0.5
	Working Losses	L_W	lb/yr	0.0010 * M_V * P_{VA} * Q * K_N * K_P	0.0	0.1	0.1
	Total Losses	L_T	lb/yr	L_S + L_W	0.5	0.6	0.6
	Annual Emission Rate		tpy	L_T / 2000	0.0002	0.0003	0.0003
	Control Eff.	CE	%		0	0	0
	Annual Emission Rate		**tpy**		**2.45E-04**	**2.94E-04**	**3.01E-04**
Maximum Short-Term Emissions	Month		-		July	July	July
	Daily Total Solar Insolation Factor	I	Btu/ft^2-d		2205.34	2205.34	2205.34
	Daily Maximum Ambient Temperature	T_{AX}	°F		91.90	91.90	91.90
	Daily Minimum Ambient Temperature	T_{AN}	°F		68.00	68.00	68.00
	Daily Ambient Temp. Change	DT_A	°F	T_{AX} - T_{AN}	23.90	23.90	23.90
	Daily Avg. Ambient Temperature	T_{AA}	°F	((T_{AX}+459.67)+(T_{AN}+459.67))/2	79.95	79.95	79.95
	Max Liquid Bulk Temperature	T_b	°F	T_{AA} + 6α -1 or Input	82.2	82.2	82.2
	Insulated?			0.44T_{AA}+0.56$_{Tb}$+0.0079(α*I) if not insulated;	No	No	No
	Daily Avg. Liquid Surface Temp.	T_{LA}	°F	otherwise T_{LA} based on measurements from tank	90.61	90.61	90.61
	Daily Max. Avg. Liq. Surf. Temp.	**T_{LX}**	°F	T_{LA}+0.25*DT_V	103.25	103.25	103.25
	Daily Vapor Temperature Range	DT_V	°R	0.72*DT_A+0.028*α*I	50.55	50.55	50.55
	True Vapor Pressure @ T_{LX}	P_{VX}	psia @ **T_{LX}**		0.02	0.02	0.02
	Max. Emission Rate	**L_{MAX}**	**lb/hr**	**(M_v* P_{VA}) / (R * T) * FR_M**	**0.07**	**0.07**	**0.07**

Notes:

1. Annual emission rate calculations taken from AP-42 5th Ed., Section 7.
2. Calculated using TCEQ equation from Storage Tank Guidance Document.

Table B-3
Fixed Roof Tank Emissions
Blue Origin Texas, LLC - West Texas Launch Site
November 2019

	Parameter Name & Variable		Units	Notes			
	FIN				**GASTK-1**	**GASTK-2**	**KERTK-1**
	EPN				**GASTK-1**	**GASTK-2**	**KERTK-1**
Tank Data	Material				Blended Gasoline (Annual)	Blended Gasoline (Annual)	Kerosene
	Material Type				Petroleum	Petroleum	Petroleum
	Tank Type				HFR	HFR	HFR
	Number of Tanks				1	1	1
	Continuous Level Tank		(Yes / No)		No	No	No
	Throughput	Q	bbl/yr		119	119	233
	Height	H_S	ft		12.17	12.17	40.92
	Average Liquid Height	H_L	ft	H_S / 2	6.08	6.08	20.46
	Diameter	D	ft		3.83	3.83	4.83
	Effective Diameter (for horizontal tanks)	De	ft		7.71	7.71	15.87
	Tank Liquid Volume	V_{LX}	ft3	(D/2)^2 * pi * H_S	140	140	751
	Tank Liquid Volume	T_{CG}	gal	VLX * 7.481	1,050	1,050	5,616
	Turnovers	N		5.614*Q / V_{LX}	4.76	4.76	1.74
	Maximum Filling Rate	FRm	bbl/hr		25	25	214
	Roof Slope	S_R	ft/ft		0.0625	0.0625	0.0625
	Paint Color				Light Grey	Light Grey	Light Grey
	Heated/Hot Product				No	No	No
	Paint Solar Absorptance	α	-		0.54	0.54	0.54
	Roof Outage	H_{RO}	ft	1/3*SR*De/2 for cone, or 0.137*De/2 for dome	0.08	0.08	0.17
	Vapor Space Outage	H_{VO}	ft	H_s-H_L+H_{RO} or D/2	1.9	1.9	2.4
	Breather Vent Pressure				0.03	0.03	0.03
	Breather Vent Vacuum				-0.03	-0.03	-0.03
Climatological Data	Month		-		Annual	Annual	Annual
	Daily Total Solar Insolation Factor	I	Btu/ft^2-d		1618.21	1618.21	1618.21
	Daily Maximum Ambient Temperature	T_{AX}	°F		73.45	73.45	73.45
	Daily Minimum Ambient Temperature	T_{AN}	°F		46.82	46.82	46.82
	Daily Ambient Temp. Change	DT_A	°F	T_{AX} - T_{AN}	26.633	26.633	26.633
	Daily Avg. Ambient Temperature	T_{AA}	°F	((T_{AX}+459.67)+(T_{AN}+459.67))/2	60.1	60.1	60.1
	Bulk Temperature Source				Ambient	Ambient	Ambient
	Liquid Bulk Temperature	T_b	°F	T_{AA} + 6α -1 or Input	62.4	62.4	62.4
	Insulated?			0.44T_{AA}+0.56$_{Tb}$+0.0079(α*I) if not insulated;	No	No	No
	Daily Avg. Liquid Surface Temp.	T_{LA}	°F	otherwise T_{LA} based on measurements from tank	68.3	68.3	68.3
	Daily Max. Avg. Liq. Surf. Temp.	**T_{LX}**	°F	T_{LA}+0.25*DT_V	79.2	79.2	79.2
	Daily Min. Avg. Liq. Surf. Temp.	T_{LN}	°F	T_{LA}-0.25*DT_V	57.4	57.4	57.4
	Daily Vapor Temperature Range	DT_V	°R	0.72*DT_A+0.028*α*I (zero for underground tanks)	43.64	43.64	43.64
Product Data	Liquid Molecular Wt.	M_L	lb/lb-mole		92.00	92.00	0.00
	Vapor Molecular Wt.	M_V	lb/lb-mole		68.00	68.00	110.00
	Vapor Pressure Method		-		RVP	RVP	RVP
	Reid Vapor Pressure	RVP	psi		8	8	0.117505165
	Slope	Sl	°F/vol %		3	3	7.749131263
	VP Constant A	A	dimensionless		11.79	11.79	10.40
	VP Constant B	B	°C		5402.01	5402.01	7018.20
	VP Constant C	C	°C		NA	NA	NA
	True Vapor Pressure @ T_{LA}	P_{VA}	psia @ **T_{LA}**		4.76094	4.76094	0.05517
	True Vapor Pressure @ T_{LX}	P_{VX}	psia @ **T_{LX}**		5.85687	5.85687	0.07221
	True Vapor Pressure @ T_{LN}	P_{VN}	psia @ **T_{LN}**		3.83639	3.83639	0.04168
	Daily Vapor Pressure Range	dPv	psia	P_{VX} - P_{VX}	2.020	2.020	0.031
	Vapor Pressure Function	P*	dimensionless	P_{VA}/P_A/(1+(1-(P_{VA}/P_A))^0.5)^2	0.33042	0.33042	0.00214
Annual or Monthly Emissions	Vapor Space Expansion Factor	K_E		0.0018DT_V or (DT_V/T_{LA}) + (DP_V - DP_B)/(P_A-P_{VA}))	0.318	0.318	0.079
	Vented Vapor Saturation Factor	K_S		1/(1 + 0.053 * P_{VA} * H_{VO})	0.67	0.67	0.99
	Turnover Factor	K_N		turnovers < 36 = 1, turnovers > 36 = (180 + N)/6N	1.00	1.00	1.00
	Working Loss Product Factor	K_P		0.75 for crude oils, 1.0 all other organic liquids	1.00	1.00	1.00
	Vapor Space Volume	V_V	ft3	pi * (D/2)^2 * H_{VO}	89.44	89.44	478.17
	Vapor Density	Wv	lb/ft3	(M_V * P_{VA}) / (10.731*T_{LA})	0.05714	0.05714	0.00107
	Standing Losses	L_S	lb/yr	Number of Days * V_V * W_V * K_E * K_S	399.2	399.2	14.6
	Working Losses	L_W	lb/yr	0.0010 * M_V * P_{VA} * Q * K_N * K_P	38.5	38.5	1.4
	Total Losses	L_T	lb/yr	L_S + L_W	437.8	437.8	16.0
	Annual Emission Rate		tpy	L_T / 2000	0.2189	0.2189	0.0080
	Control Eff.	CE	%		0	0	0
	Annual Emission Rate		**tpy**		**0.22**	**0.22**	**0.01**
Maximum Short-Term Emissions	Month		-		July	July	July
	Daily Total Solar Insolation Factor	I	Btu/ft^2-d		2205.34	2205.34	2205.34
	Daily Maximum Ambient Temperature	T_{AX}	°F		91.90	91.90	91.90
	Daily Minimum Ambient Temperature	T_{AN}	°F		68.00	68.00	68.00
	Daily Ambient Temp. Change	DT_A	°F	T_{AX} - T_{AN}	23.90	23.90	23.90
	Daily Avg. Ambient Temperature	T_{AA}	°F	((T_{AX}+459.67)+(T_{AN}+459.67))/2	79.95	79.95	79.95
	Max Liquid Bulk Temperature	T_b	°F	T_{AA} + 6α -1 or Input	82.2	82.2	82.2
	Insulated?			0.44T_{AA}+0.56$_{Tb}$+0.0079(α*I) if not insulated;	No	No	No
	Daily Avg. Liquid Surface Temp.	T_{LA}	°F	otherwise T_{LA} based on measurements from tank	90.61	90.61	90.61
	Daily Max. Avg. Liq. Surf. Temp.	**T_{LX}**	°F	T_{LA}+0.25*DT_V	103.25	103.25	103.25
	Daily Vapor Temperature Range	DT_V	°R	0.72*DT_A+0.028*α*I	50.55	50.55	50.55
	True Vapor Pressure @ T_{LX}	P_{VX}	psia @ **T_{LX}**		8.99	8.99	0.13
	Max. Emission Rate	**L_{MAX}**	**lb/hr**	**(M_v* P_{VA}) / (R * T) * FR_M**	**14.19**	**14.19**	**2.76**

Notes:

1. Annual emission rate calculations taken from AP-42 5th Ed., Section 7.
2. Calculated using TCEQ equation from Storage Tank Guidance Document.

Table B-4
Sand Blasting Emissions
Blue Origin Texas, LLC - West Texas Launch Site
November 2019

Emission Rates

Parameter	Units	BLST1
Units	-	1
Usage	hr/yr	12
Type of Abrasive/Media	-	All Purpose Sand
Operating Pressure	psi	120
Nozzle Diameter	in	0.25
Sand Flow Rate	lb/hr	367
Abrasive/Media Density	lb/ft^3	99
Abrasive Flow Rate	lb/hr	367
PM Emission Factor	lb PM/1,000 lb-media	55
PM_{10} Emission Factor	lb PM/1,000 lb-media	13
$PM_{2.5}$ Emission Factor	lb PM/1,000 lb-media	1.3
PM Emission Rates	lb/hr	20.19
	tpy	0.12
PM_{10} Emission Rates	lb/hr	4.77
	tpy	0.03
$PM_{2.5}$ Emission Rates	lb/hr	0.48
	tpy	2.86E-03

NOTES:

1. Usage rate was obtained from contractors.
2. Sand flowrate was extrapolated from Table 2-2 of EPA's AP-42 13.2.6 Background Document (September 1997).
3. Abrasive/Media density was obtained from Table 2-3 of EPA's AP-42 13.2.6 Background Document (September 1997).
4. Abrasive flowrate was calculated using Equation 2-1 from EPA's AP-42, Section 13.2.6 Background Document (September 1997).
5. Emission factor was taken from EPA's AP-42, Table 13.2.6-1 Sand blasting of mild steel panels at 10 mph.

Table B-5
Flare Emissions
Blue Origin Texas, LLC - West Texas Launch Site
November 2019

Process Assumptions

EPN	Flare Name	Flare Type	Pilot Fuel Type	Stack Height	# of Pilots	Operating Hours	Total Pilot Flow Rate		Net Heat Content of Fuel	Fuel MW	Waste/Vent Stream Routed to Flare		Net Heat Content of Stream	Vent Stream MW
				ft		hr/yr	scf/hr	scf/yr	Btu/scf	lb/lb-mole	Stream Content	Rate (scf/yr)	Btu/scf	lb/lb-mole
FLARE-1	Test Stand 1 Hydrogen Flare	Other	Propane	135	2	1920	42	80,640	2,315	44.096	Hydrogen	13,500,000	290	1.00
FLARE-3	Launch Pad Hydrogen Flare	Other	Propane	100	2	192	42	8,064	2,315	44.096	Hydrogen	6,750,000	290	1.00
FLARE-4	Test Stand 3 LNG Flare	Other	Propane	80	3	1000	186	186,000	2,315	44.096	LNG	72,500,000	943	17.00

Controlled Emission Rates

EPN	Flare Name	NOx		CO		SO2		VOC	
		lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
FLARE-1	Test Stand 1 Hydrogen Flare	0.29	0.28	0.57	1.08	1.20E-03	1.15E-03	5.24E-04	5.03E-04
FLARE-3	Launch Pad Hydrogen Flare	1.42	0.14	2.82	0.54	0.01	5.76E-04	5.24E-04	5.03E-05
FLARE-4	Test Stand 3 LNG Flare	9.47	4.74	18.86	18.80	0.04	0.02	0.37	0.19
Total Emissions		**11.18**	**5.15**	**22.25**	**20.42**	**0.05**	**0.02**	**0.37**	**0.19**

Emission Factors

Waste Gas Emission Factors		NOx	CO
Flare Type	Waste Gas	lb/MMBtu	lb/MMBtu
Steam Assist	>1000 btu/scf	0.0485	0.3503
Steam Assist	<1000 btu/scf	0.068	0.3465
Other	>1000 btu/scf	0.138	0.2755
Other	<1000 btu/scf	0.0641	0.5496

Pilot Gas Emission Factors

Pollutant	lb/MMscf	lb/MMBtu
NOx	100	0.09804
CO	84	0.08235
SO2	0.6	0.00059
VOC	5.5	0.00539

Constants		
Standard Temperature:	60	°F
Standard Pressure:	1	atm
Standard Volume:	379.58	ft3/lbmol

NOTES:

1. Worst case NOx and CO emission factors for non-steam-assisted flare per TCEQ Guidance are used in the emission estimates.
2. All calculations made at standard conditions of 60 deg F and 1 atm.
3. Pilot gas emission factors are from AP-42, 5th ed. (July 1998) Tables 1.4-1 and 1.4-2 (lb/MMBtu).
3. Pilot gas emission factors are from AP-42, 5th ed. (July 1998) Tables 1.5-1 and 1.4-2 (lb/MMBtu).
4. FLARE-1 & FLARE-3 control hydrogen streams, which are not sources of VOC. The controlled VOC emissions estimates only represent the combustion of the propane pilot gas.
5. LNG composition is conservatively based on a Typical LNG sample (5.2 wt% propane and 94.8 wt% methane).

Table B-5

Flare Emissions

Blue Origin Texas, LLC - West Texas Launch Site

November 2019

Process Assumptions

EPN	Flare Name	Total Heat Input (Pilot)		Total Heat Input (Waste Stream)		Discharge Parameters				106.492(1)(A) Limit (ft/s)	Meets 106.492 Limit? (Y/N)
		MMBtu/hr	MMBtu/yr	MMBtu/hr	MMBtu/yr	scf/hr	btu/scf	Exit Diameter (in)	Exit Velocity (ft/s)		
FLARE-1	Test Stand 1 Hydrogen Flare	0.10	186.67	2.04	3,915	7,031	302	12.40	2.34	60	Yes
FLARE-3	Launch Pad Hydrogen Flare	0.10	18.67	10.20	1,958	35,156	292	12.40	12	60	Yes
FLARE-4	Test Stand 3 LNG Flare	0.43	430.57	68.34	68,339	72,500	946	20	9.25	60	Yes

Table B-6
Wastewater Sump Emissions
Blue Origin Texas, LLC - West Texas Launch Site
November 2019

Emission Rates

Parameter	Units	SUMP1
Material	-	Wastewater
Vapor Molecular Weight	lb/lbmol	68
Water Maze Evaporation Rate	gal/hr	30
Combustion Chamber Efficiency (% Vaporized)	-	90%
Hourly Load Rate	bbl/hr	1.6
Annual Throughput	bbl/yr	476
VOC Emission Rates	lb/hr	0.16
	tpy	0.02

NOTES: Emission calculated with Ideal Gas Law and conservatively assumes product loaded is 100% VOC.

Appendix C

TCEQ Applicable Rule Text

SUBCHAPTER A: GENERAL REQUIREMENTS
§§106.1, 106.2, 106.4, 106.6, 106.8, 106.13
Effective April 17, 2014

§106.1. Purpose.

This chapter identifies certain types of facilities or changes within facilities which the commission has determined will not make a significant contribution of air contaminants to the atmosphere pursuant to the Texas Health and Safety Code, the Texas Clean Air Act (TCAA), §382.057 and §382.05196.

Adopted August 9, 2000 Effective September 4, 2000

§106.2. Applicability.

This chapter applies to certain types of facilities or changes within facilities listed in this chapter where construction is commenced on or after the effective date of the relevant permit by rule. This chapter does not apply to emissions of greenhouse gases (as defined in §101.1 of this title (relating to Definitions)).

Adopted March 26, 2014 Effective April 17, 2014

§106.4. Requirements for Permitting by Rule.

(a) To qualify for a permit by rule, the following general requirements must be met.

(1) Total actual emissions authorized under permit by rule from the facility shall not exceed the following limits, as applicable:

(A) 250 tons per year (tpy) of carbon monoxide (CO) or nitrogen oxides (NO_X);

(B) 25 tpy of volatile organic compounds (VOC), sulfur dioxide (SO_2), or inhalable particulate matter (PM);

(C) 15 tpy of particulate matter with diameters of 10 microns or less (PM_{10});

(D) 10 tpy of particulate matter with diameters of 2.5 microns or less ($PM_{2.5}$); or

(E) 25 tpy of any other air contaminant except:

(i) water, nitrogen, ethane, hydrogen, and oxygen; and

(ii) notwithstanding any provision in any specific permit by rule to the contrary, greenhouse gases as defined in §101.1 of this title (relating to Definitions).

(2) Any facility or group of facilities, which constitutes a new major stationary source, as defined in §116.12 of this title (relating to Nonattainment and Prevention of Significant Deterioration Review Definitions), or any modification which constitutes a major modification, as defined in §116.12 of this title, under the new source review requirements of the Federal Clean Air Act (FCAA), Part D (Nonattainment) as amended by the FCAA Amendments of 1990, and regulations promulgated thereunder, must meet the permitting requirements of Chapter 116, Subchapter B of this title (relating to New Source Review Permits) and cannot qualify for a permit by rule under this chapter. Persons claiming a permit by rule under this chapter should see the requirements of §116.150 of this title (relating to New Major Source or Major Modification in Ozone Nonattainment Areas) to ensure that any applicable netting requirements have been satisfied.

(3) Any facility or group of facilities, which constitutes a new major stationary source, as defined in 40 Code of Federal Regulations (CFR) §52.21, or any change which constitutes a major modification, as defined in 40 CFR §52.21, under the new source review requirements of the FCAA, Part C (Prevention of Significant Deterioration) as amended by the FCAA Amendments of 1990, and regulations promulgated thereunder because of emissions of air contaminants other than greenhouse gases, must meet the permitting requirements of Chapter 116, Subchapter B of this title and cannot qualify for a permit by rule under this chapter. Notwithstanding any provision in any specific permit by rule to the contrary, a new major stationary source or major modification which is subject to Chapter 116, Subchapter B, Division 6 of this title due solely to emissions of greenhouse gases may use a permit by rule under this chapter for air contaminants that are not greenhouse gases. However, facilities or projects which require a prevention of significant deterioration permit due to emissions of greenhouse gases may not commence construction or operation until the prevention of significant deterioration permit is issued.

(4) Unless at least one facility at an account has been subject to public notification and comment as required in Chapter 116, Subchapter B or Subchapter D of this title (relating to New Source Review Permits or Permit Renewals), total actual emissions from all facilities permitted by rule at an account shall not exceed 250 tpy of CO or NO_X; or 25 tpy of VOC or SO_2 or PM; or 15 tpy of PM_{10}; or 10 tpy of $PM_{2.5}$; or 25 tpy of any other air contaminant except water, nitrogen, ethane, hydrogen, oxygen, and GHGs (as specified in §106.2 of this title (relating to Applicability)).

(5) Construction or modification of a facility commenced on or after the effective date of a revision of this section or the effective date of a revision to a specific permit by rule in this chapter must meet the revised requirements to qualify for a permit by rule.

(6) A facility shall comply with all applicable provisions of the FCAA, §111 (Federal New Source Performance Standards) and §112 (Hazardous Air Pollutants), and the new source review requirements of the FCAA, Part C and Part D and regulations promulgated thereunder.

(7) There are no permits under the same commission account number that contain a condition or conditions precluding the use of a permit by rule under this chapter.

(8) The proposed facility or group of facilities shall obtain allowances for NO_X if they are subject to Chapter 101, Subchapter H, Division 3 of this title (relating to Mass Emissions Cap and Trade Program).

(b) No person shall circumvent by artificial limitations the requirements of §116.110 of this title (relating to Applicability).

(c) The emissions from the facility shall comply with all rules and regulations of the commission and with the intent of the Texas Clean Air Act (TCAA), including protection of health and property of the public, and all emissions control equipment shall be maintained in good condition and operated properly during operation of the facility.

(d) Facilities permitted by rule under this chapter are not exempted from any permits or registrations required by local air pollution control agencies. Any such requirements must be in accordance with Texas Health and Safety Code, §382.113 and any other applicable law.

Adopted March 26, 2014 Effective April 17, 2014

§106.6. Registration of Emissions.

(a) An owner or operator may certify and register the maximum emission rates from facilities permitted by rule under this chapter in order to establish federally-enforceable allowable emission rates which are below the emission limitations in §106.4 of this title (relating to Requirements for Permitting by Rule).

(b) All representations with regard to construction plans, operating procedures, and maximum emission rates in any certified registration under this section become conditions upon which the facility permitted by rule shall be constructed and operated.

(c) It shall be unlawful for any person to vary from such representation if the change will cause a change in the method of control of emissions, the character of the emissions, or will result in an increase in the discharge of the various emissions, unless the certified registration is first revised.

(d) The certified registration must include documentation of the basis of emission estimates and a written statement by the registrant certifying that the maximum emission rates listed on the registration reflect the reasonably anticipated maximums for operation of the facility.

(e) Certified registrations used to demonstrate that Chapter 122 of this title (relating to Federal Operating Permits) does not apply to a source shall be submitted on the required form to the executive director; to the appropriate commission regional office; and to all local air pollution control agencies having jurisdiction over the site.

(1) Certified registrations established prior to the effective date of this rule shall be submitted on or before February 3, 2003.

(2) Certified registrations established on or after the effective date of this rule shall be submitted no later than the date of operation.

(f) All certified registrations shall be maintained on-site and be provided immediately upon request by representatives of the commission or any local air pollution control agency having jurisdiction over the site. If however, the site normally operates unattended, certified registrations and records demonstrating compliance with the certified registration must be maintained at an office within Texas having day-to-day operational control of the site. Upon request, the commission shall make any such records of compliance available to the public in a timely manner.

(g) Copies of certified registrations shall be included in permit applications subject to review under Chapter 116, Subchapter B of this title (relating to New Source Review Permits).

Adopted November 20, 2002 Effective December 11, 2002

§106.8. Recordkeeping

(a) Owners or operators of facilities and sources that are de minimis as designated in §116.119 of this title (relating to De Minimis Facilities or Sources) are not subject to this section.

(b) Owners or operators of facilities operating under a permit by rule (PBR) in Subchapter C of this chapter (relating to Domestic and Comfort Heating and Cooling) or under those PBRs that only name the type of facility and impose no other conditions in the PBR itself do not need to comply with specific recordkeeping requirements of subsection (c) of this section. A list of these PBRs will be available through the commission's Austin central office, regional offices, and the commission's website. Upon request from the commission or any air pollution control program having jurisdiction, claimants must provide information that would demonstrate compliance with §106.4 of this title (relating to Requirements for Permitting by Rule), or the general requirements, if any, in effect at the time of the claim, and the PBR under which the facility is authorized.

(c) Owners or operators of all other facilities authorized to be constructed and operate under a PBR must retain records as follows:

(1) maintain a copy of each PBR and the applicable general conditions of §106.4 of this title or the general requirements, if any, in effect at the time of the claim under which the facility is operating. The PBR and general requirements claimed should be the version in effect at the time of construction or installation or changes to an existing facility, whichever is most recent. The PBR holder may elect to comply with a more recent version of the applicable PBR and general requirements;

(2) maintain records containing sufficient information to demonstrate compliance with the following:

(A) all applicable general requirements of §106.4 of this title or the general requirements, if any, in effect at the time of the claim; and

(B) all applicable PBR conditions;

(3) keep all required records at the facility site. If however, the facility normally operates unattended, records must be maintained at an office within Texas having day-to-day operational control of the plant site;

(4) make the records available in a reviewable format at the request of personnel from the commission or any air pollution control program having jurisdiction;

(5) beginning April 1, 2002, keep records to support a compliance demonstration for any consecutive 12-month period. Unless specifically required by a PBR, records regarding the quantity of air contaminants emitted by a facility to demonstrate compliance with §106.4 of this title prior to April 1, 2002 are not required under this section; and

(6) for facilities located at sites designated as major in accordance with §122.10(13) of this title (relating to General Definitions) or subject to or potentially subject to any applicable federal requirement, retain all records demonstrating compliance for at least five years. For facilities located at all other sites, all records demonstrating compliance must be retained for at least two years. These record retention requirements supercede any retention conditions of an individual PBR.

Adopted October 10, 2001 Effective November 1, 2001

§106.13. References to Standard Exemptions and Exemptions from Permitting.

The authorizations formerly known as standard exemptions and exemptions from permitting are referred to as permits by rule in this title. Types of facilities and changes within facilities authorized by those standard exemptions and exemptions from permitting continue to be authorized unless modifications or changes to those facilities has caused them to no longer meet the conditions of the former standard exemption or exemption from permitting and the general requirements of this subchapter.

Adopted August 9, 2000 Effective September 4, 2000

SUBCHAPTER K: GENERAL
§§106.261 - 106.266
Effective November 1, 2003

§106.261. Facilities (Emission Limitations).

(a) Except as specified under subsection (b) of this section, facilities, or physical or operational changes to a facility, are permitted by rule provided that all of the following conditions of this section are satisfied.

(1) The facilities or changes shall be located at least 100 feet from any recreational area or residence or other structure not occupied or used solely by the owner or operator of the facilities or the owner of the property upon which the facilities are located.

(2) Total new or increased emissions, including fugitives, shall not exceed 6.0 pounds per hour (lb/hr) and ten tons per year of the following materials: acetylene, argon, butane, crude oil, refinery petroleum fractions (except for pyrolysis naphthas and pyrolysis gasoline) containing less than ten volume percent benzene, carbon monoxide, cyclohexane, cyclohexene, cyclopentane, ethyl acetate, ethanol, ethyl ether, ethylene, fluorocarbons Numbers 11, 12, 13, 14, 21, 22, 23, 113, 114, 115, and 116, helium, isohexane, isopropyl alcohol, methyl acetylene, methyl chloroform, methyl cyclohexane, neon, nonane, oxides of nitrogen, propane, propyl alcohol, propylene, propyl ether, sulfur dioxide, alumina, calcium carbonate, calcium silicate, cellulose fiber, cement dust, emery dust, glycerin mist, gypsum, iron oxide dust, kaolin, limestone, magnesite, marble, pentaerythritol, plaster of paris, silicon, silicon carbide, starch, sucrose, zinc stearate, or zinc oxide.

(3) Total new or increased emissions, including fugitives, shall not exceed 1.0 lb/hr of any chemical having a limit value (L) greater than 200 milligrams per cubic meter (mg/m^3) as listed and referenced in Table 262 of §106.262 of this title (relating to Facilities (Emission and Distance Limitations)) or of any other chemical not listed or referenced in Table 262. Emissions of a chemical with a limit value of less than 200 mg/m^3 are not allowed under this section.

(4) For physical changes or modifications to existing facilities, there shall be no changes to or additions of any air pollution abatement equipment.

(5) Visible emissions, except uncombined water, to the atmosphere from any point or fugitive source shall not exceed 5.0% opacity in any six-minute period.

(6) For emission increases of five tons per year or greater, notification must be provided using Form PI-7 within ten days following the installation or modification of the facilities. The notification shall include a description of the project, calculations, data identifying specific chemical names, limit values, and a description of pollution control equipment, if any.

(7) For emission increases of less than five tons per year, notification must be provided using either:

(A) Form PI-7 within ten days following the installation or modification of the facilities. The notification shall include a description of the project, calculations, data identifying specific chemical names, limit values, and a description of pollution control equipment, if any; or

(B) Form PI-7 by March 31 of the following year summarizing all uses of this permit by rule in the previous calendar year. This annual notification shall include a description of the project, calculations, data identifying specific chemical names, limit values, and a description of pollution control equipment, if any.

(b) The following are not authorized under this section:

(1) construction of a facility authorized in another section of this chapter or for which a standard permit is in effect; and

(2) any change to any facility authorized under another section of this chapter or authorized under a standard permit.

Adopted October 8, 2003 Effective November 1, 2003

§106.262. Facilities (Emission and Distance Limitations).

(a) Facilities, or physical or operational changes to a facility, are permitted by rule provided that all of the following conditions of this section are satisfied.

(1) Emission points associated with the facilities or changes shall be located at least 100 feet from any off-plant receptor. Off-plant receptor means any recreational area or residence or other structure not occupied or used solely by the owner or operator of the facilities or the owner of the property upon which the facilities are located.

(2) New or increased emissions, including fugitives, of chemicals shall not be emitted in a quantity greater than five tons per year nor in a quantity greater than E as determined using the equation E = L/K and the following table.

D, Feet	K
100	326
200	200
300	139
400	104
500	81
600	65
700	54
800	46
900	39
1,000	34
2,000	14
3,000 or more	8

E = maximum allowable hourly emission, and never to exceed 6 pounds per hour.

L = value as listed or referenced in Table 262

K = value from the table on this page. (interpolate intermediate values)

D = distance to the nearest off-plant receptor.

TABLE 262
LIMIT VALUES (L) FOR USE WITH EXEMPTIONS FROM PERMITTING §106.262

The values are not to be interpreted as acceptable health effects values relative to the issuance of any permits under Chapter 116 of this title (relating to Control of Air Pollution by Permits for New Construction or Modification).

Compound	Limit (L) Milligrams Per Cubic Meter
Acetone	590.
Acetaldehyde	9.
Acetone Cyanohydrin	4.
Acetonitrile	34.
Acetylene	2662.
N-Amyl Acetate	2.7
Sec-Amyl Acetate	1.1
Benzene	3.
Beryllium and Compounds	0.0005
Boron Trifluoride, as HF	0.5
Butyl Alcohol, –	76.
Butyl Acrylate	19.
Butyl Chromate	0.01
Butyl Glycidyl Ether	30.
Butyl Mercaptan	0.3
Butyraldehyde	1.4
Butyric Acid	1.8
Butyronitrile	22.
Carbon Tetrachloride	12.
Chloroform	10.
Chlorophenol	0.2
Chloroprene	3.6
Chromic Acid	0.01
Chromium Metal, Chromium II and III Compounds	0.1
Chromium VI Compounds	0.01
Coal Tar Pitch Volatiles	0.1
Creosote	0.1

Compound	Limit (L) Milligrams Per Cubic Meter
Cresol	0.5
Cumene	50.
Dicyclopentadiene	3.1
Diethylaminoethanol	5.5
Diisobutyl Ketone	63.9
Dimethyl Aniline	6.4
Dioxane	3.6
Dipropylamine	8.4
Ethyl Acrylate	0.5
Ethylene Dibromide	0.38
Ethylene Glycol	26.
Ethylene Glycol Dinitrate	0.1
Ethylidene-2-norbornene, 5-	7.
Ethyl Mercaptan	0.08
Ethyl Sulfide	1.6
Glycolonitrile	5.
Halothane	16
Heptane	350.
Hexanediamine, 1,6-	0.32
Hydrogen Chloride	1.
Hydrogen Fluoride	0.5
Hydrogen Sulfide	1.1
Isoamyl Acetate	133.
Isoamyl Alcohol	15.
Isobutyronitrile	22.
Kepone	0.001
Kerosene	100.
Malononitrile	8.
Mesityl Oxide	40.
Methyl Acrylate	5.8
Methyl Amyl Ketone	9.4
Methyl-t-butyl ether	45.

Compound	Limit (L) Milligrams Per Cubic Meter
Methyl Butyl Ketone	4.
Methyl Disulfide	2.2
Methylenebis (2-chloroaniline) (MOCA)	0.003
Methylene Chloride	26.
Methyl Isoamyl Ketone	5.6
Methyl Mercaptan	0.2
Methyl Methacrylate	34.
Methyl Propyl Ketone	530.
Methyl Sulfide	0.3
Mineral Spirits	350.
Naphtha	350.
Nickel, Inorganic Compounds	0.015
Nitroglycerine	0.1
Nitropropane	5.
Octane	350.
Parathion	0.05
Pentane	350.
Perchloroethylene	33.5
Petroleum Ether	350
Phenyl Mercaptan	0.4
Propionitrile	14.
Propyl Acetate	62.6
Propylene Oxide	20.
Propyl Mercaptan	0.23
Silica-amorphous- precipitated, silica gel	4.
Silicon Carbide	4.
Stoddard Solvent	350.
Styrene	21.
Succinonitrile	20.
Tolidine	0.02
Trichloroethylene	135.
Trimethylamine	0.1

Compound	Limit (L) Milligrams Per Cubic Meter
Valeric Acid	0.34
Vinyl Acetate	15.
Vinyl Chloride	2.

NOTE: The time weighted average (TWA) Threshold Limit Value (TLV) published by the American Conference of Governmental Industrial Hygienists (ACGIH), in its TLVs and BEIs guide (1997 Edition) shall be used for compounds not included in the table. The Short Term Exposure Level (STEL) or Ceiling Limit (annotated with a "C") published by the ACGIH shall be used for compounds that do not have a published TWA TLV. This section cannot be used if the compound is not listed in the table or does not have a published TWA TLV, STEL, or Ceiling Limit in the ACGIH TLVs and BEIs guide.

(3) Notification must be provided using Form PI-7 within ten days following the installation or modification of the facilities. The notification shall include a description of the project, calculations, and data identifying specific chemical names, L values, D values, and a description of pollution control equipment, if any.

(4) The facilities in which the following chemicals will be handled shall be located at least 300 feet from the nearest property line and 600 feet from any off-plant receptor and the cumulative amount of any of the following chemicals resulting from one or more authorizations under this section (but not including permit authorizations) shall not exceed 500 pounds on the plant property and all listed chemicals shall be handled only in unheated containers operated in compliance with the United States Department of Transportation regulations (49 Code of Federal Regulations, Parts 171-178): acrolein, allyl chloride, ammonia (anhydrous), arsine, boron trifluoride, bromine, carbon disulfide, chlorine, chlorine dioxide, chlorine trifluoride, chloroacetaldehyde, chloropicrin, chloroprene, diazomethane, diborane, diglycidyl ether, dimethylhydrazine, ethyleneimine, ethyl mercaptan, fluorine, formaldehyde (anhydrous), hydrogen bromide, hydrogen chloride, hydrogen cyanide, hydrogen fluoride, hydrogen selenide, hydrogen sulfide, ketene, methylamine, methyl bromide, methyl hydrazine, methyl isocyanate, methyl mercaptan, nickel carbonyl, nitric acid, nitric oxide, nitrogen dioxide, oxygen difluoride, ozone, pentaborane, perchloromethyl mercaptan, perchloryl fluoride, phosgene, phosphine, phosphorus trichloride, selenium hexafluoride, stibine, liquified sulfur dioxide, sulfur pentafluoride, and tellurium hexafluoride. Containers of these chemicals may not be vented or opened directly to the atmosphere at any time.

(5) For physical changes or modifications to existing facilities, there shall be no changes or additions of air pollution abatement equipment.

(6) Visible emissions, except uncombined water, to the atmosphere from any point or fugitive source shall not exceed 5.0% opacity in any six-minute period.

(b) The following are not authorized under this section except as noted in subsection (c) of this section:

(1) construction of a facility authorized in another section of this chapter or for which a standard permit is in effect; and

(2) any change to any facility authorized under another section of this chapter or authorized under a standard permit.

(c) If a facility has been authorized under another section of this chapter or under a standard permit, subsection (a)(2) and (3) of this section may be used to qualify the use of other chemicals at the facility.

Adopted October 8, 2003 Effective November 1, 2003

§106.263. Routine Maintenance, Start-up and Shutdown of Facilities, and Temporary Maintenance Facilities.

(a) This section authorizes routine maintenance, start-up and shutdown of facilities, and specific temporary maintenance facilities except as specified in subsection (b) of this section.

(b) The following are not authorized under this section:

(1) construction of any new or modified permanent facility;

(2) reconstruction under 40 Code of Federal Regulations, Part 60, New Source Performance Standards, Subpart A, §60.15 (relating to Reconstruction);

(3) physical or operational changes to a facility which increase capacity or production beyond previously existing performance levels or results in the emission of a new air contaminant;

(4) facilities and sources that are de minimis as allowed in §116.119 of this title (relating to De Minimis Facilities or Sources);

(5) piping fugitive emissions authorized under a permit or another permit by rule; and

(6) any emissions associated with operations claimed under the following sections of this chapter:

(A) §106.231 of this title (relating to Manufacturing, Refinishing, and Restoring Wood Products);

(B) §106.351 of this title (relating to Salt Water Disposal (Petroleum));

(C) §106.352 of this title (relating to Oil and Gas Production Facilities);

(D) §106.353 of this title (relating to Temporary Oil and Gas Facilities);

(E) §106.355 of this title (relating to Pipeline Metering, Purging, and Maintenance);

(F) §106.392 of this title (relating to Thermoset Resin Facilities);

(G) §106.418 of this title (relating to Printing Presses);

(H) §106.433 of this title (relating to Surface Coat Facility);

(I) §106.435 of this title (relating to Classic or Antique Automobile Restoration Facility);

(J) §106.436 of this title (relating to Auto Body Refinishing Facility); and

(K) §106.512 of this title (relating to Stationary Engines and Turbines).

(c) The following activities and facilities are authorized under this section:

(1) routine maintenance activities which are those that are planned and predictable and ensure the continuous normal operation of a facility or control device or return a facility or control device to normal operating conditions;

(2) routine start-ups and shutdowns which are those that are planned and predictable; and

(3) temporary maintenance facilities which are constructed in conjunction with maintenance activities. Temporary maintenance facilities include only the following:

(A) facilities used for abrasive blasting, surface preparation, and surface coating on immovable fixed structures;

(B) facilities used for testing and repair of engines and turbines;

(C) compressors, pumps, or engines and associated pipes, valves, flanges, and connections, not operating as a replacement for an existing authorized unit;

(D) flares, vapor combustors, catalytic oxidizers, thermal oxidizers, carbon adsorption units, and other control devices used to control vent gases released during the degassing of immovable, fixed process vessels, storage vessels, and associated piping to atmospheric pressure, plus cleaning apparatus that will have or cause emissions;

(E) temporary piping required to bypass a unit or pipeline section undergoing maintenance; and

(F) liquid or gas-fired vaporizers used for the purpose of vaporizing inert gas.

(d) Emissions from routine maintenance (excluding temporary maintenance facilities), start-up, and shutdown are:

(1) limited to 24-hour emission totals which are less than the reportable quantities defined in §101.1(82) of this title (relating to Definitions) for individual occurrences;

(2) required to be authorized under Chapter 116 of this title (relating to Control of Air Pollution by Permits for New Construction or Modification) or comply with §101.7 and §101.11 of this title (relating to Maintenance, Start-up and Shutdown Reporting, Recordkeeping, and Operational Requirements, and Demonstrations) if unable to comply with paragraph (1) of this subsection or subsection (f) of this section; and

(3) required to comply with subsection (f) of this section.

(e) In addition to the emission limits in subsection (f) of this section, specific temporary maintenance facilities as listed in subsection (c)(3) of this section must meet the following additional requirements:

(1) flares or vapor combustors must meet the requirements of §106.492(1) and (2)(C) of this title (relating to Flares);

(2) catalytic oxidizers must meet the requirements of §106.533(5)(C) of this title (relating to Water and Soil Remediation);

(3) thermal oxidizers must meet the requirements of §106.493(2) and (3) of this title (relating to Direct Flame Incinerators);

(4) carbon adsorption systems must meet the requirements of §106.533(5)(D) of this title;

(5) other control devices used to control vents caused by the degassing of process vessels, storage vessels, and associated piping must have an overall vapor collection and destruction or removal efficiency of at least 90%;

(6) any temporary maintenance facility that cannot meet all applicable limitations of this section must obtain authorization under Chapter 116 of this title; and

(7) temporary maintenance facilities may not operate at a given location for longer than 180 consecutive days or the completion of a single project unless the facility is registered. If a

single project requires more than 180 consecutive days to complete, the facilities must be registered using a PI-7 Form, along with documentation on the project. Registration and supporting documentation shall be submitted upon determining the length of the project will exceed 180 days, but no later than 180 days after the project begins.

(f) All emissions covered by this section are limited to, collectively and cumulatively, less than any applicable emission limit under §106.4(a)(1) - (3) of this title (relating to Requirements for Permitting by Rule) in any rolling 12-month period.

(g) Facility owners or operators must retain records containing sufficient information to demonstrate compliance with this section and must include information listed in paragraphs (1) - (4) of this subsection. Documentation must be separate and distinct from records maintained for any other air authorization. Records must identify the following for all maintenance, start-up, or shutdown activities and temporary maintenance facilities:

(1) the type and reason for the activity or facility construction;

(2) the processes and equipment involved;

(3) the date, time, and duration of the activity or facility operation; and

(4) the air contaminants and amounts which are emitted as a result of the activity or facility operation.

Adopted October 10, 2001 Effective November 1, 2001

§106.264. Replacements of Facilities.

A facility which replaces an existing facility is permitted by rule provided that the following conditions of this section are satisfied:

(1) the replacement facility functions in the same or similar manner as the facility to be replaced;

(2) the emissions from the replacement facility are not more than nor have different characteristics than those from the facility to be replaced;

(3) the emissions from the replacement facility will not exceed 25 tons per year of any air contaminant;

(4) the physical location of the replacement facility is the same or immediately adjacent to the facility being replaced;

(5) there will be no increase in capacity, production rate, or throughput as a result of the replacement;

(6) notwithstanding the provisions of paragraph (3) of this section, the emissions from the replacement facility will not contain any compounds (other than carbon monoxide, nitrogen oxide, or sulfur dioxide) listed or proposed to be listed as hazardous constituents in 40 Code of Federal Regulations 261, Appendix VIII;

(7) notification of the replacement is provided to the executive director within ten days following installation of the replacement facility.

Adopted August 9, 2000 Effective September 4, 2000

§106.265. Hand-held and Manually Operated Machines.

Hand-held or manually operated equipment used for buffing, polishing, carving, cutting, drilling, machining, routing, sanding, sawing, surface grinding, or turning of ceramic art work, ceramic precision parts, leather, metals, plastics, fiber board, masonry, carbon, glass, graphite, or wood is permitted by rule.

Adopted August 9, 2000 Effective September 4, 2000

§106.266. Vacuum Cleaning Systems.

Vacuum cleaning systems used exclusively for industrial, commercial, or residential housekeeping purposes are permitted by rule.

Adopted August 9, 2000 Effective September 4, 2000

SUBCHAPTER U : TANKS, STORAGE, AND LOADING
§§106.471 - 106.478
Effective September 4, 2000

§106.471. Storage or Holding of Dry Natural Gas.

Equipment used exclusively to store or hold dry natural gas is permitted by rule.

Adopted August 9, 2000 Effective September 4, 2000

§106.472. Organic and Inorganic Liquid Loading and Unloading.

Liquid loading or unloading equipment for railcars, tank trucks, or drums; storage containers, reservoirs, tanks; and change of service of material loaded, unloaded, or stored is permitted by rule, provided that no visible emissions result and the chemicals loaded, unloaded, or stored are limited to:

(1) the following list: asphalt, resins, soaps, lube oils, fuel oils, waxes, polymers, detergents, lube oil additives, kerosene, wax emulsions, vegetable oils, greases, animal fats, and diesel fuels;

(2) water or wastewater;

(3) aqueous salt solutions;

(4) aqueous caustic solutions, except ammonia solutions;

(5) inorganic acids except oleum, hydrofluoric, and hydrochloric acids;

(6) aqueous ammonia solutions if vented through a water scrubber;

(7) hydrochloric acid if vented through a water scrubber;

(8) acetic acid if vented through a water scrubber;

(9) organic liquids having an initial boiling point of 300 degrees Fahrenheit or greater. Facilities loading, unloading, or storing butyric acid, isobutyric acid, methacrylic acid, mercaptans, croton oil, 2-methyl styrene, or any other compound with an initial boiling point of 300 degrees Fahrenheit or greater listed in 40 Code of Federal Regulations 261, Appendix VIII shall be located at least 500 feet from any recreational area or residence or other structure not occupied or used solely by the owner of the facility or the owner of the property upon which the facility is located.

Adopted August 9, 2000 Effective September 4, 2000

§106.473. Organic Liquid Loading and Unloading.

Organic liquids loading or unloading equipment for railcars, tank trucks, or drums; and storage containers, tanks, or change of service of the material loaded, unloaded, or stored is permitted by rule, provided that all of the following conditions of this section are met.

(1) Uncontrolled emissions calculated using the version of AP-42 in effect at the time are less than 25 tons per year of organic compounds or of any other air contaminant.

(2) The loading rate of the facilities does not exceed 20,000 gallons per day averaged over any consecutive 30-day period.

(3) The capacity of any tank does not exceed 25,000 gallons, except that tanks having a capacity of less than 40,000 gallons may be used to store sweet crude oil, sweet natural gas condensate, gasoline, and petroleum fuels.

(4) The facilities are used exclusively for the loading, unloading, or storage of:

(A) organic liquids normally used as solvents, diluents, thinners, inks, colorants, paints, lacquers, enamels, varnishes, liquid resins, or other surface coatings;

(B) petroleum, petroleum fuels, other motor vehicle fuels, and natural gas liquids, none of which have a true vapor pressure of 11.0 pounds per square inch, absolute, or greater at maximum temperature of use;

(5) The facilities will meet any applicable requirements of Chapter 115 of this title (relating to Control of Air Pollution from Volatile Organic Compounds);

(6) Facilities used for the loading, unloading, or storage of any compound listed in 40 Code of Federal Regulations 261, Appendix VIII are not permitted by rule under this section.

Adopted August 9, 2000 Effective September 4, 2000

§106.474. Hydrochloric Acid Storage.

Hydrochloric acid storage tanks used exclusively for the storage of hydrochloric acid with an acid strength of 38% by weight or less are permitted by rule. If an acid more concentrated than 20% by weight is stored, the tank vent must be controlled to reduce emissions by at least 99%.

Adopted August 9, 2000 Effective September 4, 2000

§106.475. Pressurized Tanks or Tanks Vented to a Firebox.

Any vessel storing carbon compounds composed only of carbon, hydrogen, or oxygen is permitted by rule, provided that the vessel vent is directed to an incinerator, boiler, or other firebox having a stationary flue or a waste gas flare system that will operate with no visible emissions except as provided by Chapter 101 of this title (relating to General Air Quality Rules) for periods of maintenance or operational upset. However, vessels not exceeding 100 barrels capacity and storing only liquid petroleum gas may have the safety relief valve vent directly to the atmosphere. Also, any tank having a capacity not to exceed 1,000 gallons and storing only commercial odorants used to odorize petroleum gases may have the safety relief valve vent directly to the atmosphere.

Adopted August 9, 2000 Effective September 4, 2000

§106.476. Pressurized Tanks or Tanks Vented to Control.

Any tank or other container storing carbon compounds is permitted by rule, provided that the tank or container pressure is sufficient at all times to prevent vapor or gas loss to the atmosphere or the tank or container is equipped with a relief valve which directs all vapors or gases to an incinerator, boiler, or other firebox having a stationary flue or a waste gas smokeless flare system. The vapors or gases and any necessary fuel gas shall be mixed thoroughly upstream of the heater burner(s) or the flare tip such that the mixed gases have a minimum net or lower heating value of 200 British thermal units per cubic foot. The flare also shall meet the other requirements of §106.492 of this title (relating to Flares).

Adopted August 9, 2000 Effective September 4, 2000

§106.477. Anhydrous Ammonia Storage.

Anhydrous ammonia storage tanks and distribution facilities that meet the following conditions are permitted by rule.

(1) All valves, connectors, and hoses, associated with permanent storage tanks and any nurse tanks stored on-site, shall be properly maintained in leak-proof condition at all times.

(2) The capacity of each permanent storage tank is 30,000 gallons or less.

(3) When transferring ammonia, all vapors shall be vented back to the host tank and never to the atmosphere.

(4) When relieving pressure from hoses associated with permanent storage tanks and any nurse tanks, all vapors shall be bled into an adequate volume of water and never to the atmosphere.

(5) Each permanent storage tank and any nurse tanks stored on-site are equipped to prevent unauthorized operation.

(6) Before construction begins, written site approval must be received from the regional director and the owner or operator shall file with the commission’s Office of Permitting, Remediation,

and Registration in Austin a completed Form PI-7 and supporting documentation demonstrating that all of the requirements of this section will be met.

(7) Each permanent storage tank is located at least 1/4 mile from any recreational area or residence or other structure not occupied or used solely by the owner of the property upon which the facility is located.

Adopted August 9, 2000 Effective September 4, 2000

§106.478. Storage Tank and Change of Service.

Any fixed or floating roof storage tank, or change of service in any tank, used to store chemicals or mixtures of chemicals shown in Table 478 in paragraph (8) of this section is permitted by rule, provided that all of the following conditions of this section are met:

(1) The tank shall be located at least 500 feet away from any recreational area or residence or other structure not occupied or used solely by the owner of the facility or the owner of the property upon which the facility is located.

(2) The true vapor pressure of the compound to be stored shall be less than 11.0 psia at the maximum storage temperature.

(3) For those compounds that have a true vapor pressure greater than 0.5 psia and less than 11.0 psia at the maximum storage temperature, any storage vessel larger than 40,000 gallons capacity shall be equipped with an internal floating cover or equivalent control.

(A) An open top tank containing an external floating roof using double seal technology shall be an approved control alternative equivalent to an internal floating cover tank, provided the primary seal consists of either a mechanical shoe seal or a liquid-mounted seal. Double seals having a vapor-mounted primary seal are an approved alternative for existing open top floating roof tanks undergoing a change of service.

(B) The floating cover or floating roof design shall incorporate sufficient flotation to conform to the requirements of American Petroleum Institute Code 650, Appendix C or an equivalent degree of flotation.

(4) Compounds with a true vapor pressure of 0.5 psia or less at the maximum storage temperature may be stored in a fixed roof or cone roof tank which includes a submerged fill pipe or utilizes bottom loading.

(5) For fixed or cone roof tanks having no internal floating cover, all uninsulated tank exterior surfaces exposed to the sun shall be painted chalk white except where a dark color is necessary to help the tank absorb or retain heat in order to maintain the material in the tank in a liquid state.

(6) Emissions shall be calculated by methods specified in Section 4.3 of the current edition of the United States Environmental Protection Agency Publication AP-42. This document may

be obtained from the Superintendent of Documents, Washington D.C. 20402. It is Stock Number 0550000251-7, Volume I.

(7) Before construction begins, storage tanks of 25,000 gallons or greater capacity and located in a designated nonattainment area for ozone shall be registered with the commission's Office of Permitting, Remediation, and Registration in Austin using Form PI-7. The registration shall include a list of all tanks, calculated emissions for each carbon compound in tons per year for each tank, and a Table 7 of Form PI-2 for each different tank design.

(8) Mixtures of the chemicals listed in Table 478 which contain more than a total of 1.0% by volume of all other chemicals not listed in Table 478 are not covered by this section.

Table 478
Approved Chemical List for Exemption from Permitting

A. Compounds of the following classes containing only atoms of carbon and hydrogen, not including aromatic compounds:

Paraffins. Examples: hexane, pentane, octane, isooctane.

Cycloparaffins (except cyclopentane). Examples: cyclohexane, methyl cyclopentane.

Olefins (except butadiene). Examples: octene, isoprene.

Cycloolefins. Examples: cyclopentadiene, cyclohexene.

B. Aromatic hydrocarbons only as follows: Ethyl benzene, styrene, xylenes.

C. Compounds of the following classes containing only atoms of carbon, hydrogen, and oxygen:

Alcohols (except allyl alcohol, isobutyl alcohol, and propargyl alcohol). Examples of approved alcohols: butyl alcohol, ethylene glycol.

Ethers (except vinyl ethers, glycol ethers, epoxides, and other ringed oxide compounds such as ketenes, furans, and pyrans). Examples of approved ethers: butyl ether, isopropyl ether.

Esters (except acrylates, methacrylates, allyl acetate, vinyl acetate, isopropyl formate). Examples of approved esters: ethyl acetate, butyl formate, methyl propionate.

Ketones (except allyl acetone, methyl ethyl ketone, methyl normal butyl ketone, acetophenone, and vinyl ketones). Examples of approved ketones: acetone, hexanone.

D. Additional chemicals:

Crude oil and refinery petroleum fractions (except pyrolysis naphthas and pyrolysis gasolines) containing less than 10% benzene. Examples of approved petroleum fractions: intermediate and finished gasolines, naphthas, alkylates, fluid catalytic cracking unit feed, fuel oils, distillates, other liquid fuels, and condensates.

Natural gas and crude oil condensates that do not emit sour gas.

E. Non-approved chemicals:

Other chemicals not specifically included within the classes defined above are not approved. Examples of non-approved chemicals: aromatics (other than those listed or those found in the crude oil and refinery liquids as listed); aldehydes; amines; amides; imines; nitriles; halogenated compounds; sulfonated chemicals; cyanates; organic acids; ethylene oxide (EtO), propylene oxide, and other oxygenated compounds not listed; organometallic compounds; pesticides.

SUBCHAPTER W: TURBINES AND ENGINES
§§106.511 - 106.513
Effective August 16, 2012

§106.511. Portable and Emergency Engines and Turbines.

Internal combustion engine and gas turbine driven compressors, electric generator sets, and water pumps, used only for portable, emergency, and/or standby services are permitted by rule, provided that the maximum annual operating hours shall not exceed 10% of the normal annual operating schedule of the primary equipment; and all electric motors. For purposes of this section, "standby" means to be used as a "substitute for" and not "in addition to" other equipment.

Adopted August 9, 2000 Effective September 4, 2000

§106.512. Stationary Engines and Turbines.

Gas or liquid fuel-fired stationary internal combustion reciprocating engines or gas turbines that operate in compliance with the following conditions of this section are permitted by rule.

(1) The facility shall be registered by submitting the commission's Form PI-7, Table 29 for each proposed reciprocating engine, and Table 31 for each proposed gas turbine to the commission's Office of Permitting, Remediation, and Registration in Austin within ten days after construction begins. Engines and turbines rated less than 240 horsepower (hp) need not be registered, but must meet paragraphs (5) and (6) of this section, relating to fuel and protection of air quality. Engine hp rating shall be based on the engine manufacturer's maximum continuous load rating at the lesser of the engine or driven equipment's maximum published continuous speed. A rich-burn engine is a gas-fired spark-ignited engine that is operated with an exhaust oxygen content less than 4.0% by volume. A lean-burn engine is a gas-fired spark-ignited engine that is operated with an exhaust oxygen content of 4.0% by volume, or greater.

(2) For any engine rated 500 hp or greater, subparagraphs (A) - (C) of this paragraph shall apply.

(A) The emissions of nitrogen oxides (NO_x) shall not exceed the following limits:

(i) 2.0 grams per horsepower-hour (g/hp-hr) under all operating conditions for any gas-fired rich-burn engine;

(ii) 2.0 g/hp-hr at manufacturer's rated full load and speed, and other operating conditions, except 5.0 g/hp-hr under reduced speed, 80-100% of full torque conditions, for any spark-ignited, gas-fired lean-burn engine, or any compression-ignited dual fuel-fired engine manufactured new after June 18, 1992;

(iii) 5.0 g/hp-hr under all operating conditions for any spark-ignited, gas-fired, lean-burn two-cycle or four-cycle engine or any compression-ignited dual fuel-fired engine rated 825 hp or greater and manufactured after September 23, 1982, but prior to June 18, 1992;

(iv) 5.0 g/hp-hr at manufacturer's rated full load and speed and other operating conditions, except 8.0 g/hp-hr under reduced speed, 80-100% of full torque conditions for any spark-ignited, gas-fired, lean-burn four-cycle engine, or any compression-ignited dual fuel-fired engine that:

(I) was manufactured prior to June 18, 1992, and is rated less than 825 hp; or

(II) was manufactured prior to September 23, 1982;

(v) 8.0 g/hp-hr under all operating conditions for any spark-ignited, gas-fired, two-cycle lean-burn engine that:

(I) was manufactured prior to June 18, 1992, and is rated less than 825 hp; or

(II) was manufactured prior to September 23, 1982;

(vi) 11.0 g/hp-hr for any compression-ignited liquid-fired engine.

(B) For such engines which are spark-ignited gas-fired or compression-ignited dual fuel-fired, the engine shall be equipped as necessary with an automatic air-fuel ratio (AFR) controller which maintains AFR in the range required to meet the emission limits of subparagraph (A) of this paragraph. An AFR controller shall be deemed necessary for any engine controlled with a non-selective catalytic reduction (NSCR) converter and for applications where the fuel heating value varies more than ± 50 British thermal unit/standard cubic feet from the design lower heating value of the fuel. If an NSCR converter is used to reduce NO_x, the automatic controller shall operate on exhaust oxygen control.

(C) Records shall be created and maintained by the owner or operator for a period of at least two years, made available, upon request, to the

commission and any local air pollution control agency having jurisdiction, and shall include the following:

(i) documentation for each AFR controller, manufacturer's, or supplier's recommended maintenance that has been performed, including replacement of the oxygen sensor as necessary for oxygen sensor-based controllers. The oxygen sensor shall be replaced at least quarterly in the absence of a specific written recommendation;

(ii) documentation on proper operation of the engine by recorded measurements of NO_x and carbon monoxide (CO) emissions as soon as practicable, but no later than seven days following each occurrence of engine maintenance which may reasonably be expected to increase emissions, changes of fuel quality in engines without oxygen sensor-based AFR controllers which may reasonably be expected to increase emissions, oxygen sensor replacement, or catalyst cleaning or catalyst replacement. Stain tube indicators specifically designed to measure NO_x and CO concentrations shall be acceptable for this documentation, provided a hot air probe or equivalent device is used to prevent error due to high stack temperature, and three sets of concentration measurements are made and averaged. Portable NO_x and CO analyzers shall also be acceptable for this documentation;

(iii) documentation within 60 days following initial engine start-up and biennially thereafter, for emissions of NO_x and CO, measured in accordance with United States Environmental Protection Agency (EPA) Reference Method 7E or 20 for NO_x and Method 10 for CO. Exhaust flow rate may be determined from measured fuel flow rate and EPA Method 19. California Air Resources Board Method A-100 (adopted June 29, 1983) is an acceptable alternate to EPA test methods. Modifications to these methods will be subject to the prior approval of the Source and Mobile Monitoring Division of the commission. Emissions shall be measured and recorded in the as-found operating condition; however, compliance determinations shall not be established during start-up, shutdown, or under breakdown conditions. An owner or operator may submit to the appropriate regional office a report of a valid emissions test performed in Texas, on the same engine, conducted no more than 12 months prior to the most recent start of construction date, in lieu of performing an emissions test within 60 days following engine start-up at the new site. Any such engine shall be sampled no less frequently than biennially (or every 15,000 hours of elapsed run time, as recorded by an elapsed run time meter) and upon request of the executive director. Following the initial compliance test, in lieu of performing stack sampling on a biennial calendar basis, an owner or operator may elect to install and operate an elapsed operating time meter and shall test the engine within 15,000 hours of engine operation after the previous emission test. The owner or operator who elects to test on an operating hour schedule shall submit in writing, to the appropriate regional office, biennially after initial sampling, documentation of the actual recorded hours of engine

operation since the previous emission test, and an estimate of the date of the next required sampling.

(3) For any gas turbine rated 500 hp or more, subparagraphs (A) and (B) of this paragraph shall apply.

(A) The emissions of NO_x shall not exceed 3.0 g/hp-hr for gas-firing.

(B) The turbine shall meet all applicable NO_x and sulfur dioxide (SO_2) (or fuel sulfur) emissions limitations, monitoring requirements, and reporting requirements of EPA New Source Performance Standards Subpart GG--Standards of Performance for Stationary Gas Turbines. Turbine hp rating shall be based on turbine base load, fuel lower heating value, and International Standards Organization Standard Day Conditions of 59 degrees Fahrenheit, 1.0 atmosphere and 60% relative humidity.

(4) Any engine or turbine rated less than 500 hp or used for temporary replacement purposes shall be exempt from the emission limitations of paragraphs (2) and (3) of this section. Temporary replacement engines or turbines shall be limited to a maximum of 90 days of operation after which they shall be removed or rendered physically inoperable.

(5) Gas fuel shall be limited to: sweet natural gas or liquid petroleum gas, fuel gas containing no more than ten grains total sulfur per 100 dry standard cubic feet, or field gas. If field gas contains more than 1.5 grains hydrogen sulfide or 30 grains total sulfur compounds per 100 standard cubic feet (sour gas), the engine owner or operator shall maintain records, including at least quarterly measurements of fuel hydrogen sulfide and total sulfur content, which demonstrate that the annual SO_2 emissions from the facility do not exceed 25 tons per year (tpy). Liquid fuel shall be petroleum distillate oil that is not a blend containing waste oils or solvents and contains less than 0.3% by weight sulfur.

(6) There will be no violations of any National Ambient Air Quality Standard (NAAQS) in the area of the proposed facility. Compliance with this condition shall be demonstrated by one of the following three methods:

(A) ambient sampling or dispersion modeling accomplished pursuant to guidance obtained from the executive director. Unless otherwise documented by actual test data, the following nitrogen dioxide (NO_2)/NO_x ratios shall be used for modeling NO_2 NAAQS;

Device	NO_x Emission Rate (Q) g/hp-hr	NO_2/NO_x Ratio

IC Engine	Less than 2.0		0.4
IC Engine	2.0 thru 10.0		0.15
		+(0.5/Q)	
IC Engine	Greater than 10.0		0.2
Turbines			0.25
IC Engine with catalytic converter			0.85

(B) all existing and proposed engine and turbine exhausts are released to the atmosphere at a height at least twice the height of any surrounding obstructions to wind flow. Buildings, open-sided roofs, tanks, separators, heaters, covers, and any other type of structure are considered as obstructions to wind flow if the distance from the nearest point on the obstruction to the nearest exhaust stack is less than five times the lesser of the height, Hb, and the width, Wb, where:

Hb = maximum height of the obstruction, and
Wb = projected width of obstruction =

$$2\sqrt{\frac{lw}{3.141}}$$

where:

L = length of obstruction
W = width of obstruction

(C) the total emissions of NO_x (nitrogen oxide plus NO_2) from all existing and proposed facilities on the property do not exceed the most restrictive of the following:

(i) 250 tpy;

(ii) the value (0.3125 D) tpy, where D equals the shortest distance in feet from any existing or proposed stack to the nearest property line.

(7) Upon issuance of a standard permit for electric generating units, registrations under this section for engines or turbines used to generate electricity will no longer be accepted, except for:

(A) engines or turbines used to provide power for the operation of facilities registered under the Air Quality Standard Permit for Concrete Batch Plants;

(B) engines or turbines satisfying the conditions for facilities permitted by rule under Subchapter E of this title (relating to Aggregate and Pavement); or

(C) engines or turbines used exclusively to provide power to electric pumps used for irrigating crops.

Adopted May 23, 2001 Effective June 13, 2001

§106.513. Natural Gas-Fired Combined Heat and Power Units.

(a) Applicability.

(1) This section applies to combined heat and power (CHP) units that are powered by pipeline-quality natural gas-fired engines, including turbines. This section also authorizes any fugitive components associated with a CHP unit authorized by this section.

(2) This section does not relieve the owner or operator from complying with any other applicable provision of the Texas Health and Safety Code, Texas Water Code, rules of the Texas Commission on Environmental Quality (TCEQ), or any additional local, state, or federal laws or regulations. Emissions that exceed the limits in this section are not authorized and are violations.

(b) Definitions.

(1) Combined heat and power (CHP) unit--A collection of facilities and other equipment that generally consists of an electric generating unit (EGU) and a means of extracting energy from the EGU for useful purposes other than electricity generation, such as heating or cooling. A CHP unit does not include facilities for generating additional electricity after the EGU. Equipment that is not a source of emissions itself but also extracts energy from the exhaust flow to create electricity is not a facility and may be used in addition to a CHP unit authorized by this section.

(2) Pipeline-quality natural gas--A naturally occurring fluid mixture of hydrocarbons (composed predominantly of methane, with lesser amounts of ethane, propane, nitrogen, carbon dioxide, and trace amounts of hydrogen sulfide) produced in geological formations beneath the Earth's surface that maintains a gaseous state at standard atmospheric temperature and pressure under ordinary conditions, and that is provided by a supplier through a pipeline. Pipeline-quality natural gas must either be composed of at least 70% methane by volume, or have a gross calorific value between 950 and 1,100 British thermal units (BTU) per standard cubic foot. Sour gas as defined

in §101.1 of this title (relating to Definitions) is not pipeline-quality natural gas for purposes of this section.

(c) General Requirements.

(1) A CHP unit must be registered with the commission using the appropriate PI-7 form or an approved electronic registration method before start of construction. A CHP unit at a residential location that generates less than 20 kilowatts(kW) of electricity does not require registration and does not have to meet any other requirements of this section except subsection (a) of this section and paragraph (2) of this subsection.

(2) For a CHP unit to be eligible for authorization under this section, the heat recovered must equal at least 20% of the total heat energy output of the CHP unit. This requirement must be met continuously based on any calendar week of operation except for no more than two weeks in a rolling 52-week period if operation of the EGU component is necessary due to lack of available electricity.

(3) No owner or operator of a CHP unit that is required to register under this section may begin construction and/or operation without first obtaining written approval from the executive director.

(4) Except for oxidation-reduction (three-way) catalysts on rich-burn engines, and oxidation catalyst controls as required by subsection (d)(3) or (4) of this section, add-on controls may not be used to comply with the emission standards of this section.

(5) Any individual CHP unit, or any group of units meeting paragraph (7)(B) of this subsection, may not exceed 15 megawatts (MW) in capacity.

(6) Only one permit by rule (PBR) for Natural Gas-Fired CHP Units per this section may be registered at a site.

(7) No more than one CHP unit may be authorized at a site under this section, except as follows:

(A) Any units with a capacity of less than 20 kW are not limited in number, or restricted in location. Units with a capacity of less than 20 kW are not required to be considered when applying subparagraphs (B) or (C) of this paragraph.

(B) Multiple units may be authorized under this PBR if all stack emission points associated with the units are located within a circular area with a radius of 200 feet, and the total EGU capacity of the group is not greater than 15 MW.

(C) Multiple units may be authorized under this PBR if all stack emission points associated with the units are separated by a distance of at least 900 feet. Multiple groups of units meeting the requirements of subparagraph (B) of this paragraph may be authorized if the groups' emission points are separated by a distance of at least 900 feet.

(8) Notwithstanding fuel restrictions elsewhere in this section, during an emergency, this PBR authorizes the use of propane, liquefied petroleum gas, gasoline, diesel, or fuel oil as an approved fuel for not more than 720 hours in any 365-day period. This PBR also authorizes brief use of these emergency fuels as needed for purposes of maintenance or testing, for not more than two hours in any seven-day period.

(d) Emission Standards and Control Requirements.

(1) Notwithstanding paragraphs (2), (3), or (4) of this subsection, a CHP unit with a capacity less than 20 kW is not subject to a nitrogen oxides (NO_X) or carbon monoxide (CO) emission standard, and is not subject to the requirement for an oxidation catalyst control device.

(2) A CHP unit or any combination of units with a total capacity greater than or equal to 20 kW, but less than or equal to 8 MW, must meet the following emission standards: 1.0 pound of NO_X per megawatt-hour (lb NO_X/MWh); and 9.0 lb CO/MWh.

(3) Except as provided in paragraph (4) of this subsection, a CHP unit or any combination of units with a total capacity greater than 8 MW must meet the following emission standards: 0.7 lb NO_X/MWh; and 9.0 lb CO/MWh. A CHP unit or units under this paragraph must also be equipped with an oxidation catalyst control device that maintains a minimum of 70% control of volatile organic compounds (VOC) in the CHP unit exhaust stream.

(4) Any combination of CHP units with a total capacity greater than 8 MW that are at least 900 feet apart from one another must meet the following emission standards and control requirements. For the purposes of this paragraph, any group of units under subsection (c)(7)(B) of this section is considered to be one unit when determining whether subparagraph (A) or (B) of this paragraph applies.

(A) CHP units with a capacity less than or equal to 8 MW: 1.0 pound of NO_X per megawatt-hour (lb NO_X/MWh); and 9.0 lb CO/MWh.

(B) CHP units with a capacity greater than 8 MW: 0.7 lb NO_X/MWh; and 9.0 lb CO/MWh. A CHP unit under this subparagraph must also be equipped with an oxidation catalyst control device that maintains a minimum of 70% control of VOC in the CHP unit exhaust stream.

(5) Compliance with the NO_X standards above may be achieved by taking credit for the heat recovered from the combustion unit. Credit will be at the rate of 1.0 MWh for each 3.4 million BTU of heat recovered. In order to claim this credit for CHP for units not sold and certified as an integrated package by the manufacturer, the owner or operator must provide as part of the application documentation of the heat recovered, electric output, efficiency of the generator alone, efficiency of the generator including CHP, and the use for the non-electric output.

(e) Monitoring and Testing. CHP units authorized under this section with an electric generating capacity greater than or equal to 20 kW must meet the following requirements :

(1) Internal combustion engine-based CHP units (excluding turbines).

(A) The owner or operator shall initially analyze the emissions from the CHP unit using a portable analyzer no later than 180 calendar days after startup.

(B) After the initial testing specified by subparagraph (A) of this paragraph, the owner or operator shall conduct ongoing monitoring using a portable analyzer, once in the first half of each calendar year and once in the second half of each calendar year, with at least two months between tests. When a CHP unit did not operate for more than 1,000 hours in that half of the year, this test is not required.

(C) The portable analyzer must be operated at minimum in accordance with the manufacturer's instructions. A copy of the manufacturer's instructions shall be made available upon request. The NO_X and CO emissions must be converted into units of lb/MWh.

(2) Internal combustion engine-based CHP units and turbines. If the CHP unit is not certified to meet the emission standards of subsection (d) of this section by the manufacturer according to a United States Environmental Protection Agency (EPA) testing protocol, the unit must be tested within 90 days of startup for NO_X and CO according to appropriate EPA reference methods, California Air Resources Board methods, or equivalent alternative testing methods approved by the executive director and in accordance with the appropriate procedures of the TCEQ Sampling Procedures Manual. Tests must consist of three runs with a minimum of 30 minutes for each run or longer if required by the reference method. All engine- and turbine-based CHP units

designed to generate more than 375 kW must be retested by the above method after every 16,000 hours of operation, regardless of certification.

(3) All CHP units which are required by subsection (d)(3) or (4) of this section to have an oxidation catalyst control device shall be tested to verify compliance with the required 70% VOC control efficiency within 90 days of startup. In lieu of the above test, the 70% VOC control requirement shall be satisfied if the unit is tested for gaseous organic compounds and the reduction is at least 90%. The testing shall be conducted using EPA reference methods or equivalent alternative testing methods approved by the executive director and in accordance with the appropriate procedures of the TCEQ Sampling Procedures Manual. All units required to be equipped with an oxidation catalyst control device must also be retested after every 16,000 hours of operation.

(4) Except for rich-burn engines equipped with oxidation-reduction (three-way) catalysts, and units required to be equipped with an oxidation catalyst under subsection (d)(3) or (4) of this section, the uncontrolled source must demonstrate compliance with the emission standards in subsection (d) of this section.

(f) Recordkeeping. In addition to the minimum records required by §106.8 of this title (relating to Recordkeeping), the owner or operator must keep the following records:

(1) For the life of the CHP unit, the registration application and any additional representations made during the approval process to obtain the registration; and

(2) The owner or operator must keep the following records for at least two years and make them available to the TCEQ or any local pollution control program with jurisdiction upon request:

(A) A record of every one-week period of operation where the CHP unit did not comply with subsection (c)(2) of this section;

(B) All monitoring and testing data generated in compliance with subsection (e) of this section and in a format that shows the emission standards have been met;

(C) Records of CHP unit operation sufficient to demonstrate compliance with any applicable hour-based requirements of subsection (e) of this section;

(D) Records of maintenance described in subsection (g)(2) of this section; and (E) Records of the number of hours that any emergency fuel is used under

subsection (c)(8) of this section, and the reason why operating on an emergency fuel is necessary.

(g) Planned Maintenance, Startup, and Shutdown.

(1) This PBR authorizes all emissions from planned startup and shutdown activities associated with facilities that are authorized by this section.

(2) This PBR authorizes emissions from the following planned maintenance activities associated with facilities authorized by this section: routine maintenance including, but not limited to, filter changes, oxygen sensor replacements, overhauls, lubricant changes, spark plug changes, and emission control system maintenance.

Adopted July 25, 2012 Effective August 16, 2012

Appendix D

TCEQ Tables and Engine Specifications

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
Table 1(a) Emission Point Summary
Air Contaminant Data (Page 1)

Date:	November 2019
Permit No.:	102349
Regulated Entity No.:	RN104961164
Area Name:	West Texas Launch Site
Customer Reference No.:	CN604092627

EPN	FIN	Name	Component or Air Contaminant Name	Air Contaminant Emission Rate	
				lb/hr	TPY
TEST STAND 1	TEST STAND 1	Rocket Engine Test Stand 1	Helium	75.00	5.63
TEST STAND 3	TEST STAND 3	Rocket Engine Test Stand 3	Total VOC [1]	15.11	2.44
TEST STAND 3	TEST STAND 3	Rocket Engine Test Stand 3	NO_x	7.53	0.57
TEST STAND 3	TEST STAND 3	Rocket Engine Test Stand 3	CO	218.28	16.38
G-PUMP-1	G-PUMP-1	GEEx Test Stand 1 - Water Pump Engine 1	Total VOC [1]	0.18	0.36
G-PUMP-1	G-PUMP-1	GEEx Test Stand 1 - Water Pump Engine 1	NOx	3.46	6.91
G-PUMP-1	G-PUMP-1	GEEx Test Stand 1 - Water Pump Engine 1	CO	3.15	6.31
G-PUMP-1	G-PUMP-1	GEEx Test Stand 1 - Water Pump Engine 1	PM10, PM2.5	0.18	0.36
G-PUMP-1	G-PUMP-1	GEEx Test Stand 1 - Water Pump Engine 1	SO2	0.01	0.01
G-PUMP-1	G-PUMP-1	GEEx Test Stand 1 - Water Pump Engine 1	Total HAPs [2]	0.01	0.02
G-PUMP-2	G-PUMP-2	GEEx Test Stand 1 - Water Pump Engine 2	Total VOC [1]	0.18	0.36
G-PUMP-2	G-PUMP-2	GEEx Test Stand 1 - Water Pump Engine 2	NOx	3.46	6.91
G-PUMP-2	G-PUMP-2	GEEx Test Stand 1 - Water Pump Engine 2	CO	3.15	6.31

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
Table 1(a) Emission Point Summary
Air Contaminant Data (Page 2)

Date:	November 2019
Permit No.:	102349
Regulated Entity No.:	RN104961164
Area Name:	West Texas Launch Site
Customer Reference No.:	CN604092627

EPN	FIN	Name	Component or Air Contaminant Name	Air Contaminant Emission Rate	
				lb/hr	TPY
G-PUMP-2	G-PUMP-2	GEEx Test Stand 1 - Water Pump Engine 2	PM10, PM2.5	0.18	0.36
G-PUMP-2	G-PUMP-2	GEEx Test Stand 1 - Water Pump Engine 2	SO2	0.01	0.01
G-PUMP-2	G-PUMP-2	GEEx Test Stand 1 - Water Pump Engine 2	Total HAPs [2]	0.01	0.02
G-PUMP-3	G-PUMP-3	GEEx Test Stand 1 - Water Pump Engine 3	Total VOC [1]	0.18	0.36
G-PUMP-3	G-PUMP-3	GEEx Test Stand 1 - Water Pump Engine 3	NOx	3.46	6.91
G-PUMP-3	G-PUMP-3	GEEx Test Stand 1 - Water Pump Engine 3	CO	3.15	6.31
G-PUMP-3	G-PUMP-3	GEEx Test Stand 1 - Water Pump Engine 3	PM10, PM2.5	0.18	0.36
G-PUMP-3	G-PUMP-3	GEEx Test Stand 1 - Water Pump Engine 3	SO2	0.01	0.01
G-PUMP-3	G-PUMP-3	GEEx Test Stand 1 - Water Pump Engine 3	Total HAPs [2]	0.01	0.02
G-PUMP-4	G-PUMP-4	GEEx Test Stand 1 - Water Pump Engine 4	Total VOC [1]	0.18	0.36
G-PUMP-4	G-PUMP-4	GEEx Test Stand 1 - Water Pump Engine 4	NOx	3.46	6.91
G-PUMP-4	G-PUMP-4	GEEx Test Stand 1 - Water Pump Engine 4	CO	3.15	6.31
G-PUMP-4	G-PUMP-4	GEEx Test Stand 1 - Water Pump Engine 4	PM10, PM2.5	0.18	0.36

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
Table 1(a) Emission Point Summary
Air Contaminant Data (Page 3)

Date:	November 2019
Permit No.:	102349
Regulated Entity No.:	RN104961164
Area Name:	West Texas Launch Site
Customer Reference No.:	CN604092627

EPN	FIN	Name	Component or Air Contaminant Name	Air Contaminant Emission Rate	
				lb/hr	TPY
G-PUMP-4	G-PUMP-4	GEEx Test Stand 1 - Water Pump Engine 4	SO2	0.01	0.01
G-PUMP-4	G-PUMP-4	GEEx Test Stand 1 - Water Pump Engine 4	Total HAPs [2]	0.01	0.02
X-PUMP-1	X-PUMP-1	XEEx Test Stand 3 - Water Pump Engine 1	Total VOC [1]	0.11	0.47
X-PUMP-1	X-PUMP-1	XEEx Test Stand 3 - Water Pump Engine 1	NOx	2.04	8.94
X-PUMP-1	X-PUMP-1	XEEx Test Stand 3 - Water Pump Engine 1	CO	1.86	8.16
X-PUMP-1	X-PUMP-1	XEEx Test Stand 3 - Water Pump Engine 1	PM10, PM2.5	0.11	0.47
X-PUMP-1	X-PUMP-1	XEEx Test Stand 3 - Water Pump Engine 1	SO2	<0.01	0.02
X-PUMP-1	X-PUMP-1	XEEx Test Stand 3 - Water Pump Engine 1	Total HAPs [2]	<0.01	0.02
X-PUMP-2	X-PUMP-2	XEEx Test Stand 3 - Water Pump Engine 2	Total VOC [1]	0.11	0.47
X-PUMP-2	X-PUMP-2	XEEx Test Stand 3 - Water Pump Engine 2	NOx	2.04	8.94
X-PUMP-2	X-PUMP-2	XEEx Test Stand 3 - Water Pump Engine 2	CO	1.86	8.16
X-PUMP-2	X-PUMP-2	XEEx Test Stand 3 - Water Pump Engine 2	PM10, PM2.5	0.11	0.47
X-PUMP-2	X-PUMP-2	XEEx Test Stand 3 - Water Pump Engine 2	SO2	<0.01	0.02

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
Table 1(a) Emission Point Summary
Air Contaminant Data (Page 4)

Date:	November 2019
Permit No.:	102349
Regulated Entity No.:	RN104961164
Area Name:	West Texas Launch Site
Customer Reference No.:	CN604092627

EPN	FIN	Name	Component or Air Contaminant Name	Air Contaminant Emission Rate	
				lb/hr	TPY
X-PUMP-2	X-PUMP-2	XEEx Test Stand 3 - Water Pump Engine 2	Total HAPs [2]	<0.01	0.02
X-PUMP-3	X-PUMP-3	XEEx Test Stand 3 - Water Pump Engine 3	Total VOC [1]	0.11	0.47
X-PUMP-3	X-PUMP-3	XEEx Test Stand 3 - Water Pump Engine 3	NOx	2.04	8.94
X-PUMP-3	X-PUMP-3	XEEx Test Stand 3 - Water Pump Engine 3	CO	1.86	8.16
X-PUMP-3	X-PUMP-3	XEEx Test Stand 3 - Water Pump Engine 3	PM10, PM2.5	0.11	0.47
X-PUMP-3	X-PUMP-3	XEEx Test Stand 3 - Water Pump Engine 3	SO2	<0.01	0.02
X-PUMP-3	X-PUMP-3	XEEx Test Stand 3 - Water Pump Engine 3	Total HAPs [2]	<0.01	0.02
H2O2TK-1	H2O2TK-1	Hydrogen Peroxide Storage Tank	H2O2	0.15	<0.01
H2O2TK-2	H2O2TK-2	Hydrogen Peroxide Storage Tank	H2O2	0.15	<0.01
H2O2TK-3	H2O2TK-3	Hydrogen Peroxide Storage Tank	H2O2	0.15	<0.01
FUG-GEEx	FUG-GEEx	GEEx Fugitive Emissions	Total VOC [1]	1.03	4.53
FUG-GEEx	FUG-GEEx	GEEx Fugitive Emissions	Helium	2.27	9.92
FUG-XEEx	FUG-XEEx	XEEx Fugitive Emissions	Total VOC [1]	0.19	0.83

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
Table 1(a) Emission Point Summary
Air Contaminant Data (Page 5)

Date:	November 2019
Permit No.:	102349
Regulated Entity No.:	RN104961164
Area Name:	West Texas Launch Site
Customer Reference No.:	CN604092627

EPN	FIN	Name	Component or Air Contaminant Name	Air Contaminant Emission Rate	
				lb/hr	TPY
FUG-XEEx	FUG-XEEx	XEEx Fugitive Emissions	Helium	0.21	0.94
FUG-LPAD	FUG-LPAD	Launch Pad Fugitive Emissions	Total VOC [1]	0.07	0.30
FUG-LPAD	FUG-LPAD	Launch Pad Fugitive Emissions	H2O2	0.03	0.12
LNG-VENT	LNG-VENT	LNG Storage Tanks Vent	Total VOC [1]	5.28	1.49

[1] Total VOC include HAPs.

[2] Total HAPs include benzene.

Texas Commission on Environmental Quality
Table 29 Reciprocating Engines

I. Engine Data

Manufacturer:	Model No.	Serial No.	Manufacture Date:
John Deere	6135HF485	TBD	2011 or later
Rebuilds Date:	**No. of Cylinders:**	**Compression Ratio:**	**EPN:**
	6	16.0:1	G-PUMP-1,2,3,4

Application: ☐ Gas Compression ☐ Electric Generation ☐ Refrigeration ☐ Emergency/Stand by

☒ 4 Stroke Cycle ☐ 2 Stroke Cycle ☐ Carbureted ☐ Spark Ignited ☐ Dual Fuel ☐ Fuel Injected

☒ Diesel ☐ Naturally Aspirated ☐ Blower /Pump Scavenged ☐ Turbo Charged and I.C. ☐ Turbo Charged

☐ Intercooled ☐ I.C. Water Temperature ☐ Lean Burn ☐ Rich Burn

Ignition/Injection Timing: Fixed: Variable:

Manufacture Horsepower Rating: 550 Proposed Horsepower Rating:

Discharge Parameters

Stack Height (Feet)	Stack Diameter (Feet)	Stack Temperature (^{o}F)	Exit Velocity (FPS)
7.67	0.5	907	246

II. Fuel Data

Type of Fuel: ☐ Field Gas ☐ Landfill Gas ☐ LP Gas ☐ Natural Gas ☐ Digester Gas ☒ Diesel

Fuel Consumption (BTU/bhp-hr): 7527 Heat Value: 19300 (HHV) 18700 (LHV)

Sulfur Content (grains/100 scf - weight %): <10

III. Emission Factors (Before Control)

NO_X		CO		SO_2		VOC		Formaldehyde		PM10	
g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv
2.85		2.60		0.93		0.15				0.15	

Source of Emission Factors: ☐ Manufacturer Data ☒ AP-42 ☐ Other (specify):

IV. Emission Factors (Post Control)

NO_X		CO		SO2		VOC		Formaldehyde		PM10	
g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv

Method of Emission Control: ☐ NSCR Catalyst ☐ Lean Operation ☐ Parameter Adjustment

☐ Stratified Charge ☐ JLCC Catalyst ☐ Other (Specify):_____

Note: *Must submit a copy of any manufacturer control information that demonstrates control efficiency.*

Is Formaldehyde included in the VOCs? ☒ Yes ☐ No

V. Federal and State Standards (Check all that apply)

☐ NSPS JJJJ ☒ MACT ZZZZ ☒ NSPS IIII ☐ Title 30 Chapter 117 - List County: _____

VI. Additional Information

1. Submit a copy of the engine manufacturer's site rating or general rating specification data.
2. Submit a typical fuel gas analysis, including sulfur content and heating value. For gaseous fuels, provide mole percent of constituents.
3. Submit description of air/fuel ratio control system (manufacturer information is acceptable).

Texas Commission on Environmental Quality
Table 29 Reciprocating Engines

I. Engine Data

Manufacturer:	Model No.	Serial No.	Manufacture Date:
John Deere	6090HF485	RG6090L118084	December 2013
Rebuilds Date:	**No. of Cylinders:**	**Compression Ratio:**	**EPN:**
	6	16.0:1	X-PUMP-1

Application: ☐ Gas Compression ☐ Electric Generation ☐ Refrigeration ☐ Emergency/Stand by

☒ 4 Stroke Cycle ☐ 2 Stroke Cycle ☐ Carbureted ☐ Spark Ignited ☐ Dual Fuel ☐ Fuel Injected

☒ Diesel ☐ Naturally Aspirated ☐ Blower /Pump Scavenged ☐ Turbo Charged and I.C. ☐ Turbo Charged

☐ Intercooled ☐ I.C. Water Temperature ☐ Lean Burn ☐ Rich Burn

Ignition/Injection Timing: Fixed: Variable:

Manufacture Horsepower Rating: 325 Proposed Horsepower Rating:

Discharge Parameters

Stack Height (Feet)	Stack Diameter (Feet)	Stack Temperature (°F)	Exit Velocity (FPS)
6.83	0.471	728	198

II. Fuel Data

Type of Fuel: ☐ Field Gas ☐ Landfill Gas ☐ LP Gas ☐ Natural Gas ☐ Digester Gas ☒ Diesel

Fuel Consumption (BTU/bhp-hr): 6658.5 Heat Value: 19300 (HHV) 18700 (LHV)

Sulfur Content (grains/100 scf - weight %): <10

III. Emission Factors (Before Control)

NO_X		CO		SO_2		VOC		Formaldehyde		PM10	
g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv
2.85		2.60		0.93		0.15				0.15	

Source of Emission Factors: ☐ Manufacturer Data ☒ AP-42 ☐ Other (specify):

IV. Emission Factors (Post Control)

NO_X		CO		SO2		VOC		Formaldehyde		PM10	
g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv

Method of Emission Control: ☐ NSCR Catalyst ☐ Lean Operation ☐ Parameter Adjustment

☐ Stratified Charge ☐ JLCC Catalyst ☐ Other (Specify):_____

Note: *Must submit a copy of any manufacturer control information that demonstrates control efficiency.*

Is Formaldehyde included in the VOCs? ☒ Yes ☐ No

V. Federal and State Standards (Check all that apply)

☐ NSPS JJJJ ☒ MACT ZZZZ ☒ NSPS IIII ☐ Title 30 Chapter 117 - List County: _____

VI. Additional Information

1. Submit a copy of the engine manufacturer's site rating or general rating specification data.
2. Submit a typical fuel gas analysis, including sulfur content and heating value. For gaseous fuels, provide mole percent of constituents.
3. Submit description of air/fuel ratio control system (manufacturer information is acceptable).

Texas Commission on Environmental Quality
Table 29 Reciprocating Engines

I. Engine Data

Manufacturer:	Model No.	Serial No.	Manufacture Date:
John Deere	6090HF485	RG6090L118128	December 2013
Rebuilds Date:	**No. of Cylinders:**	**Compression Ratio:**	**EPN:**
	6	16.0:1	X-PUMP-2

Application: ☐ Gas Compression ☐ Electric Generation ☐ Refrigeration ☐ Emergency/Stand by

☒ 4 Stroke Cycle ☐ 2 Stroke Cycle ☐ Carbureted ☐ Spark Ignited ☐ Dual Fuel ☐ Fuel Injected

☒ Diesel ☐ Naturally Aspirated ☐ Blower /Pump Scavenged ☐ Turbo Charged and I.C. ☐ Turbo Charged

☐ Intercooled ☐ I.C. Water Temperature ☐ Lean Burn ☐ Rich Burn

Ignition/Injection Timing: Fixed: Variable:

Manufacture Horsepower Rating: 325 Proposed Horsepower Rating:

Discharge Parameters

Stack Height (Feet)	Stack Diameter (Feet)	Stack Temperature (°F)	Exit Velocity (FPS)
6.83	0.471	728	198

II. Fuel Data

Type of Fuel: ☐ Field Gas ☐ Landfill Gas ☐ LP Gas ☐ Natural Gas ☐ Digester Gas ☒ Diesel

Fuel Consumption (BTU/bhp-hr): 6658.5 Heat Value: 19300 (HHV) 18700 (LHV)

Sulfur Content (grains/100 scf - weight %): <10

III. Emission Factors (Before Control)

NO_X		CO		SO_2		VOC		Formaldehyde		PM10	
g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv
2.85		2.60		0.93		0.15				0.15	

Source of Emission Factors: ☐ Manufacturer Data ☒ AP-42 ☐ Other (specify):

IV. Emission Factors (Post Control)

NO_X		CO		SO2		VOC		Formaldehyde		PM10	
g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv

Method of Emission Control: ☐ NSCR Catalyst ☐ Lean Operation ☐ Parameter Adjustment

☐ Stratified Charge ☐ JLCC Catalyst ☐ Other (Specify):_____

Note: *Must submit a copy of any manufacturer control information that demonstrates control efficiency.*

Is Formaldehyde included in the VOCs? ☒ Yes ☐ No

V. Federal and State Standards (Check all that apply)

☐ NSPS JJJJ ☒ MACT ZZZZ ☒ NSPS IIII ☐ Title 30 Chapter 117 - List County: _____

VI. Additional Information

1. Submit a copy of the engine manufacturer's site rating or general rating specification data.
2. Submit a typical fuel gas analysis, including sulfur content and heating value. For gaseous fuels, provide mole percent of constituents.
3. Submit description of air/fuel ratio control system (manufacturer information is acceptable).

Texas Commission on Environmental Quality
Table 29 Reciprocating Engines

I. Engine Data

Manufacturer:	Model No.	Serial No.	Manufacture Date:
John Deere	6090HF485	RG6090L119490	April 2014
Rebuilds Date:	**No. of Cylinders:**	**Compression Ratio:**	**EPN:**
	6	16.0:1	X-PUMP-3

Application: ☐ Gas Compression ☐ Electric Generation ☐ Refrigeration ☐ Emergency/Stand by

☒ 4 Stroke Cycle ☐ 2 Stroke Cycle ☐ Carbureted ☐ Spark Ignited ☐ Dual Fuel ☐ Fuel Injected

☒ Diesel ☐ Naturally Aspirated ☐ Blower /Pump Scavenged ☐ Turbo Charged and I.C. ☐ Turbo Charged

☐ Intercooled ☐ I.C. Water Temperature ☐ Lean Burn ☐ Rich Burn

Ignition/Injection Timing: Fixed: Variable:

Manufacture Horsepower Rating: 325 Proposed Horsepower Rating:

Discharge Parameters

Stack Height (Feet)	Stack Diameter (Feet)	Stack Temperature (^{o}F)	Exit Velocity (FPS)
6.83	0.471	728	198

II. Fuel Data

Type of Fuel: ☐ Field Gas ☐ Landfill Gas ☐ LP Gas ☐ Natural Gas ☐ Digester Gas ☒ Diesel

Fuel Consumption (BTU/bhp-hr): 6658.5 Heat Value: 19300 (HHV) 18700 (LHV)

Sulfur Content (grains/100 scf - weight %): <10

III. Emission Factors (Before Control)

NO_X		CO		SO_2		VOC		Formaldehyde		PM10	
g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv
2.85		2.60		0.93		0.15				0.15	

Source of Emission Factors: ☐ Manufacturer Data ☒ AP-42 ☐ Other (specify):

IV. Emission Factors (Post Control)

NO_X		CO		SO2		VOC		Formaldehyde		PM10	
g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv

Method of Emission Control: ☐ NSCR Catalyst ☐ Lean Operation ☐ Parameter Adjustment

☐ Stratified Charge ☐ JLCC Catalyst ☐ Other (Specify):_____

Note: *Must submit a copy of any manufacturer control information that demonstrates control efficiency.*

Is Formaldehyde included in the VOCs? ☒ Yes ☐ No

V. Federal and State Standards (Check all that apply)

☐ NSPS JJJJ ☒ MACT ZZZZ ☒ NSPS IIII ☐ Title 30 Chapter 117 - List County: _____

VI. Additional Information

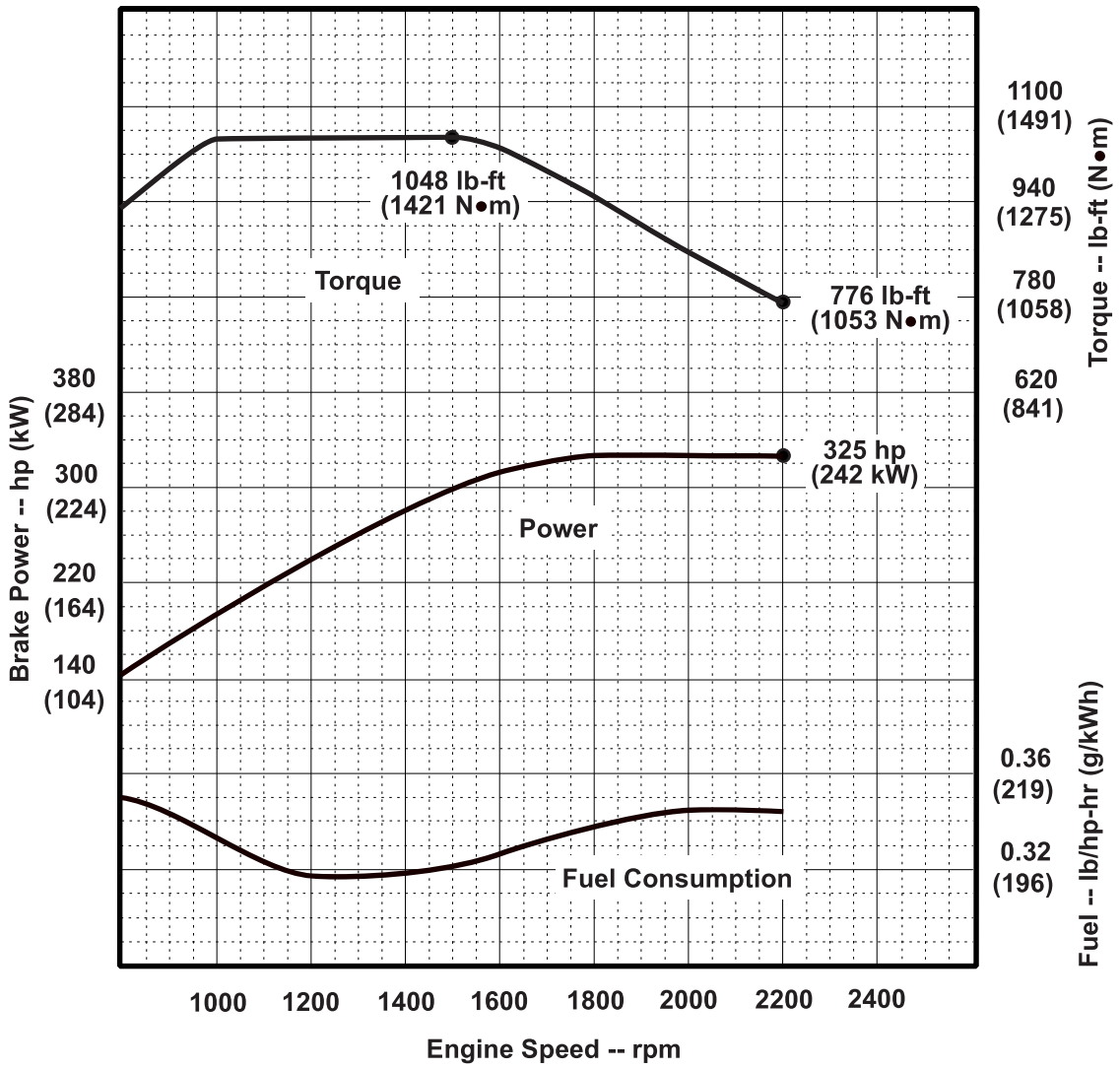
1. Submit a copy of the engine manufacturer's site rating or general rating specification data.
2. Submit a typical fuel gas analysis, including sulfur content and heating value. For gaseous fuels, provide mole percent of constituents.
3. Submit description of air/fuel ratio control system (manufacturer information is acceptable).

JOHN DEERE

ENGINE PERFORMANCE CURVE

Rating: Gross Power
Application: Industrial - Heavy-Duty
Power Bulge - 0%
Torque Rise - 35%

PowerTech Plus™ 9.0 L Engine
Model: **6090HF485**
JD Electronic Control
325 hp @ 2200 rpm
242 kW @ 2200 rpm
[See Option Code Table]



STANDARD CONDITIONS*

Air Intake Restriction ..... 12 in.H_2O (3 kPa)
Exhaust Back Pressure ..... 30 in.H_2O (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-3 Emission Certifications:	Certified by:
CARB; EPA; EU Ref: Engine Emission Label	Brian L. Carlson 15 July 2005

* Revised Data
Curve: 6090HF485325_2200_0_35 ..... Sheet 1 of 2
July 2005

Engine Installation Criteria

General Data

Model	6090HF485
Number of Cylinders	6
Bore and Stroke--in. (mm)	4.661 (118.4) x 5.354 (136.0)
Displacement--in.^{3} (L)	548 (9)
Compression Ratio	16.0 : 1
Valves per Cylinder--Intake/Exhaust	2 / 2
Firing Order	1-5-3-6-2-4
Combustion System	HPCR
Engine Type	In-line, 4-Cycle
Aspiration	Turbocharged
Charge Air Cooling System	Air-to-Air
Engine Crankcase Vent System	Open

Physical Data

Length--in. (mm)	47.6 (1208)
Width--in. (mm)	24.8 (630)
Height--in. (mm)	43.8 (1113)
Weight, dry--lb (kg)	1986 (901)
(Includes flywheel housing, flywheel & electrics)	
Center of Gravity Location	
From Rear Face of Block(X-axis)--in.(mm)	17.1 (434.4)
Right of Crankshaft (Y-axis)--in. (mm)	0.1 (2.2)
Above Crankshaft (Z-axis)--in. (mm)	7.9 (201.4)
Maximum Allowable Static Bending Moment at Rear Face of Flywhl Hsg w/ 5-G Load--lb-ft (N•m)	600 (814)

Thrust Bearing Load Limit --lb (N)	Forward	Rearward
Intermittent	2923 (13,000)	1349 (6000)
Continuous	1933 (8600)	899 (4000)

Max. Front of Crank. Torsional Vibration--DDA	0.25
Max. Continuous Damper Temp--°F (°C)	180 (82)

Electrical System

	12 Volt	24 Volt
Min. Battery Capacity (CCA)--amp	1100	750
Max. Allow. Starting Circuit Resist.--Ohm	0.0012	0.002
Starter Rolling Current		
At 32 °F (0 °C)--amp	920	600
At -22 °F (-30 °C)--amp	1300	700
Min. Voltage at ECU during Cranking--volts	6	10
Maximum ECU Temperature--°F (°C)	221 (105)	
Max. VTG Actuator Surface Temp.--°F (°C)	356 (180)	
Maximum Harness Temperature--°F (°C)	257 (125)	

Air System

Maximum Allowable Temp Rise--Ambient Air to Engine Inlet--°F (°C)	15 (8)
Maximum Air Intake Restriction:	
Dirty Air Cleaner--in. H_2O (kPa)	25 (6.25)
Clean Air Cleaner--in. H_2O (kPa)	15 (3.75)
Engine Air Flow--ft^3/min (m^3/min)	769 (21.77)
Air Cleaner Efficiency--%	99.9

Charge Air Cooling System

Air/Air Exch'r. Heat Rej.–Btu/min(kW)	3341 (58.7)
Compressor Discharge Temp.(Rated @ 77 °F (25°C) Ambient Air--°F (°C)	386 (196.7)
Compressor Discharge Temp.(Max.) @ Peak Torque, 47°C ambient, 80 kPa barometer--°F (°C)	500 (260)
Max. Pressure Drop, thru CAC--in.H_2O (kPa)	64 (16)
Min. Pressure Drop, thru CAC--in.H_2O (kPa)	32 (8)
Intake Manifold Pressure--psi (kPa)	30 (209.8)
Max CAC Out Temp @ 77°F (25°C) Amb.--°F (°C)	127(53)
Min CAC Out Temp @ 77°F (25°C) Amb.--°F (°C)	114(45.7)
Max CAC Out Temp @ any Ambient--°F (°C)	190 (88)

Cooling System

Engine Heat Rejection--BTU/min (kW)	6557 (115.2)
Coolant Flow--gal/min (L/min)	103 (390)
Thermostat Start to Open--°F (°C)	180 (82)
Thermostat Fully Open--°F (°C)	201 (94)
Engine Coolant Capacity--qt (L)	17 (16)
Minimum Pressure Cap--psi (kPa)	14.5 (100)
Maximum Top Tank Temp--°F (°C)	230 (110)
Minimum Coolant Fill Rate--gal/min (L/min)	3 (12)
Minimum Air-to-Boil Temperature--°F (°C)	117 (47)
Minimum Pump Inlet Pressure--psi (kPa)	4.4 (30)
Max. Radiator System Restriction--in. H_2O (kPa)	5.6 (14)

Exhaust System

Exhaust Flow--ft^3/min (m^3/min)	1620 (46)
Exhaust Temperature--°F (°C)	728 (387)
Max. Allowable Back Pressure--in. H_2O (kPa)	40 (10)
Minimum Exhaust Restriction----in. H_2O (kPa)	16 (4)
Max. Bend. Moment on Turbo Out.–lb-ft (N•m)	5.2 (7)
Max. Shear on Turbo Outlet--lb (kg)	24 (11)

Fuel System

ECU Description	L14 Controller
Fuel Injection Pump	Denso HP4
Governor Type	Electronic
Total Fuel Flow--lb/hr (kg/hr)	450 (204.0)
Fuel Consumption--lb/hr (kg/hr)	112 (51.0)
Max. Fuel Inlet Temperature--°F (°C)	176 (80)
Fuel Temp. Rise, Inlet to Return--°F (°C)	91.8 (51)
Max. Fuel Inlet Restriction--in. H_2O (kPa)	80 (20)
Max. Fuel Inlet Pressure--in. H_2O (kPa)	80 (20)
Max. Fuel Return Pressure--in. H_2O (kPa)	80 (20)

Lubrication System

Oil Pressure at Rated Speed--psi (kPa)	42 (290)
Oil Pressure at Low Idle--psi (kPa)	25 (170)
Max. Oil Carryover in Blow-by--lb/hr (g/hr)	0.007 (3)
Max. Airflow in Blow-by--gal/min (l/min)	40 (150)
Max. Crankcase Pressure--in. H_2O (kPa)	2 (0.5)

Performance Data

Rated Power--hp (kW)	325 (242)
Rated Speed--rpm	2200
Breakaway Speed--rpm	2270
Fast Idle Speed--rpm	2420
Peak Torque--lb-ft (N•m)	1048 (1421)
Peak Torque Speed--rpm	1500
Low Idle Speed--rpm	800
BMEP--psi (kPa)	213 (1470)
Friction Power @ Rated Speed--hp (kW)	50 (37)
Altitude Capability--ft (m)	10,000 (3000)*
Ratio--Air : Fuel	28.4 : 1
Smoke @ Rated Speed--Bosch No.	0.67
Noise--dB(A) @ 1 m	NA
Power Bulge--%	0
Power Bulge Speed--rpm	NA
Torque Rise--%	35

Engine Speed rpm	Power hp (kW)	Torque lb-ft (N•m)	BSFC lb/hp-hr (g/kWh)
2200	325 (242)	776 (1053)	0.344 (210)
2000	325 (242)	854 (1158)	0.345 (210)
1800	325 (242)	949 (1287)	0.339 (207)
1600	312 (233)	1025 (1389)	0.328 (200)
1500	299 (223)	1048 (1421)	0.325 (198)
1400	278 (208)	1044 (1416)	0.320 (195)
1200	239 (178)	1044 (1416)	0.319 (194)
1000	199 (148)	1044 (1416)	0.333 (203)
800	142 (106)	932 (1263)	0.350 (213)

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

* Revised Data

Curve: 6090HF485325_2200_0_35 ..... Sheet 2 of 2

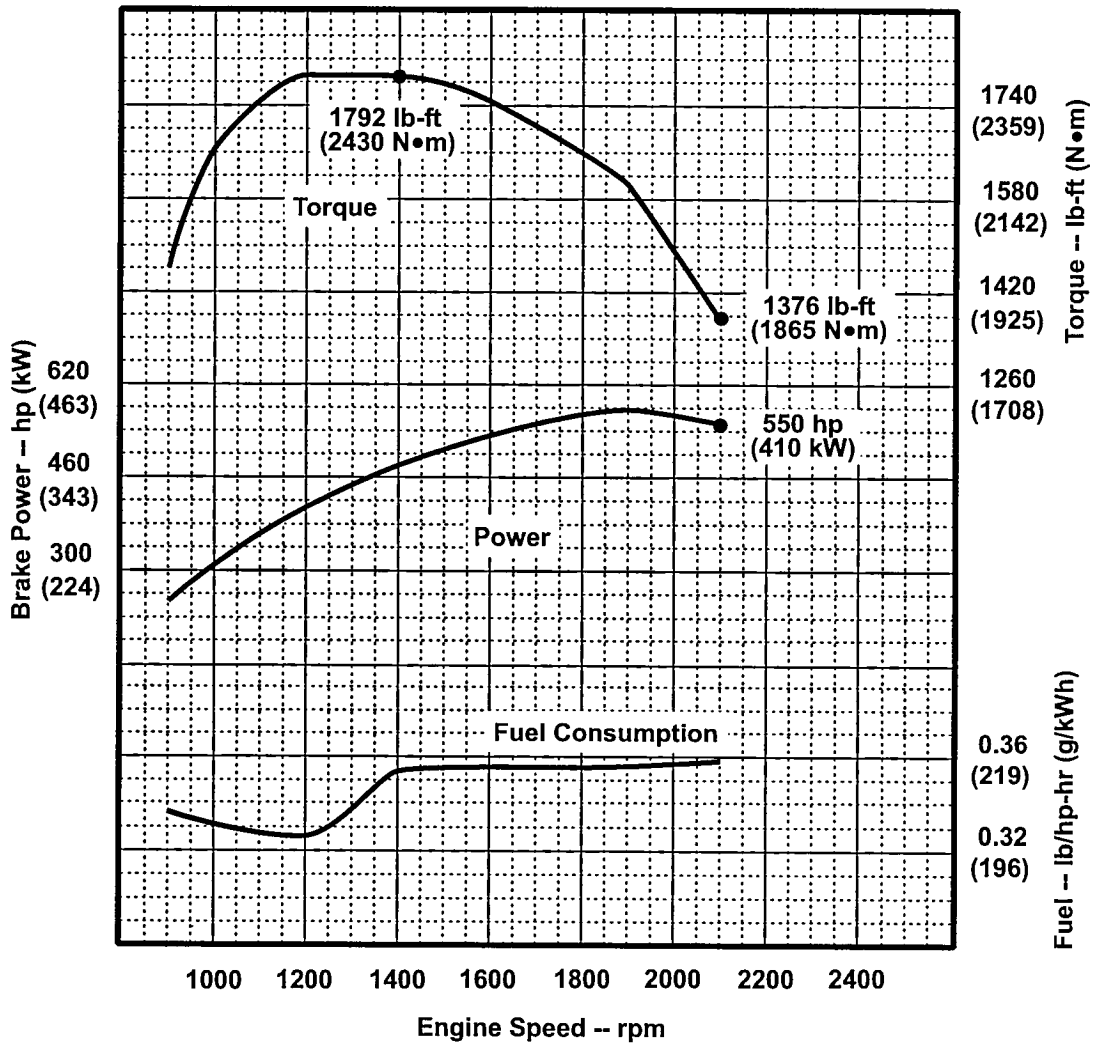
July 2005

JOHN DEERE

ENGINE PERFORMANCE CURVE

Rating: Gross Power
Application: Industrial - Intermittent
Power Bulge - 5%
Torque Rise - 30%

PowerTech Plus™ 13.5 L Engine
Model: **6135HF485**
JD Electronic Control
550 hp @ 2100 rpm
410 kW @ 2100 rpm
[See Option Code Table]



STANDARD CONDITIONS

Air Intake Restriction ..... 12 in.H_2O (3 kPa)
Exhaust Back Pressure ..... 30 in.H_2O (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-3 Emission Certifications:	Certified by:
CARB; EPA; EU Ref: Engine Emission Label	Brian L. Carlson 26 April 2006

* Revised Data
Curve: 6135HF485550_2100_5_30 ..... Sheet 1 of 2
April 2006

Engine Installation Criteria

General Data

Model	6135HF485
Number of Cylinders	6
Bore and Stroke--in. (mm)	5.20 (132) x 6.50 (165)
Displacement--in.^{3} (L)	824 (13.5)
Compression Ratio	16.0 : 1
Valves per Cylinder--Intake/Exhaust	2 / 2
Firing Order	1-5-3-6-2-4
Combustion System	Unit Injection
Engine Type	In-line, 4-Cycle
Aspiration	Turbocharged
Charge Air Cooling System	Air-to-Air
Engine Crankcase Vent System	Open

Physical Data

Length--in. (mm)	52.5 (1334)
Width--in. (mm)	33.7 (855)
Height--in. (mm)	59.5 (1512)
Weight, dry--lb (kg)	3292 (1493)
(Includes flywheel housing, flywheel & electrics)	
Center of Gravity Location	
From Rear Face of Block (X-axis)--in. (mm)	20.0 (507)
Right of Crankshaft (Y-axis)--in. (mm)	0.1 (2)
Above Crankshaft (Z-axis)--in. (mm)	8.1 (206)
Maximum Allowable Static Bending Moment at Rear Face of Flywhl Hsg w/ 5-G Load--lb-ft (N•m)	600 (814)

Thrust Bearing Load Limit --lb (N)	Forward	Rearward
Intermittent	1821 (8100)	899 (4000)
Continuous	1214 (5400)	562 (2500)

Max. Continuous Damper Temp--°F (°C)	180 (82)

Electrical System

	12 Volt	24 Volt
Min. Battery Capacity (CCA)--amp	1900	925
Max. Allow. Starting Circuit Resist.--Ohm	0.0012	0.002
Starter Rolling Current		
At 32 °F (0 °C)--amp	920	600
At -22 °F (-30 °C)--amp	1300	700
Min. Voltage at ECU during Cranking--volts	6	10
Maximum ECU Temperature--°F (°C)	221 (105)	
Max. VTG Actuator Surface Temp.--°F (°C)	356 (180)	
Maximum Harness Temperature--°F (°C)	257 (125)	

Air System

Maximum Allowable Temp Rise--Ambient Air to Engine Inlet--°F (°C)	15 (8)
Maximum Air Intake Restriction:	
Dirty Air Cleaner--in. H_2O (kPa)	25 (6.25)
Clean Air Cleaner--in. H_2O (kPa)	15 (3.75)
Engine Air Flow--ft^3/min (m^3/min)	1201 (34)
Air Cleaner Efficiency--%	99.9

Charge Air Cooling System

Air/Air Exch'r. Heat Rej.--Btu/min(kW)	5863 (103)
Compressor Discharge Temp.(Rated) @ 77 °F (25°C) Ambient Air--°F (°C)	423 (217)
Compressor Discharge Temp.(Max.) @ Peak Torque, 47°C ambient, 80 kPa barometer--°F (°C)	489 (254)
Max. Pressure Drop, thru CAC--in.H_2O (kPa)	64 (16)
Min. Pressure Drop, thru CAC--in.H_2O (kPa)	32 (8)
Intake Manifold Pressure--psi (kPa)	32 (224)
Max CAC Out Temp @ 77°F (25°C) Amb.--°F (°C)	127(53)
Min CAC Out Temp @ 77°F (25°C) Amb.--°F (°C)	116(46.7)
Max CAC Out Temp @ any Ambient--°F (°C)	190(88)

Cooling System

Engine Heat Rejection--BTU/min (kW)	12,010 (211)
Coolant Flow--gal/min (L/min)	146 (552)
Thermostat Start to Open--°F (°C)	180 (82)
Thermostat Fully Open--°F (°C)	198 (92)
Engine Coolant Capacity--qt (L)	19 (18)
Minimum Pressure Cap--psi (kPa)	14.5 (100)
Maximum Top Tank Temp--°F (°C)	221 (105)
Minimum Coolant Fill Rate--gal/min (L/min)	3 (12)
Minimum Air-to-Boil Temperature--°F (°C)	117 (47)
Minimum Pump Inlet Pressure--psi (kPa)	4.4 (30)

Exhaust System

Exhaust Flow--ft^3/min (m^3/min)	2896 (82)
Exhaust Temperature--°F (°C)	907 (486)
Max. Exhaust Restriction--in. H_2O (kPa)	40 (10)
Min. Exhaust Restriction----in. H_2O (kPa)	16 (4)
Max. Bend. Moment on Turbo Out.--lb-ft (N•m)	5.2 (7)
Max. Shear on Turbo Outlet--lb (kg)	24 (11)

Fuel System

ECU Description	L15 Controller
Fuel Injection Pump	Unit Injection
Governor Type	Electronic
Total Fuel Flow--lb/hr (kg/hr)	351 (159)
Fuel Consumption--lb/hr (kg/hr)	196 (89)
Max. Fuel Inlet Temperature--°F (°C)	212 (100)
Fuel Temp. Rise, Inlet to Return--°F (°C)	115.2 (64)
Max. Fuel Inlet Restriction--in. H_2O (kPa)	40 (10)
Max. Fuel Inlet Pressure--in. H_2O (kPa)	96 (24)
Max. Fuel Return Pressure--in. H_2O (kPa)	140 (35)

Lubrication System

Oil Pressure at Rated Speed--psi (kPa)	45 (310)
Oil Pressure at Low Idle--psi (kPa)	20 (138)
Max. Oil Carryover in Blow-by--lb/hr (g/hr)	0.007 (3)
Max. Airflow in Blow-by--gal/min (l/min)	79 (300)
Max. Crankcase Pressure--in. H_2O (kPa)	2 (0.5)

Performance Data

Rated Power--hp (kW)	550 (410)
Rated Speed--rpm	2100
Breakaway Speed--rpm	2150
Fast Idle Speed--rpm	2300
Peak Torque--lb-ft (N•m)	1792 (2430)
Peak Torque Speed--rpm	1400
Low Idle Speed--rpm	900
BMEP--psi (kPa)	252 (1736)
Friction Power @ Rated Speed--hp (kW)	78 (58)
Altitude Capability--ft (m)	10,000 (3050)
Ratio--Air : Fuel	24.8 : 1
Smoke @ Rated Speed--Bosch No.	0.26
Noise--dB(A) @ 1 m	100.1*
Power Bulge--%	5
Power Bulge Speed--rpm	1900
Torque Rise--%	30

Intermittent Power

Engine Speed rpm	Power hp (kW)	Torque lb-ft (N•m)	BSFC lb/hp-hr (g/kWh)
2100	550 (410)	1376 (1865)	0.359 (219)
2000	567 (423)	1489 (2019)	0.356 (217)
1800	567 (423)	1655 (2244)	0.356 (217)
1600	533 (397)	1749 (2371)	0.356 (217)
1400	478 (356)	1792 (2430)	0.354 (216)
1200	410 (305)	1792 (2430)	0.326 (198)
1000	317 (237)	1667 (2260)	0.331 (202)
900	250 (187)	1460 (1980)	0.337 (205)

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

* Revised Data

Curve: 6135HF485550_2100_5_30 ..... Sheet 2 of 2

April 2006

DIESEL GENERATOR SET

CATERPILLAR®

Image shown may not reflect actual package.

STANDBY
1000 ekW 1250 kVA
60 Hz 1800 rpm 480 Volts

Caterpillar is leading the power generation marketplace with Power Solutions engineered to deliver unmatched flexibility, expandability, reliability, and cost-effectiveness.

FEATURES

EMISSIONS
·EPA Tier 2 and CARB Emissions Certified for non-road mobile applications

DESIGN CRITERIA
•The generator set accepts rated load in one step

FULL RANGE OF ATTACHMENTS
• Wide range of bolt-on system expansion attachments, factory designed and tested

UL 2200
•UL 2200 listed packages are available. Certain restrictions may apply. Consult with your Caterpillar Dealer.

WORLDWIDE PRODUCT SUPPORT
•Worldwide parts availability through the Caterpillar dealer network
•With over 1844 dealer branch stores operating in 166 countries, you're never far from the Caterpillar part you need
•99.7% of parts orders filled within 24 hours. The best product support record in the industry.
•Caterpillar dealers service technicians are trained to service every aspect of your electric power generation system
•Preventative maintenance agreements
•The Cat Scheduled Oil Sampling (SOS) program cost effectively detects internal engine component condition, even the presence of unwanted fluids and combustion by-products

CAT C32 ATAAC DIESEL ENGINE
• Utilizes ACERT™ Technology
• Reliable, rugged, durable design
• Four-cycle diesel engine combines consistent performance and excellent fuel economy with minimum weight
• Electronic engine control

CAT SR4B GENERATOR
•Designed to match performance and output characteristics of Caterpillar diesel engines
•Optimum winding pitch for minimum total harmonic distortion and maximum efficiency
•Single point access to accessory connections
•UL 1446 recognized Class H insulation system

CAT EMCP 3 SERIES CONTROL PANELS
• Controls designed to meet individual customer needs
• EMCP 3 provides the option for full-featured power metering and protective relaying

FACTORY INSTALLED STANDARD & OPTIONAL EQUIPMENT

System	Standard	Optional
Air Inlet	• Single element canister type air cleaner • Service indicator	• Dual element air cleaners • Air inlet adapters
Cooling	• Radiator with guard (43°C) • Low profile (frontal area) • Low airflow • Coolant drain line with valve • Fan and belt guards • Caterpillar Extended Life Coolant • Coolant level sensors • Radiator duct flange	• Radiator with 27°C ambient capability • Jacket water heater
Exhaust	• Dry exhaust manifold • Flanged faced outlets	• Stainless steel exhaust flex fittings • Elbows, flanges, expanders & Y adapters
Fuel	• Primary fuel filter with water separator • Secondary fuel filter • Fuel priming pump • Flexible fuel lines • Fuel cooler	
Generators	• Permanent magnet excited • Class H insulation • Class F temperature (105°C prime/130°C standby) • Winding temperature detectors (select models) • Anti-condensation space heaters	• Oversize & premium generators
Power Termination	• Bus bar (NEMA and IEC mechanical lug holes) -right side standard • Bottom cable entry	• Circuit breakers, UL listed, 3 pole with shunt trip, 80% or 100% rated, choice of trip units, manual or electrically operated (low voltage only) • Circuit breakers, IEC compliant, 3 or 4 pole with shunt trip (low voltage only), choice of trip units, manual or electrically operated • Shroud cover for bottom cable entry • Power terminations can be located on the left and/or rear as an option. Also, multiple circuit breakers can be ordered (up to 3) • Top cable entry
Governor	• ADEM™ A4	• Load Share Module
Control Panels	• User Interface panel (UIP) - rear mount • EMCP 3.1 generator set controller • Speed adjust • AC & DC customer wiring area (right side) • CAT Digital Voltage Regulator (CDVR) with KVAR/PF control, 3-phase sensing • Emergency Stop Push button	• EMCP 3.2 and EMCP 3.3 • Option for right or left mount UIP • Option for rear or left mount Customer wiring area • Local & remote annunciator modules • Discrete I/0 Module • Generator temperature monitoring & protection • Voltage raise/lower switch
Lube	• Lubricating oil and filter • Oil drain line with valves • Fumes disposal • Gear type lube oil pump	• Deep sump oil pan
Mounting	• Structual steel tube • Anti-vibration mounts (shipped loose)	
Starting/Charging	• 24 volt starting motor(s) • Batteries with rack and cables • Battery disconnect	• Battery chargers (10 Amp) • 45 amp charging alternator • Oversize batteries • Ether starting aid
General	• Right-hand service • Paint - Caterpillar Yellow (except rails and radiators gloss black) • SAE standard rotation • Flywheel and Flywheel housing - SAE No. 0	• UL 2200 • CSA certification • EU Declaration of Incorporation • EEC Declaration of Conformity

STANDBY 1000 ekW 1250 kVA

60 Hz 1800 rpm 480 Volts

CATERPILLAR®

SPECIFICATIONS

CAT GENERATOR

SR4B Generator
Frame size..... 692
Excitation..... Permanent Magnet
Pitch..... 0.7143
Number of poles..... 4
Number of bearings..... 002
Insulation..... UL 1446 Recognized Class H with tropicalization and antiabrasion
IP rating..... Drip Proof IP22
Alignment..... Close Coupled
Overspeed capability - % of rated..... 150
Wave form..... 003.00
Paralleling kit/Droop transformer..... Standard
Voltage regulator.3 Phase sensing with selectible volts/Hz
Voltage regulation..... Less than +/- 1/2% (steady state) Less than +/- 1% (no load to full load)
Telephone Influence Factor..... Less than 50
Harmonic distortion..... Less than 5%

CAT DIESEL ENGINE

C32 TA, V-12, 4-stroke watercooled diesel
Bore - mm..... 145.00 mm (5.71 in)
Stroke - mm..... 162.00 mm (6.38 in)
Displacement - L..... 32.10 L (1958.86 in^3)
Compression ratio..... 15:1
Aspiration..... TA
Fuel system..... MEUI
Governor type..... ADEM™ A4

CAT EMCP 3 SERIES CONTROLS

- EMCP 3.1 (Standard)
- Integral to generator terminal box
- Single location for customer connection
- IP 23 enclosure
- 24 Volt DC Control
- UL/CSA
- Lockable hinged door (option)
- Run/Auto/Stop control
- True RMS metering, 3-phase
- Speed Adjust
- Voltage adjust (optional on 3.1)
- Digital indications for:
  - RPM
  - Operating hours
  - Oil pressure
  - Coolant temperature
  - System DC volts
  - L-L volts, L-N volts, phase amps, Hz
- ekW, kVA, kVAR, kW-hr, %kW, PF(*)
- Shutdowns with indicating lights (with optional annunciator):
  - Low oil pressure
  - High coolant temperature
  - Overspeed
  - Emergency stop
  - Failure to start (overcrank)
- Programmable protective relaying functions (*):
  - Under and over voltage
  - Under and over frequency
  - Reverse power
  - Overcurrent
- MODBUS isolated data link (RS-485 half-duplex) supports serial communication at data rate up to 115.2 kbaud (*)

(*) Available on EMCP 3.2 & EMCP 3.3

STANDBY 1000 ekW 1250 kVA

60 Hz 1800 rpm 480 Volts

CATERPILLAR®

TECHNICAL DATA

Open Generator Set - - 1800 rpm/60 Hz/480 Volts	DM7714	
Package Performance		
Genset Power rating @ 0.8 pf	1250 kVA	
Genset Power rating with fan	1000 ekW	
Low Emissions		
Coolant to aftercooler temp max	49 ° C	120 ° F
Fuel Consumption		
100% load with fan	274.3 L/hr	72.5 Gal/hr
75% load with fan	215.7 L/hr	57.0 Gal/hr
50% load with fan	148.4 L/hr	39.2 Gal/hr
Cooling System[1]		
Ambient air temperature	47 ° C	117 ° F
Air flow restriction (system)	0.12 kPa	0.48 in. water
Air flow (max @ rated speed for radiator arrangement)	1126 m³/min	39764 cfm
Engine coolant capacity	55.0 L	14.5 gal
Radiator coolant capacity	L	
Engine Coolant capacity with radiator/exp. tank	55.0 L	14.5 gal
Inlet Air		
Combustion air inlet flow rate	91.9 m³/min	3245.4 cfm
Exhaust System		
Exhaust stack gas temperature	445.3 ° C	833.5 ° F
Exhaust gas flow rate	232.4 m³/min	8207.1 cfm
Exhaust flange size (internal diameter)	203 mm	8 in
Exhaust system backpressure (maximum allowable)	10.0 kPa	40.2 in. water
Heat Rejection		
Heat rejection to coolant (total)	350 kW	19904 Btu/min
Heat rejection to exhaust (total)	1102 kW	62671 Btu/min
Heat rejection to aftercooler	306 kW	17402 Btu/min
Heat rejection to atmosphere from engine	51 kW	2900 Btu/min
Heat rejection to atmosphere from generator	56.0 kW	3184.7 Btu/min
Alternator[2]		
Motor starting capability @ 30% voltage dip	1990 skVA	
Frame	692	
Temperature Rise	130 ° C	266 ° F
Lube System		
Sump refill with filter	76.0 L	20.1 gal
Emissions (Nominal)[3]		
NOx g/hp-hr	4.7 g/hp-hr	
CO g/hp-hr	.11 g/hp-hr	
HC g/hp-hr	.05 g/hp-hr	
PM g/hp-hr	.029 g/hp-hr	

[1] Ambient capability at 1500m (4922 ft) above sea level. For ambient capability at other altitudes, consult your Caterpillar dealer.

[2] UL 2200 Listed packages may have oversized generators with a different temperature rise and motor starting characteristics. Generator temperature rise is based on a 40°C ambient per NEMA MG1-32.

[3] Emissions data measurements are consistent with those described in EPA CFR 40 Part 89, Subpart D & E and ISO8178-1 for measuring HC, CO, PM, NOx. This engine's exhaust emissions are in compliance with the US EPA and California nonroad regulations as identified above. Data shown is based on steady state operating conditions of 77°F, 28.42 in HG and number 2 diesel fuel with 35° API and LHV of 18,390 btu/lb. The nominal emissions data shown is subject to instrumentation, measurement, facility and engine to engine variations.

GeneratorJoe

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RATING DEFINITIONS AND CONDITIONS

Meets or Exceeds International Specifications: AS1359, BS4999, EGSA101P, ISO3046, ISO8528, NEMA MG 1-32, 89/336/EEC, 98/37/EEC, 72/23/EEC, CSA, UL 508 and IEC 60034

Standby - Output available with varying load for the duration of the interruption of the normal source power. Standby power in accordance with ISO8528. Fuel stop power in accordance with ISO3046/1, AS2789, DIN6271, and BS5514. Standby ambients shown indicate ambient temperature at 100 percent load which results in a coolant top tank temperature just below the shutdown temperature.

Ratings are based on SAE J1995 standard conditions. These ratings also apply at ISO3046/1, DIN6271, and BS5514 standard conditions.

Fuel Rates are based on fuel oil of 35° API (16° C or 60° F) gravity having an LHV of 42 780 kJ/kg (18,390 Btu/lb) when used at 29° C (85° F) and weighing 838.9 g/liter (7.001 lbs/U.S. gal.).

Additional Ratings may be available for specific customer requirements. Consult your Caterpillar representative for details.

STANDBY 1000 ekW 1250 kVA

60 Hz 1800 rpm 480 Volts

CATERPILLAR®

DIMENSIONS

Package Dimensions		
Length	**4766.9 mm**	**187.67 in**
Width	**2024.3 mm**	**79.7 in**
Height	**2254.0 mm**	**88.74 in**
Weight	**8046 kg**	**17,738 lb**

Note: Do not use for installation design.
See general dimension drawings for detail (Drawing #2763027).

GeneratorJoe

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Performance No.: DM7714

Feature Code:: C32DE06

Source:: U.S. Sourced

California Environmental Protection Agency AIR RESOURCES BOARD	JOHN DEERE POWER SYSTEMS	EXECUTIVE ORDER U-R-004-0377 New Off-Road Compression-Ignition Engines

Pursuant to the authority vested in the Air Resources Board by Sections 43013, 43018, 43101, 43102, 43104 and 43105 of the Health and Safety Code; and

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-02-003;

IT IS ORDERED AND RESOLVED: That the following compression-ignition engines and emission control systems produced by the manufacturer are certified as described below for use in off-road equipment. Production engines shall be in all material respects the same as those for which certification is granted.

MODEL YEAR	ENGINE FAMILY	DISPLACEMENT (liters)	FUEL TYPE	USEFUL LIFE (hours)
2010	AJDXL13.5103	13.5	Diesel	8000

SPECIAL FEATURES & EMISSION CONTROL SYSTEMS	TYPICAL EQUIPMENT APPLICATION
Electronic Control Module, Direct Diesel Injection, Turbo Charger, Charge Air Cooler, Smoke Puff Limiter, Exhaust Gas Recirculation	Tractor, Loaders, Dozer, Pump, Compressor, Generator Set, Other Industrial Equipment

The engine models and codes are attached.

The following are the exhaust certification standards (STD), or family emission limit(s) (FEL) as applicable, and certification levels (CERT) for hydrocarbon (HC), oxides of nitrogen (NOx), or non-methane hydrocarbon plus oxides of nitrogen (NMHC+NOx), carbon monoxide (CO), and particulate matter (PM) in grams per kilowatt-hour (g/kw-hr), and the opacity-of-smoke certification standards and certification levels in percent (%) during acceleration (Accel), lugging (Lug), and the peak value from either mode (Peak) for this engine family (Title 13, California Code of Regulations, (13 CCR) Section 2423):

RATED POWER CLASS	EMISSION STANDARD CATEGORY		EXHAUST (g/kw-hr)					OPACITY (%)		
			HC	NOx	NMHC+NOx	CO	PM	ACCEL	LUG	PEAK
130 ≤ kW < 225	Tier 3	STD	N/A	N/A	4.0	3.5	0.20	20	15	50
225 ≤ kW < 450	Tier 3	STD	N/A	N/A	4.0	3.5	0.20	20	15	50
450 ≤ kW < 560	Tier 3	STD	N/A	N/A	4.0	3.5	0.20	20	15	50
		FEL	–	–	3.7	–	0.19	–	–	–
		CERT	–	–	3.4	0.6	0.10	11	1	20

BE IT FURTHER RESOLVED: That the family emission limit(s) (FEL) is an emission level declared by the manufacturer for use in any averaging, banking and trading program and in lieu of an emission standard for certification. It serves as the applicable emission standard for determining compliance of any engine within this engine family under 13 CCR Sections 2423 and 2427.

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the information and materials to demonstrate certification compliance with 13 CCR Section 2424 (emission control labels), and 13 CCR Sections 2425 and 2426 (emission control system warranty).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

This Executive Order is only granted to the engine family and model-year listed above. Engines in this family that are produced for any other model-year are not covered by this Executive Order.

Executed at El Monte, California on this 26 day of August 2009.

Annette Hebert, Chief
Mobile Source Operations Division