June 3, 2020

Air Permits Initial Review Team (APIRT)
Texas Commission on Environmental Quality
Mail Code 161
12100 Park 35 Circle
Building C, Third Floor, Room 300W
Austin, Texas 78753

RE: 30 TAC 106.224 PI-7 Registration for Rocket Development Testing Program
SpaceX Texas Launch Site – Brownsville, Cameron County, Texas
Space Exploration Technologies Corporation
CN: 602867657
RN: 107697088

Dear APIRT,

On behalf of Space Exploration Technologies Corporation (SpaceX), please find enclosed a PI-7 Registration for Permit By Rule (PBR) 30 TAC 106.512 for the SpaceX Texas Launch Site located in Brownsville, Cameron County, Texas. SpaceX would like to authorize a stationary natural gas generator at the site to provide electricity to its production area. Per the TCEQ *Electric Generators under Permit by Rule* policy memo from October 2006, SpaceX would like to authorize this unit under 30 TAC 106.512 as the generator will be used to generate electricity exclusively for on-site use at a location where connection to the grid is not readily available.

This submittal contains a Form PI-7, PBR applicability checklists, process description, process flow diagram, emissions calculations, and other supporting information.

SpaceX would like to request James Nolan as the TCEQ permit engineer on this project. He has worked on previous SpaceX submittals and is familiar with SpaceX's unique operations.

Should you have any questions or require additional information, please contact me at 512-596-7929 or Katy Groom at 321-730-1469.

Thank You,
Greenthink Consulting, L.L.C.

Rajiv Y. Patel, P.E.
Principal Engineer

Attachment: **30 TAC 106.224 PI-7 Registration**

Greenthink Consulting, L.L.C.
100 Nautical Circle, Round Rock, TX 78681
512.596.7929

Cc: Katy Groom – Space Exploration Technologies
TCEQ – Region 15, Harlingen

Greenthink Consulting, L.L.C.
100 Nautical Circle, Round Rock, TX 78681
512.596.7929

30 TAC §106.512 – PI-7 Registration

For:

Natural Gas Generator (EPN GEN2)

Space Exploration Technologies
Brownsville, Texas

June 2020

Prepared by:

Greenthink Consulting, L.L.C.

www.greenthinkconsulting.com

Table of Contents

1.0 INTRODUCTION

Space Exploration Technologies Corporation (SpaceX; CN602867657) owns and operates the SpaceX Texas Launch Site (RN107697088) located in Brownville, Texas of Cameron County. SpaceX would like to authorize a natural gas electric generating unit to provide electricity to the production area of the site. Emissions will be products of combustion from burning the natural gas in the generator.

This PI-7 Registration is being submitted to authorize the generator under Permit by Rule (PBR) 30 §106.512, *Stationary Engines and Turbines* with the Texas Commission on Environmental Quality. The generator site is in a remote location making access to the grid neither readily available nor economically feasible. This PBR is being claimed per the guidance provided in the October 20, 2006 TCEQ memo, *Electric Generators Under Permit by Rule (Revised)*, which states:

> *Effective immediately, PBR §106.512 may be claimed to authorize engines or turbines used to generate electricity exclusively for on-site use at locations where the electric grid is not readily available or where it is not economically feasible to connect to the electric grid. The owner or operator of the site may be asked to validate that access to the electric grid is not available in the local area or to describe why connecting to the grid is not economically feasible. Economic feasibility is generally not part of a Permit by Rule review. However, to provide flexibility and offer the applicant the option to use a PBR, we have made an attempt to allow limited discussion for this issue.*

The remainder of this application includes a completed PI-7 and all required supporting information.

2.0 FORM PI-7

This section contains the completed Form PI-7.

Texas Commission on Environmental Quality
Registration for Permits by Rule (PBR)
Form PI-7

(Page 1)

I. Registrant Information		
A. Company or Other Legal Customer Name: **Space Exploration Technologies Corp.**		
B. Company Official Contact Information (☐ Mr. ☒ Mrs. ☐ Ms. ☐ Other:) _____		
Name: **Katy Groom, P.E.**		
Title: **Lead Environmental Health and Safety Engineer**		
Mailing Address: **1 Rocket Road**		
City: **Brownsville**	State: **TX**	ZIP Code: **78521**
Phone: **321-730-1469**	Fax:	
E-mail Address: **katy.groom@spacex.com**		
All PBR registration responses will be sent via e-mail.		
C. Technical Contact Information (☒ Mr. ☐ Mrs. ☐ Ms. ☐ Other:) _____		
Name: **Rajiv Y. Patel, P.E.**		
Title: **Principal Engineer**		
Company Name: **Greenthink Consulting, L.L.C.**		
Mailing Address: **100 Nautical Circle**		
City: **Round Rock**	State: **TX**	ZIP Code: **78681**
Phone: **512-596-7929**	Fax:	
E-mail: **rajiv@greenthinkconsulting.com**		
II. Facility and Site Information		
A. Name and Type of Facility		
Facility Name: **SpaceX Texas Launch Site – Generator 2 (GEN-2)**		
Type of Facility: ☒ Permanent ☐ Temporary		
For portable units, please provide the serial number of the equipment being authorized below.		
Serial No:	Serial No:	

II. Facility and Site Information *(continued)*		
B. Facility Location Information		
Street Address: **1 Rocket Road**		
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: **Brownsville**	County: **Cameron**	ZIP Code: **78521**
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): **CN602867657**		
Regulated Entity Number (RN): **RN107697088**		
D. TCEQ Account Identification Number (if known):		
E. Type of Action		
☒ Initial Application ☐ Change to Registration		
For Change to Registration provide the Registration Number:		
F. PBR number(s) claimed under 30 TAC Chapter 106		
(List all the individual rule number(s) that are being claimed.)		
106.**512**	106.	
106.	106.	
106.	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**	

II. Facility and Site Information *(continued)*	
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 date in the spaces provided below.	
Standard Exemption and PBR Registration Number(s)	Effective Date
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
Registration No. 156011	**04/01/2019**
Registration No. 155544	**03/15/2019**
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.	

II. Facility and Site Information *(continued)*	
L. Federal Operating Permit (FOP) Requirements (30 TAC Chapter 122 Applicability)	
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:_____	
1. Check the requirements of 30 TAC Chapter 122 that will be triggered if this claim 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 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 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 $6 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.	

III. Fee Information *(see Section VII. for address to send fee or go to www.tceq.texas.gov/epay to pay online)* ***(continued)***		
C. Payment Information		
Check/money order/transaction or voucher number: **E-Pay Voucher No. 467747**		
Individual or company name on check: **Paid for by Rajiv Patel, Greenthink Consulting, LLC**		
Fee Amount: $**450**		
Was fee paid online?		☒ YES ☐ NO
IV. Selected Facility Reviews and Voluntary Registrations *Only*		
Note: If registering any of the PBRs listed in IV.B., or if voluntarily registering any other PBR(s), complete this section, then skip to Section VI. below:		
A. List any PBRs that are being voluntarily registered.		
106.	106.	106.
106.	106.	106.
B. PBR Checklists		
If you are registering any of the following PBRs, did you attach the applicable PBR checklists that shows your facility meets all general and specific requirements? • *Animal Feeding Operations § 106.161, Livestock Auction Facilities § 106.162, Saw Mills § 106.223, Grain Handling, Storage and Drying § 106.283, Auto Body Refinishing Facilities § 106.436,* or *Air Curtain Incinerator § 106.496* (If "NO" then you ***must*** provide ***all*** technical information outlined in Section V.)		☐ YES ☐ NO
C. Distances to Property Line and Nearest Off-Property Structure		
Distance from this facility's emission release point to the nearest property line:		feet
Distance from this facility's emission release point to the nearest off-property structure:		feet

V. 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 a deficiency 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
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. Distance from Property Line and Nearest Off-Property Structure	
Distance from this facility's emission release point to the nearest property line:	512 feet
Distance from this facility's emission release point to the nearest off-property structure:	2,575 feet
G. Project Status	
Has the company implemented the project or waiting on a response from TCEQ?	☐ Implemented ☒ Waiting
H. Projected Start of Construction and Projected Start of Operation Dates:	
Projected Start of Construction (provide date): **Upon approval**	
Project Start of Operation (provide date): **Upon approval**	
VI. Delinquent Fees and Penalties	
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.	

VII. Copies of the Registration		
Processing delays may occur if copies are not sent as noted. Copies must be sent as listed below:		
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 of Form PI-7, 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, 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, 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, Core Data Form, and all attachments

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

3.0 30 TAC §106.4 and §106.512 APPLICABILITY CHECKLISTS

This section contains the completed checklists demonstrating compliance with 30 TAC §106.4 and §106.512 requirements.

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.	
•	(Serious) - Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller counties:	☐ HGB
•	(Serious) - Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, Tarrant, and Wise counties:	☐ DFW
•	(Marginal) - Bexar	☐ BEXAR
	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 50 tpy for Serious Counties, or 100 tpy for Marginal Counties, 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 25 tpy for Serious Counties, or 40 tpy for Marginal Counties, 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?	
•	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?	
40 CFR Part 63, MACT 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.	

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

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

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 permit by rule (PBR) forms, tables, checklists, and guidance documents are available from the Texas Commission on Environmental Quality (TCEQ), Air Permits Division Web site at: www.tceq.texas.gov/permitting/air/nav/air_pbr.html.

This PBR (§ 106.512) requires registration with the commission's Office of Air in Austin before construction if the horsepower (hp) of the facility is greater than 240 hp. Registration of the facility can be performed by completing a 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

Definitions:

The following words and terms, when used in this section, shall have the following meanings, unless the context clearly indicates otherwise.

A. **Rich-burn Engine**: A rich-burn engine is a gas-fired, spark-ignited engine that is operated with an exhaust oxygen content less than four percent by volume.

B. **Lean-burn Engine**: A lean-burn engine is a gas-fired, spark-ignited engine that is operated with an exhaust oxygen content of four percent by volume, or greater.

C. **Rated Engine Horsepower**: Engine rated horsepower 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.

D. **Turbine Horsepower**: Turbine rated horsepower shall be based on turbine base load, fuel power heating value, and International Standards Organization Standard Day Conditions of 59 degrees Fahrenheit, 1.0 atmosphere pressure, and 60 percent relative humidity.

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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: **0.5** (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: _____ 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: **Not located in Houston/Galveston nonattainment area.**	
Is the facility subject to 30 TAC Chapter 115? ☐ YES ☒ NO	
Why or Why Not: **Not located in an affected county under Chapter 115.**	
Is the facility subject to 30 TAC Chapter 117? ☐ YES ☒ NO	
Why or Why Not: **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: **Not a steam generating unit.**	
Is the facility subject to 40 CFR Part 60, NSPS Subpart Da?	☐ YES ☒ NO
Why or Why Not: **Not a steam generating unit.**	
Is the facility subject to 40 CFR Part 60, NSPS Subpart Db?	☐ YES ☒ NO
Why or Why Not: **Not a steam generating unit.**	
Is the facility subject to 40 CFR Part 60, NSPS Subpart Dc?	☐ YES ☒ NO
Why or Why Not: **Not a steam generating unit.**	
Is the facility subject to 40 CFR Part 60, NSPS Subpart GG?	☐ YES ☒ NO
Why or Why Not: **Not a stationary gas turbine.**	
Is the facility subject to 40 CFR Part 63, MACT Subpart YYYY?	☐ YES ☒ NO
Why or Why Not: **Not a stationary gas turbine. Not located at a major source of HAPs.**	
Is the facility subject to 40 CFR Part 63, MACT Subpart ZZZZ	☒ YES ☐ NO
Why or Why Not: **The unit 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: **Not an engine test cell/stand.**	

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:

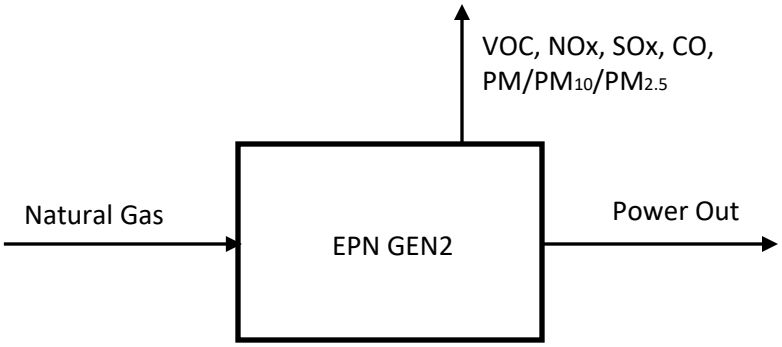
* Lower emission rates apply to lean-burn engine operating: Full Speed & Any Torque or Any Speed & <80% or >100% Torque
† Turbine emissions are also regulated by EPA NSPS Standards for NO_X and SO_2
** Lean Burn > 4% exhaust O_2
†† Rich Burn = ≤ 4% exhaust O_2

4.0 PROCESS DESCRIPTION

SpaceX is proposing one (1) Caterpillar XQ1250G/G3516B low emission natural gas generator (EPN GEN2) to provide electricity to the production area of the site. The generator will have a maximum run time of 8,760 hours per year. Emissions will occur as a result of the combustion of natural gas within the generator and will include carbon monoxide (CO), oxides of nitrogen (NOx), oxides of sulfur (SOx), volatile organic compounds (VOC), and particulate matter (PM) which will be exhausted to the
atmosphere.

5.0 PROCESS FLOW DIAGRAM

This section contains the process flow diagram.



6.0 TABLE 1(a) / MAXIMUM EMISSIONS DATA AND CALCULATIONS

This section contains maximum emissions data and calculations.

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	Jun-20	**Permit No.:**	TBD	**Regulated Entity No.:**	RN107697088
Area Name:	SpaceX Texas Launch Site - Generator 2			**Customer Reference No.:**	CN602867657

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA					
1. Emission Point			**2. Component or Air Contaminant Name**	**3. Air Contaminant Emission Rate**	
(A) EPN	**(B) FIN**	**(C) NAME**		**(A) POUND**	**(B) TPY**
GEN-2	GEN-2	Generator 2	VOC (NMHC)	1.52	6.64
			NOX	1.85	8.09
			CO	0.74	3.24
			PM	0.12	0.53
			PM10/PM2.5	0.00	0.00
			SO2	0.01	0.03
			Total HAP	0.88	3.86

EPN = Emission Point Number
FIN = Facility Identification Number

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Table 1(a) Emission Point Summary

Date:	Jun-20	**Permit No.:**	TBD	**Regulated Entity No.:**	RN107697088
Area Name:	SpaceX Texas Launch Site - Generator 2			**Customer Reference No.:**	CN602867657

Review of applications and issuance of permits will be expedited by supplying all necessary information requested on this Table.

AIR CONTAMINANT DATA			**EMISSION POINT DISCHARGE PARAMETERS**										
1. Emission Point			**4. UTM Coordinates of Emission Point**			**Source**							
						5. Building	**6. Height Above**	**7. Stack Exit Data**			**8. Fugitives**		
EPN (A)	**FIN (B)**	**Name (C)**	**Zone**	**East (Meters)**	**North (Meters)**	**Height (Ft.)**	**Ground (Ft.)**	**Diameter (Ft.) (A)**	**Velocity (FPS) (B)**	**Temperature (°F) (C)**	**Length (Ft.) (A)**	**Width (Ft.) (B)**	**Axis Degrees (C)**
GEN-2	GEN-2	Generator 2	14N	681321	2875279	14.0	14.0	TBD	TBD	974			

EPN = Emission Point Number
FIN = Facility Identification Number

Generator 2

EPN(s): GEN-2
FIN(s): GEN-2

Brownsville Launch Site

PI-7 Registration
June 2020

Overview:

SpaceX is proposing one (1) Caterpillar XQ1250G/G3516B low emission natural gas generator (EPN GEN2) to provide electricity to the production area of the site. The generator will have a maximum run time of 8,760 hours per year. Emissions will occur as a result of the combustion of natural gas within the generator and will include carbon monoxide (CO), oxides of nitrogen (NOx), oxides of sulfur (SOx), volatile organic compounds (VOC), and particulate matter (PM) which will be exhausted to the

Authorization:

Permit By Rule 30 TAC 106.512; Registration No. TBD

Background Information:

Emission Point Information	
EPN	GEN-2
FIN	GEN-2
Description	Generator 2
Application	Electric Generation
Engine Data[1]	
Engine manufacturer	Caterpillar
Engine model	G3516B
Serial Number	TBD
Manufacture Date	TBD
Engine Power (kW)	1,250
Engine Power (Horsepower)	1,676
Fuel Consumption (BTU/hp-hr)	7,274
Hours of operation per year	8,760
Distance to the Property Line (ft)	512
Fuel Data	
Fuel type	Natural Gas
Constants and Conversion Factors	
Horsepower per kilowatt (hp/kW)	1.3410
Grams per pound (g/lb)	453.5924

1. Engine data taken from specification sheets and previous PBR submittal for the generators.
2. High heat value (HHV) was taken from Table C-1 of the EPA MRR (40 CFR Part 98) for Distillate Fuel Oil No. 2.
3. Diesel fuel sulfur content based on the EPA standard of 15 ppm sulfur for diesel fuel used in nonroad applications [40 CFR 80.510(c)(1)].
4. Density of diesel fuel taken from AP-42, Appendix A, pg. A-7.

Generator 2

EPN(s): GEN-2
FIN(s): GEN-2

Brownsville Launch Site

PI-7 Registration
June 2020

Emission Factors:

Pollutants	Emission Factor	Units	Source of Emission Factor
VOC (NMHC)	0.41	g/hp-hr	Vendor Data, Spec Sheet
NO_X	0.50	g/hp-hr	Vendor Data, Spec Sheet
CO	0.20	g/hp-hr	Vendor Data, Spec Sheet
PM	9.99E-03	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
$PM_{10}/PM_{2.5}$	7.71E-05	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
SO_2	5.88E-04	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Total HAP	0.0722	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
1,1,2,2-Tetrachloroethane	4.00E-05	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
1,1,2-Trichloroethane	3.18E-05	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
1,3-Butadiene	2.67E-04	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
1,3-Dichloropropene	2.64E-05	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
2-Methylnaphthalene	3.32E-05	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
2,2,4-Trimethylpentane	2.50E-04	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Acenaphthene	1.25E-06	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Acenaphthylene	5.53E-06	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Acetaldehyde	8.36E-03	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Acrolein	5.14E-03	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Benzene	4.40E-04	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Benzo(b)fluoranthene	1.66E-07	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Benzo(e)pyrene	4.15E-07	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Benzo(g,h,i)perylene	4.14E-07	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Biphenyl	2.12E-04	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Carbon Tetrachloride	3.67E-05	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Chlorobenzene	3.04E-05	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Chloroform	2.85E-05	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Chrysene	6.93E-07	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Ethylbenzene	3.97E-05	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Ethylene Dibromide	4.43E-05	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Fluoranthene	1.11E-06	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Fluorene	5.67E-06	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Formaldehyde	0.0528	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Methanol	2.50E-03	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Methylene Chloride	2.00E-05	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
n-Hexane	1.11E-03	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Naphthalene	7.44E-05	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
PAH	2.69E-05	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Phenanthrene	1.04E-05	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Phenol	2.40E-05	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Pyrene	1.36E-06	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Styrene	2.36E-05	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Tetrachloroethane	2.48E-06	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Toluene	4.08E-04	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Vinyl Chloride	1.49E-05	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2
Xylene	1.84E-04	lb/MMBtu	AP-42, Chapter 3.2, Table 3.2-2

Generator 2

EPN(s): GEN-2
FIN(s): GEN-2

Brownsville Launch Site

PI-7 Registration
June 2020

Emission Calculations:

Pollutants	Emissions[1, 2]	
	GEN-2	
	lb/hr	tpy
VOC (NMHC)	**1.5152**	**6.6365**
NO_X	**1.8478**	**8.0933**
CO	**0.7391**	**3.2373**
PM	**0.1218**	**0.5334**
$PM_{10}/PM_{2.5}$	**9.40E-04**	**4.12E-03**
SO_2	**7.17E-03**	**0.0314**
Total HAP	**0.8803**	**3.8557**
1,1,2,2-Tetrachloroethane	**4.88E-04**	**2.14E-03**
1,1,2-Trichloroethane	**3.88E-04**	**1.70E-03**
1,3-Butadiene	**3.26E-03**	**0.0143**
1,3-Dichloropropene	**3.22E-04**	**1.41E-03**
2-Methylnaphthalene	**4.05E-04**	**1.77E-03**
2,2,4-Trimethylpentane	**3.05E-03**	**0.0134**
Acenaphthene	**1.52E-05**	**6.68E-05**
Acenaphthylene	**6.74E-05**	**2.95E-04**
Acetaldehyde	**0.1019**	**0.4465**
Acrolein	**0.0627**	**0.2745**
Benzene	**5.37E-03**	**0.0235**
Benzo(b)fluoranthene	**2.02E-06**	**8.87E-06**
Benzo(e)pyrene	**5.06E-06**	**2.22E-05**
Benzo(g,h,i)perylene	**5.05E-06**	**2.21E-05**
Biphenyl	**2.58E-03**	**0.0113**
Carbon Tetrachloride	**4.47E-04**	**1.96E-03**
Chlorobenzene	**3.71E-04**	**1.62E-03**
Chloroform	**3.48E-04**	**1.52E-03**
Chrysene	**8.45E-06**	**3.70E-05**
Ethylbenzene	**4.84E-04**	**2.12E-03**
Ethylene Dibromide	**5.40E-04**	**2.37E-03**
Fluoranthene	**1.35E-05**	**5.93E-05**
Fluorene	**6.91E-05**	**3.03E-04**
Formaldehyde	**0.6438**	**2.8199**
Methanol	**0.0305**	**0.1335**
Methylene Chloride	**2.44E-04**	**1.07E-03**
n-Hexane	**0.0135**	**0.0593**
Naphthalene	**9.07E-04**	**3.97E-03**
PAH	**3.28E-04**	**1.44E-03**
Phenanthrene	**1.27E-04**	**5.55E-04**
Phenol	**2.93E-04**	**1.28E-03**
Pyrene	**1.66E-05**	**7.26E-05**
Styrene	**2.88E-04**	**1.26E-03**
Tetrachloroethane	**3.02E-05**	**1.32E-04**
Toluene	**4.97E-03**	**0.0218**
Vinyl Chloride	**1.82E-04**	**7.96E-04**
Xylene	**2.24E-03**	**9.83E-03**

1. (VOC, NOx, CO) Emissions (lb/hr) = Engine Power (hp) x Emission Factor (g/hp-hr) / 453.5924 g/lb
   ($PM/PM_{10}/PM_{2.5}$, SO_2, and HAP) Emissions (lb/hr) = Engine Power (hp) x Fuel Consumption (BTU/hp-hr) / 1,00,000 BTU/MMBTU x Emission Factor (lb/MMBTU)
2. Emissions (tpy) = Emissions (lb/hr) x Hours of Operation (hr/yr) / 2,000 lb/ton

Generator 2

EPN(s): GEN-2
FIN(s): GEN-2

Brownsville Launch Site

PI-7 Registration
June 2020

Demonstration of Compliance with NAAQS Per 30 TAC 106.512(6)(C)(ii):

NOx emissions must be less than (0.3125 D) tpy, where D equals the shortest distance in feet from any existing or proposed stack to the nearest property line.

Emission Point Information	
Shortest Distance to Property Line (ft)[1]	130
NO_X Emissions Limit (0.3125 D; tpy)	40.6
Sitewide NO_X Emissions (tpy)[2]	10.3
GEN-1 NO_X Emissions (tpy)[3]	*2.0*
CONTROL-1 NO_X Emissions (tpy)[3]	*0.2*
GEN-2 NO_X Emissions (tpy)	*8.1*
Compliance with NO_X Limit	In Compliance

1. This is the shortest distance in feet from any existing or proposed stack to the nearest property line (EPN GEN-1).
2. This is the total emissions of NOx from all existing and proposed facilities on the property.
3. Existing emissions source.
4. Proposed emission source (this registration).

7.0 SUPPORTING INFORMATION

This section contains TCEQ Table 29, *Reciprocating Engines* as well as the generator specification sheet.

Texas Commission on Environmental Quality
Table 29 Reciprocating Engines

I. Engine Data			
Manufacturer: Caterpillar	Model No. CAT G3516B	Serial No. TBD	Manufacture Date: 01/01/2020
Rebuilds Date:	No. of Cylinders:	Compression Ratio: 11:1	EPN: GEN2

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: 1,675 Proposed Horsepower Rating: 1,675

Discharge Parameters

Stack Height (Feet)	Stack Diameter (Feet)	Stack Temperature (°F)	Exit Velocity (FPS)
14	TBD	974	TBD

II. Fuel Data

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

Fuel Consumption (BTU/bhp-hr): Heat ing Value: 1,020 BTU/scf Lower Heating Value:

Sulfur Content (grains/100 scf - weight %): 2,000 gr/106scf

III. Emission Factors (Before Control)

NO_X		CO		SO_2		VOC		Formaldehyde		PM_{10}	
g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv
0.5		0.2		5.88E-04		0.41		5.28E-02		7.71E-05	

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

IV. Emission Factors (Post Control)

NO_X		CO		SO_2		VOC		Formaldehyde		PM_{10}	
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): Oxidation Catalyst

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).

Reset Form Print Form

XQ1250G RENTAL

CATERPILLAR®

CONTINUOUS 1250 KW POWER MODULE

60 Hz with On-Package Auto Paralleling Control System

Voltage	Continuous kW (kVA)
480/277V	1250 (1562.5)

FEATURES

The XQ1250G incorporates a wide range of rugged features into a mobile, natural gas powered, rental package. Each unit is factory designed and production tested to deliver a package ready to be connected to your fuel and power lines. Supported 100% by your Cat dealer with warranty on parts and labor with Extended Warranty available in most areas. The generator set is designed and manufactured in an ISO 9001:2000 compliant facility. Generator set and components meet or exceed the following specifications:
AS1359, AS2789, ABGSM TM3, BS4999, DIN6271, DIN6280, EGSA101P, JEM1359,
IEC 34/1, ISO3046/1, ISO8528, NEMA MG1-22

RELIABLE, FUEL EFFICIENT GAS ENGINE
The compact, four-stroke-cycle Cat® G3516 Low Emission gas engine combines durability with minimum weight while providing exceptional dependability, economy, and power density. The G3516B uses a new robust kilowatt based air to fuel ratio control system providing enhanced system performance. The fuel system is designed for maximum performance on low pressure pipeline natural gas (5-10 psi to the container).

CAT SR4B GENERATOR
Single bearing, wye-connected, static regulated, brushless, permanent magnet excited, the Cat SR4B 824 frame generator designed to match the performance and output characteristics of the Cat gas engine driving it.

CAT ON-PACKAGE AUTO PARALLELING SYSTEM
Provides single unit stand alone, paralleling with other units, and single unit-to-utility paralleling capability (consult your local Cat Dealer to ensure correct application and transient load performance). Operational modes are standby or base load control with soft load/unload and power factor control. Utility/intertie protection features provided by the standard Utility Multi-function Relay (UMR).

CAT COOLING SYSTEM
Remote horizontally mounted radiator with vertical discharge for close proximity to buildings. Sized compatible to rating with energy efficient electric drive fan and core. The cooling system provides 43° C (104° F) ambient capability for continuous 1 g/bhp NO_x rating or 38° C (100° F) ambient capability for 0.5 g/bhp NO_x rating.

EXCLUSIVE CAT DIGITAL VOLTAGE REGULATOR (CDVR)
Three-phase sensing and adjustable Volts-per-Hertz regulation give precise control, excellent block loading, and constant voltage in the normal operating range.

ENVIRONMENTALLY FRIENDLY
110% spill containment of onboard engine fluids
Positive crankcase fumes ventilation

SOUND ATTENUATED CONTAINER
CSC approved for ease of transportation and protection. Enclosure designed with 4 inch sound attenuating panels and air inlet louvers, and critical grade exhaust silencer.

FACTORY INSTALLED STANDARD EQUIPMENT

SYSTEM	STANDARD EQUIPMENT
Engine	Cat G3516B Low Emission Gas Engine capable of New Source Performance Standard (NSPS) certification on-site (Operates on 31.5 to 47.2 MJ/Nm^3 (800 to 1200 btu/cu ft) dry pipeline natural gas) Cat Engine Advisor Panel provides engine diagnostics and full text descriptions Cat Gas Engine Control Module (based on ADEM III) includes electronic speed governor with hydrax actuator and provides transient richening and turbo bypass control Electronic Ignition System (controlled by ECM) Individual cylinder Detonation Sensitive Timing (DST) Engine installed electronic fuel metering valve Hydraulic actuated throttle plate electronically controlled by ECM Heavy duty, single element canister type air cleaner with service indicator 60-Amp charging alternator Dual 24V electric starting motors Integral lube oil cooler, lube oil pump, oil filter, filler, and dipstick and oil drain lines routed to engine rail 115/230 VAC continuous prelube Jacket water heater
Generator	824 frame, SR4B brushless, form wound, permanent magnet excited, three-phase with Cat Digital Voltage Regulator (CDVR), 6-lead design, Class H insulation operating at Class F temperature for extended life, and anti-condensation space heaters (120/240V 1.2 kW)
Containerized Module	40' ISO high cube container, CSC certified for nine (9) high stacking 3-axle, 40' ISO container chassis Spill containment 110% of all engine fluids Interior walls and ceilings insulated with 100 mm of acoustic paneling Floor of container insulated with acoustic glass and covered with steel plating Sound attenuated air intake louvers and 3 lockable personnel doors with panic release Side bus bar access door, external access load connection bus bars Distribution block connections for jacket water heater, battery charger, space heaters, and generator condensate heaters 3” ANSI flange customer fuel connection with cover to prevent vandalism Energized-to-run (ETR) shutoff valve (double solenoid, low/high pressure switch, CSA/FM approved) Cat Brand fuel filter, wall mounted and gas pressure regulator Lube oil level regulator with makeup tank Exhaust silencer, wrapped and insulated, with oxidation catalyst Four (4) oversized maintenance-free batteries disconnect switch, rack, and cables 20-Amp battery charger Vibration isolators, corrosion resistant hardware and hinges External drain access to standard fluids Standard lighting 3 AC/4 DC, three (3) duplex service receptacles, 3 external emergency stop push buttons Three (3) 4.5 kg (10lb) carbon dioxide fire extinguishers Cat Rental decals and painted Cat Power Module white
Cooling	Cooling provides 43° C ambient capability at 1g/bhp NO_x and 38° C ambient capability at 0.5g/bhp No_x Remote, horizontally mounted with vertical discharge JW and SCAC engine driven pumps and thermostats
Generator Controls and Protection	EMCP 3.3 control panel and wall-mounted auto paralleling controls Automatic start/stop with cool down timer Generator Protection features: 25, 32, 40, 50/51, 27/59, 81 O/U Utility multi-function relay protection features: 25, 27/59, 32, 47, 51, 51N, 81O/U UMR is IEEE1547-2003 compliant in most applications 3000A generator circuit breaker with field adjustable long time trip point setting Multi-mode operation (stand-alone, multi-unit and utility paralleling), load sharing (multi-unit only) Manual and automatic paralleling capability Metering display: voltage, current, frequency, power factor, kW, WHM, kVAR, and synchroscope
Quality	Factory testing of generator set and complete power module UL, NEMA, ISO and IEEE standards O&M manuals

XQ1250G RENTAL

CATERPILLAR®

SPECIFICATIONS

CAT SR4B GENERATOR

Frame Size 824
Pitch 0.6667
No. of poles 4
Excitation . . . . . Static regulated brushless PM excited
Construction . . . . . Single bearing, close coupled
Insulation. . . . . Class H
Enclosure . . . . . Drip proof IP22
Alignment. . . . . Pilot shaft
Overspeed capability – % of rated . . . . . 125% of rated
Voltage regulator . . . . . 3 phase sensing with Volts-per-Hertz
Voltage regulation. . . . . Less than ± 0.5% voltage gain
Adjustable to compensate for engine speed droop and line loss
Wave form deviation . . . . . Less than 5% deviation
Telephone Influence Factor (TIF). . . . . Less than 50
Harmonic Distortion (THD). . . . . Less than 5%

CAT G3516B LOW EMISSION ENGINE GAS ENGINE

Bore – mm (in). 170 (6.7)
Stroke – mm (in) 190 (7.5)
Displacement – L (cu in) 69 (4,210)
Compression ratio. 11:1
Engine Speed 1800
Aspiration. . . . . Turbocharged, Separate Circuit AC
Aftercooler Inlet (^{o}C) 54
Jacket Water Outlet (^{o}C). 92
Exhaust Manifold . . . . . Dry
Fuel system . . . . . .CAT Low Pressure w/ Air Fuel Ratio Control
Governor type . . . . . .ADEM™ A3
Combustion . . . . . Lean Burn
Fuel . . . . . Natural Gas
Fuel Pressure Range (PSIG) 5-10
Methane Number 60-100
Lower Heating Value (LHV) (Btu/ft^3). 800-1200
(consult your Cat dealer if fuel is out of spec)

TECHNICAL DATA

Generator Set Technical Data	Units	60 Hz Continuous	60Hz Continuous
Power Rating	kW (KVA)	1250 (1562.5)	1250 (1562.5)
Performance Specification	**(See data sheet for complete details)**	DM5644 (0.5 g/bhp-hr NO_x)	DM5646 (1.0 g/bhp-hr NO_x)
Rating and Efficiency			
LHV of Fuel	MJ/Nm^3 (BTU/SCF)	36.4 (925)	36.4 (925)
Engine Power	KW (BHP)	1356 (1818)	1356 (1818)
Engine Efficiency (ISO 3046/1)	% [A]	36.1	37.1
Engine Efficiency	% [B]	35.0	36.0
Engine Data			
Fuel Consumption (ISO 3046/1)	MJ/bkw-hr (BTU/bhp-hr)	9.98 (7055)	9.71 (6863)
Fuel Consumption	MJ/bkw-hr (BTU/bhp-hr)	10.29 (7274)	10.02 (7078)
Air flow	kg/bkw-hr (lb/hr)	6.12 (18294)	5.84 (17435)
Inlet Man. Press	KPAa (in. HG abs)	280 (82.9)	268 (79.3)
Inlet Man. Temp	^{o}C (^{o}F)	60 (139)	61 (141)
Exhaust Stack Temp	^{o}C (^{o}F)	523 (974)	530 (986)
Exhaust Mass (Wet)	kg/bkw-hr (lb/hr)	6.34 (18932)	6.04 (18054)
Cooling System			
Cooling Airflow	m^3/min (ft^3/min)	2391 (84,486)	2391 (84,486)
Radiator coolant capacity including engine	L (gal)	681.5 (180)	681.5 (180)
Lubricating System			
Lube oil refill volume w/filter change	L (gal)	424 (112)	424 (112)
Emissions Data*			
NO_x (as NO_2) (corr 5% O_2)	Mg/Nm^3 (g/bhp-hr) [C]	185 (0.5)	407 (1.0)
CO	Mg/Nm^3 (g/bhp-hr) [D]	72 (0.2)	78 (0.2)
THC	Mg/Nm^3 (g/bhp-hr) [D]	1675 (4.1)	1421 (3.3)
NMHC	Mg/Nm^3 (g/bhp-hr) [D]	168 (0.41)	143 (0.33)
Exhaust O_2	% [E]	9.2	9.2

*Emissions with oxidation catalyst

Model	Length mm (in)	Width mm (in)	Height mm (in)	Approximate Weight (Dry) kg (lb)
XQ1250G w/o chassis	12192 (480)	2438 (96)	2896 (114)	27,365 (60,340)
XQ1250G w/ chassis	12192 (480)	2438 (96)	4267 (168)	31,365 (69,150)

RATING DEFINITIONS

Conditions and Definitions: Engine rating obtained and presented in accordance with ISO 3046/1. Data represents conditions of 25C, 100 KPA barometric temperature, 30% relative humidity, 2.5 KPA air filter restriction, and 6.7 KPA exhaust stack pressure. No overload permitted at rating shown. Data noted as ISO 3046/1 represents the same ambient conditions with 1.25 KPA air filter restriction and 0 KPA exhaust stack pressure. Consult altitude curves for applications above maximum rated altitude and/or ambient temperature. Engine rating is with 2 engine driven water pumps.

Notes: A) ISO 3046/1 fuel consumption is 0, +5% of full load data. B) Fuel consumption tolerance is +/-3% of full load data. C) NO_x value shown is dry. Full load NO_x value is set at site. Control tolerance is +/- 30% of full load data. D) Emissions data shown are dry and not to exceed. E) Exhaust O_2 is nominal +/- 0.5% O_2.

STANDARD FEATURES

GAS ENGINE CONTROL MODULE (ECM)
- Based on ADEM III technology
- Fuel/air ratio control
- Start/stop logic with purge cycle and staged shutdown
- Engine Protection System with:
  - Detonation Sensitive Timing - Overspeed
  - High Exhaust Temperature - Emergency Stop
  - Failure to Start (Overcrank) - Low oil pressure
  - High oil temperature
- Electronic speed governor with 4 to 20ma input

CAT ADVISOR PANEL
- Display engine performance and diagnostics information
- Full text descriptions

EMCP 3.3 LOCAL CONTROL PANEL
- Generator mounted EMCP 3.3 provides power metering, protective relaying and generator control and monitoring.
- Integration with the CDVR provides enhanced system monitoring.
- Real-time clock allows for date and time-stamping of diagnostics and events.
- True RMS AC metering, 3 phase: L-L volts, L-N volts, Phase, Amps, Hz, ekW, kVA kVAR, kWHr, % kW, PF

EMCP 3.3 ENGINE OPERATOR INTERFACE
- Digital indication for:
  - RPM
  - DC Volts
  - Operating hours
  - Oil pressure
  - Coolant Temperature
- Auto start/stop control switch
- Voltage adjust potentiometer
- Lamp test and Alarm acknowledgement keys
- Warnings/shutdowns with indicating lights
- Emergency stop pushbutton
- Panel illuminating lights
- Programmable protective relaying
  - Over/under voltage
  - Reverse Power
  - Over/Under frequency
  - Overcurrent
  - Loss of Excitation (provided by CDVR)

CONTAINER
- 40’ ISO high cube container, CSC 9 stack certified
- Painted Cat Power Module white steel
- Sound attenuated air intake louvers
- Floor insulated with acoustic glass and covered by steel plate
- Three lockable personnel doors with panic release
- Three fire extinguishers
- External drain access to standard fluids

FUEL SYSTEM
- 3” ANSI flange connection with cover
- Gas pressure regulator, self operated design

EXHAUST SYSTEM
- Rectangular exhaust silencer with oxidation catalyst
- Exhaust wraps and insulation
- Capable of meeting emission requirements: NSPS, HAPS (93% reduction CO)

SHORE POWER TWO
- One shore power connection distribution block for jacket water heaters.
- One for generator space heaters and battery charger.

INTERNAL LIGHTING
- Four internal DC lights with one timer and two switches installed at each side of the container door.
- Three internal AC lights.
- Three duplex service receptacles

BATTERY CHARGER AND BATTERIES
- 24 VDC/20A battery charger with float/equalize modes and charging ammeter.
- Four oversized maintenance free batteries.

EMERGENCY STOP PUSHBUTTON
- Three external emergency stop pushbuttons located near each access door.

TRAILER
- Three axle with Anti-lock brake system
- Goodyear G314 295/75R225 Load Range G

VOLTAGE REGULATION AND POWER FACTOR CONTROL CIRCUITRY

- Generator mounted automatic voltage regulator, microprocessor based.
- Manual raise/lower voltage adjust capability and VAR/power factor control circuitry for maintaining constant generator power factor while paralleled with the utility. Voltage and power factor adjustments are performed on the Generator Paralleling Control
- Includes RFI suppression, exciter limiter and exciter diode monitoring.

CIRCUIT BREAKER

- 3000A fixed type, 3 poles, genset mounted, electrically operated, insulated CB.
- Field adjustable, solid state trip unit for overload (time overcurrent) and fault (instantaneous) overcurrent protection.
- Includes DC shunt trip coil activated on any monitored engine or electrical fault, 100 KA-interrupting capacity at 480 VAC.

CURRENT TRANSFORMERS

- CT's rated 3000:5 with secondaries wired to shorting terminal strips.

POTENTIAL TRANSFORMERS

- 4:1 ratio with primary and secondary fuse protection.

BUS BARS

- Three phase, plus full rated neutral, bus bars are tin-plated copper with NEMA standard hole pattern for connection of customer load cables and generator cables.
- Bus bars are sized for full load capacity of the generator set at 0.8 power factor.
- Includes ground bus, tin-plated copper, for connection to the generator frame ground and field ground cable.

AC DISTRIBUTION

- Provides 240 VAC for all module accessories.
- Includes controls to de-energize jacket water heaters and generator space heater when the engine is running.

ON-PACKAGE PARALLELING CONTROL SYSTEM

- Cat On-Package Paralleling controls are intended for automatic or manual paralleling with a utility power source as a load management system, with provisions for standby operation feeding an isolated load network. For Standby operation, the generator operates as an isochronous machine isolated from the utility supply. The controls allow for automatic operation, initiated locally or remotely by the customer's SCADA system.
- Operator controls are conveniently mounted on the generator terminal box next to the EMCP 3.3 while the Generator Paralleling Control (GPC) and Utility Multi-Function Relay (UMR) are wall-mounted nearby
- GPC provides Generator/Bus metering display and LED synchroscope.
- GPC performs all the necessary functions for paralleling: auto synchronization, load sharing, utility baseload control w/ soft load & soft unload, and utility PF control.
- The simple to use Operator Controls include:
  - Local start/stop control switch (for auto mode)
  - Generator voltage and frequency adjust
  - Generator Breaker control switch
  - Lockout Relay (86), manual reset type
  - Base-load Select Switch and Potentiometer
  - Indicating lights for:
    - Auto start
    - Dead bus close permissive
    - Utility Transfer Trip
    - Utility breaker closed
- Fail to parallel circuit with (field adjustable) timer delay causes shutdown if the breaker fails to close automatically
- Allows for customer utility-transfer-trip signal (dry contact) and utility breaker status signal (dry contact)
- Basler Utility Multi-function Relay (UMR) IPS-100 provides the following utility/intertie protection features:
  - Synch Check (Device 25)
  - Phase under voltage, 2 stage (Device 27)
  - Reverse Power (Device 32)
  - Negative sequence overvoltage (Device 47)
  - Phase time overcurrent (Device 51)
  - Neutral overcurrent (Device 51N)
  - Phase overvoltage, 2 stage (Device 59)
  - Under frequency, 2 stage (Device 81U)
  - Over frequency (Device 81O)

MODES OF OPERATION

MODES OF OPERATION

- Provides for single unit stand-alone operation, island mode paralleling and load sharing with other power modules, and single unit-to-utility mode paralleling for base load control (with open transition between paralleling modes)
- Island mode paralleling features:
  - Lead unit select control allows single unit to connect to a dead bus
  - Auto synchronization (voltage & phase matching)
  - Load sharing (kW) analog signal (like units & legacy compatible)
  - Load sharing (kVAR) analog signal (like units only)
- Utility mode paralleling features:
  - Auto synchronization (voltage & phase matching)
  - Base-load control (selectable: programmable set-point or potentiometer adjust)
  - Soft load/unload (programmable, shared set-point)
  - Power Factor control (programmable set-point)

SINGLE UNIT STAND-ALONE AND MULTI-UNIT PARALLELING OPERATION

1. Utility Standby Mode (Normal)
   a. The utility is providing power for the plant loads.
   b. The PM Generator breaker is open.
   c. The PM is in automatic standby mode to respond to a utility failure.
2. Emergency Mode (Emergency)
   a. Utility Failure
      1) The customer protective relaying senses a utility abnormal condition.
      2) A run request is sent to the PM Generator plant.
      3) The lead unit reaches rated voltage and frequency and is closed to the bus. This function is performed via the lead unit select jumper and interconnect wiring between the Power Modules.
      4) In Multi-Unit Island Mode, the remaining PM Generators are paralleled to the bus as they reach rated voltage and frequency.
      5) Plant load is transferred to the Power Modules, which share load equally via load share lines.

SINGLE UNIT BASE LOAD OPERATION

1. Utility Mode (Normal)
   a. The utility is providing power for the plant loads.
   b. The PM is in auto mode and the generator breaker is open.
   c. The PM is interconnected to the utility breaker aux contact, lead unit jumper is not installed and load share lines are not connected
   d. The Paralleling controls automatically detect utility parallel mode when the utility aux contact is closed.
   e. GPC is programmed to the desired Base-load level, ramp times, and PF control
2. Base Load Mode
   a. Unit receives remote run request and starts
   b. Unit reaches rated voltage and frequency.
   c. UMR performs sync-check to permit generator breaker to close.
   d) Unit ramps to Base-Load set-point at programmed ramp time.
3. Unit continues to run until either a remote run request is removed, the unit is stopped at control panel, or a utility failure is detected.