San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

June 15, 2023

Kyle Willard
Maas Energy Works, Inc.
3711 Meadow View Dr, Ste 100
Redding, CA 96002

Re: Notice of Preliminary Decision - Authority to Construct for Lakeside Pipeline LLC
Facility Number: C-9441
Project Number: C-1223005

Dear Mr. Willard:

Enclosed for your review and comment is the District's analysis of Lakeside Pipeline LLC's application for an Authority to Construct for the modification to two existing natural gas-fired IC engines (currently permitted as C-9441-2 and C-9441-3) to authorize them to be fired on digester gas, at 15662 7th Ave, Hanford.

The notice of preliminary decision for this project has been posted on the District's website (www.valleyair.org). After addressing all comments made during the 30-day public notice period, the District intends to issue the Authority to Construct. Please submit your written comments on this project within the 30-day public comment period, as specified in the enclosed public notice.

Thank you for your cooperation in this matter. If you have any questions regarding this matter, please contact Mr. Jesse A. Garcia of Permit Services at (559) 230-5918.

Sincerely,

Brian Clements
Director of Permit Services

BC:jag

Enclosures

cc: Courtney Graham, CARB (w/ enclosure) via email

San Joaquin Valley Air Pollution Control District

Authority to Construct Application Review

Authorize Existing Natural Gas-Fired IC Engines to Fire on Digester Gas

Facility Name:	Lakeside Pipeline LLC	Date:	June 15, 2023
Mailing Address:	3711 Meadow View Dr, Ste 100 Redding, CA 96002	Engineer:	Jesse A. Garcia
		Lead Engineer:	Derek Fukuda
Contact Person:	Alec Snyder-Fair		
Telephone:	(413) 835-1717		
E-Mail:	alec.snyder@maasenergy.com		
Application #s:	C-9441-2-2 & -3-2		
Project #:	C-1223005		
Deemed Complete:	August 23, 2022		

I. Proposal

Lakeside Pipeline LLC has requested an Authority to Construct (ATC) permit for the modification of their two 1,966 bhp natural gas-fired IC engines under permits C-9441-2 and -3 to authorize digester gas from the onsite digester to be used as fuel.

The applicant amended the proposal on December 14, 2022 to propose emission factors equivalent to the BACT limits when fired on digester gas. This proposed increase in the emission factors compared to the original proposal is to include a margin of compliance to ensure continued compliance with the permitted emissions limits when performing regular source testing.

The copy of the existing permits for the engines are included in Appendix B and the draft ATCs issued in this project are included in Appendix A.

II. Applicable Rules

Rule 1070	Inspections (12/17/92)
Rule 2201	New and Modified Stationary Source Review Rule (8/15/19)
Rule 2410	Prevention of Significant Deterioration (6/16/11)
Rule 2520	Federally Mandated Operating Permits (8/15/19)
Rule 4001	New Source Performance Standards (4/14/99)
Rule 4002	National Emissions Standards for Hazardous Air Pollutants (5/20/04)
Rule 4101	Visible Emissions (2/17/05)
Rule 4102	Nuisance (12/17/92)
Rule 4201	Particulate Matter Concentration (12/17/92)
Rule 4701	Internal Combustion Engines - Phase 1 (8/21/03)

Rule 4702	Internal Combustion Engines (11/14/13)
Rule 4801	Sulfur Compounds (12/17/92)
CH&SC 41700	Health Risk Assessment
CH&SC 42301.6	School Notice

Public Resources Code 21000-21177: California Environmental Quality Act (CEQA)
California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387: CEQA Guidelines

III. Project Location

The facility is located at 15662 7th Ave in Hanford, California. The equipment is not located within 1,000 feet of the outer boundary of a K-12 school. Therefore, the public notification requirement of California Health and Safety Code 42301.6 is not applicable to this project.

IV. Process Description

The applicant is proposing to modify two 1,966 bhp Jenbacher lean burn IC engines. Each engine is equipped with an SCR system and an oxidation catalyst for emissions control. These engines serve as power generation units. The engines will be permitted to operate up to 8 hours per day and 120 hours per year during the commissioning period (the time allowed during initial startup of each engine to perform testing, adjustment, tuning, and calibration of the IC engine without full operation of the SCR system and/or oxidation catalyst) when fired on digester gas in the first year and up to 24 hours per day and 8,500 hours per year after the commissioning period.

V. Equipment Listing

Pre-Project Equipment Description:

C-9441-2-1: 1,966 BHP JENBACHER MODEL J-420 GS-A82 NATURAL GAS-FIRED LEAN-BURN IC ENGINE WITH A HUG ENGINEERING MODEL COMBIKAT SELECTIVE CATALYTIC REDUCTION (SCR) WITH OXIDATION CATALYST SYSTEM POWERING AN ELECTRICAL GENERATOR

C-9441-3-1: 1,966 BHP JENBACHER MODEL J-420 GS-A82 NATURAL GAS-FIRED LEAN-BURN IC ENGINE WITH A HUG ENGINEERING MODEL COMBIKAT SELECTIVE CATALYTIC REDUCTION (SCR) WITH OXIDATION CATALYST SYSTEM POWERING AN ELECTRICAL GENERATOR

Proposed Modification:

C-9441-2-2: MODIFICATION OF 1,966 BHP JENBACHER MODEL J-420 GS-A82 NATURAL GAS-FIRED LEAN-BURN IC ENGINE WITH A HUG ENGINEERING MODEL COMBIKAT SELECTIVE CATALYTIC REDUCTION (SCR) WITH OXIDATION CATALYST SYSTEM POWERING AN ELECTRICAL GENERATOR: AUTHORIZE THE ENGINE TO BE FIRED ON DIGESTER GAS

C-9441-3-2: MODIFICATION OF 1,966 BHP JENBACHER MODEL J-420 GS-A82 NATURAL GAS-FIRED LEAN-BURN IC ENGINE WITH A HUG ENGINEERING MODEL COMBIKAT SELECTIVE CATALYTIC REDUCTION (SCR) WITH OXIDATION CATALYST SYSTEM POWERING AN ELECTRICAL GENERATOR: AUTHORIZE THE ENGINE TO BE FIRED ON DIGESTER GAS

Post-Project Equipment Description:

C-9441-2-2: 1,966 BHP JENBACHER MODEL J-420 GS-A82 DIGESTER GAS/NATURAL GAS-FIRED LEAN-BURN IC ENGINE WITH A HUG ENGINEERING MODEL COMBIKAT SELECTIVE CATALYTIC REDUCTION (SCR) WITH OXIDATION CATALYST SYSTEM POWERING AN ELECTRICAL GENERATOR

C-9441-3-2: 1,966 BHP JENBACHER MODEL J-420 GS-A82 DIGESTER GAS/NATURAL GAS-FIRED LEAN-BURN IC ENGINE WITH A HUG ENGINEERING MODEL COMBIKAT SELECTIVE CATALYTIC REDUCTION (SCR) WITH OXIDATION CATALYST SYSTEM POWERING AN ELECTRICAL GENERATOR

VI. Emission Control Technology Evaluation

The engines will be equipped with:

- Turbocharger
- Intercooler
- Positive Crankcase Ventilation (PCV)
- Air/Fuel Ratio or an O_2 Controller
- Lean Burn Technology
- Oxidation Catalyst
- Selective Catalytic Reduction (SCR)

The turbocharger reduces the NO_X emission rate from each engine by increasing the efficiency and promoting more complete burning of the fuel.

The intercooler functions in conjunction with the turbocharger to reduce the inlet air temperature. By reducing the inlet air temperature, the peak combustion temperature is lowered, which reduces the formation of thermal NO_X.

The PCV system reduces crankcase VOC and PM_{10} emissions by at least 90% over an uncontrolled crankcase vent.

The fuel/air ratio controller (oxygen controller) is used to maintain the amount of oxygen in the exhaust stream to optimize engine operation and catalyst function.

Lean burn technology increases the volume of air in the combustion process and therefore increases the heat capacity of the mixture. This technology also incorporates improved swirl patterns to promote thorough air/fuel mixing. This in turn lowers the combustion temperature and reduces NO_X formation.

A Selective Catalytic Reduction (SCR) system operates as an external control device where flue gases and a reagent, in this case urea, are passed through an appropriate catalyst. Urea will be injected upstream of the catalyst where it is converted to ammonia. The ammonia is used to reduce NO_X, over the catalyst bed, to form elemental nitrogen and other by-products. The use of a catalyst typically reduces the NO_X emissions by up to 90%.

An oxidation catalyst which converts CO and VOC emissions to CO_2 and water will be included. Typically, these catalysts are located prior to the urea injection site since the oxidation catalyst would otherwise convert the excess ammonia into NOx.

VII. General Calculations

A. Assumptions

- The IC engines will only be fired on digester gas and PUC-quality natural gas.
- EPA F-factor of natural gas (adjusted to 60° F): 8,578 dscf/MMBtu (40 CFR Appendix B)
- Natural gas Higher Heating Value (HHV): 1,000 Btu/scf (District Policy APR 1720)
- Digester Gas Higher Heating Value (HHV) for Digester Gas: 700 Btu/scf (proposed by the applicant, based on 70% methane content, also used in other similar District projects)
- Conversion from Btu to bhp-hr: 2,542.5 Btu/bhp-hr (AP-42 Appendix A-14)
- Molar Specific Volume = 379.5 scf/lb-mol (60°F)
- Molecular weights:
  NO_X (as NO_2) = 46 lb/lb-mol CO = 28 lb/lb-mol NH_3 = 17 lb/lb-mol
  VOC (as CH_4) = 16 lb/lb-mol SO_X (as SO_2) = 64.06 lb/lb-mol
- Efficiency of each engine = 30% (District practice)
- A commissioning period to perform testing, adjustment, tuning, and calibration of each IC engine without full operation of the SCR system or oxidation catalyst will be allowed during initial startup of the engine only during the first year of operation. The duration of the commissioning period shall last no more than 8 hours/day and 120 hours/year of operation of the engine without the SCR system or oxidation catalyst installed and operating at its maximum efficiency (per applicant)
- During normal operation, the engine will operate 24 hours/day and 8,500 hours per year (per the applicant)
- Ammonia slip from SCR = 10 ppm (per applicant)
- To streamline emission calculations, PM2.5 emissions are assumed to be equal to PM10 emissions.

B. Emission Factors

Pre-Project

Natural Gas

The emission factors for the engines during normal operation are taken from the current permit and summarized in the following table:

Emission Factors for Natural Gas-Fired Engine (Normal Operation)			
Pollutant	**g/bhp-hr**	**ppmvd (@ 15% O_2)**	**Source**
NOx	0.035	2.5 ppmvd	Current Permit
SOx	0.0081	--	Mass Balance Below
PM_{10}	0.06	--	Current Permit
CO	0.104	12 ppmvd	Current Permit
VOC	0.049	10 ppmvd	Current Permit
NH_3	0.05	10 ppmvd	Current Permit

SOx EF = SOx EF, lb/MMBtu × NG HHV, MMBtu/MMscf × MMscf/10^6 scf × Engine Fuel Consumption, scf/hr × 453.6 g/lb ÷ Engine Power Rating, bhp

Where,

SOx EF:	0.00285 lb-SOx/MMBtu (District Policy APR 1720)
NG Higher Heating Value (HHV):	1,000 MMBtu/MMscf (District Policy APR 1720)
Engine Fuel Consumption:	12,349 scf/hr (applicant in project C-1201750)
Engine Power Rating:	1,966 bhp (applicant in project C-1201750)

Thus,

SOx EF = 0.00285 lb/MMBtu × 1,000 MMBtu/MMscf × MMscf/1E6 scf × 12,349 scf/hr × 453.6 g/lb ÷ 1,966 bhp
= 0.0081 g-SOx/bhp-hr

Digester Gas

Pre-project the engines are not authorized to fire on digester gas; therefore, the PE is 0.

Post-Project

Natural Gas

The applicant is not proposing any changes to the pre-project emission factors when fired on natural gas; therefore, EF2 = EF1.

Digester Gas

Emission Factors during the Commissioning Period:

The commissioning period precedes normal operation of a power plant. Activities conducted during the commissioning period typically include checking all mechanical, electrical, and control systems for the units and related equipment; confirming the

performance measures specified for the equipment; test firing the units; and tuning of the units and the generators. The early stages of commissioning are conducted prior to the installation/operation of the emission control equipment to prevent its damage. In accordance with EPA's guidance, the commissioning period is considered the final phase of the construction process rather than initial startup of the equipment.[1] Therefore, other than quantifying emissions for New and Modified Source Review (NSR), source-specific emission limitations from applicable rules and regulations are generally not effective until completion of the commissioning period. Because emission control devices are not in place/functioning during commissioning, higher emission limits are required during this time.

Emission Factors for Digester Gas-Fired Engine (Commissioning Period)			
Pollutant	**g/bhp·hr**	**ppmvd (@ 15% O_2)**	**Source**
NO_X	1.0	--	Information from Engine Supplier
SO_X	0.04	40 ppmvd in fuel gas	BACT Requirement/Mass Balance Equation Below
PM_{10}	0.06	--	AP-42 Draft Table 2.4.4 (October 2008) (Value for Landfill Gas Engines) – See equation below
CO	2.5	--	Information from Engine Supplier
VOC	0.4	--	Information from Engine Supplier
NH_3	0.05	10 ppmvd	Information from Engine Supplier

<u>SO_X – 40 ppmvd H_2S @ 15% O_2 in fuel gas</u>

$$\frac{40\,ft^3\,H_2S}{10^6\,ft^3} \times \frac{32.06\,lb\,S}{lb\text{-}mol\,H_2S} \times \frac{lb\text{-}mole}{379.5\,ft^3} \times \frac{64.06\,lb\,SO_2}{32.06\,lb\,S} \times \frac{ft^3}{700\,Btu} \times \frac{10^6\,Btu}{MMBtu} = 0.00965\,\frac{lb\,SOx}{MMBtu}$$

$$0.00965\,\frac{lb\,SOx}{MMBtu} \times \frac{MMBtu}{392.75\,bhp\text{-}hr} \times \frac{Btu_{in}}{0.30\,Btu_{out}} \times \frac{453.59\,g}{lb} = 0.04\,\frac{g\text{-}SOx}{bhp\text{-}hr}$$

<u>PM_{10} – 0.015 lb/MMBtu (based on 15 lb-PM/10^6 dscf CH_4)</u>

$$0.015\,\frac{lb\,PM_{10}}{MMBtu} \times \frac{1\,MMBtu}{10^6\,Btu} \times \frac{1\,Btu_{in}}{0.30\,Btu_{out}} \times \frac{2{,}545\,Btu}{1\,bhp-hr} \times \frac{453.59\,g}{1\,lb} = 0.06\,\frac{g-PM_{10}}{bhp-hr}$$

<u>Emission Factors during Normal Operation after the Commissioning Period:</u>
The emission factors for NO_X, CO, and VOC from the proposed engines during normal operation were proposed by the applicant and supported by information provided by the engines and catalyst supplier. The emission factors for NO_X, CO, and VOC will be achieved with the use of the SCR and catalyst system. The emission factors for SO_X,

[1] See US EPA Implementation Question and Answer Document for National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines and New Source Performance Standards for Stationary Compression Ignition and Spark Ignition Internal Combustion Engines, April 2, 2013, Question 39 (http://www.epa.gov/ttn/atw/rice/20120717riceqaupdate.pdf)

PM_{10}, and ammonia slip during normal operation are same as the emission factors presented previously for during the commissioning period. The unit conversions (from ppmvd to g/bhp-hr) for the emission factors are also shown below.

Emission Factors for Digester Gas-Fired Engine (Normal Operation)			
Pollutant	**g/bhp-hr**	**ppmvd (@ 15% O_2)**	**Source**
NOx	0.15	10.6 ppmvd	Proposed by the Applicant to meet BACT
SOx	0.04	--	Mass Balance Above
PM_{10}	0.06	--	AP-42 Draft Table 2.4.4 (October 2008) (Value for Landfill Gas Engines) – See equation above
CO	0.646	74.8 ppmvd	Proposed by the Applicant to meet BACT
VOC	0.10	20.3 ppmvd	Proposed by the Applicant to meet BACT
NH_3	0.05	10 ppmvd	Proposed by the Applicant

<u>NOx – 0.15 g/bhp-hr as proposed by Applicant:</u>

$$\frac{0.15\ g-NOx}{bhp-hr} x \frac{1MMBtu}{8{,}578\ ft^3} x \frac{1\ lb-mole}{46\ lb\ NOx} x \frac{20.9-15}{20.9} x \frac{379.5\ ft^3}{1\ lb-mole} x \frac{392.75\ bhp-hr}{MMBtu} x \frac{1\ lb}{453.6\ g} x \frac{0.30\ Btu_{out}}{Btu_{in}} = \frac{10.6\ ft^3\ NOx}{10^6 ft^3}$$

<u>CO – 0.646 g/bhp-hr as proposed by Applicant:</u>

$$\frac{0.646\ g-CO}{bhp-hr} x \frac{1MMBtu}{8{,}578\ ft^3} x \frac{1\ lb-mole}{28\ lb\ CO} x \frac{20.9-15}{20.9} x \frac{379.5\ ft^3}{1\ lb-mole} x \frac{392.75\ bhp-hr}{MMBtu} x \frac{1\ lb}{453.6\ g} x \frac{0.30\ Btu_{out}}{Btu_{in}} = \frac{74.8\ ft^3\ CO}{10^6 ft^3}$$

<u>VOC – 0.10 g/bhp-hr as proposed by Applicant:</u>

$$\frac{0.10\ g-VOC}{bhp-hr} x \frac{1MMBtu}{8{,}578\ ft^3} x \frac{1\ lb-mole}{16\ lb\ CO} x \frac{20.9-15}{20.9} x \frac{379.5\ ft^3}{1\ lb-mole} x \frac{392.75\ bhp-hr}{MMBtu} x \frac{1\ lb}{453.6\ g} x \frac{0.30\ Btu_{out}}{Btu_{in}} = \frac{20.3\ ft^3\ VOC}{10^6 ft^3}$$

<u>NH_3 – 10 ppmvd @ 15% O_2 as proposed by Applicant:</u>

$$\frac{10\ ft^3\ NH_3}{10^6 ft^3} x \frac{8{,}578\ ft^3}{1MMBtu} x \frac{17\ lb\ NH_3}{1\ lb-mole} x \frac{20.9}{20.9-15} x \frac{1\ lb-mole}{379.5\ ft^3} x \frac{MMBtu}{392.75\ bhp-hr} x \frac{453.6\ g}{1\ lb} x \frac{Btu_{in}}{0.30\ Btu_{out}} = 0.05 \frac{g-NH_3}{bhp-hr}$$

C. Calculations

1. Pre-Project Potential to Emit (PE1)

Although the engine were authorized a commissioning period for firing on natural gas in the pre-project, the commissioning period has ended; therefore, no commissioning period will be calculated for the PE1.

<u>Natural Gas</u>
<u>Daily PE1 for Each Engine:</u>

Daily PE for the engines is calculated in the following table.

PE1 (lb/day) = [EF (g/hp-hr) x Rating (bhp) x 24 (hr/day)] / 453.6 (g/lb)

Daily PE1								
NO_X	0.035	(g/bhp·hr) x	1,966	(bhp) x	24	(hr/day) ÷ 453.59 (g/lb) =	3.6	(lb/day)
SO_X	0.0081	(g/bhp·hr) x	1,966	(bhp) x	24	(hr/day) ÷ 453.59 (g/lb) =	0.8	(lb/day)
PM_{10}	0.06	(g/bhp·hr) x	1,966	(bhp) x	24	(hr/day) ÷ 453.59 (g/lb) =	6.2	(lb/day)
CO	0.104	(g/bhp·hr) x	1,966	(bhp) x	24	(hr/day) ÷ 453.59 (g/lb) =	10.8	(lb/day)
VOC	0.049	(g/bhp·hr) x	1,966	(bhp) x	24	(hr/day) ÷ 453.59 (g/lb) =	5.1	(lb/day)
NH_3	0.05	(g/bhp·hr) x	1,966	(bhp) x	24	(hr/day) ÷ 453.59 (g/lb) =	5.2	(lb/day)

Annual PE1 for Each Engine:

Annual PE for the engines is calculated in the following table.

PE1 (lb/day) = [EF (g/hp-hr) x Rating (bhp) x 8,550 (hr/year)] / 453.6 (g/lb)

Annual PE1								
NO_X	0.035	(g/bhp·hr) x	1,966	(bhp) x	8,500	(hr) ÷ 453.59 (g/lb) =	1,289	(lb/yr)
SO_X	0.0081	(g/bhp·hr) x	1,966	(bhp) x	8,500	(hr) ÷ 453.59 (g/lb) =	298	(lb/yr)
PM_{10}	0.06	(g/bhp·hr) x	1,966	(bhp) x	8,500	(hr) ÷ 453.59 (g/lb) =	2,210	(lb/yr)
CO	0.104	(g/bhp·hr) x	1,966	(bhp) x	8,500	(hr) ÷ 453.59 (g/lb) =	3,832	(lb/yr)
VOC	0.049	(g/bhp·hr) x	1,966	(bhp) x	8,500	(hr) ÷ 453.59 (g/lb) =	1,805	(lb/yr)
NH_3	0.05	(g/bhp·hr) x	1,966	(bhp) x	8,500	(hr) ÷ 453.59 (g/lb) =	1,842	(lb/yr)

Digester Gas
Since the engines are not authorized to fire on digester gas pre-project, the PE1 = 0 for all pollutants.

2. Post-Project Potential to Emit (PE2)

The engines are proposed to be fired on either digester gas or natural gas; therefore, the PE2 will be based of the scenario with the highest emissions. The emission for each fuel type is calculated below:

Natural Gas
There is no change proposed for the engines when fired on natural gas; therefore, the PE2 = PE1 for natural gas fuel:

PE2 from Natural Gas		
Pollutant	**lb/day**	**lb/yr**
NOx	3.6	1,289
SOx	0.8	298
PM_{10}	6.2	2,210
CO	10.8	3,832
VOC	5.1	1,805
NH_3	5.2	1,842

Digester Gas
Daily PE2 for Each Engine during the Commissioning Period:

As discussed above, during the commissioning period each engine will be limited to operating for no more than 8 hours per day.

PE2 (lb/day) = [EF (g/hp-hr) x Rating (bhp) x 8 (hr/day)] / 453.6 (g/lb)

Daily PE2 During the Commissioning Period								
NO_X	1.0	(g/bhp·hr) x	1,966	(bhp) x	8	(hr/day) ÷ 453.59 (g/lb) =	34.7	(lb/day)
SO_X	0.04	(g/bhp·hr) x	1,966	(bhp) x	8	(hr/day) ÷ 453.59 (g/lb) =	1.4	(lb/day)
PM_{10}	0.06	(g/bhp·hr) x	1,966	(bhp) x	8	(hr/day) ÷ 453.59 (g/lb) =	2.1	(lb/day)
CO	2.5	(g/bhp·hr) x	1,966	(bhp) x	8	(hr/day) ÷ 453.59 (g/lb) =	86.7	(lb/day)
VOC	0.4	(g/bhp·hr) x	1,966	(bhp) x	8	(hr/day) ÷ 453.59 (g/lb) =	13.9	(lb/day)
NH_3	0.05	(g/bhp·hr) x	1,966	(bhp) x	8	(hr/day) ÷ 453.59 (g/lb) =	1.7	(lb/day)

Daily PE2 for Each Engine after Completion of the Commissioning Period:

Daily PE for the proposed engines after completion of the commissioning period is calculated in the following table.

PE2 (lb/day) = [EF (g/hp-hr) x Rating (bhp) x 24 (hr/day)] / 453.6 (g/lb)

Daily PE2 After the Commissioning Period (Normal Operation)								
NO_X	0.15	(g/bhp·hr) x	1,966	(bhp) x	24	(hr/day) ÷ 453.59 (g/lb) =	15.6	(lb/day)
SO_X	0.04	(g/bhp·hr) x	1,966	(bhp) x	24	(hr/day) ÷ 453.59 (g/lb) =	4.2	(lb/day)
PM_{10}	0.06	(g/bhp·hr) x	1,966	(bhp) x	24	(hr/day) ÷ 453.59 (g/lb) =	6.2	(lb/day)
CO	0.646	(g/bhp·hr) x	1,966	(bhp) x	24	(hr/day) ÷ 453.59 (g/lb) =	67.2	(lb/day)
VOC	0.10	(g/bhp·hr) x	1,966	(bhp) x	24	(hr/day) ÷ 453.59 (g/lb) =	10.4	(lb/day)
NH_3	0.05	(g/bhp·hr) x	1,966	(bhp) x	24	(hr/day) ÷ 453.59 (g/lb) =	5.2	(lb/day)

Maximum Daily PE2 from Each Engine

The maximum daily PE2 will be the higher of either the commissioning period emissions or the normal operation emissions. The two sets of emissions are compared below:

Maximum Post-Project Daily PE2			
Pollutant	**Commissioning Period (lb/day)**	**Normal Operation (lb/day)**	**Maximum Daily PE2 (lb/day)**
NO_X	34.7	15.6	34.7
SO_X	1.4	4.2	4.2
PM_{10}	2.1	6.2	6.2
CO	86.7	67.2	86.7
VOC	13.9	10.4	13.9
NH_3	1.7	5.2	5.2

Maximum Annual PE2 for Each Engine Including the Commissioning Period:

As discussed above, the proposed engines will be allowed to operate up to 120 hours for commissioning during the first year of operation. The maximum annual PE for each engine will be calculated based on the maximum hours of operation during the commissioning period and the remaining hours during normal operation.

Annual PE2 During the Commissioning Period								
NO_X	1.0	(g/bhp·hr) x	1,966	(bhp) x	120	(hr) ÷ 453.59 (g/lb) =	520	(lb/yr)
SO_X	0.04	(g/bhp·hr) x	1,966	(bhp) x	120	(hr) ÷ 453.59 (g/lb) =	21	(lb/yr)
PM_{10}	0.06	(g/bhp·hr) x	1,966	(bhp) x	120	(hr) ÷ 453.59 (g/lb) =	31	(lb/yr)
CO	2.5	(g/bhp·hr) x	1,966	(bhp) x	120	(hr) ÷ 453.59 (g/lb) =	1,300	(lb/yr)
VOC	0.4	(g/bhp·hr) x	1,966	(bhp) x	120	(hr) ÷ 453.59 (g/lb) =	208	(lb/yr)
NH_3	0.05	(g/bhp·hr) x	1,966	(bhp) x	120	(hr) ÷ 453.59 (g/lb) =	26	(lb/yr)

First Year Annual PE2 After the Commissioning Period								
NO_X	0.15	(g/bhp·hr) x	1,966	(bhp) x	8,380	(hr) ÷ 453.59 (g/lb) =	5,448	(lb/yr)
SO_X	0.04	(g/bhp·hr) x	1,966	(bhp) x	8,380	(hr) ÷ 453.59 (g/lb) =	1,453	(lb/yr)
PM_{10}	0.06	(g/bhp·hr) x	1,966	(bhp) x	8,380	(hr) ÷ 453.59 (g/lb) =	2,179	(lb/yr)
CO	0.646	(g/bhp·hr) x	1,966	(bhp) x	8,380	(hr) ÷ 453.59 (g/lb) =	23,464	(lb/yr)
VOC	0.10	(g/bhp·hr) x	1,966	(bhp) x	8,380	(hr) ÷ 453.59 (g/lb) =	3,632	(lb/yr)
NH_3	0.05	(g/bhp·hr) x	1,966	(bhp) x	8,380	(hr) ÷ 453.59 (g/lb) =	1,816	(lb/yr)

Maximum Annual PE2 from Each Engine during First year, Including Commissioning:

Maximum Post-Project Annual PE2			
Pollutant	**During Commissioning (lb/year)**	**After Commissioning (lb/year)**	**Total (lb/year)**
NO_X	520	5,448	5,968
SO_X	21	1,453	1,474
PM_{10}	31	2,179	2,210
CO	1,300	23,464	24,764
VOC	208	3,632	3,840
NH_3	26	1,816	1,842

Annual PE2 after Commissioning:

The annual PE2 for each engine after completion of the first year of operation when there will not be any commissioning period is calculated as follows:

Annual PE2 After Year 1 with no Commissioning (Normal Operation)								
NO_X	0.15	(g/bhp·hr) x	1,966	(bhp) x	8,500	(hr) ÷ 453.59 (g/lb) =	5,526	(lb/yr)
SO_X	0.04	(g/bhp·hr) x	1,966	(bhp) x	8,500	(hr) ÷ 453.59 (g/lb) =	1,474	(lb/yr)
PM_{10}	0.06	(g/bhp·hr) x	1,966	(bhp) x	8,500	(hr) ÷ 453.59 (g/lb) =	2,210	(lb/yr)
CO	0.646	(g/bhp·hr) x	1,966	(bhp) x	8,500	(hr) ÷ 453.59 (g/lb) =	23,800	(lb/yr)
VOC	0.10	(g/bhp·hr) x	1,966	(bhp) x	8,500	(hr) ÷ 453.59 (g/lb) =	3,684	(lb/yr)
NH_3	0.05	(g/bhp·hr) x	1,966	(bhp) x	8,500	(hr) ÷ 453.59 (g/lb) =	1,842	(lb/yr)

Natural Gas/Digester Gas
The highest annual emissions from either of the two fuel types is chosen as the annual PE2 and summarized below:

Maximum Annual PE2	
Pollutant	**Annual (lb/yr)**
NO_X	5,526
SO_X	1,474
PM_{10}	2,210
CO	24,764
VOC	3,684
NH_3	1,842

3. Pre-Project Stationary Source Potential to Emit (SSPE1)

Pursuant to District Rule 2201, the SSPE1 is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of Emission Reduction Credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions (AER) that have occurred at the source, and which have not been used on-site.

The PE from S-9441-1-0 is calculated in project C-1202485. The PEs from each unit are summarized below:

SSPE1 (lb/year)						
Permit Unit	**NO_X**	**SO_X**	**PM_{10}**	**CO**	**VOC**	**NH3**
C-9441-1-1	1,915	565	479	9,896	210	108
C-9441-2-1	1,771	298	2,210	5,077	1,805	1,842
C-9441-3-1	1,771	298	2,210	5,077	1,805	1,842
SSPE1	**5,457**	**1,161**	**4,899**	**20,050**	**3,820**	**3,792**

4. Post-Project Stationary Source Potential to Emit (SSPE2)

Pursuant to District Rule 2201, the SSPE2 is the PE from all units with valid ATCs or PTOs at the Stationary Source and the quantity of ERCs which have been banked since September 19, 1991 for AER that have occurred at the source, and which have not been used on-site.

SSPE2 (lb/year)						
Permit Unit	**NO_X**	**SO_X**	**PM_{10}**	**CO**	**VOC**	**NH3**
C-9441-1-1	1,915	565	479	9,896	210	108
C-9441-2-2	5,968	1,474	2,210	24,764	3,840	1,842
C-9441-3-2	5,968	1,474	2,210	24,764	3,840	1,842
SSPE2	**13,851**	**3,513**	**4,899**	**59,424**	**7,890**	**3,792**

5. Major Source Determination

<u>Rule 2201 Major Source Determination:</u>

Pursuant to District Rule 2201, a Major Source is a stationary source with a SSPE2 equal to or exceeding one or more of the following threshold values. For the purposes of determining major source status the following shall not be included:

- any ERCs associated with the stationary source
- Emissions from non-road IC engines (i.e. IC engines at a particular site at the facility for less than 12 months), pursuant to the Clean Air Act, Title 3, Section 302, US Codes 7602(j) and (z)
- Fugitive emissions, except for the specific source categories specified in 40 CFR 70.2

Rule 2201 Major Source Determination (lb/year)						
	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO	VOC
SSPE1	5,457	1,161	4,899	4,899	20,050	3,820
SSPE2	13,851	3,513	4,899	4,899	59,424	7,890
Major Source Threshold	20,000	140,000	140,000	140,000	200,000	20,000
Major Source?	No	No	No	No	No	No

Note: PM2.5 assumed to be equal to PM10

As seen in the table above, the facility is not an existing Major Source and is not becoming a Major Source as a result of this project.

Rule 2410 Major Source Determination:

The facility or the equipment evaluated under this project is not listed as one of the categories specified in 40 CFR 52.21 (b)(1)(iii). Therefore the PSD Major Source threshold is 250 tpy for any regulated NSR pollutant.

PSD Major Source Determination (tons/year)						
	NO_2	VOC	SO_2	CO	PM	PM_{10}
Estimated Facility PE before Project Increase	2.7	1.9	0.6	10.0	2.4	2.4
PSD Major Source Thresholds	250	250	250	250	250	250
PSD Major Source?	No	No	No	No	No	No

As shown above, the facility is not an existing PSD major source for any regulated NSR pollutant expected to be emitted at this facility.

6. Baseline Emissions (BE)

The BE calculation (in lb/year) is performed pollutant-by-pollutant for each unit within the project to calculate the QNEC, and if applicable, to determine the amount of offsets required.

Pursuant to District Rule 2201, BE = PE1 for:

- Any unit located at a non-Major Source,
- Any Highly-Utilized Emissions Unit, located at a Major Source,
- Any Fully-Offset Emissions Unit, located at a Major Source, or
- Any Clean Emissions Unit, located at a Major Source.

otherwise,

BE = Historic Actual Emissions (HAE), calculated pursuant to District Rule 2201.

As shown in Section VII.C.5 above, the facility is not a Major Source for any pollutant.

Therefore BE = PE1.

As calculated in Section VII.C.1 above, PE1 is summarized in the following table:

BE (lb/year) for each engine						
	NO_X	**SO_X**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**
C-9441-2 and -3	1,771	298	2,210	2,210	5,077	1,805

7. SB 288 Major Modification

40 CFR Part 51.165 defines a SB 288 Major Modification as any physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant subject to regulation under the Act.

Since this facility is not a major source for any of the pollutants addressed in this project, this project does not constitute an SB 288 major modification and no further discussion is required.

8. Federal Major Modification / New Major Source

Federal Major Modification

District Rule 2201 states that a Federal Major Modification is the same as a “Major Modification” as defined in 40 CFR 51.165 and part D of Title I of the CAA.

As defined in 40 CFR 51.165, Section (a)(1)(v) and part D of Title I of the CAA, a Federal Major Modification is any physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant subject to regulation under the Act. The significant net emission increase threshold for each criteria pollutant is included in Rule 2201.

Since this facility is not a Major Source for any pollutants, this project does not constitute a Federal Major Modification and no further discussion is required.

New Major Source

As demonstrated above, this facility is not becoming a Major Source as a result of this project, therefore, this facility is not a New Major Source pursuant to 40 CFR 51.165 a(1)(iv)(A)(3).

9. Rule 2410 – Prevention of Significant Deterioration (PSD) Applicability Determination

Rule 2410 applies to any pollutant regulated under the Clean Air Act, except those for which the District has been classified nonattainment. The pollutants which must be addressed in the PSD applicability determination for sources located in the SJV and which are emitted in this project are: (See 52.21 (b) (23) definition of significant)

- NO2 (as a primary pollutant)
- SO2 (as a primary pollutant)
- CO
- PM
- PM10

I. Project Emissions Increase - New Major Source Determination

The post-project potentials to emit from all new and modified units are compared to the PSD major source thresholds to determine if the project constitutes a new major source subject to PSD requirements.

The facility or the equipment evaluated under this project is not listed as one of the categories specified in 40 CFR 52.21 (b)(1)(iii). The PSD Major Source threshold is 250 tpy for any regulated NSR pollutant.

PSD Major Source Determination: Potential to Emit (tons/year)						
	NO_2	**VOC**	**SO_2**	**CO**	**PM**	**PM_{10}**
Total PE from New and Modified Units	6.0	3.8	1.5	24.8	2.2	2.2
PSD Major Source threshold	250	250	250	250	250	250
New PSD Major Source?	No	No	No	No	No	No

As shown in the table above, the potential to emit for the project, by itself, does not exceed any PSD major source threshold. Therefore Rule 2410 is not applicable and no further analysis is required.

10. Quarterly Net Emissions Change (QNEC)

The QNEC is calculated solely to establish emissions that are used to complete the District's PAS emissions profile screen. Detailed QNEC calculations are included in Appendix E.

VIII. Compliance Determination

Rule 2201 New and Modified Stationary Source Review Rule

A. Best Available Control Technology (BACT)

1. BACT Applicability

Pursuant to District Rule 2201, Section 4.1, BACT requirements are triggered on a pollutant-by-pollutant basis and on an emissions unit-by-emissions unit basis. Unless specifically exempted by Rule 2201, BACT shall be required for the following actions*:

a. Any new emissions unit with a potential to emit exceeding two pounds per day,
b. The relocation from one Stationary Source to another of an existing emissions unit with a potential to emit exceeding two pounds per day,
c. Modifications to an existing emissions unit with a valid Permit to Operate resulting in an Adjusted Increase in Permitted Emissions (AIPE) exceeding two pounds per day, and/or
d. Any new or modified emissions unit, in a stationary source project, which results in an SB 288 Major Modification or a Federal Major Modification, as defined by the rule.

*Except for CO emissions from a new or modified emissions unit at a Stationary Source with an SSPE2 of less than 200,000 pounds per year of CO.

a. New emissions units – PE > 2 lb/day

As seen in Section VII.C.2 above, the applicant is proposing to fire the existing natural gas-fired IC engines with digester gas. When the IC engines are fired on digester gas, they are considered as a new emissions unit because they are a new class and category. The PE is greater than 2 lb/day for NO_X, SO_X, PM_{10}, CO, VOC and NH_3. BACT is triggered for NO_X, SO_X, PM_{10}, and VOC only since the PEs are greater than 2 lb/day. However, BACT is not triggered for CO since the SSPE2 for CO is not greater than 200,000 lb/year, as demonstrated in Section VII.C.5 above.

Additionally, the SCR is an emissions control device used to control NO_X. Per Section 3.46.2 of District Rule 1020, an emissions control device is not a source operation; consequently, it does not meet the definition of an emission unit per section 3.17 of District Rule 2201. Therefore, only emissions for the pollutant(s) which the device controls may trigger District BACT requirements. Therefore, only direct emissions

from the IC engines may trigger District BACT requirements, not secondary emissions from the flare (i.e. NH_3). Therefore, BACT is not triggered for NH_3.

b. Relocation of emissions units – PE > 2 lb/day

As discussed in Section I above, there are no emissions units being relocated from one stationary source to another; therefore, BACT is not triggered.

c. Modification of emissions units – AIPE > 2 lb/day

There IC engines when fired on natural gas are not being modified. Therefore, BACT is not triggered.

d. SB 288/Federal Major Modification

As discussed in Sections VII.C.7 and VII.C.8 above, this project does not constitute an SB 288 and/or Federal Major Modification for any pollutant. Therefore, BACT is not triggered for any pollutant.

2. BACT Guideline

BACT Guideline 3.3.15 applies to the proposed 1,966 bhp IC engine when it is fueled with digester gas. (See Appendix C)

3. Top-Down BACT Analysis

Pursuant to Permit Services Policies and Procedures for BACT, a Top-Down BACT analysis shall be performed as a part of the application review for each application subject to the BACT requirements pursuant to the District's NSR Rule.

<u>BACT for IC Engines when Fueled with Digester Gas</u>

Pursuant to the Top-Down BACT Analysis (See Appendix C), BACT for the proposed IC engine when fueled with digester gas has been satisfied with the following:

NO_X: 0.15 g/bhp-hr
SO_X: Digester fuel sulfur content ≤ 40 ppmv as H_2S
PM_{10}: Digester fuel sulfur content ≤ 40 ppmv as H_2S
VOC: 0.10 g/bhp-hr

B. Offsets

1. Offset Applicability

Pursuant to District Rule 2201, Section 4.5, offset requirements shall be triggered on a pollutant by pollutant basis and shall be required if the SSPE2 equals or exceeds the offset threshold levels in Table 4-1 of Rule 2201.

The SSPE2 is compared to the offset thresholds in the following table.

Offset Determination (lb/year)					
	NO_X	SO_X	PM_{10}	CO	VOC
SSPE2	13,851	3,513	4,899	59,424	7,890
Offset Thresholds	20,000	54,750	29,200	200,000	20,000
Offsets Triggered?	No	No	No	No	No

2. Quantity of District Offsets Required

As discussed above, the SSPE2 is not greater than the offset thresholds for all pollutants; therefore, District offsets are not triggered. In addition, as demonstrated above, this project does not trigger Federal Major Modification or New Major Source requirements. In conclusion, offsets will not be required for this project and no further discussion is required.

C. Public Notification

1. Applicability

Pursuant to District Rule 2201, Section 5.4, public noticing is required for:

a. New Major Sources, Federal Major Modifications, and SB 288 Major Modifications,
b. Any new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any one pollutant,
c. Any project which results in the offset thresholds being surpassed,
d. Any project with an SSIPE of greater than 20,000 lb/year for any pollutant, and/or
e. Any project which results in a Title V significant permit modification

a. New Major Sources, Federal Major Modifications, and SB 288 Major Modifications

As shown in Section VII.C.5 above, this existing minor source facility is not becoming a Major Source as a result of this project. Therefore, this facility is not a New Major Source and this project does not constitute an SB 288 or a Federal Major Modification. Consequently, public noticing for this project for New Major Source, Federal Major Modification, or SB 288 Major Modification purposes is not required.

b. PE > 100 lb/day

Applications which include a new emissions unit with a PE greater than 100 pounds during any one day for any pollutant will trigger public noticing requirements. As seen

in Section VII.C.2 above, this project does not include a new emissions unit which has daily emissions greater than 100 lb/day for any pollutant; therefore public noticing for PE > 100 lb/day purposes is not required.

c. Offset Threshold

Public notification is required if the pre-project Stationary Source Potential to Emit (SSPE1) is increased to a level exceeding the offset threshold levels. The following table compares the SSPE1 with the SSPE2 in order to determine if any offset thresholds have been surpassed with this project.

Offset Thresholds				
Pollutant	**SSPE1 (lb/year)**	**SSPE2 (lb/year)**	**Offset Threshold**	**Public Notice Required?**
NO_X	5,457	13,851	20,000 lb/year	No
SO_X	1,161	3,513	54,750 lb/year	No
PM_{10}	4,899	4,899	29,200 lb/year	No
CO	20,050	59,424	200,000 lb/year	No
VOC	3,820	7,890	20,000 lb/year	No

As demonstrated above, there were no thresholds surpassed with this project; therefore, public noticing is not required for offset purposes.

d. SSIPE > 20,000 lb/year

Public notification is required for any permitting action that results in a SSIPE of more than 20,000 lb/year of any affected pollutant. According to District policy, the SSIPE = SSPE2 – SSPE1. The SSIPE is compared to the SSIPE Public Notice thresholds in the following table.

SSIPE Public Notice Thresholds					
Pollutant	**SSPE2 (lb/year)**	**SSPE1 (lb/year)**	**SSIPE (lb/year)**	**SSIPE Public Notice Threshold**	**Public Notice Required?**
NO_x	13,851	5,457	8,394	20,000 lb/year	No
SO_x	3,513	1,161	2,352	20,000 lb/year	No
PM_{10}	4,899	4,899	0	20,000 lb/year	No
CO	59,424	20,050	39,374	20,000 lb/year	Yes
VOC	7,890	3,820	4,070	20,000 lb/year	No
NH_3	3,792	3,792	0	20,000 lb/year	No

As demonstrated above, the SSIPE for CO is greater than 20,000 lb/year; therefore, public noticing for SSIPE purposes is required.

e. Title V Significant Permit Modification

Since this facility does not have a Title V operating permit, this change is not a Title V significant Modification, and therefore public noticing is not required.

2. Public Notice Action

As discussed above, public noticing is required for this project for CO emissions in excess of 20,000 lb/year. Therefore, public notice documents will be submitted to the California Air Resources Board (CARB) and a public notice will be electronically published on the District's website prior to the issuance of the ATC for this equipment.

D. Daily Emission Limits (DELs)

DELs and other enforceable conditions are required by Rule 2201 to restrict a unit's maximum daily emissions, to a level at or below the emissions associated with the maximum design capacity. The DEL must be contained in the latest ATC and contained in or enforced by the latest PTO and enforceable, in a practicable manner, on a daily basis. DELs are also required to enforce the applicability of BACT.

<u>Proposed Rule 2201 (DEL) Conditions for Engines during Both Commissioning and Normal Operation</u>:

- This engine shall only be fueled with PUC-regulated natural gas, digester gas, or a blend of PUC-regulated natural gas and digester gas. [District Rules 2201, 4702, and 4801]
- This engine shall be equipped with an operational non-resettable elapsed time meter or other APCO approved alternative. [District Rules 2201 and 4702]
- Ammonia (NH_3) emissions from this engine shall not exceed 10 ppmvd @ 15% O2. [District Rule 2201]
- All equipment shall be maintained in good operating condition and shall be operated in a manner consistent with good air pollution control practice to minimize emissions of air contaminants. [District Rule 2201]

<u>Proposed Rule 2201 (DEL) Conditions for Engines during Commissioning Period</u>:

For the proposed engines, the DELs for NO_X, PM_{10}, CO, and VOC are stated in the form of maximum emission factors (g/bhp-hr), the maximum engine horsepower rating (1,966 bhp), and maximum number of hours allowed for commissioning activities. The following conditions will be placed on the permits to ensure compliance.

- The owner/operator shall minimize the emissions from the engine to the maximum extent possible during the commissioning period. [District Rule 2201]

- Commissioning activities are defined as, but not limited to, all adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the construction contractor to ensure safe and reliable operation of the reciprocating IC engine, emission control equipment, and associated electrical delivery systems. [District Rule 2201]
- Commissioning period shall commence when all mechanical, electrical, and control systems are installed and individual system startup has been completed, or when the engine is first fired, whichever occurs first. The commissioning period shall terminate when the initial engine tuning has completed and the engine is available for commercial operation. The total duration of the commissioning period for this engine shall not exceed 120 hours of operation of the engine. [District Rule 2201]
- During the commissioning period this engine shall operate for no more than 8 hours on any day in which the SCR system or oxidation catalyst are not installed and operating for the entire duration of engine operation for that day. The permittee shall record total operating time of the engine for each day during the commissioning period in which the SCR system or oxidation catalyst are not installed and operating for the entire duration of engine operation on that day. [District Rule 2201]
- The total number of firing hours of this unit without abatement of emissions by the SCR system and oxidation catalyst shall not exceed 120 hours during the commissioning period. Such operation of this unit without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system or oxidation catalyst. Upon completion of these activities, the permittee shall provide written notice to the District and the unused balance of the 120 firing hours without abatement shall expire. [District Rule 2201]
- Emission rates from this engine during the commissioning period shall not exceed any of the following limits: 1.0 g-NOx/bhp-hr, 0.06 g-PM_{10}/bhp-hr, 2.5 g-CO/bhp-hr, or 0.4 g-VOC/bhp-hr. [District Rule 2201]
- At the earliest feasible opportunity, in accordance with the recommendations of the equipment supplier and the construction contractor, the Selective Catalytic Reduction (SCR) system and oxidation catalyst shall be installed, adjusted, and operated to minimize emissions from this unit. [District Rule 2201]
- The permittee shall submit a summary of activities to be performed during the commissioning period to the District at least two weeks prior to the first firing of this engine. The summary shall include a list of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but are not limited to, the tuning of the engine, the installation and operation of the SCR system and oxidation catalyst, the installation, calibration, and testing of emissions monitors, and any activities requiring the firing of this unit without abatement by the SCR system and oxidation catalyst. [District Rule 2201]
- The permittee shall record the daily and total cumulative operating time of the engine in hours during the commissioning period. [District Rule 2201]

<u>Proposed Rule 2201 (DEL) Conditions for Engines during Normal Operation</u>:

- Emissions from this IC engine, when fired on natural gas, shall not exceed any of the following limits: 0.035 g-NOx/bhp-hr (equivalent to 2.5 ppmvd NOx @ 15% O2), NOx

referenced as NO2; 0.06 g-PM10/bhp-hr; 0.104 g-CO/bhp-hr (equivalent to 12 ppmvd CO @ 15% O2); or 0.049 g-VOC/bhp-hr (equivalent to 10 ppmvd VOC @ 15% O2), VOC referenced as CH4. [District Rules 2201 and 4702]

- After the commissioning period, emissions from this IC engine, when fired on digester gas, shall not exceed any of the following limits: 0.15 g-NOx/bhp-hr (equivalent to 10.6 ppmvd NOx @ 15% O2), NOx referenced as NO2; 0.06 g-PM10/bhp-hr; 0.646 g-CO/bhp-hr (equivalent to 74.8 ppmvd CO @ 15% O2); or 0.10 g-VOC/bhp-hr (equivalent to 20.3 ppmvd VOC @ 15% O2), VOC referenced as CH4. [District Rules 2201 and 4702]
- The air-to-fuel ratio controller(s) shall be maintained and operated appropriately in order to ensure proper operation of the engine and control device to minimize emissions at all times. [District Rule 2201]
- This engine shall not operate more than 8,500 hours per calendar year. [District Rules 2201 and 4102]

E. Compliance Assurance

1. Source Testing

The natural gas/digester gas-fired engines are subject to District Rule 4702 - Internal Combustion Engines. District Rule 4702, Section 6.3.2.1 requires source testing of NO_X, CO, and VOC emissions at least once every 24 months for a non-agricultural spark-ignited IC engine. Therefore, source testing for NO_X, CO, and VOC will be required within 60 days of first firing on digester gas and at least once every 24 months thereafter. Since the control equipment will include an SCR system, periodic testing of ammonia slip will also be required. In addition, Section 5.10.1 of District Rule 4702 requires an annual analysis of the sulfur content of engine fuel. The PM_{10} emissions from the engine are not expected to change significantly over time as long as the quality of the gas used to fuel the engine remains consistent. The facility will be required to periodically monitor the sulfur content of the digester gas fuel, which should ensure that the quality of the digester gas fuel is consistent. Therefore, initial PM_{10} source testing will be required to demonstrate compliance with the PM_{10} emission limit, but ongoing PM_{10} source testing will not be required.

The following conditions will be included on the ATC permit for the IC engines:

- The exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods and shall be equipped with safe permanent provisions to sample stack gases with a portable NOx, CO, and O2 analyzer during District inspections. The sampling ports shall be located in accordance with the California Air Resources Board (CARB) document titled Air Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. [District Rule 1081]
- Source testing to measure NOx, CO, VOC, PM10, and ammonia (NH3) emissions from this unit shall be conducted within 60 days upon end of the commissioning period. [District Rules 1081, 2201, and 4702]

- Source testing to measure NOx, CO, VOC, and ammonia (NH3) emissions from this unit shall be conducted at least once every 24 months. [District Rules 1081, 2201, and and 4702]
- {109} Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]
- The results of each source test shall be submitted to the District within 60 days after completion of the source test. [District Rule 1081]
- Emissions source testing shall be conducted with the engine operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. [District Rule 4702]
- For emissions source testing, the arithmetic average of three 30-consecutive-minute test runs shall apply. If two of three runs are above an applicable limit, the test cannot be used to demonstrate compliance with an applicable limit. VOC emissions shall be reported as methane. NOx, CO, VOC, and NH3 concentrations shall be reported in ppmv, corrected to 15% oxygen. [District Rules 2201 and 4702]
- The following methods shall be used for source testing: NOx (ppmv) - EPA Method 7E or ARB Method 100; CO (ppmv) - EPA Method 10 or ARB Method 100; VOC (ppmv) - EPA Method 18, 25A or 25B or ARB Method 100; stack gas oxygen - EPA Method 3 or 3A or ARB Method 100; stack gas velocity/volumetric flowrate - EPA Method 2 or EPA Method 19; stack gas moisture content - EPA Method 4; PM10 (filterable and condensable) - EPA Method 201 and 202, EPA Method 201a and 202, or ARB Method 5 in combination with Method 501; NH3 - BAAQMD ST-1B or SCAQMD Method 207-1. Alternative test methods as approved by the District may be used to address the source testing requirements of this permit. [District Rules 1081, 2201, and 4702]
- The higher heating value (HHV) of the fuel gas shall be determined using ASTM D1826, ASTM 1945 in conjunction with ASTM D3588, or an alternative method approved by the District. [District Rules 2201 and 4702]
- Fuel sulfur content analysis of the digester gas used to fuel this engine shall be performed within 60 days upon end of the commissioning period using EPA Method 11 or EPA Method 15, as appropriate, or an alternative method approved by the District. [District Rules 2201 and 4702]
- Fuel sulfur content analysis of the digester gas used to fuel this engine shall be performed at least annually using EPA Method 11 or EPA Method 15, as appropriate, or an alternative method approved by the District. Records of the fuel sulfur analysis shall be maintained and provided to the District upon request. [District Rules 2201 and 4702]

2. Monitoring

The natural gas/digester gas-fired engines are subject to District Rule 4702 - Internal Combustion Engines. Section 5.8.1 of District Rule 4702 requires engines rated at least 1,000 bhp that can operate more than 2,000 hour per calendar year or equipped with

external control devices to install, operate, and maintain an APCO-approved alternate monitoring plan. Section 5.8.9 of District Rule 4702 requires monitoring of NO_X emissions at least once every calendar quarter for a non-agricultural spark-ignited IC engine. However, Section 6.5.3 of District Rule 4702 requires monthly monitoring for engines equipped with non-certified control devices in order to demonstrate compliance with the emission limits in District Rule 4702. Therefore, monthly monitoring of NO_X, CO, and O_2 concentrations in accordance pre-approved alternate monitoring plan "A" will be required. Since the engines will be equipped with SCR, quarterly monitoring of ammonia slip will also be required.

The following conditions will be placed on the permits to ensure compliance:

- Coincident with the end of the commissioning period, the permittee shall monitor and record the stack concentration of NOx, CO, and O2 at least once every calendar quarter (in which a source test is not performed) using a portable emission monitor that meets District specifications. Monitoring shall be performed not less than once every month for 12 months if two consecutive deviations are observed during quarterly monitoring. Monitoring shall not be required if the engine is not in operation, i.e. the engine need not be started solely to perform monitoring. Monitoring shall be performed within 5 days of restarting the engine unless monitoring has been performed within the last month if on a monthly monitoring schedule, or within the last quarter if on a quarterly monitoring schedule. Records must be maintained of the dates of non-operation to validate extended monitoring frequencies. [District Rules 2201 and 4702]
- In-stack emission monitors shall be calibrated using EPA protocol calibration gases a minimum of once within every 30 days. Records of calibration dates, instruments calibrated, gas readings prior to calibration, calibration gases used, and calibration gas certification and expiration dates shall be maintained. [District Rules 1080 and 4702]
- Portable emission monitors shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Calibration records shall be shall be maintained. [District Rules 1080 and 4702]
- The permittee shall monitor and record the stack concentration of NH3 at least once every calendar quarter in which a source test is not performed. NH3 monitoring shall be conducted utilizing District approved gas-detection tubes or a District approved equivalent method. Monitoring shall not be required if the unit is not in operation, i.e. the unit need not be started solely to perform monitoring. Monitoring shall be performed within 5 days of restarting the unit unless monitoring has been performed within the last quarter. Records must be maintained of the dates of non-operation to validate extended monitoring frequencies. [District Rules 2201 and 4102]
- If the NOx, CO, or NH3 concentrations corrected to 15% O2, as measured by the portable analyzer, the District-approved in-stack emission monitor(s), or the District-approved ammonia monitoring equipment, exceed the respective permitted emissions concentration(s), the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 8 hours of operation after detection. If the

portable analyzer or ammonia monitoring equipment readings continue to exceed the permitted emissions concentration(s) after 8 hours of operation after detection, the permittee shall notify the District within the following 1 hour and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100 in lieu of the performing the notification and testing required by this condition. [District Rules 2201 and 4702]

- All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the permit-to-operate. The analyzer and any in-stack emission monitors shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rule 4702]

Because of the variable composition of digester gas, additional monitoring of the fuel sulfur content of the digester gas will be required. The following conditions will be placed on the ATCs as a mechanism to ensure compliance:

- The sulfur content of the digester gas used to fuel the engine shall be monitored and recorded at least once every calendar quarter. If quarterly monitoring shows a violation of the fuel sulfur content limit of this permit, monthly monitoring will be required until six consecutive months of monitoring show compliance with the fuel sulfur content limit. Once compliance with the fuel sulfur content limit is shown for six consecutive months, then the monitoring frequency may return to quarterly. Monitoring of the sulfur content of the digester gas fuel shall not be required if the engine does not operate during that period. Records of the results of monitoring of the digester gas fuel sulfur content shall be maintained. [District Rule 2201]
- Monitoring of the digester gas sulfur content shall be performed using gas detection tubes calibrated for H2S; District-approved test methods, including EPA Method 11 or EPA Method 15, ASTM Method D1072, D1945, D4084, D4468, D4810 or D5504; a continuous analyzer employing gas chromatography; a continuous fuel gas monitor that meets the requirements specified in SCAQMD Rule 431.1, Attachment A; or an alternative method approved by the District. The permittee shall maintain records of any in-line monitors used to demonstrate compliance with the digester gas sulfur content limit of this permit, including the make, model, and detection limits of the monitor(s). [District Rule 2201]

3. Recordkeeping

Recordkeeping is required to demonstrate compliance with the offset, public notification and daily emission limit requirements of Rule 2201. The following conditions are listed on the permit to operate:

- This engine shall be equipped with an operational non-resettable elapsed time meter or other APCO approved alternative. [District Rules 2201 and 4702]
- The permittee shall record total operating time of the engine in hours during the commissioning period. [District Rule 2201]
- The SCR catalyst shall be maintained and replaced in accordance with the recommendations of the catalyst manufacturer or emission control supplier. Records of catalyst maintenance and replacement shall be maintained. [District Rules 2201 and 4702]
- The permittee shall maintain records of: (1) the date and time of NOx, CO, O2, and NH3 measurements, (2) the O2 concentration in percent and the measured NOx, CO, and NH3 concentrations corrected to 15% O2, (3) make and model of portable emission analyzer(s) and in-stack emission analyzer(s), (4) emission analyzer calibration records, (5) the method of determining the NH3 emission concentration, and (6) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 2201 and 4702]
- The permittee shall maintain an engine operating log to demonstrate compliance. The engine operating log shall include, on a monthly basis, the following information: the hours of operation for commissioning of the engine, the total hours of operation, the type and quantity of each fuel used, maintenance and modifications performed, monitoring data, compliance source test results, and any other information necessary to demonstrate compliance. Quantity of fuel used shall be recorded in standard cubic feet using a non-resettable, totalizing mass or volumetric fuel flow meter or other APCO approved-device. [District Rules 2201 and 4702]
- Records shall be maintained of the composition of the fuel used during each source test, including the percent blend of natural gas and digester gas on a volumetric and heat input basis in the fuel used. [District Rule 2201]
- The permittee shall document that the natural gas used as fuel in the engine is from a PUC regulated source. Valid purchase contracts, supplier certifications, tariff sheets, or transportation contacts may be used to satisfy this requirement. [District Rules 2201 and 4702]
- Records of hydrogen sulfide analyzer(s) installed or utilized and the calibration records of such analyzer(s) shall be maintained. Records are only required on such analyzer(s) utilized to demonstrate compliance with this permit. [District Rule 2201]
- {4051} The permittee shall record the total time the engine operates, in hours per calendar year. [District Rule 2201]
- All records shall be maintained and retained for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rules 2201 and 4702]

4. Reporting

No reporting is required to demonstrate compliance with Rule 2201.

F. Ambient Air Quality Analysis (AAQA)

Section 4.14 of District Rule 2201 requires that an AAQA be conducted for the purpose of determining whether a new or modified Stationary Source will cause or make worse a violation of an air quality standard. The District's Technical Services Division conducted the required analysis. Refer to Appendix D of this document for the AAQA summary sheet.

The proposed location is in an attainment area for NO_X, CO, and SO_X. As shown by the AAQA summary sheet the proposed equipment will not cause a violation of an air quality standard for NO_X, CO, or SO_X.

The proposed location is in a non-attainment area for the state's PM_{10} as well as federal and state $PM_{2.5}$ thresholds. As shown by the AAQA summary sheet the proposed equipment will not cause a violation of an air quality standard for PM_{10} and $PM_{2.5}$.

Rule 2410 Prevention of Significant Deterioration

As shown in Section VII.C.9 above, this project does not result in a new PSD major source or PSD major modification. No further discussion is required.

Rule 2520 Federally Mandated Operating Permits

Since this facility's potential emissions do not exceed any major source thresholds of Rule 2201, this facility is not a major source, and Rule 2520 does not apply.

Rule 4001 New Source Performance Standards (NSPS)

This rule incorporates NSPS from Part 60, Chapter 1, Title 40, Code of Federal Regulations (CFR), and applies to all new sources of air pollution and modifications of existing sources of air pollution listed in 40 CFR Part 60.

40 CFR 60 Subpart JJJJ Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

The purpose of 40 CFR 60 Subpart JJJJ is to establish New Source Performance Standards to reduce emissions of NO_X, SO_X, PM, CO, and VOC from new stationary spark ignition (SI) internal combustion (IC) engines.

Pursuant to Section 60.4230, compliance with this subpart is required for owners and operators of stationary SI IC engines that commence construction after June 12, 2006, where the stationary SI ICE are manufactured: (a) on or after July 1, 2007, for engines with a maximum engine power greater than or equal to 500 HP (except lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP); (b) on or after January 1, 2008, for lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP; (c) on or after July 1, 2008, for engines with a maximum engine power less than 500 HP; or (d) on or after January 1, 2009, for emergency engines with a maximum engine power greater than 19 KW (25 HP).

The engines are 1,966 bhp SI IC engines that are constructed after June 12, 2006 and manufactured after July 1, 2007; therefore, the engines are subject to this subpart. However, the District has not been delegated the authority to implement 40 CFR 60, Subpart JJJJ for non-Major Sources; therefore, the requirements from this subpart will not be included in the permit. However, the applicant will be responsible for compliance with the applicable requirements of this regulation.

Rule 4002 National Emission Standards for Hazardous Air Pollutants (NESHAPs)

This rule incorporates NESHAPs from Part 63, Chapter 1, Title 40, Code of Federal Regulations (CFR) and applies to all new sources of air pollution and modifications of existing sources of air pollution listed in 40 CFR Part 63.

40 CFR 63 Subpart ZZZZ National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE)

40 CFR 63 Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAPs) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. A major source of HAP emissions is a facility that has the potential to emit any single HAP at a rate of 10 tons/year or greater or any combinations of HAPs at a rate of 25 tons/year or greater. An area source of HAPs is a facility is not a major source of HAPs.

Pursuant to Section 63.6590(c), an affected source that is a new or reconstructed stationary Reciprocating Internal Combustion Engine (RICE) located at an area source must meet the requirements of 40 CFR 63, Subpart ZZZZ by meeting the requirements of 40 CFR 60, Subpart IIII, for compression ignition engines or 40 CFR 60, Subpart JJJJ, for spark ignition engines and no further requirements apply for such engines under this part.

As with 40 CFR 60, Subpart JJJJ, the District has not been delegated the authority to implement 40 CFR 63, Subpart ZZZZ for non-Major Sources; therefore, no requirements from this subpart will be included in the permits. However, the applicant will be responsible for compliance with the applicable requirements of this regulation.

Rule 4101 Visible Emissions

Rule 4101 states that no person shall discharge into the atmosphere emissions of any air contaminant aggregating more than 3 minutes in any hour which is as dark as or darker than Ringelmann 1 (or 20% opacity). The following condition will be listed on the permits as a mechanism to ensure compliance:

- {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]

Rule 4102 Nuisance

Rule 4102 prohibits discharge of air contaminants which could cause injury, detriment, nuisance or annoyance to the public. Public nuisance conditions are not expected as a result of these operations, provided the equipment is well maintained. Therefore, compliance with this rule is expected.

California Health & Safety Code 41700 (Health Risk Assessment)

District Policy APR 1905 – *Risk Management Policy for Permitting New and Modified Sources* specifies that for an increase in emissions associated with a proposed new source or modification, the District perform an analysis to determine the possible impact to the nearest resident or worksite.

District policy APR 1905 also specifies that the increase in emissions associated with a proposed new source or modification of an existing source shall not result in an increase in cancer risk greater than the District's significance level (20 in a million) and shall not result in acute and/or chronic risk indices greater than 1.

According to the Technical Services Memo for this project, the total facility prioritization score including this project was greater than one. Therefore, an HRA was required to determine the short-term acute and long-term chronic exposure from this project.

The resulting prioritization score, acute hazard index, chronic hazard index, and cancer risk for this project is shown below.

Health Risk Assessment Summary	
	Worst Case Potential
Prioritization Score	148.56
Cancer Risk	1.21E-06
Acute Hazard Index	0.78
Chronic Hazard Index	0.01
T-BACT Required?	No

Discussion of T-BACT

BACT for toxic emission control (T-BACT) is required if the cancer risk exceeds one in one million. As demonstrated above, T-BACT is not required for this project because the HRA indicates that the risk is not above the District's thresholds for triggering T-BACT requirements; therefore, compliance with the District's Risk Management Policy is expected.

In accordance with District policy APR 1905, no further analysis is required, and compliance with District Rule 4102 requirements is expected.

See Appendix D: Health Risk Assessment Summary

The following permit conditions are required as a mechanism to ensure compliance with the assumptions made for the risk management review:

- The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]

Rule 4201 Particulate Matter Concentration

Section 3.1 prohibits discharge of dust, fumes, or total particulate matter into the atmosphere from any single source operation in excess of 0.1 grain per dry standard cubic foot. The higher of the two emission factors (0.06 g-PM_{10}/bhp-hr) for the engines will be used to demonstrate compliance for the engine:

$$\frac{0.06\ \text{g}}{\text{hp}\cdot\text{hr}} \times \frac{1\ \text{hp}\cdot\text{hr}}{2{,}545\ \text{Btu}} \times \frac{10^6\ \text{Btu}}{8{,}784\ \text{dscf}} \times \frac{0.3\,\text{Btu}_{out}}{1\text{Btu}_{in}} \times \frac{15.43\ \text{grain}}{\text{g}} = 0.01\ \frac{\text{grain}}{\text{dscf}}$$

Since 0.01 grain/dscf is less than 0.1 grain/dscf, compliance with this rule is expected.

The following condition will be listed on the permits as a mechanism to ensure compliance:

- {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]

Rule 4701 Internal Combustion Engines – Phase I

The purpose of this rule is to limit the emissions of nitrogen oxides (NO_X), carbon monoxide (CO), and volatile organic compounds (VOC) from internal combustion (IC) engines.

The requirements of Rule 4702 are equivalent or more stringent than the requirements of this Rule. Since the proposed IC engines are subject to both Rules 4701 and 4702, compliance with Rule 4702 is sufficient to demonstrate compliance with this rule.

Rule 4702 Internal Combustion Engines – Phase 2

The purpose of this rule is to limit the emissions of nitrogen oxides (NO_X), carbon monoxide (CO), and volatile organic compounds (VOC) from internal combustion engines.

This rule applies to any internal combustion engine rated brake at 25 horsepower or greater.

The proposed engines are subject to the rule.

Section 5.1 applies to only Non-Agricultural Operations (Non-AO) IC engines up to 50 hp. This section is not applicable and no further discussion is required.

Section 5.2
On and after the compliance schedule specified in Section 7.5, the operator of a spark-ignited engine > 50 bhp that is used in non-agricultural operation (non-AO) shall comply with all the applicable requirements of the rule and one of the following, on an engine-by-engine basis:

5.2.2.1 On and after the compliance schedule specified in Section 7.5, the operator of a spark-ignited engine that is used exclusively in non-AO shall comply with Sections 5.2.2.1.1 through 5.2.2.1.3 on an engine-by-engine basis:

5.2.2.1.1 NOx, CO, and VOC emission limits pursuant to Table 2 and Table 3, as applicable;
5.2.2.1.2 SOx control requirements of Section 5.7, pursuant to the deadlines specified in Section 7.5; and
5.2.2.1.3 Monitoring requirements of Section 5.11, pursuant to the deadlines specified in Section 7.5.

5.2.2.2 In lieu of complying with the NOx emission limit requirement of Section 5.2.2.1.1, an operator may pay an annual fee to the District, as specified in Section 5.6, pursuant to Section 7.6. This compliance option will sunset after December 31, 2023, where after an operator must comply with the NOx emissions limit requirements in Table 2 and Table 3, per the compliance schedule included in Section 7.5.

5.2.2.2.1 Engines in the fee payment program shall have actual emissions not greater than the applicable limits in Table 1 during the entire time the engine is part of the fee payment program.

5.2.2.3 In lieu of complying with the NOx, CO, and VOC limits of Table 2 and Table 3 on an engine-by-engine basis, an operator may elect to implement an alternative emission control plan pursuant to Section 8.0. An operator electing this option shall not be eligible to participate in the fee payment option outlined in Section 5.2.2.2 and Section 5.6.

Table 2			
Engine Type	**NOx Limit (ppmv)**	**CO Limit (ppmv)**	**VOC Limit (ppmv)**
2. Lean-Burn Engines			
a. Two-Stroke, Gaseous Fueled, >50 bhp and < 100 bhp	75	2000	750
b. Limited Use	65	2000	750
c. Lean-Burn Engine used for gas compression	65 ppmv or 93% reduction	2000	750
d. Waste Gas Fueled (≥50% total monthly heat input from waste gas based on hhv)	65 ppmv or 90% reduction	2000	750
e. Lean-Burn Engine, not listed above	11	2000	750

Table 3			
Engine Type	**NOx Limit (ppmv)**	**CO Limit (ppmv)**	**VOC Limit (ppmv)**
2. Lean-Burn Engines			
a. Limited Use	11	2000	90
b. Lean-Burn Engine used for gas compression	40	2000	90
c. Waste Gas Fueled (≥50% total monthly heat input from waste gas based on hhv)	40	2000	90
d. Lean-Burn Engine, not listed above	11	2000	90

Compliance with the emissions limits in Table 2 is required at the time of permit issuance. The emissions limits in Table 3 are identical to, or more stringent than the limits in Table 2. Full compliance with the emission limits in Table 3 is required by December 21, 2023.

The applicant has proposed limits for the engines that comply with the Rule.

The following conditions will be included on each permit as a mechanism to ensure compliance:

- Emissions from this IC engine, when fired on natural gas, shall not exceed any of the following limits: 0.035 g-NOx/bhp-hr (equivalent to 2.5 ppmvd NOx @ 15% O2), NOx referenced as NO2; 0.06 g-PM10/bhp-hr; 0.104 g-CO/bhp-hr (equivalent to 12 ppmvd CO

@ 15% O2); or 0.049 g-VOC/bhp-hr (equivalent to 10 ppmvd VOC @ 15% O2), VOC referenced as CH4. [District Rules 2201 and 4702]

- After the commissioning period, emissions from this IC engine, when fired on digester gas, shall not exceed any of the following limits: 0.15 g-NOx/bhp-hr (equivalent to 10.6 ppmvd NOx @ 15% O2), NOx referenced as NO2; 0.06 g-PM10/bhp-hr; 0.646 g-CO/bhp-hr (equivalent to 74.8 ppmvd CO @ 15% O2); or 0.10 g-VOC/bhp-hr (equivalent to 20.3 ppmvd VOC @ 15% O2), VOC referenced as CH4. [District Rules 2201 and 4702]

Section 5.3 applies to continuous emission monitoring systems (CEMS). The proposed engines does not have a CEMS; therefore, this section is not applicable

Sections 5.4 and 5.5 apply to compliance demonstration with percent emissions reductions. The proposed engines are not proposing to meet the NOx emission limits of Section 5.2 by percent emission reduction; therefore, this section is not applicable

Section 5.6 applies to compliance demonstration with an annual fee payment. The proposed engines are not demonstrating compliance by paying an annual fee; therefore, this section is not applicable.

Section 5.7 applies to sulfur oxide (SOx) control requirements. The section requires that on and after the compliance schedule specified in Section 7.5, operators of non-agricultural spark-ignited engines and non-agricultural compression-ignited engines shall comply shall comply with Sections 5.7.1, 5.7.2, 5.7.3, 5.7.4, 5.7.5, or 5.7.6:

5.7.1 Operate the engine exclusively on PUC-quality natural gas, commercial propane, butane, or liquefied petroleum gas, or a combination of such gases; or
5.7.2 Limit gaseous fuel sulfur content to no more than five (5) grains of total sulfur per one hundred (100) standard cubic feet; or
5.7.3 Use California Reformulated Gasoline for gasoline-fired spark-ignited engines; or
5.7.4 Use California Reformulated Diesel for compression-ignited engines; or
5.7.5 Operate the engine on liquid fuel that contains no more than 15 ppm sulfur, as determined by the test method specified in Section 6.4.6; or
5.7.6 Install and properly operate an emission control system that reduces SO_2 emissions by at least 95% by weight as determined by the test method specified in Section 6.4.6.

The average sulfur content of the digester gas fuel for the engine is limited to 40 ppmv or 0.04 g/bhp-hr (approximately equal to 0.008 grains sulfur per standard cubic feet[2]). The following condition will be listed on the permit as a mechanism to ensure compliance:

- The sulfur content of the digester gas and natural gas/digester gas blends used as fuel in this engine shall not exceed 40 ppmv as H2S. An averaging period of up to one calendar day in

[2]

$$0.04 \quad \frac{g}{hp \cdot hr} \times \frac{392.75 hp \cdot hr}{MMBtu} \times \frac{MMBtu}{9{,}100\, dscf} \times \frac{0.30\, Btu_{out}}{1\, Btu_{in}} \times \frac{15.43\, grain}{g} = \quad 0.008 \quad \frac{grain}{dscf}$$

length may be utilized for demonstration of compliance with the digester gas sulfur content limit. [District Rules 2201, 4702, and 4801]

When fired on natural gas, the engines will meet the Section 5.7.1 requirement of operating the engine exclusively on PUC-quality natural gas upon implementation. The following condition will be placed on the permits as a mechanism to ensure compliance:

- This engine shall only be fueled with PUC-regulated natural gas, digester gas, or a blend of PUC-regulated natural gas and digester gas. [District Rules 2201, 4702, and 4801]

Section 5.8 applies to Particulate Matter (PM) control requirements. The proposed engines are spark-ignited engines and will comply with Section 5.7; therefore, the engines will be in compliance with Section 5.8.1.

Section 5.9 states the operator of a non-AO spark-ignited engine subject to the requirements of Section 5.2 or any engine subject to the requirements of Section 8.0 shall comply with the requirements specified in Section 5.9.1 through Section 5.9.11.

5.9.1 For each engine with a rated brake horsepower of 1,000 bhp or greater and which is allowed by Permit-to-Operate or Permit-Exempt Equipment Registration condition to operate more than 2,000 hours per calendar year, or with an external emission control device, either install, operate, and maintain continuous monitoring equipment for NOx, CO, and oxygen, as identified in Rule 1080 (Stack Monitoring), or install, operate, and maintain APCO-approved alternate monitoring. The monitoring system may be a continuous emissions monitoring system (CEMS), a parametric emissions monitoring system (PEMS), or an alternative monitoring system approved by the APCO. APCO-approved alternate monitoring shall consist of one or more of the following:

5.9.1.1 Periodic NOx and CO emission concentrations,
5.9.1.2 Engine exhaust oxygen concentration,
5.9.1.3 Air-to-fuel ratio,
5.9.1.4 Flow rate of reducing agents added to engine exhaust,
5.9.1.5 Catalyst inlet and exhaust temperature,
5.9.1.6 Catalyst inlet and exhaust oxygen concentration, or
5.9.1.7 Other operational characteristics.

The engines are equipped with an external emission control device. Therefore, this section is applicable. Since the applicant has selected periodic monitoring of emissions with a portable analyzer, the following conditions are listed on each permit to ensure compliance.

- Coincident with the end of the commissioning period, the permittee shall monitor and record the stack concentration of NOx, CO, and O2 at least once every calendar quarter (in which a source test is not performed) using a portable emission monitor that meets District specifications. Monitoring shall be performed not less than once every month for 12 months if two consecutive deviations are observed during quarterly monitoring. Monitoring shall not be required if the engine is not in operation, i.e. the engine need not be started solely to perform monitoring. Monitoring shall be performed within 5 days

of restarting the engine unless monitoring has been performed within the last month if on a monthly monitoring schedule, or within the last quarter if on a quarterly monitoring schedule. Records must be maintained of the dates of non-operation to validate extended monitoring frequencies. [District Rules 2201 and 4702]

- If the NOx, CO, or NH3 concentrations corrected to 15% O2, as measured by the portable analyzer or the District-approved ammonia monitoring equipment, exceed the respective permitted emissions concentration(s), the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 8 hours of operation after detection. If the portable analyzer or ammonia monitoring equipment readings continue to exceed the permitted emissions concentration(s) after 8 hours of operation after detection, the permittee shall notify the District within the following 1 hour and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100 in lieu of the performing the notification and testing required by this condition. [District Rule 4702]
- {3787} All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the permit-to-operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rule 4702]
- The permittee shall maintain records of: (1) the date and time of NOx, CO, O2, and NH3 measurements, (2) the O2 concentration in percent and the measured NOx, CO, and NH3 concentrations corrected to 15% O2, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, (5) the method of determining the NH3 emission concentration, and (6) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rule 4702]

5.9.2 For each engine not subject to Section 5.9.1, monitor operational characteristics recommended by the engine manufacturer or emission control system supplier, and approved by the APCO. The engines are subject to Section 5.9.1; therefore, Section 5.9.2 is not applicable.

5.9.3 For each engine with an alternative monitoring system, submit to, and receive approval from the APCO, adequate verification of the alternative monitoring system's acceptability. The engines are subject to Section 5.9.1 and the applicant has proposed to utilize a District pre-approved alternate monitoring system which measures NOx and CO emissions at least once every quarter. Therefore, compliance with the requirements of this section is expected.

5.9.4 For each engine with an APCO approved CEMS, operate the CEMS in compliance with the requirements of 40 Code of Federal Regulations (CFR) Part 51, 40 CFR Parts

60.7 and 60.13 (except subsection h), 40 CFR Appendix B (Performance Specifications), 40 CFR Appendix F (Quality Assurance Procedures), and applicable provisions of Rule 1080 (Stack Monitoring). The engines in this project are not equipped with CEMS; therefore, Section 5.9.4 is not applicable.

5.9.5 For each engine, have the data gathering and retrieval capabilities of an installed monitoring system described in Section 5.9 approved by the APCO. Section 5.9.5 is not applicable since the applicant is not using an installed monitoring system on the proposed engines to comply with the rule.

5.9.6 For each engine, install and operate a functional nonresettable elapsed time meter.

5.9.6.1 In lieu of installing a nonresettable elapsed time meter, the operator may use an alternative device, method, or technique, in determining operating time provided that the alternative is approved by the APCO and EPA and is allowed by a Permit-to-Operate or Permit-Exempt Equipment Registration condition.

5.9.6.2 The operator shall properly maintain and operate the nonresettable elapsed time meter or alternative device in accordance with the manufacturer's instructions.

The following condition will be placed on the ATCs.

- This engine shall be equipped with an operational non-resettable elapsed time meter or other APCO approved alternative. [District Rules 2201 and 4702]

5.9.7 requires that for each engine, the permittee implement the Inspection and Monitoring (I&M) plan, if any, submitted to and approved by the APCO pursuant to Section 6.5. The pre-approved alternate emissions monitoring procedure proposed in Section 5.9.1 above will satisfy the requirements of Section 5.9.7. Therefore, compliance with Section 5.9.7 is expected.

- {4261} This engine shall be operated and maintained in proper operating condition as recommended by the engine manufacturer or emissions control system supplier. [District Rule 4702]

5.9.8 requires the operator to collect data through the I&M plan in a form approved by the APCO. By following the pre-approved alternate emissions monitoring procedure proposed in Section 5.9.1 above, the applicant will be collecting data in a form approved by the APCO. Therefore, compliance with Section 5.9.8 is expected.

- The operator shall collect data through the I&M plan in a form approved by the APCO. [District Rule 4702]

5.9.9 requires that a portable analyzer be used to take NOx and CO emission readings and oxygen concentration readings to verify compliance with the emission requirements of Section 5.2 during each calendar quarter in which a source test is not performed and the engine is operated. The data must be taken and reported as approved by the

APCO. This requirement is identified in the alternate monitoring section above and by inclusion of the following ATC condition:

- Coincident with the end of the commissioning period, the permittee shall monitor and record the stack concentration of NOx, CO, and O2 at least once every calendar quarter (in which a source test is not performed) using a portable emission monitor that meets District specifications. Monitoring shall be performed not less than once every month for 12 months if two consecutive deviations are observed during quarterly monitoring. Monitoring shall not be required if the engine is not in operation, i.e. the engine need not be started solely to perform monitoring. Monitoring shall be performed within 5 days of restarting the engine unless monitoring has been performed within the last month if on a monthly monitoring schedule, or within the last quarter if on a quarterly monitoring schedule. Records must be maintained of the dates of non-operation to validate extended monitoring frequencies. [District Rules 2201 and 4702]

5.9.10 The APCO shall not approve an alternative monitoring system unless it is documented that continued operation within ranges of specified emissions-related performance indicators or operational characteristics provides a reasonable assurance of compliance with applicable emission limits. The operator shall source test over the proposed range of surrogate operating parameters to demonstrate compliance with the applicable emission standards.

No monitoring system will be installed for the proposed engines for compliance with this rule. Therefore, no further discussion is required.

5.9.11 contains requirements for engines utilizing an Alternate Emission Control Plan (AECP). The proposed engines are not subject to an AECP; therefore, the requirements of Section 5.9.11 are not applicable.

Section 5.10 applies to the operator of engines subject to Sections 5.10.1.1 through 5.10.1.2. As seen above, the proposed engines are non-AO spark-ignited engines; therefore, this section is not applicable.

Section 5.11 states on and after the compliance schedules specified in Section 7.0, an operator of an engine shall comply with the following requirements:

5.11.1 An operator of an engine complying with Sections 5.7.2, 5.7.5, or Section 5.7.7 shall perform an annual fuel sulfur analysis in accordance with the test methods in Section 6.4. The operator shall keep the records of the fuel analysis and shall provide it to the District upon request,

5.11.2 An operator of an engine complying with Section 5.7.6 by installing and operating a control device with at least 95% by weight SOx reduction efficiency shall submit for approval by the APCO the proposed key system operating parameters and frequency of the monitoring and recording not later than July 1, 2013, and

5.11.3 An operator of an engine complying with Section 5.7.6 shall perform an annual source test unless a more frequent sampling and reporting period is included in the Permit-to-Operate. Source tests shall be performed in accordance with the test methods in Section 6.4.

Since the engines are complying with this rule by compliance with Section 5.7.1, this section is not applicable.

Section 6.1 requires that the operator of an engine to submit to the APCO an emission control plan of all actions to be taken to satisfy the emission requirements of Section 5.2 and the compliance schedules of Section 7.0.

As discussed above, the proposed engines already comply with the emission requirements of Section 5.2 ahead of the compliance schedules of Section 7.0. Therefore, an emission control plan is not required.

6.2.1 requires the operator of an engine subject to the requirements of Section 5.2 of this rule shall maintain an engine operating log to demonstrate compliance with this rule. This information shall be retained for a period of at least five years, shall be readily available, and be made available to the APCO upon request. The engine operating log shall include, on a monthly basis, the following information:

- Total hours of operation,
- Type of fuel used,
- Maintenance or modifications performed,
- Monitoring data,
- Compliance source test results, and
- Any other information necessary to demonstrate compliance with this rule.

The following conditions will be added to the ATCs:

- The permittee shall maintain records of: (1) the date and time of NOx, CO, O2, and NH3 measurements, (2) the O2 concentration in percent and the measured NOx, CO, and NH3 concentrations corrected to 15% O2, (3) make and model of portable emission analyzer(s) and in-stack emission analyzer(s), (4) emission analyzer calibration records, (5) the method of determining the NH3 emission concentration, and (6) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 2201 and 4702]
- The permittee shall maintain an engine operating log to demonstrate compliance. The engine operating log shall include, on a monthly basis, the following information: the hours of operation for commissioning of the engine, the total hours of operation, the type and quantity of each fuel used, maintenance and modifications performed, monitoring data, compliance source test results, and any other information necessary to demonstrate compliance. Quantity of fuel used shall be recorded in standard cubic feet using a non-resettable, totalizing mass or volumetric fuel flow meter or other APCO approved-device. [District Rules 2201 and 4702]

6.2.2 requires that the data collected pursuant to the requirements of Section 5.8 and Section 5.9 shall be maintained for at least five years, shall be readily available, and made available to the APCO upon request. The following condition will be added to the ATCs:

- All records shall be maintained and retained on-site for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rules 2201 and 4702]

6.2.3 applies to operators claiming an exemption under Section 4.2 or Section 4.3. The proposed engines are not exempt from any requirements under Sections 4.2 or 4.3. Therefore, this section does not apply.

Section 6.3 identifies the source testing requirements. Engines retrofitted with exhaust control devices must comply with Sections 6.3.2 through 6.3.4 (source testing frequency, under normal conditions, source test protocol). The following conditions are listed on the ATCs.

- Source testing to measure NOx, CO, VOC, PM10, and ammonia (NH3) emissions from this unit shall be conducted within 60 days upon end of the commissioning period. [District Rules 1081, 2201, and 4702]
- Source testing to measure NOx, CO, VOC, and ammonia (NH3) emissions from this unit shall be conducted at least once every 24 months. [District Rules 1081, 2201, and 4702]
- Emissions source testing shall be conducted with the engine operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. [District Rule 4702]
- For emissions source testing, the arithmetic average of three 30-consecutive-minute test runs shall apply. If two of three runs are above an applicable limit, the test cannot be used to demonstrate compliance with an applicable limit. VOC emissions shall be reported as methane. NOx, CO, VOC, and NH3 concentrations shall be reported in ppmv, corrected to 15% oxygen. [District Rules 2201 and 4702]

6.3.5 specifies that engines that are limited by Permit-to-Operate or Permit-Exempt Equipment Registration condition to be fueled exclusively with PUC quality natural gas shall not be subject to the reoccurring source test requirements of Section 6.3.2 for VOC emissions. The proposed engine will be fueled with both natural gas and digester gas; therefore, this section does not apply.

6.3.6 (representative source testing) allows for representative source testing from an engine or engines that represents a specified group of engines, provided the necessary requirements are met. Representative source testing has not been proposed.

Section 6.4 requires that the compliance with the requirements of Section 5.2 shall be determined in accordance with the following test procedures or any other method approved by the APCO:

- Oxides of nitrogen - EPA Method 7E, or ARB Method 100.
- Carbon monoxide - EPA Method 10, or ARB Method 100.
- Stack gas oxygen - EPA Method 3 or 3A, or ARB Method 100.
- Volatile organic compounds - EPA Method 25A or 25B, or ARB Method 100. Methane and ethane, which are exempt compounds, shall be excluded from the result of the test.
- Operating horsepower determination - any method approved by the APCO.
- Oxides of sulfur – EPA Method 6C or 8, or ARB Method 100.

The following conditions are listed on the ATCs.

- The following methods shall be used for source testing: NOx (ppmv) - EPA Method 7E or ARB Method 100; CO (ppmv) - EPA Method 10 or ARB Method 100; VOC (ppmv) - EPA Method 18, 25A or 25B, or ARB Method 100; stack gas oxygen - EPA Method 3 or 3A or ARB Method 100; stack gas velocity - EPA Method 2 or EPA Method 19; stack gas moisture content - EPA Method 4; PM10 (filterable and condensable) - EPA Method 201 and 202, or ARB Method 5 in combination with Method 501; NH3 - BAAQMD ST-1B or SCAQMD Method 207-1. Alternative test methods as approved by the District may also be used to address the source testing requirements of this permit. [District Rules 1081, 2201, and 4702]
- The higher heating value (HHV) of the fuel gas shall be determined using ASTM D1826, ASTM 1945 in conjunction with ASTM D3588, or an alternative method approved by the District. [District Rules 2201 and 4702]
- Fuel sulfur content analysis of the digester gas used to fuel this engine shall be performed within 60 days upon end of the commissioning period using EPA Method 11 or EPA Method 15, as appropriate, or an alternative method approved by the District. [District Rules 2201 and 4702]
- Fuel sulfur content analysis of the digester gas used to fuel this engine shall be performed at least annually using EPA Method 11 or EPA Method 15, as appropriate, or an alternative method approved by the District. Records of the fuel sulfur analysis shall be maintained and provided to the District upon request. [District Rules 2201 and 4702]
- {109} Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]
- The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081]

Section 6.5 requires that the operator of an engine subject to the requirements of Section 5.2 or the requirements of Section 8.0 shall submit to the APCO for approval an Inspection and Monitoring (I&M) Plan that specifies all actions to be taken to satisfy the following requirements and the requirements of Section 5.9. The actions to be identified in the I&M plan shall include, but are not limited to, the following requirements listed in Sections 6.5.2 through 6.5.9. If there is no change to the previously approved I&M plan, the operator shall submit a letter to the District indicating that previously approved plan is still valid.

6.5.1 states the requirements of Section 6.5.2 through 6.5.9 shall apply to the following engines:

- Engines that have been retrofitted with an exhaust control device, except those certified per Section 9.0;
- Engines subject to Section 8.0;
- An AO spark-ignited engine that is subject to the requirements of Section 8.0;

- An AO spark-ignited engine that has been retrofitted with a catalytic emission control and is not subject to the requirements of Section 8.0.

The proposed engines have an exhaust control device. Therefore, Sections 6.5.2 through 6.5.9 apply.

Section 6.5.2 specifies procedures requiring the operator to establish ranges for control equipment parameters, engine operating parameters, and engine exhaust oxygen concentrations that source testing has shown result in pollutant concentrations within the rule limits.

Section 6.5.3 specifies procedures for monthly inspections as approved by the APCO. The applicable control equipment parameters and engine operating parameters will be inspected and monitored monthly in conformance with a regular inspection schedule in the I&M plan.

Each proposed engine will be equipped with an SCR system for the control of NOx emissions and an oxidation catalyst for the control of CO and VOC emissions. The applicant has proposed the following alternate monitoring program to ensure compliance with Sections 6.5.2 and 6.5.3 of the Rule:

<u>Alternate Monitoring: NOx Emissions</u>

In order to satisfy the I&M requirements for NOx emissions, the applicant has proposed to perform the following:

1. Measurement of NOx emissions concentrations with a portable analyzer at least once every calendar quarter.

2. To ensure that NOx emissions concentrations are not being exceeded between periodic NOx portable analyzer measurements, the applicant is proposing to determine a correlation between the SCR system's reagent injection rate and the catalyst control system inlet exhaust temperature and NOx emissions. The appropriate ranges for each operating load will be established during performance testing and will be monitored at least once per month.

<u>Alternate Monitoring: CO and VOC Emissions</u>

In order to satisfy the I&M requirements for CO and VOC emissions, the applicant has proposed to perform the following:

1. Measurement of CO emissions concentrations with a portable analyzer at least once every calendar quarter. Generally, if the oxidation catalyst is controlling CO emissions, it should also be achieving the desired removal efficiency for VOC emissions. Therefore, no additional monitoring for VOC emissions is required.

2. To ensure that CO and VOC emissions concentrations are not being exceeded between periodic CO emissions concentration measurements, the applicant is

proposing to determine a correlation between the catalyst control system inlet exhaust temperature and back pressure and CO emissions. The appropriate ranges for each operating load will be established during performance testing and will be monitored at least once per month.

Section 6.5.4 requires procedures for the corrective actions on the noncompliant parameter(s) that the operator will take when an engine is found to be operating outside the acceptable range for control equipment parameters, engine operating parameters, and engine exhaust NOx, CO, VOC, or oxygen concentrations.

Section 6.5.5 requires procedures for the operator to notify the APCO when an engine is found to be operating outside the acceptable range for control equipment parameters, engine operating parameters, and engine exhaust NOx, CO, VOC, or oxygen concentrations.

The applicant has proposed that the alternate monitoring program will ensure compliance with Sections 6.5.3, 6.5.4, and 6.5.5. The following conditions will be included on each IC engine permit as a mechanism to enforce compliance:

- During initial performance testing when fired on digester gas, and during subsequent performance tests as needed, the SCR system reagent injection rate shall be monitored to establish acceptable values and ranges that provide a reasonable assurance of ongoing compliance with the NOx emissions limit(s) stated in this permit. Acceptable values and ranges shall be established for each load that the engine is expected to operate at, in a minimum of 10% increments (e.g. 70%, 80%, and 90%). Records of the acceptable SCR system reagent injection rate(s) and inlet temperature(s) to the catalyst control system demonstrated to result in compliance with the NOx emission limit(s) shall be maintained and made available for inspection upon request. [District Rule 4702]
- The SCR system reagent injection rate may be reestablished during a performance test by monitoring the SCR system reagent injection rate concurrently with each testing run to reestablish acceptable values and ranges that provide a reasonable assurance of ongoing compliance with the emissions limitations stated in this permit. Acceptable values and ranges may be reestablished for each load that the engine is expected to operate at, in a minimum of 10% increments (e.g. 70%, 80%, and 90%). The acceptable SCR system reagent injection rate(s) demonstrated during the performance test that result in compliance with the NOx emission limits shall be imposed as a condition in the Permit to Operate. [District Rule 4702]
- If the SCR system reagent injection rate is outside of the established acceptable range, the permittee shall return the SCR system reagent injection rate to within the established acceptable range as soon as possible, but no longer than 8 hours after detection. If the SCR system reagent injection rate is not returned to within acceptable range within 8 hours, the permittee shall notify the District within the following 1 hour and begin monitoring and recording the stack concentration of NOx and O2 at least once every month. Monthly monitoring of the stack concentration of NOx and O2 shall continue until the operator can show that the SCR system reagent injection rate is returned to operating within the acceptable range demonstrated to result in compliance with the NOx emission limits of this permit. [District Rule 4702]

- The permittee shall monitor and record the engine operating load, the SCR system reagent injection rate, the inlet temperature to the catalyst control system, and the back pressure of the exhaust upstream of the catalyst control system at least once per month. [District Rules 2201 and 4702]
- During initial performance testing when fired on digester gas, and during subsequent performance tests as needed, the inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system shall be monitored concurrently with each testing run to establish acceptable values and ranges that provide a reasonable assurance of ongoing compliance with the emissions limits stated in this permit. Acceptable values and ranges shall be established for each load that the engine is expected to operate at, in a minimum of 10% increments (e.g. 70%, 80%, and 90%). The acceptable inlet temperature and back pressure demonstrated during the initial compliance test that result in compliance with the CO and VOC emission limits shall be imposed as a condition in the Permit to Operate. [District Rule 4702]
- The inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system may be reestablished during a performance test by monitoring concurrently with each testing run to reestablish acceptable values and ranges that provide a reasonable assurance of ongoing compliance with the emissions limitations stated in this permit. Acceptable values and ranges may be reestablished for each load that the engine is expected to operate at, in a minimum of 10% increments (e.g. 70%, 80%, and 90%). The acceptable inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system demonstrated during the performance test that result in compliance with the CO and VOC emission limits shall be imposed as a condition in the Permit to Operate. [District Rule 4702]
- If the inlet temperature to the catalyst control system and/or the back pressure of the exhaust upstream of the catalyst control system is outside of the established acceptable ranges established during the initial compliance test, the permittee shall return the inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system back to the acceptable range as soon as possible, but no longer than 8 hours after detection. If the inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system are not returned to within acceptable range within 8 hours, the permittee shall notify the District within the following 1 hour and begin monitoring and recording the stack concentration of CO and O2 at least once every month. Monthly monitoring of the stack concentration of CO and O2 shall continue until the operator can show that the inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system are returned to operating within the acceptable ranges specified within this permit. [District Rule 4702]
- The permittee shall monitor and record the stack concentration of NOx, CO, and O2 at least once every calendar quarter (in which a source test is not performed) using a portable emission monitor that meets District specifications. Monitoring shall be performed not less than once every month for 12 months if two consecutive deviations are observed during quarterly monitoring. Monitoring shall not be required if the engine is not in operation, i.e. the engine need not be started solely to perform monitoring. Monitoring shall be performed within 5 days of restarting the engine unless monitoring has been performed within the last month if on a monthly monitoring schedule, or within the last quarter if on a quarterly monitoring schedule. Records must be maintained of the dates of non-operation to validate extended monitoring frequencies. [District Rules 2201 and 4702]

- The permittee shall monitor and record the stack concentration of NH3 at least once every calendar quarter in which a source test is not performed. NH3 monitoring shall be conducted utilizing District approved gas-detection tubes or a District approved equivalent method. Monitoring shall not be required if the unit is not in operation, i.e. the unit need not be started solely to perform monitoring. Monitoring shall be performed within 5 days of restarting the unit unless monitoring has been performed within the last quarter. Records must be maintained of the dates of non-operation to validate extended monitoring frequencies. [District Rule 2201]
- If the NOx, CO, or NH3 concentrations corrected to 15% O2, as measured by the portable analyzer or the District approved ammonia monitoring equipment, exceed the allowable emission concentration(s), the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 8 hours after detection. If the portable analyzer readings continue to exceed the allowable emissions concentration(s) after 8 hours, the permittee shall notify the District within the following 1 hour, and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100 in lieu of performing the notification and testing required by this condition. [District Rules 2201 and 4702]
- {modified 3787} All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the permit-to-operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rules 2201 and 4702]

Section 6.5.6 requires procedures and corrective maintenance performed for the purpose of maintaining an engine in proper operating condition. The applicant has proposed that each engine will be operated and maintained per the specifications of the manufacturer or emissions control system supplier. The following conditions will be included on each IC engine permit as a mechanism to enforce compliance:

- {4261} This engine shall be operated and maintained in proper operating condition as recommended by the engine manufacturer or emissions control system supplier. [District Rule 4702]
- {3203} This engine shall be operated within the ranges that the source testing has shown result in pollution concentrations within the emissions limits as specified on this permit. [District Rule 4702]

Section 6.5.7 requires procedures and a schedule for using a portable NOx analyzer to take NOx emission readings pursuant to Section 5.8.9. The applicant has proposed that the alternate monitoring program will ensure compliance with this section of the rule. The following condition will be placed on the permit to ensure continued compliance:

- All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the permit-to-operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rules 2201 and 4702]

Section 6.5.8 requires procedures for collecting and recording required data and other information in a form approved by the APCO including, but not limited to, data collected through the I&M plan and the monitoring systems described in Sections 5.8.1 and 5.8.2. Data collected through the I&M plan shall have retrieval capabilities as approved by the APCO. The applicant has proposed that the alternate monitoring program will ensure compliance with this section of the rule. The following condition will be included on each IC engine permit as a mechanism to enforce compliance:

- The permittee shall maintain records of: (1) the date and time of NOx, CO, O2, and NH3 measurements, (2) the O2 concentration in percent and the measured NOx, CO, and NH3 concentrations corrected to 15% O2, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, (5) the method of determining the NH3 emission concentration, and (6) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 2201 and 4702]

Section 6.5.9 specifies procedures for revising the I&M plan. The I&M plan shall be updated to reflect any change in operation. The I&M plan shall be updated prior to any planned change in operation. An engine operator that changes significant I&M plan elements must notify the District no later than seven days after the change and must submit an updated I&M plan to the APCO no later than 14 days after the change for approval. The date and time of the change to the I&M plan shall be recorded in the engine operating log. For new engines and modifications to existing engines, the I&M plan shall be submitted to and approved by the APCO prior to issuance of the Permit-to-Operate. The operator of an engine may request a change to the I&M plan at any time.

The applicant has proposed to comply with the I&M plan modification requirements per this section of the rule. The following condition will be included on each IC engine permit as a mechanism to enforce compliance:

- {3212} The permittee shall update the I&M plan for this engine prior to any planned change in operation. The permittee must notify the District no later than seven days after changing the I&M plan and must submit an updated I&M plan to the APCO for approval no later than 14 days after the change. The date and time of the change to the I&M plan shall be recorded in the engine's operating log. For modifications, the revised I&M plan shall be submitted to and approved by the APCO prior to issuance of the Permit to Operate. The permittee may request a change to the I&M plan at any time. [District Rule 4702]

Section 7.0 specifies the schedules for compliance with the general requirements of Section 5.0 and the Alternative Emission Control Plan (AECP) option of Section 8.0. The proposed engines

will be required to comply with the applicable sections of District Rule 4702 upon initial startup of the equipment; therefore, compliance with this section is expected.

Section 8.0 allows an operator to comply with the NOx emission requirements of Section 5.2 for a group of engines by aggregating their NOx emissions.

The facility has not requested to comply with an Alternative Emission Control Plan in lieu of the requirements of Section 5.2. Therefore, this section will not be addressed.

Section 9.0 specifies requirements for certification of exhaust control systems for compliance with District Rule 4702. Certification under this section for the exhaust control systems for the proposed engines are not currently being proposed; therefore this section of the Rule is not applicable at this time.

Conclusion
Compliance with this rule is expected.

Rule 4801 Sulfur Compounds

The purpose of District Rule 4801 is to limit the emissions of sulfur compounds. A maximum concentration and test method are specified. The provisions of this rule shall apply to any discharge to the atmosphere of sulfur compounds, which would exist as a liquid or a gas at standard conditions.

Section 3.1 states that a person shall not discharge into the atmosphere sulfur compounds, which would exist as a liquid or gas at standard conditions, exceeding in concentration at the point of discharge: two-tenths (0.2) percent by volume calculated as sulfur dioxide (SO_2), on a dry basis averaged over 15 consecutive minutes.

Using the ideal gas equation, the sulfur compound emissions are calculated as follows:

$$\text{Volume } SO_2 = \frac{n\,RT}{P}$$

Where:

N = moles SO_2
T (Standard Temperature) = 60°F = 520°R
P (Standard Pressure) = 14.7 psi

$$R \text{ (Universal Gas Constant)} = \frac{10.73\,\text{psi}\cdot\text{ft}^3}{\text{lb}\cdot\text{mol}\cdot{}^\circ\text{R}}$$

Estimated F Factor for Natural Gas: 8,578 dscf/MMBtu at 60 ˚F
Estimated F Factor for the Digester Gas: 8,784 dscf/MMBtu at 60 ˚F

To demonstrate compliance with the sulfur compound emission limit of Rule 4801, the maximum concentration of sulfur compound emissions from the engine will be calculated below based on the engines being fueled with PUC regulated natural gas and digester gas:

<u>SO_X Emission Concentration from Engines When Fueled with Natural Gas</u>

$$\frac{0.00285\ lb-SOx}{MMBtu} \times \frac{1\ MMBtu}{8{,}578\ dscf} \times \frac{1\ lb \cdot mol}{64\ lb-SOx} \times \frac{10.73\ psi \cdot ft^3}{lb \cdot mol \cdot {}^\circ R} \times \frac{520\ {}^\circ R}{14.7\ psi} \times \frac{1{,}000{,}000\ parts}{million} = 2.0\ \frac{parts}{million}$$

<u>SO_X Emission Concentration from Engines When Fueled with Digester Gas</u>

$$\frac{0.00965\ lb-SOx}{MMBtu} \times \frac{1\ MMBtu}{8{,}784\ dscf} \times \frac{1\ lb \cdot mol}{64\ lb-SOx} \times \frac{10.73\ psi \cdot ft^3}{lb \cdot mol \cdot {}^\circ R} \times \frac{520\ {}^\circ R}{14.7\ psi} \times \frac{1{,}000{,}000\ parts}{million} = 6.5\ \frac{parts}{million}$$

Because 2.0 ppmv and 6.5 ppmv are ≤ 2000 ppmv, the engines are expected to comply with Rule 4801.

The following conditions will be placed on the ATC permits to ensure compliance:

- This engine shall only be fueled with PUC-regulated natural gas, digester gas, or a blend of PUC-regulated natural gas and digester gas. [District Rules 2201, 4702, and 4801]
- The sulfur content of the digester gas and natural gas/digester gas blends used as fuel in this engine shall not exceed 40 ppmv as H2S. An averaging period of up to one calendar day in length may be utilized for demonstration of compliance with the digester gas sulfur content limit. [District Rules 2201, 4702, and 4801]

California Health & Safety Code 42301.6 (School Notice)

The District has verified that this site is not located within 1,000 feet of a school. Therefore, pursuant to California Health and Safety Code 42301.6, a school notice is not required.

California Environmental Quality Act (CEQA)

CEQA requires each public agency to adopt objectives, criteria, and specific procedures consistent with CEQA Statutes and the CEQA Guidelines for administering its responsibilities under CEQA, including the orderly evaluation of projects and preparation of environmental documents. The District adopted its *Environmental Review Guidelines* (ERG) in 2001. The basic purposes of CEQA are to:

- Inform governmental decision-makers and the public about the potential, significant environmental effects of proposed activities;
- Identify the ways that environmental damage can be avoided or significantly reduced;
- Prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible; and
- Disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved.

Greenhouse Gas (GHG) Significance Determination

It is determined that another agency has prepared an environmental review document for the project. The District is a Responsible Agency for the project because of its discretionary approval power over the project via its Permits Rule (Rule 2010) and New Source Review Rule (Rule 2201), (CEQA Guidelines §15381). As a Responsible Agency, the District is limited to mitigating or avoiding impacts for which it has statutory authority. The District does not have statutory authority for regulating greenhouse gas emissions. The District has determined that the applicant is responsible for implementing greenhouse gas mitigation measures, if any, imposed by the Lead Agency.

District CEQA Findings

The County of Kings (County) is the public agency having principal responsibility for approving the Project. As such, the County served as the Lead Agency for the Project. The County determined the project to be exempt from CEQA according to CEQA Guidelines §15268 (Ministerial Section 21080(b)(1)). Consistent with CEQA Guidelines §15062 a Notice of Exemption was prepared and adopted by the County.

The District is a Responsible Agency for the project because of its discretionary approval power over the project via its Permits Rule (Rule 2010) and New Source Review Rule (Rule 2201), (CEQA Guidelines §15381).

The District's engineering evaluation of the project (this document) demonstrates that compliance with District rules and permit conditions would reduce Stationary Source emissions from the project to levels below the District's thresholds of significance for criteria pollutants. Thus, the District concludes that through a combination of project design elements and permit conditions, project specific stationary source emissions will be reduced to less than significant levels. The District does not have authority over any of the other project impacts and has, therefore, determined that no additional findings are required (CEQA Guidelines §15096(h)).

Indemnification Agreement/Letter of Credit Determination

According to District Policy APR 2010 (CEQA Implementation Policy), when the District is the Lead or Responsible Agency for CEQA purposes, an indemnification agreement and/or a letter of credit may be required. The decision to require an indemnity agreement and/or a letter of credit is based on a case-by-case analysis of a particular project's potential for litigation risk, which in turn may be based on a project's potential to generate public concern, its potential for significant impacts, and the project proponent's ability to pay for the costs of litigation without a letter of credit, among other factors.

The criteria pollutant emissions and toxic air contaminant emissions associated with the proposed project are not significant, and there is minimal potential for public concern for this particular type of facility/operation. Therefore, an Indemnification Agreement and/or a Letter of Credit will not be required for this project in the absence of expressed public concern.

IX. Recommendation

Compliance with all applicable rules and regulations is expected. Pending a successful NSR Public Noticing period, issue ATCs C-9441-2-2 and -3-2 subject to the permit conditions on the attached draft ATC in Appendix A**.**

X. Billing Information

Annual Permit Fees			
Permit Number	**Fee Schedule**	**Fee Description**	**Annual Fee**
C-9441-2-2	3020-10-F	1,966 bhp	$900
C-9441-3-2	3020-10-F	1,966 bhp	$900

Appendices

A: Draft ATCs
B: Current PTOs
C: BACT Guideline and BACT Analysis for IC Engine when Fueled with Digester Gas
D: HRA/AAQA Summary
E: Quarterly Net Emissions Change

APPENDIX A
Draft ATCs

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

DRAFT

PERMIT NO: C-9441-2-3 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: LAKESIDE PIPELINE LLC
MAILING ADDRESS: 1730 SOUTH STREET
REDDING, CA 96003

LOCATION: 15662 7TH AVE
HANFORD, CA 93230

EQUIPMENT DESCRIPTION:
MODIFICATION OF 1,966 BHP JENBACHER MODEL J-420 GS-A82 DIGESTER GAS/NATURAL GAS-FIRED LEAN-BURN IC ENGINE WITH A HUG ENGINEERING MODEL COMBIKAT SELECTIVE CATALYTIC REDUCTION (SCR) WITH OXIDATION CATALYST SYSTEM POWERING AN ELECTRICAL GENERATOR: DESIGNATE AS A COMPLIANT DORMANT EMISSIONS UNIT

CONDITIONS

1. Authority to Construct (ATC) C-9441-2-2 shall be implemented prior to, or concurrently with this ATC. [District Rule 2080]
2. While dormant, the fuel line shall be physically disconnected from the unit. [District Rule 2080]
3. {4562} Permittee shall submit written notification to the District upon designating the unit as dormant or active. [District Rule 2080]
4. {4560} While dormant, normal source testing shall not be required. [District Rule 2080]
5. {4563} Upon recommencing operation of this unit, normal source testing shall resume. [District Rule 2080]
6. {4564} Any source testing required by this permit shall be performed within 60 days of recommencing operation of this unit, regardless of whether the unit remains active or is again designated as dormant. [District Rule 2080]
7. {4565} Records of all dates and times that this unit is designated as dormant or active, and copies of all corresponding notices to the District, shall be maintained, retained for a period of at least five years, and made available for District inspection upon request. [District Rule 1070]
8. All equipment shall be maintained in good operating condition and shall be operated in a manner consistent with good air pollution control practice to minimize emissions of air contaminants. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (559) 230-5950 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Samir Sheikh, Executive Director / APCO

DRAFT

Brian Clements, Director of Permit Services

C-9441-2-3 : Jun 15 2023 11:40AM -- GARCIAJ : Joint Inspection NOT Required

9. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]

10. {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]

11. {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]

12. {1898} The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]

13. The exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods and shall be equipped with safe permanent provisions to sample stack gases with a portable NOx, CO, and O2 analyzer during District inspections. The sampling ports shall be located in accordance with the California Air Resources Board (CARB) document titled Air Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. [District Rule 1081]

14. This engine shall be equipped with an operational non-resettable elapsed time meter or other APCO approved alternative. [District Rules 2201 and 4702]

15. The owner/operator shall minimize the emissions from the engine to the maximum extent possible during the commissioning period while fired on digester gas. [District Rule 2201]

16. Commissioning activities are defined as, but not limited to, all adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the construction contractor to ensure safe and reliable operation of the reciprocating IC engine, emission control equipment, and associated electrical delivery systems while fired on digester gas. [District Rule 2201]

17. Commissioning period shall commence when all mechanical, electrical, and control systems are installed and individual system startup has been completed, or when the engine is first fired on digester gas, whichever occurs first. The commissioning period shall terminate when the engine tuning has completed and the engine is available for commercial operation while fired on digester gas. The total duration of the commissioning period for this engine shall not exceed 120 hours of operation of the engine. [District Rule 2201]

18. During the commissioning period this engine shall operate for no more than 8 hours on any day in which the SCR system or oxidation catalyst are not installed and operating for the entire duration of engine operation for that day. The permittee shall record total operating time of the engine for each day during the commissioning period in which the SCR system or oxidation catalyst are not installed and operating for the entire duration of engine operation on that day. [District Rule 2201]

19. The total number of firing hours of this unit without abatement of emissions by the SCR system and oxidation catalyst shall not exceed 120 hours during the commissioning period. Such operation of this unit without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system or oxidation catalyst. Upon completion of these activities, the permittee shall provide written notice to the District and the unused balance of the 120 firing hours without abatement shall expire. [District Rule 2201]

20. The permittee shall record total operating time of the engine in hours during the commissioning period. [District Rule 2201]

21. At the earliest feasible opportunity, in accordance with the recommendations of the equipment supplier and the construction contractor, the Selective Catalytic Reduction (SCR) system and oxidation catalyst shall be installed, adjusted, and operated to minimize emissions from this unit. [District Rule 2201]

22. The permittee shall submit a summary of activities to be performed during the commissioning period to the District at least two weeks prior to the first firing of this engine. The summary shall include a list of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but are not limited to, the tuning of the engine, the installation and operation of the SCR system and oxidation catalyst, the installation, calibration, and testing of emissions monitors, and any activities requiring the firing of this unit without abatement by the SCR system and oxidation catalyst. [District Rule 2201]

23. Emission rates from this engine during the commissioning period shall not exceed any of the following limits: 1.0 g-NOx/bhp-hr, 0.06 g-PM10/bhp-hr, 2.5 g-CO/bhp-hr, or 0.4 g-VOC/bhp-hr. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

24. The SCR catalyst shall be maintained and replaced in accordance with the recommendations of the catalyst manufacturer or emission control supplier. Records of catalyst maintenance and replacement shall be maintained. [District Rules 2201 and 4702]

25. The air-to-fuel ratio controller(s) shall be maintained and operated appropriately in order to ensure proper operation of the engine and control device to minimize emissions at all times. [District Rule 2201]

26. {4261} This engine shall be operated and maintained in proper operating condition as recommended by the engine manufacturer or emissions control system supplier. [District Rule 4702]

27. {3203} This engine shall be operated within the ranges that the source testing has shown result in pollution concentrations within the emissions limits as specified on this permit. [District Rule 4702]

28. The operator shall collect data through the I&M plan in a form approved by the APCO. [District Rule 4702]

29. This engine shall not operate more than 8,500 hours per calendar year. [District Rules 2201 and 4102]

30. This engine shall only be fueled with PUC-regulated natural gas, digester gas, or a blend of PUC-regulated natural gas and digester gas. [District Rules 2201, 4702, and 4801]

31. The sulfur content of the digester gas and natural gas/digester gas blends used as fuel in this engine shall not exceed 40 ppmv as H2S. An averaging period of up to one calendar day in length may be utilized for demonstration of compliance with the digester gas sulfur content limit. [District Rules 2201, 4702, and 4801] Federally Enforceable Through Title V Permit

32. Emissions from this IC engine, when fired on natural gas, shall not exceed any of the following limits: 0.035 g-NOx/bhp-hr (equivalent to 2.5 ppmvd NOx @ 15% O2), NOx referenced as NO2; 0.06 g-PM10/bhp-hr; 0.104 g-CO/bhp-hr (equivalent to 12 ppmvd CO @ 15% O2); or 0.049 g-VOC/bhp-hr (equivalent to 10 ppmvd VOC @ 15% O2), VOC referenced as CH4. [District Rules 2201 and 4702]

33. After the commissioning period, emissions from this IC engine, when fired on digester gas, shall not exceed any of the following limits: 0.15 g-NOx/bhp-hr (equivalent to 10.6 ppmvd NOx @ 15% O2), NOx referenced as NO2; 0.06 g-PM10/bhp-hr; 0.646 g-CO/bhp-hr (equivalent to 74.8 ppmvd CO @ 15% O2); or 0.10 g-VOC/bhp-hr (equivalent to 20.3 ppmvd VOC @ 15% O2), VOC referenced as CH4. [District Rule 2201]

34. Ammonia (NH3) emissions from this engine shall not exceed 10 ppmvd @ 15% O2. [District Rule 2201]

35. At the earliest feasible opportunity, in accordance with the recommendations of the equipment supplier and the construction contractor, the engine shall be tuned to minimize emissions. [District Rule 2201]

36. Source testing to measure NOx, CO, VOC, PM10, and ammonia (NH3) emissions from this unit shall be conducted within 60 days upon end of the digester gas commissioning period. [District Rules 1081, 2201, and 4702]

37. Source testing to measure NOx, CO, VOC, and ammonia (NH3) emissions from this unit shall be conducted at least once every 24 months. [District Rules 1081, 2201, and 4702]

38. {3791} Emissions source testing shall be conducted with the engine operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. [District Rule 4702]

39. The results of each source test shall be submitted to the District within 60 days after completion of the source test. [District Rule 1081]

40. {109} Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]

41. For emissions source testing, the arithmetic average of three 30-consecutive-minute test runs shall apply. If two of three runs are above an applicable limit, the test cannot be used to demonstrate compliance with an applicable limit. VOC emissions shall be reported as methane. NOx, CO, VOC, and NH3 concentrations shall be reported in ppmv, corrected to 15% oxygen. [District Rules 2201 and 4702]

CONDITIONS CONTINUE ON NEXT PAGE

42. The following methods shall be used for source testing: NOx (ppmv) - EPA Method 7E or ARB Method 100; CO (ppmv) - EPA Method 10 or ARB Method 100; VOC (ppmv) - EPA Method 18, 25A or 25B or ARB Method 100; stack gas oxygen - EPA Method 3 or 3A or ARB Method 100; stack gas velocity/volumetric flowrate - EPA Method 2 or EPA Method 19; stack gas moisture content - EPA Method 4; PM10 (filterable and condensable) - EPA Method 201 and 202, EPA Method 201a and 202, or ARB Method 5 in combination with Method 501; NH3 - BAAQMD ST-1B or SCAQMD Method 207-1. Alternative test methods as approved by the District may be used to address the source testing requirements of this permit. [District Rules 1081 and 4702]

43. The higher heating value (HHV) of the fuel gas shall be determined using ASTM D1826, ASTM 1945 in conjunction with ASTM D3588, or an alternative method approved by the District. [District Rules 2201 and 4702]

44. Fuel sulfur content analysis of the digester gas used to fuel this engine shall be performed within 60 days upon end of the commissioning period using EPA Method 11 or EPA Method 15, as appropriate, or an alternative method approved by the District. [District Rules 2201 and 4702]

45. Fuel sulfur content analysis of the digester gas used to fuel this engine shall be performed at least annually using EPA Method 11 or EPA Method 15, as appropriate, or an alternative method approved by the District. Records of the fuel sulfur analysis shall be maintained and provided to the District upon request. [District Rules 2201 and 4702]

46. The exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods and shall be equipped with safe permanent provisions to sample stack gases with a portable NOx, CO, and O2 analyzer during District inspections. The sampling ports shall be located in accordance with the CARB regulation titled California Air Resources Board Air Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. [District Rule 1081]

47. The permittee shall monitor and record the stack concentration of NOx, CO, and O2 at least once every calendar quarter (in which a source test is not performed) using a portable emission monitor that meets District specifications. Monitoring shall be performed not less than once every month for 12 months if two consecutive deviations are observed during quarterly monitoring. Monitoring shall not be required if the engine is not in operation, i.e. the engine need not be started solely to perform monitoring. Monitoring shall be performed within 5 days of restarting the engine unless monitoring has been performed within the last month if on a monthly monitoring schedule, or within the last quarter if on a quarterly monitoring schedule. Records must be maintained of the dates of non-operation to validate extended monitoring frequencies. [District Rules 2201 and 4702]

48. In-stack emission monitors shall be calibrated using EPA protocol calibration gases a minimum of once within every 30 days. Records of calibration dates, instruments calibrated, gas readings prior to calibration, calibration gases used, and calibration gas certification and expiration dates shall be maintained. [District Rules 1080 and 4702]

49. Portable emission monitors shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Calibration records shall be shall be maintained. [District Rules 1080 and 4702]

50. The permittee shall monitor and record the stack concentration of NH3 at least once every calendar quarter in which a source test is not performed. NH3 monitoring shall be conducted utilizing District approved gas-detection tubes or a District approved equivalent method. Monitoring shall not be required if the unit is not in operation, i.e. the unit need not be started solely to perform monitoring. Monitoring shall be performed within 5 days of restarting the unit unless monitoring has been performed within the last quarter. Records must be maintained of the dates of non-operation to validate extended monitoring frequencies. [District Rules 2201 and 4102]

51. If the NOx, CO, or NH3 concentrations corrected to 15% O2, as measured by the portable analyzer or the District-approved ammonia monitoring equipment, exceed the respective permitted emissions concentration(s), the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 8 hours of operation after detection. If the portable analyzer or ammonia monitoring equipment readings continue to exceed the permitted emissions concentration(s) after 8 hours of operation after detection, the permittee shall notify the District within the following 1 hour and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100 in lieu of the performing the notification and testing required by this condition. [District Rules 2201 and 4702]

CONDITIONS CONTINUE ON NEXT PAGE

52. {3787} All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the permit-to-operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rule 4702]

53. The sulfur content of the digester gas used to fuel the engine shall be monitored and recorded at least once every calendar quarter. If quarterly monitoring shows a violation of the fuel sulfur content limit of this permit, monthly monitoring will be required until six consecutive months of monitoring show compliance with the fuel sulfur content limit. Once compliance with the fuel sulfur content limit is shown for six consecutive months, then the monitoring frequency may return to quarterly. Monitoring of the sulfur content of the digester gas fuel shall not be required if the engine does not operate during that period. Records of the results of monitoring of the digester gas fuel sulfur content shall be maintained. [District Rule 2201]

54. Monitoring of the digester gas sulfur content shall be performed using gas detection tubes calibrated for H2S; District-approved test methods, including EPA Method 11 or EPA Method 15, ASTM Method D1072, D1945, D4084, D4468, D4810 or D5504; a continuous analyzer employing gas chromatography; a continuous fuel gas monitor that meets the requirements specified in SCAQMD Rule 431.1, Attachment A; or an alternative method approved by EPA and the District. The permittee shall maintain records of any in-line monitors used to demonstrate compliance with the digester gas sulfur content limit of this permit, including the make, model, and detection limits of the monitor(s). [District Rule 2201]

55. The permittee shall maintain records of: (1) the date and time of NOx, CO, O2, and NH3 measurements, (2) the O2 concentration in percent and the measured NOx, CO, and NH3 concentrations corrected to 15% O2, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, (5) the method of determining the NH3 emission concentration, and (6) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 2201 and 4702]

56. During initial performance testing when fired on digester gas, and during subsequent performance tests as needed, the SCR system reagent injection rate shall be monitored to establish acceptable values and ranges that provide a reasonable assurance of ongoing compliance with the NOx emissions limit(s) stated in this permit. Acceptable values and ranges shall be established for each load that the engine is expected to operate at, in a minimum of 10% increments (e.g. 70%, 80%, and 90%). Records of the acceptable SCR system reagent injection rate(s) and inlet temperature(s) to the catalyst control system demonstrated to result in compliance with the NOx emission limit(s) shall be maintained and made available for inspection upon request. [District Rule 4702]

57. The SCR system reagent injection rate may be reestablished during a performance test by monitoring the SCR system reagent injection rate concurrently with each testing run to reestablish acceptable values and ranges that provide a reasonable assurance of ongoing compliance with the emissions limitations stated in this permit. Acceptable values and ranges may be reestablished for each load that the engine is expected to operate at, in a minimum of 10% increments (e.g. 70%, 80%, and 90%). The acceptable SCR system reagent injection rate(s) demonstrated during the performance test that result in compliance with the NOx emission limits shall be imposed as a condition in the Permit to Operate. [District Rule 4702]

58. If the SCR system reagent injection rate is outside of the established acceptable range, the permittee shall return the SCR system reagent injection rate to within the established acceptable range as soon as possible, but no longer than 8 hours after detection. If the SCR system reagent injection rate is not returned to within acceptable range within 8 hours, the permittee shall notify the District within the following 1 hour and begin monitoring and recording the stack concentration of NOx and O2 at least once every month. Monthly monitoring of the stack concentration of NOx and O2 shall continue until the operator can show that the SCR system reagent injection rate is returned to operating within the acceptable ranges specified within this permit. [District Rule 4702]

CONDITIONS CONTINUE ON NEXT PAGE

59. During initial performance testing when fired on digester gas, and during subsequent performance tests as needed, the inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system shall be monitored concurrently with each testing run to establish acceptable values and ranges that provide a reasonable assurance of ongoing compliance with the emissions limits stated in this permit. Acceptable values and ranges shall be established for each load that the engine is expected to operate at, in a minimum of 10% increments (e.g. 70%, 80%, and 90%). The acceptable inlet temperature and back pressure demonstrated during the initial compliance test that result in compliance with the CO and VOC emission limits shall be imposed as a condition in the Permit to Operate. [District Rule 4702]

60. The inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system may be reestablished during a performance test by monitoring concurrently with each testing run to reestablish acceptable values and ranges that provide a reasonable assurance of ongoing compliance with the emissions limitations stated in this permit. Acceptable values and ranges may be reestablished for each load that the engine is expected to operate at, in a minimum of 10% increments (e.g. 70%, 80%, and 90%). The acceptable inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system demonstrated during the performance test that result in compliance with the CO and VOC emission limits shall be imposed as a condition in the Permit to Operate. [District Rule 4702]

61. The permittee shall monitor and record the engine operating load, the SCR system reagent injection rate, the inlet temperature to the catalyst control system, and the back pressure of the exhaust upstream of the catalyst control system at least once per month. [District Rules 2201 and 4702]

62. If the inlet temperature to the catalyst control system and/or the back pressure of the exhaust upstream of the catalyst control system is outside of the established acceptable ranges established during the initial compliance test, the permittee shall return the inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system back to the acceptable range as soon as possible, but no longer than 8 hours after detection. If the inlet temperature to the catalyst control system and/or the back pressure of the exhaust upstream of the catalyst control system are not returned to within acceptable range within 8 hours, the permittee shall notify the District within the following 1 hour and begin monitoring and recording the stack concentration of CO and O2 at least once every month. Monthly monitoring of the stack concentration of CO and O2 shall continue until the operator can show that the inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system are returned to operating within the acceptable ranges specified within this permit. [District Rule 4702]

63. {3212} The permittee shall update the I&M plan for this engine prior to any planned change in operation. The permittee must notify the District no later than seven days after changing the I&M plan and must submit an updated I&M plan to the APCO for approval no later than 14 days after the change. The date and time of the change to the I&M plan shall be recorded in the engine's operating log. For modifications, the revised I&M plan shall be submitted to and approved by the APCO prior to issuance of the Permit to Operate. The permittee may request a change to the I&M plan at any time. [District Rule 4702]

64. The permittee shall maintain an engine operating log to demonstrate compliance. The engine operating log shall include, on a monthly basis, the following information: the total hours of operation, the type and quantity of fuel used during normal operation, maintenance and modifications performed, monitoring data, compliance source test results, and any other information necessary to demonstrate compliance. Quantity of fuel used shall be recorded in standard cubic feet using a non-resettable, totalizing mass or volumetric fuel flow meter or other APCO approved-device. [District Rules 2201 and 4702]

65. Records shall be maintained of the composition of the fuel used during each source test, including the percent blend of natural gas and digester gas on a volumetric and heat input basis in the fuel used. [District Rule 2201]

66. The permittee shall document that the natural gas used as fuel in the engine is from a PUC regulated source. Valid purchase contracts, supplier certifications, tariff sheets, or transportation contacts may be used to satisfy this requirement. [District Rules 2201 and 4702]

67. Records of hydrogen sulfide analyzer(s) installed or utilized and the calibration records of such analyzer(s) shall be maintained. Records are only required on such analyzer(s) utilized to demonstrate compliance with this permit. [District Rule 2201]

68. {4051} The permittee shall record the total time the engine operates, in hours per calendar year. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

69. All records shall be maintained and retained for a minimum of five (5) years, and shall be made available for District inspection upon request. All records may be maintained and submitted in an electronic format approved by the District. [District Rules 2201 and 4702]

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

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PERMIT NO: C-9441-3-3 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: LAKESIDE PIPELINE LLC
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CONDITIONS

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2. While dormant, the fuel line shall be physically disconnected from the unit. [District Rule 2080]
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7. {4565} Records of all dates and times that this unit is designated as dormant or active, and copies of all corresponding notices to the District, shall be maintained, retained for a period of at least five years, and made available for District inspection upon request. [District Rule 1070]
8. All equipment shall be maintained in good operating condition and shall be operated in a manner consistent with good air pollution control practice to minimize emissions of air contaminants. [District Rule 2201]

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Brian Clements, Director of Permit Services

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10. {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]

11. {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]

12. {1898} The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]

13. The exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods and shall be equipped with safe permanent provisions to sample stack gases with a portable NOx, CO, and O2 analyzer during District inspections. The sampling ports shall be located in accordance with the California Air Resources Board (CARB) document titled Air Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. [District Rule 1081]

14. This engine shall be equipped with an operational non-resettable elapsed time meter or other APCO approved alternative. [District Rules 2201 and 4702]

15. The owner/operator shall minimize the emissions from the engine to the maximum extent possible during the commissioning period while fired on digester gas. [District Rule 2201]

16. Commissioning activities are defined as, but not limited to, all adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the construction contractor to ensure safe and reliable operation of the reciprocating IC engine, emission control equipment, and associated electrical delivery systems while fired on digester gas. [District Rule 2201]

17. Commissioning period shall commence when all mechanical, electrical, and control systems are installed and individual system startup has been completed, or when the engine is first fired on digester gas, whichever occurs first. The commissioning period shall terminate when the engine tuning has completed and the engine is available for commercial operation while fired on digester gas. The total duration of the commissioning period for this engine shall not exceed 120 hours of operation of the engine. [District Rule 2201]

18. During the commissioning period this engine shall operate for no more than 8 hours on any day in which the SCR system or oxidation catalyst are not installed and operating for the entire duration of engine operation for that day. The permittee shall record total operating time of the engine for each day during the commissioning period in which the SCR system or oxidation catalyst are not installed and operating for the entire duration of engine operation on that day. [District Rule 2201]

19. The total number of firing hours of this unit without abatement of emissions by the SCR system and oxidation catalyst shall not exceed 120 hours during the commissioning period. Such operation of this unit without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system or oxidation catalyst. Upon completion of these activities, the permittee shall provide written notice to the District and the unused balance of the 120 firing hours without abatement shall expire. [District Rule 2201]

20. The permittee shall record total operating time of the engine in hours during the commissioning period. [District Rule 2201]

21. At the earliest feasible opportunity, in accordance with the recommendations of the equipment supplier and the construction contractor, the Selective Catalytic Reduction (SCR) system and oxidation catalyst shall be installed, adjusted, and operated to minimize emissions from this unit. [District Rule 2201]

22. The permittee shall submit a summary of activities to be performed during the commissioning period to the District at least two weeks prior to the first firing of this engine. The summary shall include a list of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but are not limited to, the tuning of the engine, the installation and operation of the SCR system and oxidation catalyst, the installation, calibration, and testing of emissions monitors, and any activities requiring the firing of this unit without abatement by the SCR system and oxidation catalyst. [District Rule 2201]

23. Emission rates from this engine during the commissioning period shall not exceed any of the following limits: 1.0 g-NOx/bhp-hr, 0.06 g-PM10/bhp-hr, 2.5 g-CO/bhp-hr, or 0.4 g-VOC/bhp-hr. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

24. The SCR catalyst shall be maintained and replaced in accordance with the recommendations of the catalyst manufacturer or emission control supplier. Records of catalyst maintenance and replacement shall be maintained. [District Rules 2201 and 4702]

25. The air-to-fuel ratio controller(s) shall be maintained and operated appropriately in order to ensure proper operation of the engine and control device to minimize emissions at all times. [District Rule 2201]

26. {4261} This engine shall be operated and maintained in proper operating condition as recommended by the engine manufacturer or emissions control system supplier. [District Rule 4702]

27. {3203} This engine shall be operated within the ranges that the source testing has shown result in pollution concentrations within the emissions limits as specified on this permit. [District Rule 4702]

28. The operator shall collect data through the I&M plan in a form approved by the APCO. [District Rule 4702]

29. This engine shall not operate more than 8,500 hours per calendar year. [District Rules 2201 and 4102]

30. This engine shall only be fueled with PUC-regulated natural gas, digester gas, or a blend of PUC-regulated natural gas and digester gas. [District Rules 2201, 4702, and 4801]

31. The sulfur content of the digester gas and natural gas/digester gas blends used as fuel in this engine shall not exceed 40 ppmv as H2S. An averaging period of up to one calendar day in length may be utilized for demonstration of compliance with the digester gas sulfur content limit. [District Rules 2201, 4702, and 4801] Federally Enforceable Through Title V Permit

32. Emissions from this IC engine, when fired on natural gas, shall not exceed any of the following limits: 0.035 g-NOx/bhp-hr (equivalent to 2.5 ppmvd NOx @ 15% O2), NOx referenced as NO2; 0.06 g-PM10/bhp-hr; 0.104 g-CO/bhp-hr (equivalent to 12 ppmvd CO @ 15% O2); or 0.049 g-VOC/bhp-hr (equivalent to 10 ppmvd VOC @ 15% O2), VOC referenced as CH4. [District Rules 2201 and 4702]

33. After the commissioning period, emissions from this IC engine, when fired on digester gas, shall not exceed any of the following limits: 0.15 g-NOx/bhp-hr (equivalent to 10.6 ppmvd NOx @ 15% O2), NOx referenced as NO2; 0.06 g-PM10/bhp-hr; 0.646 g-CO/bhp-hr (equivalent to 74.8 ppmvd CO @ 15% O2); or 0.10 g-VOC/bhp-hr (equivalent to 20.3 ppmvd VOC @ 15% O2), VOC referenced as CH4. [District Rule 2201]

34. Ammonia (NH3) emissions from this engine shall not exceed 10 ppmvd @ 15% O2. [District Rule 2201]

35. At the earliest feasible opportunity, in accordance with the recommendations of the equipment supplier and the construction contractor, the engine shall be tuned to minimize emissions. [District Rule 2201]

36. Source testing to measure NOx, CO, VOC, PM10, and ammonia (NH3) emissions from this unit shall be conducted within 60 days upon end of the digester gas commissioning period. [District Rules 1081, 2201, and 4702]

37. Source testing to measure NOx, CO, VOC, and ammonia (NH3) emissions from this unit shall be conducted at least once every 24 months. [District Rules 1081, 2201, and 4702]

38. {3791} Emissions source testing shall be conducted with the engine operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. [District Rule 4702]

39. The results of each source test shall be submitted to the District within 60 days after completion of the source test. [District Rule 1081]

40. {109} Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]

41. For emissions source testing, the arithmetic average of three 30-consecutive-minute test runs shall apply. If two of three runs are above an applicable limit, the test cannot be used to demonstrate compliance with an applicable limit. VOC emissions shall be reported as methane. NOx, CO, VOC, and NH3 concentrations shall be reported in ppmv, corrected to 15% oxygen. [District Rules 2201 and 4702]

CONDITIONS CONTINUE ON NEXT PAGE

42. The following methods shall be used for source testing: NOx (ppmv) - EPA Method 7E or ARB Method 100; CO (ppmv) - EPA Method 10 or ARB Method 100; VOC (ppmv) - EPA Method 18, 25A or 25B or ARB Method 100; stack gas oxygen - EPA Method 3 or 3A or ARB Method 100; stack gas velocity/volumetric flowrate - EPA Method 2 or EPA Method 19; stack gas moisture content - EPA Method 4; PM10 (filterable and condensable) - EPA Method 201 and 202, EPA Method 201a and 202, or ARB Method 5 in combination with Method 501; NH3 - BAAQMD ST-1B or SCAQMD Method 207-1. Alternative test methods as approved by the District may be used to address the source testing requirements of this permit. [District Rules 1081 and 4702]

43. The higher heating value (HHV) of the fuel gas shall be determined using ASTM D1826, ASTM 1945 in conjunction with ASTM D3588, or an alternative method approved by the District. [District Rules 2201 and 4702]

44. Fuel sulfur content analysis of the digester gas used to fuel this engine shall be performed within 60 days upon end of the commissioning period using EPA Method 11 or EPA Method 15, as appropriate, or an alternative method approved by the District. [District Rules 2201 and 4702]

45. Fuel sulfur content analysis of the digester gas used to fuel this engine shall be performed at least annually using EPA Method 11 or EPA Method 15, as appropriate, or an alternative method approved by the District. Records of the fuel sulfur analysis shall be maintained and provided to the District upon request. [District Rules 2201 and 4702]

46. The exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods and shall be equipped with safe permanent provisions to sample stack gases with a portable NOx, CO, and O2 analyzer during District inspections. The sampling ports shall be located in accordance with the CARB regulation titled California Air Resources Board Air Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. [District Rule 1081]

47. The permittee shall monitor and record the stack concentration of NOx, CO, and O2 at least once every calendar quarter (in which a source test is not performed) using a portable emission monitor that meets District specifications. Monitoring shall be performed not less than once every month for 12 months if two consecutive deviations are observed during quarterly monitoring. Monitoring shall not be required if the engine is not in operation, i.e. the engine need not be started solely to perform monitoring. Monitoring shall be performed within 5 days of restarting the engine unless monitoring has been performed within the last month if on a monthly monitoring schedule, or within the last quarter if on a quarterly monitoring schedule. Records must be maintained of the dates of non-operation to validate extended monitoring frequencies. [District Rules 2201 and 4702]

48. In-stack emission monitors shall be calibrated using EPA protocol calibration gases a minimum of once within every 30 days. Records of calibration dates, instruments calibrated, gas readings prior to calibration, calibration gases used, and calibration gas certification and expiration dates shall be maintained. [District Rules 1080 and 4702]

49. Portable emission monitors shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Calibration records shall be shall be maintained. [District Rules 1080 and 4702]

50. The permittee shall monitor and record the stack concentration of NH3 at least once every calendar quarter in which a source test is not performed. NH3 monitoring shall be conducted utilizing District approved gas-detection tubes or a District approved equivalent method. Monitoring shall not be required if the unit is not in operation, i.e. the unit need not be started solely to perform monitoring. Monitoring shall be performed within 5 days of restarting the unit unless monitoring has been performed within the last quarter. Records must be maintained of the dates of non-operation to validate extended monitoring frequencies. [District Rules 2201 and 4102]

51. If the NOx, CO, or NH3 concentrations corrected to 15% O2, as measured by the portable analyzer or the District-approved ammonia monitoring equipment, exceed the respective permitted emissions concentration(s), the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 8 hours of operation after detection. If the portable analyzer or ammonia monitoring equipment readings continue to exceed the permitted emissions concentration(s) after 8 hours of operation after detection, the permittee shall notify the District within the following 1 hour and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100 in lieu of the performing the notification and testing required by this condition. [District Rules 2201 and 4702]

CONDITIONS CONTINUE ON NEXT PAGE

52. {3787} All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the permit-to-operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rule 4702]

53. The sulfur content of the digester gas used to fuel the engine shall be monitored and recorded at least once every calendar quarter. If quarterly monitoring shows a violation of the fuel sulfur content limit of this permit, monthly monitoring will be required until six consecutive months of monitoring show compliance with the fuel sulfur content limit. Once compliance with the fuel sulfur content limit is shown for six consecutive months, then the monitoring frequency may return to quarterly. Monitoring of the sulfur content of the digester gas fuel shall not be required if the engine does not operate during that period. Records of the results of monitoring of the digester gas fuel sulfur content shall be maintained. [District Rule 2201]

54. Monitoring of the digester gas sulfur content shall be performed using gas detection tubes calibrated for H2S; District-approved test methods, including EPA Method 11 or EPA Method 15, ASTM Method D1072, D1945, D4084, D4468, D4810 or D5504; a continuous analyzer employing gas chromatography; a continuous fuel gas monitor that meets the requirements specified in SCAQMD Rule 431.1, Attachment A; or an alternative method approved by EPA and the District. The permittee shall maintain records of any in-line monitors used to demonstrate compliance with the digester gas sulfur content limit of this permit, including the make, model, and detection limits of the monitor(s). [District Rule 2201]

55. The permittee shall maintain records of: (1) the date and time of NOx, CO, O2, and NH3 measurements, (2) the O2 concentration in percent and the measured NOx, CO, and NH3 concentrations corrected to 15% O2, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, (5) the method of determining the NH3 emission concentration, and (6) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 2201 and 4702]

56. During initial performance testing when fired on digester gas, and during subsequent performance tests as needed, the SCR system reagent injection rate shall be monitored to establish acceptable values and ranges that provide a reasonable assurance of ongoing compliance with the NOx emissions limit(s) stated in this permit. Acceptable values and ranges shall be established for each load that the engine is expected to operate at, in a minimum of 10% increments (e.g. 70%, 80%, and 90%). Records of the acceptable SCR system reagent injection rate(s) and inlet temperature(s) to the catalyst control system demonstrated to result in compliance with the NOx emission limit(s) shall be maintained and made available for inspection upon request. [District Rule 4702]

57. The SCR system reagent injection rate may be reestablished during a performance test by monitoring the SCR system reagent injection rate concurrently with each testing run to reestablish acceptable values and ranges that provide a reasonable assurance of ongoing compliance with the emissions limitations stated in this permit. Acceptable values and ranges may be reestablished for each load that the engine is expected to operate at, in a minimum of 10% increments (e.g. 70%, 80%, and 90%). The acceptable SCR system reagent injection rate(s) demonstrated during the performance test that result in compliance with the NOx emission limits shall be imposed as a condition in the Permit to Operate. [District Rule 4702]

58. If the SCR system reagent injection rate is outside of the established acceptable range, the permittee shall return the SCR system reagent injection rate to within the established acceptable range as soon as possible, but no longer than 8 hours after detection. If the SCR system reagent injection rate is not returned to within acceptable range within 8 hours, the permittee shall notify the District within the following 1 hour and begin monitoring and recording the stack concentration of NOx and O2 at least once every month. Monthly monitoring of the stack concentration of NOx and O2 shall continue until the operator can show that the SCR system reagent injection rate is returned to operating within the acceptable ranges specified within this permit. [District Rule 4702]

CONDITIONS CONTINUE ON NEXT PAGE

59. During initial performance testing when fired on digester gas, and during subsequent performance tests as needed, the inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system shall be monitored concurrently with each testing run to establish acceptable values and ranges that provide a reasonable assurance of ongoing compliance with the emissions limits stated in this permit. Acceptable values and ranges shall be established for each load that the engine is expected to operate at, in a minimum of 10% increments (e.g. 70%, 80%, and 90%). The acceptable inlet temperature and back pressure demonstrated during the initial compliance test that result in compliance with the CO and VOC emission limits shall be imposed as a condition in the Permit to Operate. [District Rule 4702]

60. The inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system may be reestablished during a performance test by monitoring concurrently with each testing run to reestablish acceptable values and ranges that provide a reasonable assurance of ongoing compliance with the emissions limitations stated in this permit. Acceptable values and ranges may be reestablished for each load that the engine is expected to operate at, in a minimum of 10% increments (e.g. 70%, 80%, and 90%). The acceptable inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system demonstrated during the performance test that result in compliance with the CO and VOC emission limits shall be imposed as a condition in the Permit to Operate. [District Rule 4702]

61. The permittee shall monitor and record the engine operating load, the SCR system reagent injection rate, the inlet temperature to the catalyst control system, and the back pressure of the exhaust upstream of the catalyst control system at least once per month. [District Rules 2201 and 4702]

62. If the inlet temperature to the catalyst control system and/or the back pressure of the exhaust upstream of the catalyst control system is outside of the established acceptable ranges established during the initial compliance test, the permittee shall return the inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system back to the acceptable range as soon as possible, but no longer than 8 hours after detection. If the inlet temperature to the catalyst control system and/or the back pressure of the exhaust upstream of the catalyst control system are not returned to within acceptable range within 8 hours, the permittee shall notify the District within the following 1 hour and begin monitoring and recording the stack concentration of CO and O2 at least once every month. Monthly monitoring of the stack concentration of CO and O2 shall continue until the operator can show that the inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system are returned to operating within the acceptable ranges specified within this permit. [District Rule 4702]

63. {3212} The permittee shall update the I&M plan for this engine prior to any planned change in operation. The permittee must notify the District no later than seven days after changing the I&M plan and must submit an updated I&M plan to the APCO for approval no later than 14 days after the change. The date and time of the change to the I&M plan shall be recorded in the engine's operating log. For modifications, the revised I&M plan shall be submitted to and approved by the APCO prior to issuance of the Permit to Operate. The permittee may request a change to the I&M plan at any time. [District Rule 4702]

64. The permittee shall maintain an engine operating log to demonstrate compliance. The engine operating log shall include, on a monthly basis, the following information: the total hours of operation, the type and quantity of fuel used during normal operation, maintenance and modifications performed, monitoring data, compliance source test results, and any other information necessary to demonstrate compliance. Quantity of fuel used shall be recorded in standard cubic feet using a non-resettable, totalizing mass or volumetric fuel flow meter or other APCO approved-device. [District Rules 2201 and 4702]

65. Records shall be maintained of the composition of the fuel used during each source test, including the percent blend of natural gas and digester gas on a volumetric and heat input basis in the fuel used. [District Rule 2201]

66. The permittee shall document that the natural gas used as fuel in the engine is from a PUC regulated source. Valid purchase contracts, supplier certifications, tariff sheets, or transportation contacts may be used to satisfy this requirement. [District Rules 2201 and 4702]

67. Records of hydrogen sulfide analyzer(s) installed or utilized and the calibration records of such analyzer(s) shall be maintained. Records are only required on such analyzer(s) utilized to demonstrate compliance with this permit. [District Rule 2201]

68. {4051} The permittee shall record the total time the engine operates, in hours per calendar year. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

69. All records shall be maintained and retained for a minimum of five (5) years, and shall be made available for District inspection upon request. All records may be maintained and submitted in an electronic format approved by the District. [District Rules 2201 and 4702]

APPENDIX B
Current PTOs

San Joaquin Valley
Air Pollution Control District

PERMIT UNIT: C-9441-2-1 **EXPIRATION DATE:** 04/30/2026

EQUIPMENT DESCRIPTION:
1,966 BHP JENBACHER MODEL J-420 GS-A82 NATURAL GAS-FIRED LEAN-BURN IC ENGINE WITH A HUG ENGINEERING MODEL COMBIKAT SELECTIVE CATALYTIC REDUCTION (SCR) WITH OXIDATION CATALYST SYSTEM POWERING AN ELECTRICAL GENERATOR

PERMIT UNIT REQUIREMENTS

1. All equipment shall be maintained in good operating condition and shall be operated in a manner consistent with good air pollution control practice to minimize emissions of air contaminants. [District Rule 2201]
2. No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
3. No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]
4. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]
5. The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]
6. This engine shall be equipped with an operational non-resettable elapsed time meter or other APCO approved alternative. [District Rules 2201 and 4702]
7. The SCR catalyst shall be maintained and replaced in accordance with the recommendations of the catalyst manufacturer or emission control supplier. Records of catalyst maintenance and replacement shall be maintained. [District Rules 2201 and 4702]
8. The air-to-fuel ratio controller(s) shall be maintained and operated appropriately in order to ensure proper operation of the engine and control device to minimize emissions at all times. [District Rule 2201]
9. This engine shall be operated and maintained in proper operating condition as recommended by the engine manufacturer or emissions control system supplier. [District Rule 4702]
10. This engine shall be operated within the ranges that the source testing has shown result in pollution concentrations within the emissions limits as specified on this permit. [District Rule 4702]
11. This engine shall not operate more than 8,500 hours per calendar year. [District Rules 2201 and 4102]
12. This IC engine shall only be fired on Public Utility Commission (PUC) quality natural gas. [District Rules 2201, 4702, and 4801]
13. Emissions from this IC engine shall not exceed any of the following limits: 0.035 g-NOx/bhp-hr (equivalent to 2.5 ppmvd NOx @ 15% O2), NOx referenced as NO2; 0.06 g-PM10/bhp-hr; 0.104 g-CO/bhp-hr (equivalent to 12 ppmvd CO @ 15% O2); or 0.049 g-VOC/bhp-hr (equivalent to 10 ppmvd VOC @ 15% O2), VOC referenced as CH4. [District Rules 2201 and 4702]
14. Ammonia (NH3) emissions from this engine shall not exceed 10 ppmvd @ 15% O2. [District Rules 2201 and 4102]
15. Source testing to measure NOx, CO, VOC, and ammonia (NH3) emissions from this unit shall be conducted at least once every 24 months. [District Rules 1081, 2201, and 4702]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

16. Emissions source testing shall be conducted with the engine operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. [District Rule 4702]

17. The results of each source test shall be submitted to the District within 60 days after completion of the source test. [District Rule 1081]

18. Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]

19. For emissions source testing, the arithmetic average of three 30-consecutive-minute test runs shall apply. If two of three runs are above an applicable limit, the test cannot be used to demonstrate compliance with an applicable limit. VOC emissions shall be reported as methane. NOx, CO, VOC, and NH3 concentrations shall be reported in ppmv, corrected to 15% oxygen. [District Rules 2201 and 4702]

20. The following methods shall be used for source testing: NOx (ppmv) - EPA Method 7E or ARB Method 100; CO (ppmv) - EPA Method 10 or ARB Method 100; VOC (ppmv) - EPA Method 18, 25A or 25B, or ARB Method 100; stack gas oxygen - EPA Method 3 or 3A or ARB Method 100; stack gas velocity - EPA Method 2 or EPA Method 19; stack gas moisture content - EPA Method 4; NH3 - BAAQMD ST-1B or SCAQMD Method 207-1. Alternative test methods as approved by the District may also be used to address the source testing requirements of this permit. [District Rules 1081 and 4702]

21. The Higher Heating Value (HHV) of the fuel gas shall be determined using ASTM D1826, ASTM 1945 in conjunction with ASTM D3588, or an alternative method approved by the District. [District Rules 2201 and 4702]

22. The exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods and shall be equipped with safe permanent provisions to sample stack gases with a portable NOx, CO, and O2 analyzer during District inspections. The sampling ports shall be located in accordance with the CARB regulation titled California Air Resources Board Air Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. [District Rule 1081]

23. Fuel sulfur content analysis shall be performed at least annually using EPA Method 11 or EPA Method 15, as appropriate. Records of the fuel sulfur analysis shall be maintained and provided to the District upon request. [District Rules 2201 and 4702]

24. The permittee shall monitor and record the stack concentration of NOx, CO, and O2 at least once every calendar quarter (in which a source test is not performed) using a portable emission monitor that meets District specifications. Monitoring shall be performed not less than once every month for 12 months if two consecutive deviations are observed during quarterly monitoring. Monitoring shall not be required if the engine is not in operation, i.e. the engine need not be started solely to perform monitoring. Monitoring shall be performed within 5 days of restarting the engine unless monitoring has been performed within the last month if on a monthly monitoring schedule, or within the last quarter if on a quarterly monitoring schedule. Records must be maintained of the dates of non-operation to validate extended monitoring frequencies. [District Rules 2201 and 4702]

25. The permittee shall monitor and record the stack concentration of NH3 at least once every calendar quarter in which a source test is not performed. NH3 monitoring shall be conducted utilizing District approved gas-detection tubes or a District approved equivalent method. Monitoring shall not be required if the unit is not in operation, i.e. the unit need not be started solely to perform monitoring. Monitoring shall be performed within 5 days of restarting the unit unless monitoring has been performed within the last quarter. Records must be maintained of the dates of non-operation to validate extended monitoring frequencies. [District Rules 2201 and 4102]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

26. If the NOx, CO, or NH3 concentrations corrected to 15% O2, as measured by the portable analyzer or the District-approved ammonia monitoring equipment, exceed the respective permitted emissions concentration(s), the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 8 hours of operation after detection. If the portable analyzer or ammonia monitoring equipment readings continue to exceed the permitted emissions concentration(s) after 8 hours of operation after detection, the permittee shall notify the District within the following 1 hour and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100 in lieu of the performing the notification and testing required by this condition. [District Rules 2201 and 4702]

27. All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the permit-to-operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rule 4702]

28. The permittee shall maintain records of: (1) the date and time of NOx, CO, O2, and NH3 measurements, (2) the O2 concentration in percent and the measured NOx, CO, and NH3 concentrations corrected to 15% O2, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, (5) the method of determining the NH3 emission concentration, and (6) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 2201 and 4702]

29. The permittee shall monitor and record the SCR system reagent injection rate and the engine operating load at least once per month. [District Rule 4702]

30. The SCR system reagent injection rate shall not be less than 8.4 liters per hour (lph) at an operating load greater than 80% and less than 90%. The SCR system reagent injection rate shall not be less than 8.4 lph at an operating load greater than 90% and less than 100%. The SCR system reagent injection rate shall not be less than 8.2 lph at an operating load equal to 100%. [District Rule 4702]

31. The SCR system reagent injection rate may be reestablished during a performance test by monitoring the SCR system reagent injection rate concurrently with each testing run to reestablish acceptable values and ranges that provide a reasonable assurance of ongoing compliance with the emissions limitations stated in this permit. Acceptable values and ranges may be reestablished for each load that the engine is expected to operate at, in a minimum of 10% increments (e.g. 70%, 80%, and 90%). The acceptable SCR system reagent injection rate(s) demonstrated during the performance test that result in compliance with the NOx emission limits shall be imposed as a condition in the Permit to Operate. [District Rule 4702]

32. If the SCR system reagent injection rate is outside of the established acceptable range, the permittee shall return the SCR system reagent injection rate to within the established acceptable range as soon as possible, but no longer than 8 hours after detection. If the SCR system reagent injection rate is not returned to within acceptable range within 8 hours, the permittee shall notify the District within the following 1 hour and begin monitoring and recording the stack concentration of NOx and O2 at least once every month. Monthly monitoring of the stack concentration of NOx and O2 shall continue until the operator can show that the SCR system reagent injection rate is returned to operating within the acceptable ranges specified within this permit. [District Rule 4702]

33. The SCR system inlet temperature shall not be greater than 829 degrees Fahrenheit at any operating load. [District Rule 4702]

34. The SCR differential pressure shall not be greater than 0.5 inches water column at any operating load. [District Rule 4702]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

35. The inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system may be reestablished during a performance test by monitoring concurrently with each testing run to reestablish acceptable values and ranges that provide a reasonable assurance of ongoing compliance with the emissions limitations stated in this permit. Acceptable values and ranges may be reestablished for each load that the engine is expected to operate at, in a minimum of 10% increments (e.g. 70%, 80%, and 90%). The acceptable inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system demonstrated during the performance test that result in compliance with the CO and VOC emission limits shall be imposed as a condition in the Permit to Operate. [District Rule 4702]

36. The permittee shall monitor and record the inlet temperature to the SCR system, the back pressure of the exhaust upstream of the catalyst control system, and the engine operating load at least once per month. [District Rule 4702]

37. If the inlet temperature to the catalyst control system and/or the back pressure of the exhaust upstream of the catalyst control system is outside of the established acceptable ranges established during the initial compliance test, the permittee shall return the inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system back to the acceptable range as soon as possible, but no longer than 8 hours after detection. If the inlet temperature to the catalyst control system and/or the back pressure of the exhaust upstream of the catalyst control system are not returned to within acceptable range within 8 hours, the permittee shall notify the District within the following 1 hour and begin monitoring and recording the stack concentration of CO and O2 at least once every month. Monthly monitoring of the stack concentration of CO and O2 shall continue until the operator can show that the inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system are returned to operating within the acceptable ranges specified within this permit. [District Rule 4702]

38. The permittee shall update the I&M plan for this engine prior to any planned change in operation. The permittee must notify the District no later than seven days after changing the I&M plan and must submit an updated I&M plan to the APCO for approval no later than 14 days after the change. The date and time of the change to the I&M plan shall be recorded in the engine's operating log. For modifications, the revised I&M plan shall be submitted to and approved by the APCO prior to issuance of the Permit to Operate. The permittee may request a change to the I&M plan at any time. [District Rule 4702]

39. The permittee shall maintain an engine operating log to demonstrate compliance. The engine operating log shall include, on a monthly basis, the following information: the total hours of operation, the type and quantity of fuel used during normal operation, maintenance and modifications performed, monitoring data, compliance source test results, and any other information necessary to demonstrate compliance. Quantity of fuel used shall be recorded in standard cubic feet using a non-resettable, totalizing mass or volumetric fuel flow meter or other APCO approved-device. [District Rules 2201 and 4702]

40. The permittee shall record the total time the engine operates, in hours per calendar year. [District Rule 2201]

41. All records shall be maintained and retained for a minimum of five (5) years, and shall be made available for District inspection upon request. All records may be maintained and submitted in an electronic format approved by the District. [District Rules 2201 and 4702]

San Joaquin Valley
Air Pollution Control District

PERMIT UNIT: C-9441-3-1 **EXPIRATION DATE:** 04/30/2026

EQUIPMENT DESCRIPTION:
1,966 BHP JENBACHER MODEL J-420 GS-A82 NATURAL GAS-FIRED LEAN-BURN IC ENGINE WITH A HUG ENGINEERING MODEL COMBIKAT SELECTIVE CATALYTIC REDUCTION (SCR) WITH OXIDATION CATALYST SYSTEM POWERING AN ELECTRICAL GENERATOR

PERMIT UNIT REQUIREMENTS

1. All equipment shall be maintained in good operating condition and shall be operated in a manner consistent with good air pollution control practice to minimize emissions of air contaminants. [District Rule 2201]
2. No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
3. No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]
4. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]
5. The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]
6. This engine shall be equipped with an operational non-resettable elapsed time meter or other APCO approved alternative. [District Rules 2201 and 4702]
7. The SCR catalyst shall be maintained and replaced in accordance with the recommendations of the catalyst manufacturer or emission control supplier. Records of catalyst maintenance and replacement shall be maintained. [District Rules 2201 and 4702]
8. The air-to-fuel ratio controller(s) shall be maintained and operated appropriately in order to ensure proper operation of the engine and control device to minimize emissions at all times. [District Rule 2201]
9. This engine shall be operated and maintained in proper operating condition as recommended by the engine manufacturer or emissions control system supplier. [District Rule 4702]
10. This engine shall be operated within the ranges that the source testing has shown result in pollution concentrations within the emissions limits as specified on this permit. [District Rule 4702]
11. This engine shall not operate more than 8,500 hours per calendar year. [District Rules 2201 and 4102]
12. This IC engine shall only be fired on Public Utility Commission (PUC) quality natural gas. [District Rules 2201, 4702, and 4801]
13. Emissions from this IC engine shall not exceed any of the following limits: 0.035 g-NOx/bhp-hr (equivalent to 2.5 ppmvd NOx @ 15% O2), NOx referenced as NO2; 0.06 g-PM10/bhp-hr; 0.104 g-CO/bhp-hr (equivalent to 12 ppmvd CO @ 15% O2); or 0.049 g-VOC/bhp-hr (equivalent to 10 ppmvd VOC @ 15% O2), VOC referenced as CH4. [District Rules 2201 and 4702]
14. Ammonia (NH3) emissions from this engine shall not exceed 10 ppmvd @ 15% O2. [District Rules 2201 and 4102]
15. Source testing to measure NOx, CO, VOC, and ammonia (NH3) emissions from this unit shall be conducted at least once every 24 months. [District Rules 1081, 2201, and 4702]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

16. Emissions source testing shall be conducted with the engine operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. [District Rule 4702]

17. The results of each source test shall be submitted to the District within 60 days after completion of the source test. [District Rule 1081]

18. Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]

19. For emissions source testing, the arithmetic average of three 30-consecutive-minute test runs shall apply. If two of three runs are above an applicable limit, the test cannot be used to demonstrate compliance with an applicable limit. VOC emissions shall be reported as methane. NOx, CO, VOC, and NH3 concentrations shall be reported in ppmv, corrected to 15% oxygen. [District Rules 2201 and 4702]

20. The following methods shall be used for source testing: NOx (ppmv) - EPA Method 7E or ARB Method 100; CO (ppmv) - EPA Method 10 or ARB Method 100; VOC (ppmv) - EPA Method 18, 25A or 25B, or ARB Method 100; stack gas oxygen - EPA Method 3 or 3A or ARB Method 100; stack gas velocity - EPA Method 2 or EPA Method 19; stack gas moisture content - EPA Method 4; NH3 - BAAQMD ST-1B or SCAQMD Method 207-1. Alternative test methods as approved by the District may also be used to address the source testing requirements of this permit. [District Rules 1081 and 4702]

21. The Higher Heating Value (HHV) of the fuel gas shall be determined using ASTM D1826, ASTM 1945 in conjunction with ASTM D3588, or an alternative method approved by the District. [District Rules 2201 and 4702]

22. The exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods and shall be equipped with safe permanent provisions to sample stack gases with a portable NOx, CO, and O2 analyzer during District inspections. The sampling ports shall be located in accordance with the CARB regulation titled California Air Resources Board Air Monitoring Quality Assurance Volume VI, Standard Operating Procedures for Stationary Emission Monitoring and Testing. [District Rule 1081]

23. Fuel sulfur content analysis shall be performed at least annually using EPA Method 11 or EPA Method 15, as appropriate. Records of the fuel sulfur analysis shall be maintained and provided to the District upon request. [District Rules 2201 and 4702]

24. The permittee shall monitor and record the stack concentration of NOx, CO, and O2 at least once every calendar quarter (in which a source test is not performed) using a portable emission monitor that meets District specifications. Monitoring shall be performed not less than once every month for 12 months if two consecutive deviations are observed during quarterly monitoring. Monitoring shall not be required if the engine is not in operation, i.e. the engine need not be started solely to perform monitoring. Monitoring shall be performed within 5 days of restarting the engine unless monitoring has been performed within the last month if on a monthly monitoring schedule, or within the last quarter if on a quarterly monitoring schedule. Records must be maintained of the dates of non-operation to validate extended monitoring frequencies. [District Rules 2201 and 4702]

25. The permittee shall monitor and record the stack concentration of NH3 at least once every calendar quarter in which a source test is not performed. NH3 monitoring shall be conducted utilizing District approved gas-detection tubes or a District approved equivalent method. Monitoring shall not be required if the unit is not in operation, i.e. the unit need not be started solely to perform monitoring. Monitoring shall be performed within 5 days of restarting the unit unless monitoring has been performed within the last quarter. Records must be maintained of the dates of non-operation to validate extended monitoring frequencies. [District Rules 2201 and 4102]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

26. If the NOx, CO, or NH3 concentrations corrected to 15% O2, as measured by the portable analyzer or the District-approved ammonia monitoring equipment, exceed the respective permitted emissions concentration(s), the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 8 hours of operation after detection. If the portable analyzer or ammonia monitoring equipment readings continue to exceed the permitted emissions concentration(s) after 8 hours of operation after detection, the permittee shall notify the District within the following 1 hour and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100 in lieu of the performing the notification and testing required by this condition. [District Rules 2201 and 4702]

27. All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the permit-to-operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rule 4702]

28. The permittee shall maintain records of: (1) the date and time of NOx, CO, O2, and NH3 measurements, (2) the O2 concentration in percent and the measured NOx, CO, and NH3 concentrations corrected to 15% O2, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, (5) the method of determining the NH3 emission concentration, and (6) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 2201 and 4702]

29. The permittee shall monitor and record the SCR system reagent injection rate and the engine operating load at least once per month. [District Rule 4702]

30. The SCR system reagent injection rate shall not be less than 12.8 liters per hour (lph) at an operating load greater than 80% and less than 90%. The SCR system reagent injection rate shall not be less than 12.8 lph at an operating load greater than 90% and less than 100%. The SCR system reagent injection rate shall not be less than 12.8 lph at an operating load equal to 100%. [District Rule 4702]

31. The SCR system reagent injection rate may be reestablished during a performance test by monitoring the SCR system reagent injection rate concurrently with each testing run to reestablish acceptable values and ranges that provide a reasonable assurance of ongoing compliance with the emissions limitations stated in this permit. Acceptable values and ranges may be reestablished for each load that the engine is expected to operate at, in a minimum of 10% increments (e.g. 70%, 80%, and 90%). The acceptable SCR system reagent injection rate(s) demonstrated during the performance test that result in compliance with the NOx emission limits shall be imposed as a condition in the Permit to Operate. [District Rule 4702]

32. If the SCR system reagent injection rate is outside of the established acceptable range, the permittee shall return the SCR system reagent injection rate to within the established acceptable range as soon as possible, but no longer than 8 hours after detection. If the SCR system reagent injection rate is not returned to within acceptable range within 8 hours, the permittee shall notify the District within the following 1 hour and begin monitoring and recording the stack concentration of NOx and O2 at least once every month. Monthly monitoring of the stack concentration of NOx and O2 shall continue until the operator can show that the SCR system reagent injection rate is returned to operating within the acceptable ranges specified within this permit. [District Rule 4702]

33. The SCR system inlet temperature shall not be greater than 824 degrees Fahrenheit at any operating load. [District Rule 4702]

34. The SCR differential pressure shall not be greater than 0.5 inches water column at any operating load. [District Rule 4702]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

35. The inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system may be reestablished during a performance test by monitoring concurrently with each testing run to reestablish acceptable values and ranges that provide a reasonable assurance of ongoing compliance with the emissions limitations stated in this permit. Acceptable values and ranges may be reestablished for each load that the engine is expected to operate at, in a minimum of 10% increments (e.g. 70%, 80%, and 90%). The acceptable inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system demonstrated during the performance test that result in compliance with the CO and VOC emission limits shall be imposed as a condition in the Permit to Operate. [District Rule 4702]

36. The permittee shall monitor and record the inlet temperature to the SCR system, the back pressure of the exhaust upstream of the catalyst control system, and the engine operating load at least once per month. [District Rule 4702]

37. If the inlet temperature to the catalyst control system and/or the back pressure of the exhaust upstream of the catalyst control system is outside of the established acceptable ranges established during the initial compliance test, the permittee shall return the inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system back to the acceptable range as soon as possible, but no longer than 8 hours after detection. If the inlet temperature to the catalyst control system and/or the back pressure of the exhaust upstream of the catalyst control system are not returned to within acceptable range within 8 hours, the permittee shall notify the District within the following 1 hour and begin monitoring and recording the stack concentration of CO and O2 at least once every month. Monthly monitoring of the stack concentration of CO and O2 shall continue until the operator can show that the inlet temperature to the catalyst control system and the back pressure of the exhaust upstream of the catalyst control system are returned to operating within the acceptable ranges specified within this permit. [District Rule 4702]

38. The permittee shall update the I&M plan for this engine prior to any planned change in operation. The permittee must notify the District no later than seven days after changing the I&M plan and must submit an updated I&M plan to the APCO for approval no later than 14 days after the change. The date and time of the change to the I&M plan shall be recorded in the engine's operating log. For modifications, the revised I&M plan shall be submitted to and approved by the APCO prior to issuance of the Permit to Operate. The permittee may request a change to the I&M plan at any time. [District Rule 4702]

39. The permittee shall maintain an engine operating log to demonstrate compliance. The engine operating log shall include, on a monthly basis, the following information: the total hours of operation, the type and quantity of fuel used during normal operation, maintenance and modifications performed, monitoring data, compliance source test results, and any other information necessary to demonstrate compliance. Quantity of fuel used shall be recorded in standard cubic feet using a non-resettable, totalizing mass or volumetric fuel flow meter or other APCO approved-device. [District Rules 2201 and 4702]

40. The permittee shall record the total time the engine operates, in hours per calendar year. [District Rule 2201]

41. All records shall be maintained and retained for a minimum of five (5) years, and shall be made available for District inspection upon request. All records may be maintained and submitted in an electronic format approved by the District. [District Rules 2201 and 4702]

APPENDIX C
BACT Analysis for IC Engine when Fueled with Digester Gas

SJVAPCD Best Available Control Technology (BACT) Guideline 3.3.15*

Last Update: 3/6/2013

Waste Gas-Fired IC Engine**

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
NO_X	0.15 g/bhp-hr (lean-burn engine with SCR, rich-burn engine with 3-way catalyst, or other equivalent)		1. Fuel Cells (<0.05 lb/MW-hr) 2. Microturbines (<9 ppmv @ 15% O_2) 3. Gas Turbine (<9 ppmv @ 15% O_2) *(Note: gas turbines only ABE for projects ≥ 3 MW)*
SO_X	Sulfur content of fuel gas ≤ 40 ppmv (as H_2S) (dry absorption, wet absorption, chemical H_2S reduction, water scrubber, or equivalent) (may be averaged up to 24 hours for compliance)		
PM_{10}	Sulfur content of fuel gas ≤ 40 ppmv (as H_2S)		
CO	2.0 g/bhp-hr		1. Fuel Cells (<0.10 lb/MW-hr) 2. Microturbines (<60 ppmv @ 15% O_2) 3. Gas Turbine (<60 ppmv @ 15% O_2) *(Note: gas turbines only ABE for projects ≥ 3 MW)*
VOC	0.10 g/bhp-hr (lean burn and positive crankcase ventilation (PCV) or a 90% efficient crankcase control device or equivalent)		Fuel Cells (<0.02 lb-VOC/MW-hr as CH_4)
Ammonia (NH_3) Slip***	≤ 10 ppmv @ 15% O_2		

*** For the purposes of this determination, waste gas is a gas produced from the digestion of material excluding municipal sources such as waste water treatment plants, landfills, or any source where siloxane impurities are a concern.*

**** District BACT Guideline 3.3.15 is being amended to remove NH_3 slip emission requirements since NH_3 slip results from operation of an emissions control device (SCR) and, therefore, does not trigger BACT.*

BACT is the most stringent control technique for the emissions unit and class of source. Control techniques that are not achieved in practice or contained in s a state implementation plan must be cost effective as well as feasible. Economic analysis to demonstrate cost effectiveness is required for all determinations that are not achieved in practice or contained in an EPA approved State Implementation Plan.

***This is a Summary Page for this Class of Source**

i.

Top-Down BACT Analysis for Digester Gas-Fired IC Engine

Current District BACT Guideline 3.3.15 applies to the proposed natural gas/digester gas-fired IC engines when it is fueled with digester gas. In accordance with the District BACT policy, information from District BACT Guideline 3.3.15 will be utilized for the BACT analysis for the digester gas-fired engine proposed under this project.

I. Proposal

The facility has requested an Authority to Construct (ATC) permits for the operation of two 1,966 bhp lean-burn IC engine with a selective catalytic reduction (SCR) system to control emissions and will be fueled with natural gas and digester gas. The applicant has proposed to limit operation of the new IC engine to 8,500 hours per year.

II. BACT Applicability

New emissions units – PE > 2.0 lb/day

BACT Applicability for New Emissions Unit When Fueled with Digester Gas				
Pollutant	PE2 for each unit after commissioning (lb/day)	BACT Threshold (lb/day)	SSPE2 (lb/yr)	BACT Triggered?
NO_X (Normal Operation)	15.6	> 2.0	N/A	**Yes**
SO_X	4.2	> 2.0	N/A	**Yes**
PM_{10}	6.2	> 2.0	N/A	**Yes**
CO	67.2	> 2.0 and SSPE2 ≥ 200,000 lb/yr*	59,424	**No**
VOC	10.4	> 2.0	N/A	**Yes**
NH_3	5.2	> 2.0	N/A	No**

* BACT is not required for CO from a new or modified emissions unit at a Stationary Source with an SSPE2 of less than 200,000 pounds per year of CO.

** NH_3 results from operation of an emissions control device (SCR) and, therefore, NH_3 emissions do not trigger BACT. However, NH_3 slip emissions from the proposed unit will still be limited by the permit to no more than 10 ppmv @ 15% O_2.

III. Top-Down BACT Analyses for the Natural Gas/Digester Gas-Fired Engine when Fueled with Digester Gas

As stated above, the information form the existing District BACT Guideline 3.3.15 for Waste Gas-Fired IC Engines will be utilized for the BACT analysis for the proposed natural gas/digester gas-fired IC engine evaluated under this project when it is fueled with digester gas.

1. BACT Analysis for NO_X Emissions:

a. Step 1 - List all control technologies

District BACT Guideline 3.3.15 lists the following options to reduce NO_X emissions from digester gas-fired IC engines:

1) NO_X emissions ≤ 0.15 g-NO_X/bhp-hr (lean-burn engine with SCR, rich-burn engine with 3-way catalyst, or other equivalent) (Achieved in Practice)

2) Fuel Cell (≤ 0.05 lb-NO_X/MW-hr) (Alternate Basic Equipment)

3) Microturbine (< 9 ppmv NO_X @ 15% O_2) (Alternate Basic Equipment)

4) Gas Turbine (< 9 ppmv NO_X @ 15% O_2) (Alternate Basic Equipment)

<u>Description of Control Technologies</u>

1) NO_X emissions ≤ 0.15 g-NO_X/bhp-hr (9-11 ppmv NO_X @ 15% O_2) (Selective Catalytic Reduction (SCR) or equivalent) (Achieved in Practice)

A Selective Catalytic Reduction (SCR) system operates as an external control device where exhaust gases and a reagent (e.g. urea or ammonia) are passed through an appropriate catalyst. The reagent is used to reduce NO_X, over the catalyst bed, to form elemental nitrogen (N_2), water vapor, and other by-products. The use of an SCR system typically reduces NO_X emissions by 90% or more.

2) Fuel Cell (≤ 0.05 lb- NO_X/MW-hr ≈ 1.5 ppmv NO_X @ 15% O_2) (Alternate Basic Equipment)

Fuel cells use an electrochemical process to produce a direct electric current without the combustion of fuel. Fuel cells use externally supplied reactant gases (hydrogen and oxygen) that are combined in a catalytic process. Like a battery, the electric potential generated by a fuel cell is accessed by connecting an external load to the anode and cathode plates of the fuel cell. Because the fuel for a fuel cell is supplied externally, it does not run down like a battery. However, the fuel cell stack must be periodically replaced because of deactivation of catalytic materials contained in the fuel cell, which results in reduced conversion efficiencies. Since fuel cells require pure hydrogen gas for fuel, hydrocarbons used to power fuel cells must be purified and reformed prior to use. The reformation process can occur in an external fuel processor or through internal reforming in the fuel cell. Both molten carbonate fuel cells and solid

oxide fuel cells can internally reform the hydrocarbon fuel to hydrogen for use in the fuel cell. Additionally, these fuel cells, which operate at high temperatures, are tolerant of CO_2 that is found digester gas.

Fuel cells offer the advantages of high efficiency, nearly negligible emissions, and very quiet power generation. The greatest deterrent to increased use of fuel cells has been the significantly higher expense when compared to other generation technologies. These higher costs include the initial capital expense, the cost of periodic replacement of the fuel cell stack, and, for digester gas installations, the increased ongoing expenses associated with the extensive cleanup required to remove contaminants that can poison fuel cell catalysts. Although this expense can be substantial, digester gas-fueled fuel cells have been installed at some wastewater treatment plants and fuel cells have also been fueled with other types of digester gas, such as landfill gas and brewery wastewater gas.

3) Gas Turbine (< 9 ppmv NO_X @ 15% O_2) (Alternate Basic Equipment)

Gas turbines are internal combustion engines that operate on the Brayton (Joule) combustion cycle rather than the Otto combustion cycle used in reciprocating internal combustion engines or the diesel cycle for diesel engines. In the Brayton cycle the air flow and fuel injection are steady, and the different parts of the cycle occur continuously within different components of the system. In a gas turbine, fuel is continually injected into the combustion chamber or combustor and air is constantly drawn into the turbine and compressed. All elements of the Brayton cycle occur simultaneously in a gas turbine.

Gas turbines are one of the cleanest ways of generating electricity through combustion. With the use of lean pre-mixed combustion or catalytic exhaust cleanup, NO_X emissions from large gas-fired turbines are generally in the single-digit ppmv range. These levels are generally for natural gas-fired units but they are considered technologically feasible for digester gas-fired units.

Gas turbines are available in sizes ranging from 500 kW - 25 MW. Based on contacts with turbine suppliers, digester gas-fired turbines used to produce electricity are expected to be available in the size range of 2.5 - 7 MW. According to Solar Turbines, the smaller digester gas-fired turbines are no longer actively produced or marketed since this size range is generally covered by other generation technologies such as reciprocating IC engines and microturbines.

4) Microturbine (< 9 ppmv NO_X @ 15% O_2) (Alternate Basic Equipment)

Microturbines are small gas turbines rated between 25 kW and 500 kW that burn gaseous and liquid fuels to generate electricity or provide mechanical power. Microturbines were developed from turbocharger technologies found in large trucks and the turbines in aircraft auxiliary power units. Microturbines can be operated on a wide variety of fuels, including natural gas, liquefied petroleum gas, gasoline, diesel, landfill gas, and digester gas. According to the California Air Resources Board (ARB), there were approximately 200 digester gas-fired microturbines operating in California

as of the year 2006.[3] Microturbines typically have electrical efficiencies of 25-30% based on the lower heating value (LHV) of the fuel, with larger microturbines usually having greater efficiencies than smaller microturbines. Microturbine manufacturers include Capstone Green Energy and FlexEnergy Solutions.

Microturbines without add-on controls can meet very stringent emission limits and have significantly lower emissions of NO_X, CO, and VOC than uncontrolled reciprocating engines because most microturbines operating on gaseous fuels utilize lean premixed (dry low NO_X (DLN)) combustion technology. Microturbine manufacturers will generally guarantee NO_X emissions of 9-15 ppmv @ 15% O_2 for microturbines fuel with digester gas. However, several emission tests performed on digester gas-fired microturbines have demonstrated lower emissions.

The proposed project is for two 1,426 kW natural gas and digester gas-fueled IC engines that will be used to produce combined heat and power for the operations at the site, although larger microturbines have recently become available, at least two microturbines packages with several individual microturbines would be required to replace the proposed IC engines. In addition, for previous projects that the District evaluated for the installation of digester gas-fired IC engines for power production, the applicants indicated that when they investigated microturbines as an alternative they found that there were difficulties related to the loss of power and efficiency because of heat de-rating in warmer climates and the very high pressure requirement and parasitic load, which increased overall costs. Although microturbines may not currently be a practical option for this particular project, they will be included as alternative equipment in the BACT analysis below.

b. Step 2 - Eliminate technologically infeasible options

Option 3 - Gas Turbine (≤ 9 ppmv NO_X @ 15% O_2) (Alternate Basic Equipment)

Option 3, Gas Turbine, was determined to be infeasible for the proposed project because the available information indicates that the principal suppliers of gas turbines (e.g. Solar Turbines, Allison, and General Electric) do not currently produce or market gas turbines fueled with digester gas rated less than 3 MW since this size range is generally covered by other generation technologies such as reciprocating IC engines and microturbines.

The cost information given in the US EPA Combined Heat and Power Partnership Catalog of CHP Technologies[4] (September 2017) and the SGIP 2015 Self-Generation Incentive Program Cost Effectiveness Study [Final Report][5] (October 5, 2015) also supports that gas turbines rated less than approximately 3 MW are not generally available. The smallest turbine for which the US EPA Combined Heat and Power Partnership Catalog of CHP Technologies provides cost information is 3,304 kW and the smallest turbine for which

[3] "Staff Report: Initial Statement of Reasons for Proposed Amendments to the Distributed Generation Certification Regulation" (9/1/2006), Cal EPA - ARB, Executive Summary Pg. ii (http://www.arb.ca.gov/regact/dg06/dgisor.pdf)

[4] US EPA Combined Heat and Power Partnership "Catalog of CHP Technologies" (September 2017) http://www.epa.gov/chp/catalog-chp-technologies

[5] SGIP 2015 Self-Generation Incentive Program Cost Effectiveness Study [Final Report] (October 5, 2015). https://www.cpuc.ca.gov/-/media/cpuc-website/files/legacyfiles/2/7889-20151119finalfullreport-1-.pdf

the SGIP 2015 Self-Generation Incentive Program Cost Effectiveness Study [Final Report] provides cost information is 2,500 kW.

The proposed project would require a gas turbine rated approximately 1,426 kWe, which is below the range that is currently being marketed by turbine manufacturers; therefore, gas turbines are not considered feasible for this particular project and will be eliminated from consideration. However, the NO_X emission limit that the applicant has proposed for the engines, 0.15 g-NOx/bhp-hr (equivalent to 10.6 ppmvd NOx @ 15% O_2), is expected to be no greater than the NO_X emission limit that would be achieved by a comparably sized gas turbine.

c. Step 3 - Rank remaining options by control effectiveness

1) Fuel Cell (≤ 0.05 lb-NO_X/MW-hr ≈ 1.5 ppmv NO_X @ 15% O_2) (Alternate Basic Equipment)

2) Digester gas-fueled microturbines (< 9 ppmv NO_X @ 15% O_2) (Alternate Basic Equipment)

3) NO_X emissions ≤ 0.15 g-NO_X/bhp-hr (Achieved in Practice)

d. Step 4 - Cost Effectiveness Analysis

As explained above, because the application for this project was deemed complete after the June 1, 2022 updates to the District BACT Policy, the BACT analysis for this project will utilize the new District BACT policy and cost-effectiveness thresholds that was in effect at the time that the application was deemed complete.

Pursuant to Section IX.D of District Policy APR 1305 – BACT Policy (dated June 1, 2022), a cost effectiveness analysis is required for the options that have not been determined to be achieved in practice. To determine the cost effectiveness of particular technologically feasible control options or alternate equipment options, the amount of emissions resulting from each option will be quantified and compared to the District Standard Emissions allowed by the District rules that are applicable to the particular unit. The emission reductions will be equal to the difference between the District Standard Emissions and the emissions resulting from the particular option being evaluated.

The lean burn, natural gas/digester gas-fired IC engines are currently subject to the following emission limits for non-agricultural, lean burn IC engines contained in District Rule 4702, Section 5.2.2, Table 2, 2e: 11 ppmvd NO_X, 2,000 ppmvd CO, and 750 ppmvd VOC (all measured @ 15% O_2). The proposed natural gas/digester gas-fired IC engines are also subject to the New Source Performance Standards (NSPS) for spark-ignited IC Engines contained in 40 CFR 60 Subpart JJJJ, which includes more stringent CO and VOC emissions limits of 5.0 g-CO/bhp-hr (or 610 ppmv CO @ 15% O_2) and 1.0 g-VOC/bhp-hr (or 80 ppmv @ 15% O_2 reported as propane) for landfill and digester gas-fired IC engines. Therefore, the District Standard Emissions used for the BACT cost analysis below for the proposed engines will be based on the emission limits contained in these applicable regulations.

Option 1: Fuel Cells (≤ 0.05 lb/MW-hr ≈ 1.5 ppmv NO_X @ 15% O_2) (Alternate Basic Equipment)

Because fuel cells result in reduced NO_X and VOC emissions in comparison to a reciprocating IC engine, a Multi-Pollutant Cost Effectiveness Threshold (MCET) will be used to determine if this option is cost-effective. The following cost analysis demonstrates that replacement of the proposed engine with a fuel cell is not cost effective even when the additional operation costs of a fuel cell are not considered.

Assumptions

- Molar Specific Volume = 379.5 scf/lb-mol (at 60°F)
- bhp-hr to Btu conversion: 2,545 Btu/hp-hr
- Btu to kW-hr conversion: 3,412.14 Btu/kW-hr
- The initial capital costs and the operation costs for the digester gas-fueled IC engine and fuel cells will be based on information given in the US EPA Combined Heat and Power Partnership Catalog of CHP Technologies[4] and the SGIP 2015 Self-Generation Incentive Program Cost Effectiveness Study [Final Report][5]
- Because the US EPA Combined Heat and Power Partnership Catalog of CHP Technologies only provides cost information for natural gas-fueled engines and fuel cells, additional capital costs for the use of biogas are taken from the SGIP 2015 Self-Generation Incentive Program Cost Effectiveness Study [Final Report]
- Price for electricity: $127.72/MW-hr (based on the current California Bioenergy Market Adjusting Tariff (BioMAT) contract price offered by Investor Owned for electricity produced from Category 2 – dairy and other agricultural bioenergy[6])

Assumptions for the Natural Gas/Digester Gas-Fired IC Engines when fueled with Digester Gas

- The IC engines will operate at up to full load for 24 hour/day and 8,500 hour/year (applicant's proposal)
- Higher Heating Value (hhv) efficiency for the IC engine: 30% (District practice)

[6] See the California Public Utilities Commission (CPUC) Bioenergy Feed-Tariff (SB 1122) webpage at https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/electric-power-procurement/rps/rps-procurement-programs/rps-sb-1122-biomat; Pacific Gas & Electric Company (PG&E) BioMAT Feed-in Tariff contract price pricing at https://www.pge.com/en_US/for-our-business-partners/floating-pages/biomat/biomat.page?WT.mc_id=Vanity_rfo-biomat&ctx=large-business, and the California Public Utilities Commission (CPUC) 2020 California Renewables Portfolio Annual Report (November 2020). https://www.cpuc.ca.gov/-/media/cpuc-website/files/uploadedfiles/cpuc_public_website/content/utilities_and_industries/energy_-_electricity_and_natural_gas/2020-rps-annual-report.pdf

- The maximum daily total heating value of the digester gas used to fuel the engines will be: 400.3 MMBtu/day (*1,966 bhp_{out} x 1 bhp_{in}/0.30 bhp_{out} x 2,545 Btu_{in}/bhp_{in}-hr x 1 MMBtu/10^6 Btu x 24 hr/day*)

- The maximum annual total heating value for of the digester gas used by the engines will be: 141,765 MMBtu/year (*1,966 bhp_{out} x 1 bhp_{in}/0.30 bhp_{out} x 2,545 Btu_{in}/bhp_{in}-hr x 1 MMBtu/10^6 Btu x 8,500 hr/year*)

- Estimated purchase and installation cost for CHP IC engine producing approximately 1,426 kWe without add-on air pollution control equipment: $2,137/kW (*Average of interpolated costs from US EPA Combined Heat and Power Partnership Catalog of CHP Technologies and the SGIP 2015 Self-Generation Incentive Program Cost Effectiveness Study [Final Report] adjusted to December 2022 based on US Consumer Price Index (CPI) Inflation Calculator*)

- Additional capital investment for digester gas conditioning and cleanup for IC engines: $511/kW (*SGIP 2015 Self-Generation Incentive Program Cost Effectiveness Study [Final Report] adjusted to December 2022 based on US CPI Inflation Calculator*)

- Total Installation Cost for digester gas-fueled IC engine that can produce 1,426 kWe: $2,648/kW

- Estimated operation costs for CHP IC engine that can produce 1,426 kWe without add-on air pollution control costs: $0.025/kW-hr (*average of interpolated values from US EPA Combined Heat and Power Partnership Catalog of CHP Technologies and SGIP 2015 Self-Generation Incentive Program Cost Effectiveness Study [Final Report] adjusted to December 2022 based on US CPI Inflation Calculator*)

- The SGIP 2015 Self-Generation Incentive Program Cost Effectiveness Study [Final Report] indicates that digester gas conditioning/cleanup costs are highly dependent on the quantity of digester gas being processed and contaminants being removed and that the differences in clean-up costs for digester gas-fueled IC engines, microturbines, and gas turbines "reflect the greater rigor in the removal of the hydrogen sulfide". The digester gas used to fuel the engine must be limited to a sulfur content of no more than 40 ppmv as H_2S to satisfy BACT. Because required level of sulfur removal is adequate for use in the engine, there will be no increase in operating costs related to cleaning the digester gas for use in the IC engine

- Rule 4702 NO_X emission limit for non-agricultural, lean burn IC engines: 11 ppmv @ 15% O_2 = 0.0427 lb/MMBtu

- Rule 4702 VOC emission limit for non-agricultural, lean burn IC engines: 750 ppmv @ 15% O_2 as CH_4 = 1.012 lb/MMBtu

- 40 CFR 60 Subpart JJJJ VOC emission limit for landfill and digester gas-fired IC engines: 1.0 g/bhp-hr (or 80 ppmv @ 15% O_2 reported as propane)

Assumptions for Fuel Cell System

- Net electrical hhv efficiency for a fuel cell: 49% (2016-2017 Self Generation Incentive Program Impact Evaluation[7] (September 28, 2018) submitted to the Pacific Gas and Electric Company SGIP Working Group reports lower heating value (LHV) efficiencies for Fuel Cells used only for electrical generation of 54% in 2016 and 55% in 2017. This results in an average LHV efficiency of 54.5% for 2016-2017 and an estimated average higher heating value (HHV) efficiency of 49% for 2014-2015)

- Size of fuel cell system needed to replace the proposed 1,426 kWe IC engine: 2,395 kW (estimated based on 400.3 MMBtu/day and 49% efficiency)

- Estimated Purchase and Installation Cost for a 2,100 kW Molten Carbonate Fuel Cell (conservatively using a 2,100 kW system instead of a 2,395 kW system): $5,266/kW (*Average of values for largest fuel cells from US EPA Combined Heat and Power Partnership Catalog of CHP Technologies and SGIP 2015 Self-Generation Incentive Program Cost Effectiveness Study [Final Report] adjusted to 2021 dollars based on CPI Inflation Calculator; Note: the U.S. Department of Energy Federal energy management Program (FEMP) document "Fuel Cells and Renewable Energy" (last updated 10-21-2016 and available at: http://www.wbdg.org/resources/fuelcell.php) states, "Installation costs of a fuel cell system can range from $5,000/kW to $10,000/kW." Therefore, this estimate falls within the expected range and is below recently reported costs for some fuel cells.*)

- Additional capital investment for digester gas conditioning and cleanup for fuel cells: $740/kW (*inflation adjusted value from the SGIP 2015 Self-Generation Incentive Program Cost Effectiveness Study [Final Report] ($563/kW) adjusted to December 2022 dollars based on CPI inflation calculator*)

- Total Installation Cost for digester gas-fueled fuel cells rated 2,395 kW: $6,006/kW

- Typical operation costs for natural gas-fueled fuel cells, including stack replacement costs: $0.05/kW-hr (*SGIP 2015 Self-Generation Incentive Program Cost Effectiveness Study [Final Report] (*$0.05/kW-hr) *adjusted to December 2022 dollars based on CPI inflation calculator*)

- Additional operational costs for digester gas conditioning and cleanup for 2,395 kW fuel cell: $0.19/kW-hr (*Interpolated value SGIP 2015 Self-Generation Incentive Program Cost Effectiveness Study [Final Report] adjusted to December 2022 dollars based on CPI inflation calculator*)

[7] Self Generation Incentive Program Impact Evaluation (September 28, 2018) Prepared by Itron, submitted to the Pacific Gas and Electric Company SGIP Working Group, Section 4 – Generation Project Energy Impacts, Figure 4-34 - 2017 Overall and Component LHV Efficiencies by Technology. https://www.cpuc.ca.gov/industries-and-topics/electrical-energy/demand-side-management/self-generation-incentive-program/self-generation-incentive-program-evaluation-reports

- Total Operation Cost for digester gas-fueled fuel cells rated 2,395 kW: $0.24/kW-hr

- Fuel Cell NO_X emissions: 0.01 - 0.02 lb/MW-hr *(Note: Fuel cells have been certified to the ARB Distributed Generation Certification level of 0.07 lb-NO_X/MW-hr but measured emissions from fuel cells are generally much lower)*

- Fuel Cell VOC emissions: 0.02 lb-VOC/MW-hr (≤ 2.0 ppmv VOC @ 15% O_2 as CH_4 based on ARB Distributed Generation Certification level and emission tests on fuel cells)

Capital Cost

The estimated increased incremental capital cost for replacement of the proposed IC engine with fuel cells is calculated based on the difference in cost of a fuel cell power plant and the proposed IC engine.

The incremental capital cost for replacement of the proposed IC engine with a fuel cell power plant is calculated as follows:

(2,395 kW x $6,006/kW) - (1,426 kW x $2,648/kW) = $10,608,322

Annualized Capital Cost

Pursuant to District Policy APR 1305, Section X (dated June 1, 2021), which was in effect at the time that the application for this project was deemed complete, the incremental capital cost for the purchase of the fuel cell system will be spread over the expected life of the system using the capital recovery equation. The expected life of the entire system will be estimated at 10 years. A 4% interest rate is assumed in the equation and the assumption will be made that the equipment has no salvage value at the end of the ten-year cycle.

$$A = [P \times i(I+1)^n]/[(I+1)^n-1]$$

Where: A = Annual Cost
P = Present Value
I = Interest Rate (4%)
N = Equipment Life (10 years)

$$A = [\$10{,}608{,}322 \times 0.04(1.04)^{10}]/[(1.04)^{10}-1]$$
$$= \mathbf{\$1{,}304{,}824/year}$$

Annual Costs

Electricity Generated
The amount of electricity potentially generated by each option is calculated as follows:

Proposed IC Engine Producing 1,426 kWe
1,426 kWe x 8,500 hr/yr = 12,121,000 kW-hr/year

Fuel Cells (Alternate Equipment)
400.3 MMBtu/day x 10^6 Btu/MMBtu x 1 day/24 hr x 1 kW-hr/3,412.14 Btu x 0.49 (electrical efficiency) = 2,395 kWe

141,765 MMBtu/yr x 10^6 Btu/MMBtu x 1 kW-hr/3,412.14 Btu x 0.49 (electrical efficiency) = 20,358,148 kW-hr/year

Cost (Decrease) from Increased Revenue for Power Generation from Replacing the Proposed 1,426 kW Engine with a Fuel Cell System
(12,121,000 kW-hr/yr - 20,358,148 kW-hr/yr) x 1 MW/1,000 kW x $127.72/MW-hr = -$1,052,049/year

Annual Operation and Maintenance Cost
The annual operation and maintenance costs for each option are calculated as follows:

Proposed IC Engine Producing 1,426 kWe
12,121,000 kW-hr/yr x $0.025/kW-hr = $303,025/year

Fuel Cells (Alternate Equipment)
20,358,148 kW-hr/yr x $0.22/kW-hr = $4,478,793/year

Annual Costs of Increased Maintenance
$4,478,793/yr - $303,025/yr = $4,175,768/year

Total Increased Annual Costs for Fuel Cell as an Alternative to Proposed IC Engine
$1,358,320/year + (-$1,052,049/year) + $4,175,768/year = **$4,482,039/year**

Emission Reductions:

NO_X and VOC Emission Factors:

Pursuant to the District's Policy APR 1305 (dated June 1, 2021), which was in effect at the time that he application for this project was deemed complete, District Standard Emissions that will be used to calculate the emission reductions from alternative equipment.

The District Standard Emissions for NO_X emissions from the IC engine will be based on the NO_X emission limit for non-agricultural, lean burn IC engines from District Rule 4702, Section 5.2.2, Table 2, 2.e. The District Standard Emissions for VOC emissions from the engines will be based on the New Source Performance Standard (NSPS) VOC emission limits for landfill and digester gas-fired IC engines from 40 CFR 60 Subpart JJJJ, since these limits are applicable and are more representative of the emissions than the current applicable VOC emission limits of District Rule 4702.

The following emissions factors will be used for the cost analysis:

District Standard Emissions:

NO_X: 0.0427 lb-NO_X/MMBtu (11 ppmv NO_X @ 15% O_2)
VOC: 1.0 g-VOC/bhp-hr

Emissions from Fuel Cells as Alternative Equipment:
NO_X: 0.01 lb-NO_X/MW-hr
VOC: 0.02 lb-VOC/MW-hr

Emission Reductions:

Proposed Engine Compared to Fuel Cells based on District Standard Emission Reductions

NO_X Emission Reductions (11 ppmv NO_X @ 15% O_2 → 0.01 lb-NO_X/MW-hr)
(121,512.8 MMBtu/yr x 0.0427 lb-NO_X/MMBtu) – (17,449,833 kW-hr/yr x 1 MW/1,000 kW x 0.01 lb-NO_X/MW-hr)
= 5,014 lb-NO_X/year (2.507 ton-NO_X/year)

VOC Emission Reductions (1.0 g-VOC/bhp-hr → 0.02 lb-VOC/MW-hr)
(1,966 bhp x 8,500 hr/yr x 1.0 g-VOC/bhp-hr x 1 lb/453.59 g) – (17,449,833 kW-hr/yr x 1 MW/1,000 kW x 0.02 lb-VOC/MW-hr)
= 36,493 lb-VOC/year (18.246 ton-VOC/year)

Multi-Pollutant Cost Effectiveness Threshold (MCET) for NO_X and VOC Reductions based on District Standard Emission Reductions

Multi-Pollutant Cost Effectiveness Threshold (MCET) for the NO_X and VOC reductions from replacing the proposed IC engine with fuel cells is calculated below using the cost effectiveness thresholds from the District's Revised BACT Cost Effectiveness Thresholds Memo, dated June 1, 2022.

(2.507 ton-NO_X/year x $32,900/ton-$NO_X$) + (18.246 ton-VOC/year x $23,600/ton-VOC)
= **$513,086/year**

As shown above, the annualized capital cost of this alternate option exceeds the Multi-Pollutant Cost Effectiveness Threshold (MCET) calculated for the NO_X and VOC emission reductions. Therefore, this option is not cost effective and is being removed from consideration.

Option 2 - Microturbines (≤ 9 ppmv NO_X @ 15% O_2) (Alternate Basic Equipment)

The applicant has proposed IC engines with NO_X emissions of 0.0597 g-NOx/bhp-hr (equivalent to 4.3 ppmvd NOx @ 15% O_2) when it is fueled with digester gas. The NO_X emissions from the proposed IC engines when fueled with digester gas are less than or equal to the NO_X emissions achieved by this alternative; therefore, this option does not need to be considered further and a cost analysis is not required.

Option 3: NO_X emissions ≤ 0.15 g-NO_X/bhp-hr (Achieved in Practice)

This option is achieved in practice and the applicant has proposed an IC engine with NO_X emissions of 0.15 g-NOx/bhp-hr when it is fueled with digester gas, which is Achieved in Practice BACT requirement; therefore, a cost analysis is not required.

e. Step 5 - Select BACT

Pursuant to the above BACT Analysis, BACT for the natural gas/digester gas-fired IC engine when it is fueled with digester gas satisfied with the following: NO_X emissions to ≤ 0.15 g-NOx/bhp-hr, as proposed by the applicant. The applicant has proposed to use an SCR system for the natural gas/digester gas-fired lean burn IC engine to reduce NO_X emissions to ≤ 0.15 g-NOx/bhp-hr. Therefore, the BACT requirements for NO_X will be satisfied.

2. BACT Analysis for PM_{10}/SO_X Emissions:

a. Step 1 - Identify all control technologies

Combustion of gaseous fuels generally does not result in significant emissions of particulate matter (PM). Natural Gas and digester gas from a dairy digester are the proposed fuel for the IC engines. The digester gas will be composed primarily of methane (approximately 60-70% molar composition) and CO_2 (approximately 30-40% molar composition) and is expected to burn in a fairly clean manner. Particulate emissions from combustion of the digester gas are expected to primarily result from the incineration of fuel-born sulfur compounds (mostly H_2S) resulting in the formation of sulfur-containing particulate. Therefore, reducing the sulfur content of the digester gas is the principal means to reduce particulate emissions.

The following control was identified to reduce emissions of particulate matter and SO_X from combustion of the digester gas as fuel in the proposed IC engine:

Sulfur Content of fuel ≤ 40 ppmv as H_2S (Achieved in Practice)

b. Step 2 - Eliminate technologically infeasible options

There are no technologically infeasible options to eliminate from step 1.

c. Step 3 - Rank remaining options by control effectiveness

1) Sulfur Content of fuel gas ≤ 40 ppmv as H_2S (Achieved in Practice)

d. Step 4 - Cost Effectiveness Analysis

The only option listed above has been identified as achieved in practice and has been proposed by the applicant. Therefore, the option required and is not subject to a cost analysis.

e. Step 5 - Select BACT

Pursuant to the above BACT Analysis, BACT for PM_{10} emissions from the proposed IC engine when fueled with digester gas is sulfur content of the digester gas not exceeding 40 ppmv as H_2S. The applicant has proposed to reduce the sulfur content of the digester gas combusted in the IC engine to ≤ 40 ppmv as H_2S. Therefore, the BACT requirements for PM_{10} will be satisfied.

3. BACT Analysis for VOC Emissions:

a. Step 1 - Identify all control technologies

The following options were identified to reduce VOC emissions:

1) VOC emissions ≤ 0.10 g-VOC/bhp-hr (Achieved in Practice)

2) Fuel Cell (≤ 0.02 lb-VOC/MW-hr) (Alternate Basic Equipment)

b. Step 2 - Eliminate technologically infeasible options

There are no technologically infeasible options to eliminate from step 1.

c. Step 3 - Rank remaining options by control effectiveness

1) Fuel Cell (≤ 0.02 lb-VOC/MW-hr) (Alternate Basic Equipment)

2) VOC emissions ≤ 0.10 g-VOC/bhp-hr (Achieved in Practice)

d. Step 4 - Cost Effectiveness Analysis

<u>Option 1: Fuel Cell (≤ 0.02 lb/MW-hr VOC as CH_4) (Alternate Basic Equipment)</u>

The multi-pollutant cost analysis performed above for the NO_X and VOC emissions demonstrated that the annualized cost of this alternate option exceeds the Multi Pollutant Cost Effectiveness Threshold calculated for the NO_X and VOC emission reductions achieved by this technology. Therefore, this option is not cost effective and is being removed from consideration.

<u>Option 2: VOC emissions ≤ 0.10 g-VOC/bhp-hr (Achieved in Practice)</u>

This option is achieved in practice and the applicant has proposed an IC engine with VOC emissions ≤ 0.10 g-VOC/bhp-hr when it is fueled with digester gas; therefore, a cost analysis is not required.

e. Step 5 - Select BACT

Pursuant to the above BACT Analysis, BACT for the proposed natural gas/digester gas-fired IC engine when it is fueled with digester gas satisfied with the following: VOC emissions to ≤ 0.10 g-VOC/bhp-hr, as proposed by the applicant. Because the applicant has proposed this option, the BACT requirements for VOC will be satisfied.

APPENDIX D
HRA and AAQA Summary

San Joaquin Valley Air Pollution Control District
Risk Management Review and Ambient Air Quality Analysis

To:	Jesse Garcia – Permit Services
From:	Will Worthley – Technical Services
Date:	February 13, 2023
Facility Name:	LAKESIDE PIPELINE LLC
Location:	15662 7TH AVE , HANFORD
Application #(s):	C-9441-2-2, -3-2
Project #:	C-1223005

1. Summary

1.1 Risk Management Review (RMR)

Units	Prioritization Score	Acute Hazard Index	Chronic Hazard Index	Maximum Individual Cancer Risk	T-BACT Required	Special Permit Requirements
2	74.28	0.32	0.01	5.97E-07	No	Yes
3	74.28	0.46	0.01	6.15E-07	No	Yes
Project Totals	148.56	0.78	0.01	1.21E-06		
Facility Totals	>1	0.99	0.03	2.70E-06		

1.2 Ambient Air Quality Analysis (AAQA)

Pollutant	Air Quality Standard (State/Federal)				
	1 Hour	3 Hours	8 Hours	24 Hours	Annual
CO	Pass		Pass		
NO_x	Pass				Pass
SO_x	Pass	Pass		Pass	Pass

Notes:
1. Results were taken from the attached AAQA Report.
2. The criteria pollutants are below EPA's level of significance as found in 40 CFR Part 51.165 (b)(2) unless otherwise noted below.

To ensure that human health risks will not exceed District allowable levels; the following shall be included as requirements for:

<u>Unit # 2-2 & 3-2</u>

1. The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction.

2. Project Description

Technical Services received a revised request to perform a Risk Management Review (RMR) and Ambient Air Quality Analysis (AAQA) for the following:

- Unit -2-2: MODIFICATION OF 1,966 BHP JENBACHER MODEL J-420 GS-A82 NATURAL GAS-FIRED LEAN-BURN IC ENGINE WITH A HUG ENGINEERING MODEL COMBIKAT SELECTIVE CATALYTIC REDUCTION (SCR) WITH OXIDATION CATALYST SYSTEM POWERING AN ELECTRICAL GENERATOR: AUTHORIZE THE ENGINE TO BE FIRED ON DIGESTER GAS AND CHANGE THE EMISSION FACTORS WHEN FIRED ON NATURAL GAS
- Unit -3-2: MODIFICATION OF 1,966 BHP JENBACHER MODEL J-420 GS-A82 NATURAL GAS-FIRED LEAN-BURN IC ENGINE WITH A HUG ENGINEERING MODEL COMBIKAT SELECTIVE CATALYTIC REDUCTION (SCR) WITH OXIDATION CATALYST SYSTEM POWERING AN ELECTRICAL GENERATOR: AUTHORIZE THE ENGINE TO BE FIRED ON DIGESTER GAS AND CHANGE THE EMISSION FACTORS WHEN FIRED ON NATURAL GAS

3. RMR Report

3.1 Analysis

The District performed an analysis pursuant to the District's Risk Management Policy for Permitting New and Modified Sources (APR 1905, May 28, 2015) to determine the possible cancer and non-cancer health impact to the nearest resident or worksite. This policy requires that an assessment be performed on a unit by unit basis, project basis, and on a facility-wide basis. If a preliminary prioritization analysis demonstrates that:

- A unit's prioritization score is less than the District's significance threshold and;
- The project's prioritization score is less than the District's significance threshold and;
- The facility's total prioritization score is less than the District's significance threshold

Then, generally no further analysis is required.

The District's significant prioritization score threshold is defined as being equal to or greater than 1.0. If a preliminary analysis demonstrates that either the units', the project's or the facility's total prioritization score is greater than the District threshold, a screening or a refined assessment is required.

If a refined assessment is greater than one in a million but less than 20 in a million for carcinogenic impacts (cancer risk) and less than 1.0 for the acute and chronic hazard indices (non-carcinogenic) on a unit by unit basis, project basis and on a facility-wide basis the proposed application is considered less than significant. For units that exceed a cancer risk of one in a million, Toxic Best Available Control Technology (TBACT) must be implemented.

Toxic emissions for this project were calculated using the following methods:

- Process rates for the proposed operation were provided by the Permit Engineer. These process rates were speciated into toxic air contaminants using emission factors derived from the 2000 AP-42, Fifth Edition, Volume I, Chapter 3: Stationary Internal Combustion Sources, Section 2: Natural Gas-Fired Reciprocating Engines and Dairy Biomethane Characterization from 2009 report, Pipeline Quality Biomethane: North American Guidance Document for Introduction of Dairy Waste Derived Biomethane Into Existing Natural Gas Networks.

These emissions were input into the San Joaquin Valley APCD's Hazard Assessment and Reporting Program (SHARP). In accordance with the District's Risk Management Policy, risks from the proposed unit's toxic emissions were prioritized using the procedure in the 2016 CAPCOA Facility Prioritization Guidelines. The prioritization score for this proposed facility was greater than 1.0 (see RMR Summary Table). Therefore, a refined health risk assessment was required.

The AERMOD model was used, with the parameters outlined below and meteorological data for 2013-2017 from Hanford (rural dispersion coefficient selected) to determine the dispersion factors (i.e., the predicted concentration or X divided by the normalized source strength or Q) for a receptor grid. These dispersion factors were input into the SHARP Program, which then used the Air Dispersion Modeling and Risk Tool (ADMRT) of the Hot Spots Analysis and Reporting Program Version 2 (HARP 2) to calculate the chronic and acute hazard indices and the carcinogenic risk for the project.

The following parameters were used for the review:

Source Process Rates					
Unit ID	**Process ID**	**Process Material**	**Process Units**	**Hourly Process Rate**	**Annual Process Rate**
2	1	Dairy Gas Usage	MMscf	0.015	129.6
2	2	Dairy Gas Usage Commissioning	MMscf	0.015	1.8
3	1	Dairy Gas Usage	MMscf	0.015	129.6
3	2	Dairy Gas Usage Commissioning	MMscf	0.015	1.8

Point Source Parameters						
Unit ID	**Unit Description**	**Release Height (m)**	**Temp. (°K)**	**Exit Velocity (m/sec)**	**Stack Diameter (m)**	**Vertical/ Horizontal/ Capped**
2	1966 BHP Biogas ICE	6.71	748	31.25	0.46	Vertical
3	1966 BHP Biogas ICE	6.71	748	31.25	0.46	Vertical

4. AAQA Report

The District modeled the impact of the proposed project on the National Ambient Air Quality Standard (NAAQS) and/or California Ambient Air Quality Standard (CAAQS) in accordance with District Policy APR-1925 (Policy for District Rule 2201 AAQA Modeling) and EPA's Guideline for Air Quality Modeling (Appendix W of 40 CFR Part 51). The District uses a progressive three level approach to perform AAQAs. The first level (Level 1) uses a very conservative approach. If this analysis indicates a likely exceedance of an AAQS or Significant Impact Level (SIL), the analysis proceeds to the second level (Level 2) which implements a more refined approach. For the 1-hour NO_2 standard, there is also a third level that can be implemented if the Level 2 analysis indicates a likely exceedance of an AAQS or SIL.

The modeling analyses predicts the maximum air quality impacts using the appropriate emissions for each standard's averaging period. Required model inputs for a refined AAQA include background ambient air quality data, land characteristics, meteorological inputs, a receptor grid,

and source parameters including emissions. These inputs are described in the sections that follow.

Ambient air concentrations of criteria pollutants are recorded at monitoring stations throughout the San Joaquin Valley. Monitoring stations may not measure all necessary pollutants, so background data may need to be collected from multiple sources. The following stations were used for this evaluation:

Monitoring Stations				
Pollutant	**Station Name**	**County**	**City**	**Measurement Year**
CO	Clovis-Villa	Fresno	Clovis	2021
NOx	Hanford-Irwin	Kings	Hanford	2021
SOx	Fresno - Garland	Fresno	Fresno	2021

Technical Services performed modeling for directly emitted criteria pollutants with the emission rates below:

Emission Rates (lbs/hour)				
Unit ID	**Process**	**NOx**	**SOx**	**CO**
2	1	4.10	0.20	10.30
3	1	4.10	0.20	10.30

Emission Rates (lbs/year)				
Unit ID	**Process**	**NOx**	**SOx**	**CO**
2	1	4,679	1,176	20,932
3	1	4,679	1,176	20,932

The AERMOD model was used to determine if emissions from the project would cause or contribute to an exceedance of any state of federal air quality standard. The parameters outlined below and meteorological data for 2013-2017 from Hanford (rural dispersion coefficient selected) were used for the analysis:

The following parameters were used for the review:

Point Source Parameters						
Unit ID	**Unit Description**	**Release Height (m)**	**Temp. (°K)**	**Exit Velocity (m/sec)**	**Stack Diameter (m)**	**Vertical/ Horizontal/ Capped**
2	1966 BHP Biogas ICE	6.71	748	31.25	0.46	Vertical
3	1966 BHP Biogas ICE	6.71	748	31.25	0.46	Vertical

5. Conclusion

5.1 RMR

The cumulative acute and chronic indices for this facility, including this project, are below 1.0; and the cumulative cancer risk for this facility, including this project, is less than 20 in a million. In addition, the cancer risk for each unit in this project is less than 1.0 in a million. **In accordance**

with the District's Risk Management Policy, the project is approved without Toxic Best Available Control Technology (T-BACT).

To ensure that human health risks will not exceed District allowable levels; the permit requirements listed on page 1 of this report must be included for this proposed unit.

These conclusions are based on the data provided by the applicant and the project engineer. Therefore, this analysis is valid only as long as the proposed data and parameters do not change.

5.2 AAQA

The emissions from the proposed equipment will not cause or contribute significantly to a violation of the State and National AAQS.

6. Attachments

A. Modeling request from the project engineer

B. Additional information from the applicant/project engineer

C. Prioritization score w/ toxic emissions summary

D. Facility Summary

E. AAQA results

APPENDIX E
Quarterly Net Emissions Change

Quarterly Net Emissions Change (QNEC)

The Quarterly Net Emissions Change is used to complete the emission profile screen for the District's PAS database. The QNEC shall be calculated as follows:

QNEC = PE2 - PE1, where:

QNEC = Quarterly Net Emissions Change for each emissions unit, lb/qtr.
PE2 = Post-Project Potential to Emit for each emissions unit, lb/qtr.
PE1 = Pre-Project Potential to Emit for each emissions unit, lb/qtr.

Using the values in Sections VII.C.2 and VII.C.1 in the evaluation above, quarterly PE2 and quarterly PE1 can be calculated as follows:

$PE2_{quarterly} = PE2_{annual} \div 4$ quarters/year

$PE1_{quarterly} = PE1_{annual} \div 4$ quarters/year

Quarterly NEC [QNEC] for Each Engine			
Pollutant	**PE2 (lb/qtr)**	**PE1 (lb/qtr)**	**QNEC (lb/qtr)**
NO_X	1,382	443	939
SO_X	369	76	293
PM_{10}	553	553	0
CO	6,191	1,269	4,922
VOC	454	451	470