

AUG 20 2019

Jordan Leichthy  
Maas Energy Works, Inc.  
3711 Meadow View Dr, #100  
Redding, CA 96002

**Re: Notice of Preliminary Decision - Authority to Construct**  
**Facility Number: S-6991**  
**Project Number: S-1183921**

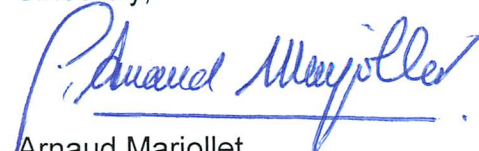
Dear Mr. Leichthy:

Enclosed for your review and comment is the District's analysis of Maas Energy Works, Inc.'s application for an Authority to Construct for the modification of an existing 1,215 bhp digester gas-fired IC engine powering an electric generator (unit S-6991-14) to increase the CO emission limit, from 0.60 g/bhp-hr to 2.0 g/bhp-hr, at 5850 Avenue 160, Tipton.

The notice of preliminary decision for this project will be published approximately three days from the date of this letter. 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. Manuel Salinas of Permit Services at (559) 230-5833.

Sincerely,



Arnaud Marjollet  
Director of Permit Services

AM:ms

Enclosures

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

**Samir Sheikh**  
Executive Director/Air Pollution Control Officer

**Northern Region**  
4800 Enterprise Way  
Modesto, CA 95356-8718  
Tel: (209) 557-6400 FAX: (209) 557-6475

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**San Joaquin Valley Air Pollution Control District**  
**Authority to Construct Application Review**  
*Modification of Digester Gas-Fired IC Engine*

Facility Name: Randy Sugarman, Trustee For Greg Tevelde Date: August 5, 2019  
Mailing Address: 5850 Avenue 160 Tipton, CA 93272 Engineer: Manuel Salinas  
Lead Engineer: Derek Fukuda  
Contact Person: Jordan Leichty, Project Manager  
Telephone: (319) 750-3434  
Application #: S-6991-14-1  
Project #: S-1183921  
Deemed Complete: February 13, 2019

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**I. Proposal**

The primary business of Randy Sugarman, Trustee For Greg Tevelde is a dairy operation. Randy Sugarman, Trustee For Greg Tevelde has submitted an Authority to Construct (ATC) permit application for the following:

- Modify their existing 1,215 bhp digester gas-fired Internal Combustion (IC) engine powering an 800 kW electrical generator, S-6991-14-0 (See Appendix A). The facility is proposing to increase the CO emission factor from 0.60 g-CO/bhp-hr (equivalent to 82 ppmvd CO @ 15% O<sub>2</sub>) to 2.0 g-CO/bhp-hr (equivalent to 223 ppmvd @ 15% O<sub>2</sub>).

An initial source test was conducted by the facility on August 2, 2017 as required by previously issued ATC S-6991-14-0. District review of the test report showed the engine to be operating in full compliance with the permitted emission limits. In this project the facility has requested an increase of the CO emission factor to allow for a margin of compliance while meeting the 12 ppm NO<sub>x</sub> limit. Test data shows they will be in compliance with the new CO limit as well.

**II. Applicable Rules**

Rule 1070 Inspections (12/17/92)  
Rule 2020 Exemptions (12/18/14)  
Rule 2201 New and Modified Stationary Source Review Rule (2/18/16)  
Rule 2410 Prevention of Significant Deterioration (6/16/11)  
Rule 2520 Federally Mandated Operating Permits (6/21/01)  
Rule 4001 New Source Performance Standards (4/14/99)  
Rule 4002 National Emission 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

This project is located at 5850 Avenue 160 in Tipton, CA. The District has verified that 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 1,215 bhp Gauscor, Model SFGLD 480, lean burn digester gas-fired IC engine is equipped with a Selective Catalytic Reduction (SCR) system and an oxidation catalyst for emissions control and powers an 800 kW electric generator. The electricity generated by this operation provides power used to run the dairy operation at this location. Excess power not used on-site is exported back to the main utility provider. The engine is permitted to operate up to 24 hours per day and 8,500 hours per year.

### V. Equipment Listing

#### Pre-Project Equipment Description:

S-6991-14-0: 1,215 BHP GUASCOR, MODEL SFGLD, DIGESTER GAS-FIRED LEAN-BURN IC ENGINE WITH A HUG ENGINEERING, MODEL COMBIKAT, CATALYST SYSTEM (SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM WITH OXIDATION CATALYST) POWERING AN ELECTRICAL GENERATOR

#### Modification Equipment Description:

S-6991-14-1: MODIFICATION OF 1,215 BHP GUASCOR, MODEL SFGLD, DIGESTER GAS-FIRED LEAN-BURN IC ENGINE WITH A HUG ENGINEERING, MODEL COMBIKAT, CATALYST SYSTEM (SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM WITH OXIDATION CATALYST) POWERING AN ELECTRICAL GENERATOR: INCREASE CO EMISSION FACTOR FROM 0.60 G-CO/BHP-HR (EQUIVALENT TO 82 PPMVD CO @ 15% O<sub>2</sub>) TO 2.0 G-CO/BHP-HR (EQUIVALENT TO 223 PPMVD CO @ 15% O<sub>2</sub>)

#### Post Project Equipment Descriptions:

S-6991-14-1: 1,215 BHP GUASCOR, MODEL SFGLD, DIGESTER GAS-FIRED LEAN-BURN IC ENGINE WITH A HUG ENGINEERING, MODEL COMBIKAT, CATALYST SYSTEM (SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM WITH OXIDATION CATALYST) POWERING AN ELECTRICAL GENERATOR

## VI. Emission Control Technology Evaluation

The engine is equipped with:

- Turbocharger
- Intercooler
- Air/Fuel Ratio or an O<sub>2</sub> Controller
- Lean Burn Technology
- Selective Catalytic Reduction (SCR)

The turbocharger reduces the NO<sub>x</sub> emission rate from the 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<sub>x</sub>.

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<sub>x</sub> 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<sub>x</sub>, over the catalyst bed, to form elemental nitrogen and other by-products. The use of a catalyst typically reduces the NO<sub>x</sub> emissions by up to 90%.

## VII. General Calculations

### A. Assumptions

- Average sulfur content of the scrubbed biogas: 40 ppmv as H<sub>2</sub>S (current permit)
- Bhp to Btu/hr conversion: 2,545 Btu/hp-hr
- Efficiency of engine = 30% (District practice)
- The engine operates 24 hours/day and 8,500 hours per year (current permit)
- Ammonia slip from SCR = 10 ppmvd @ 15% O<sub>2</sub> (current permit)

**B. Emission Factors**

S-6991-14-0:

Pollutant	g/hp-hr	lb/MMBtu	ppmvd (@ 15%O <sub>2</sub> )	Source
NO <sub>x</sub>	0.15	N/A	12 ppmvd	Current Permit
SO <sub>x</sub>	0.037	0.0096	40 ppmvd in fuel gas	Mass Balance Equation Below
PM <sub>10</sub>	0.081	0.021	--	Current Permit
CO	0.60	N/A	82 ppmvd	Current Permit
VOC	0.10	N/A	24 ppmvd (as CH <sub>4</sub> )	Current Permit
NH <sub>3</sub>	0.055	0.0144	10 ppmvd	Current Permit

SO<sub>x</sub> – 40 ppmvd H<sub>2</sub>S in fuel gas

$$\frac{40 \text{ ft}^3 \text{ H}_2\text{S}}{10^6 \text{ ft}^3} \times \frac{32.06 \text{ lb S}}{\text{lb - mol H}_2\text{S}} \times \frac{\text{lb - mole}}{379.5 \text{ ft}^3} \times \frac{64.06 \text{ lb SO}_2}{32.06 \text{ lb S}} \times \frac{\text{ft}^3}{700 \text{ Btu}} \times \frac{10^6 \text{ Btu}}{\text{MMBtu}} = 0.0096 \frac{\text{lb SO}_x}{\text{MMBtu}}$$

$$0.0096 \frac{\text{lb SO}_x}{\text{MMBtu}} \times \frac{1 \text{ MMBtu}}{10^6 \text{ Btu}} \times \frac{\text{Btu}_{in}}{0.30 \text{ Btu}_{out}} \times \frac{2,545 \text{ Btu}}{\text{hp - hr}} \times \frac{453.59 \text{ g}}{\text{lb}} = 0.037 \frac{\text{g - SO}_x}{\text{bhp - hr}}$$

S-6991-14-1:

Pollutant	g/hp-hr	lb/MMBtu	ppmvd (@ 15%O <sub>2</sub> )	Source
NO <sub>x</sub>	0.15	N/A	12 ppmvd	Current Permit
SO <sub>x</sub>	0.037	0.0096	40 ppmvd in fuel gas	Current Permit
PM <sub>10</sub>	0.081	0.021	--	Current Permit
CO	2.0	N/A	223 ppmvd	Proposed by Applicant (BACT limit)
VOC	0.10	N/A	24 ppmvd (as CH <sub>4</sub> )	Current Permit
NH <sub>3</sub>	0.055	0.0144	10 ppmvd	Current Permit

CO – 223 ppmvd @ 15% O<sub>2</sub>

$$\frac{223 \text{ ft}^3 \text{ CO}}{10^6 \text{ ft}^3} \times \frac{9,100 \text{ ft}^3}{1 \text{ MMBtu}} \times \frac{28 \text{ lb CO}}{1 \text{ lb - mole}} \times \frac{20.9}{20.9 - 15} \times \frac{1 \text{ lb - mole}}{379.5 \text{ ft}^3} \times \frac{\text{MMBtu}}{392.75 \text{ bhp - hr}} \times \frac{453.6 \text{ g}}{\text{lb}} \times \frac{\text{Btu}_{in}}{0.30 \text{ Btu}_{out}} = 2.0 \frac{\text{g - CO}}{\text{bhp - hr}}$$

## C. Calculations

### 1. Pre-Project Potential to Emit (PE1)

$$\text{PE1 (lb/day)} = [\text{EF (g/hp-hr)} \times \text{Rating (bhp)} \times 24 \text{ (hr/day)}] / 453.6 \text{ (g/lb)}$$

$$\text{PE1 (lb/year)} = [\text{EF (g/hp-hr)} \times \text{Rating (bhp)} \times 8,500 \text{ (hr/year)}] / 453.6 \text{ (g/lb)}$$

Daily PE1								
NO <sub>x</sub>	0.15	(g/hp-hr) x	1,215	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	<b>9.6</b>	(lb/day)
SO <sub>x</sub>	0.037	(g/hp-hr) x	1,215	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	<b>2.4</b>	(lb/day)
PM <sub>10</sub>	0.081	(g/hp-hr) x	1,215	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	<b>5.2</b>	(lb/day)
CO	0.60	(g/hp-hr) x	1,215	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	<b>38.6</b>	(lb/day)
VOC	0.10	(g/hp-hr) x	1,215	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	<b>6.4</b>	(lb/day)
NH <sub>3</sub>	0.055	(g/hp-hr) x	1,215	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	<b>3.5</b>	(lb/day)

Annual PE1								
NO <sub>x</sub>	0.15	(g/hp-hr) x	1,215	(hp) x	8,500	(hr/year) ÷ 453.6 (g/lb) =	<b>3,415</b>	(lb/year)
SO <sub>x</sub>	0.037	(g/hp-hr) x	1,215	(hp) x	8,500	(hr/year) ÷ 453.6 (g/lb) =	<b>842</b>	(lb/year)
PM <sub>10</sub>	0.081	(g/hp-hr) x	1,215	(hp) x	8,500	(hr/year) ÷ 453.6 (g/lb) =	<b>1,844</b>	(lb/year)
CO	0.60	(g/hp-hr) x	1,215	(hp) x	8,500	(hr/year) ÷ 453.6 (g/lb) =	<b>13,661</b>	(lb/year)
VOC	0.10	(g/hp-hr) x	1,215	(hp) x	8,500	(hr/year) ÷ 453.6 (g/lb) =	<b>2,277</b>	(lb/year)
NH <sub>3</sub>	0.055	(g/hp-hr) x	1,215	(hp) x	8,500	(hr/year) ÷ 453.6 (g/lb) =	<b>1,252</b>	(lb/year)

### 2. Post-Project Potential to Emit (PE2)

$$\text{PE2 (lb/day)} = [\text{EF (g/hp-hr)} \times \text{Rating (bhp)} \times 24 \text{ (hr/day)}] / 453.6 \text{ (g/lb)}$$

$$\text{PE2 (lb/year)} = [\text{EF (g/hp-hr)} \times \text{Rating (bhp)} \times 8,500 \text{ (hr/year)}] / 453.6 \text{ (g/lb)}$$

Daily PE2								
NO <sub>x</sub>	0.15	(g/hp-hr) x	1,215	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	<b>9.6</b>	(lb/day)
SO <sub>x</sub>	0.037	(g/hp-hr) x	1,215	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	<b>2.4</b>	(lb/day)
PM <sub>10</sub>	0.081	(g/hp-hr) x	1,215	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	<b>5.2</b>	(lb/day)
CO	2.0	(g/hp-hr) x	1,215	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	<b>128.6</b>	(lb/day)
VOC	0.10	(g/hp-hr) x	1,215	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	<b>6.4</b>	(lb/day)
NH <sub>3</sub>	0.055	(g/hp-hr) x	1,215	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	<b>3.5</b>	(lb/day)

Annual PE2								
NO <sub>x</sub>	0.15	(g/hp-hr) x	1,215	(hp) x	8,500	(hr/year) ÷ 453.6 (g/lb) =	<b>3,415</b>	(lb/year)
SO <sub>x</sub>	0.037	(g/hp-hr) x	1,215	(hp) x	8,500	(hr/year) ÷ 453.6 (g/lb) =	<b>842</b>	(lb/year)
PM <sub>10</sub>	0.081	(g/hp-hr) x	1,215	(hp) x	8,500	(hr/year) ÷ 453.6 (g/lb) =	<b>1,844</b>	(lb/year)
CO	2.0	(g/hp-hr) x	1,215	(hp) x	8,500	(hr/year) ÷ 453.6 (g/lb) =	<b>45,537</b>	(lb/year)
VOC	0.10	(g/hp-hr) x	1,215	(hp) x	8,500	(hr/year) ÷ 453.6 (g/lb) =	<b>2,277</b>	(lb/year)
NH <sub>3</sub>	0.055	(g/hp-hr) x	1,215	(hp) x	8,500	(hr/year) ÷ 453.6 (g/lb) =	<b>1,252</b>	(lb/year)

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

Pursuant to Section 4.9 of District Rule 2201, the Pre-Project Stationary Source Potential to Emit (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 that have occurred at the source, and which have not been used on-site.

The SSPE emissions values from PTOs S-6991-1-2, '-2-2, '-3-2, '-4-2, '-10-0, '-11-0, -and '-12-1 were calculated in Appendix E and shown in the following table. Emissions values from PTOs S-6991-13-0 and '-14-0 are from previous project S-1153321.

Pre-Project Stationary Source Potential to Emit [SSPE1] (lb/year)							
Permit Unit	NO <sub>x</sub>	SO <sub>x</sub>	PM <sub>10</sub>	CO	VOC	NH <sub>3</sub>	H <sub>2</sub> S
S-6991-1-2, '-2-2, '-3-2, '-4-2 and '-12-1	0	0	70,409	0	213,930	269,506	4,221
S-6991-10-0	992	1	50	302	113	0	0
S-6991-11-0	0	0	0	0	351	0	0
S-6991-13-0	5,105	875	1,914	6,017	5,743	0	0
S-6991-14-0	3,415	842	1,844	13,661	2,277	1,252	0
Pre-Project SSPE (SSPE1)	9,512	1,718	74,217	19,980	222,414	270,758	4,221

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

Pursuant to Section 4.10 of District Rule 2201, the Post-Project Stationary Source Potential to Emit (SSPE2) 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.

SSPE2 is summarized in the following table.

Post Project Stationary Source Potential to Emit [SSPE2] (lb/year)							
Permit Unit	NO <sub>x</sub>	SO <sub>x</sub>	PM <sub>10</sub>	CO	VOC	NH <sub>3</sub>	H <sub>2</sub> S
S-6991-1-2, '-2-2, '-3-2, '-4-2 and '-12-1	0	0	70,409	0	213,930	269,506	4,221
S-6991-10-0	992	1	50	302	113	0	0
S-6991-11-0	0	0	0	0	351	0	0
S-6991-13-0	5,105	875	1,914	6,017	5,743	0	0
S-6991-14-1 (ATC)	3,415	842	1,844	45,537	2,277	1,252	0
Post Project SSPE (SSPE2)	9,512	1,718	74,217	51,856	222,414	270,758	4,221

## 5. Major Source Determination

### Rule 2201 Major Source Determination:

Pursuant to Section 3.24 of District Rule 2201, a major source is a stationary source with post-project emissions or a post-project Stationary Source Potential to Emit (SSPE2), equal to or exceeding one or more of the following threshold values. However, Section 3.24.2 states, “for the purposes of determining major source status, the SSPE2 shall not include the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

The non-fugitive emissions for this dairy facility are summarized in the table below. For the dairy operations (permits S-6991-1 through ‘-4 and ‘-12), the non-fugitive emission totals were taken from the SSPE calculations in Appendix E.

<b>Major Source Determination (lb/year)</b>						
	NO <sub>x</sub>	SO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO	VOC
S-6991-1 through ‘-4 and ‘-12-1	0	0	0	0	0	9,479
S-6991-10-0	992	1	50	50	302	113
S-6991-11-0	0	0	0	0	0	351
S-6991-13-0	5,105	875	1,914	1,914	6,017	5,743
S-6991-14-1	3,415	842	1,844	1,844	45,537	2,277
Stationary Source Potential to Emit	9,512	1,734	3,808	3,808	51,584	17,963
Major Source Threshold	20,000	140,000	140,000	140,000	200,000	20,000
Major Source?	No	No	No	No	No	No

Note: PM<sub>2.5</sub> assumed to be equal to PM<sub>10</sub>

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 <sub>2</sub>	VOC	SO <sub>2</sub>	CO	PM	PM <sub>10</sub>
Estimated Facility PE before Project Increase	4.8	111.2	0.9	25.9	37.1	37.1
PSD Major Source Thresholds	250	250	250	250	250	250
PSD Major Source ? (Y/N)	N	N	N	N	N	N

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 lbs/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 Section 3.7 of District Rule 2201, BE = Pre-project Potential to Emit 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 Section 3.22 of 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)						
	NO <sub>x</sub>	SO <sub>x</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>	CO	VOC
S-6991-14-1	3,415	842	1,844	1,844	13,661	2,277

## 7. SB 288 Major Modification

SB 288 Major Modification is defined in 40 CFR Part 51.165 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.

## **8. 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.

Since this facility is not a Major Source for any pollutants, this project does not constitute a Federal Major Modification.

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

Rule 2410 applies to pollutants for which the District is in attainment or for unclassified, pollutants. The pollutants addressed in the PSD applicability determination are listed as follows:

- NO<sub>2</sub> (as a primary pollutant)
- SO<sub>2</sub> (as a primary pollutant)
- CO
- PM
- PM<sub>10</sub>
- Hydrogen sulfide (H<sub>2</sub>S)<sup>1</sup>
- Total reduced sulfur (including H<sub>2</sub>S)<sup>1</sup>

### **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)(i). The PSD Major Source threshold is 250 tpy for any regulated NSR pollutant.

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<sup>1</sup> Because the facility is not included in the specific source categories listed in 40 CFR 51.165, for PSD purposes only non-fugitive emissions from the engine exhaust stack must be addressed for this project. Although the sulfur (primarily H<sub>2</sub>S) in the fuel will be converted almost entirely to SO<sub>x</sub> during combustion, the maximum possible amount of H<sub>2</sub>S and total reduced sulfur compounds from the engine stack can be calculated by assuming that all sulfur in the fuel is emitted as H<sub>2</sub>S. Based on the fuel sulfur limit of 40 ppmv as H<sub>2</sub>S, the maximum possible H<sub>2</sub>S emission factor for the engine is calculated to be 0.04 g-H<sub>2</sub>S/bhp, resulting in a total maximum of 0.4 tpy H<sub>2</sub>S from the exhaust stack of the engine. This is well below the applicable PSD threshold of 250 tpy.

<b>PSD Major Source Determination: Potential to Emit (tons/year)</b>						
	NO <sub>2</sub>	VOC	SO <sub>2</sub>	CO	PM	PM <sub>10</sub>
Total PE from New and Modified Units	1.7	1.1	0.4	22.8	0.9	0.9
PSD Major Source threshold	250	250	250	250	250	250
New PSD Major Source?	N	N	N	N	N	N

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. See Appendix B for QNEC calculations.

## **VIII. Compliance**

### **Rule 1070 Inspections**

This rule applies to any source operation, which emits or may emit air contaminants. This rule allows the District to perform inspections for the purpose of obtaining information necessary to determine whether air pollution sources are in compliance with applicable rules and regulations. The rule also allows the District to require record keeping, to make inspections and to conduct tests of air pollution sources. The following conditions will be included on the ATC to ensure compliance.

- Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to enter the permittee's premises where a permitted source is located or emissions related activity is conducted, or where records must be kept under condition of the permit. [District Rule 1070]
- Upon presentation of appropriate credentials, a permittee shall allow an authorized representative of the District to have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit. [District Rule 1070]

### **Rule 2020 Exemptions**

This rule specifies emissions units that are not required to obtain an Authority to Construct (ATC) or Permit to Operate (PTO). This rule is applicable to any source that emits or may emit air contaminants.

Per Section 6.20, no permit is required for agricultural sources at a stationary source that, in aggregate, produce actual emissions less than one-half of the major source thresholds. For the purposes of determining permitting applicability, fugitive emissions, except fugitive dust

emissions, are included in determining aggregate emissions. As shown in section VII.C.4, facility emissions exceed ½ the major source threshold for at least one pollutant; therefore, this facility is not exempt from permitting requirements. No further discussion is required.

## **Rule 2201 New and Modified Stationary Source Review Rule**

### **A. Best Available Control Technology (BACT)**

#### **1. BACT Applicability**

BACT requirements are triggered on a pollutant-by-pollutant basis and on an emissions unit-by-emissions unit basis for the following\*:

- 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 AIPE exceeding two pounds per day, and/or
- d. Any new or modified emissions unit, in a stationary source project, which results in a Major Modification.

\*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 discussed in Section I above, there are no new emissions units associated with this project. Therefore BACT for new units with PE > 2 lb/day purposes is not triggered.

#### **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**

$$\text{AIPE} = \text{PE}_2 - \text{HAPE}$$

Where,

AIPE = Adjusted Increase in Permitted Emissions, (lb/day)

PE<sub>2</sub> = Post-Project Potential to Emit, (lb/day)

HAPE = Historically Adjusted Potential to Emit, (lb/day)

$$\text{HAPE} = \text{PE}_1 \times (\text{EF}_2/\text{EF}_1)$$

Where,

PE<sub>1</sub> = The emissions unit's PE prior to modification or relocation, (lb/day)

EF2 = The emissions unit's permitted emission factor for the pollutant after modification or relocation. If EF2 is greater than EF1 then EF2/EF1 shall be set to 1  
 EF1 = The emissions unit's permitted emission factor for the pollutant before the modification or relocation

$$AIPE = PE2 - (PE1 * (EF2 / EF1))$$

NOx, SOx, PM<sub>10</sub>, and VOC:

As discussed above, the emission factors and daily PE values for NOx, SOx, PM<sub>10</sub>, and VOC are not changing for this unit within this project. Therefore, the AIPE = PE2 - PE1. Since PE2 equals the PE1 for all pollutants, the AIPE = 0.0 lb/day. Therefore BACT is not triggered for NOx, SOx, PM<sub>10</sub>, and VOC.

CO:

$$\begin{aligned} AIPE &= 128.6 - (38.6 * (2.0/0.6)) \\ &= 128.6 - 38.6 * 1 \\ &= 90.0 \text{ lb/day} \end{aligned}$$

As demonstrated above, the AIPE is greater than 2.0 lb/day for CO emissions. 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.

**d. Major Modification**

As discussed in Section VII.C.7 above, this project does not constitute a Major Modification; therefore BACT is not triggered.

**B. Offsets**

Pursuant to Section 4.6.9 of District Rule 2201, agricultural sources that are not major sources are exempt from offsets. As demonstrated in Section VII.C.5 above, this facility is not a major source. Therefore, this source is exempt from offsets.

However, even when there is an applicable exemption, the SSPE2 values are compared to the offset threshold to determine if offsets are triggered. In its PAS database, the District keeps track of facilities where offsets are triggered but an exemption applies. The SSPE2 values are compared to the offset trigger thresholds in the following table:

Offset Determination (lb/year)					
	NOx	SOx	PM10	CO	VOC
SSPE2	9,512	1,718	74,217	51,856	222,414
Offset Thresholds	20,000	54,750	29,200	200,000	20,000
Offsets Triggered?	No	No	Yes	No	Yes

## 2. Quantity of Offsets Required

As shown in the table above, the SSPE2 is compared to the offset thresholds. PM<sub>10</sub> and VOC emissions exceed the offset threshold; however, per Section 4.6.9, offsets are not required for agricultural sources unless they are a major source. As determined in Section VII.C.5 above, this facility is not a major source for any pollutant. Therefore, offsets are not 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 SSPE 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

New Major Sources are new facilities, which are also Major Sources. Since this is not a new facility, public noticing is not required for this project for New Major Source purposes.

As demonstrated in Sections VII.C.7 and VII.C.8, this project does not constitute an SB 288 or Federal Major Modification; therefore, public noticing for SB 288 or Federal Major Modification purposes is not required.

#### b. PE > 100 lb/day

Applications which include a new emissions unit with a Potential to Emit 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

The following table compares the SSPE1 with the SSPE2 in order to determine if any offset thresholds have been surpassed with this project.

Pollutant	SSPE1 (lb/year)	SSPE2 (lb/year)	Offset Threshold (lb/year)	Public Notice Required?
NO <sub>x</sub>	9,512	9,512	20,000	No
SO <sub>x</sub>	1,718	1,718	54,750	No
PM <sub>10</sub>	74,217	74,217	29,200	No
CO	19,980	51,856	200,000	No
VOC	222,414	222,414	20,000	No

As detailed above, there were no offset thresholds surpassed with this project; therefore public noticing is not required for surpassing an offset threshold.

**d. SSIPE > 20,000 lb/year**

Public notification is required for any permitting action that results in a Stationary Source Increase in Permitted Emissions (SSIPE) of more than 20,000 lb/year of any affected pollutant. According to District policy, the SSIPE is calculated as the Post-Project Stationary Source Potential to Emit (SSPE2) minus the Pre-Project Stationary Source Potential to Emit (SSPE1), i.e.  $SSIPE = SSPE2 - SSPE1$ . The values for SSPE1 and SSPE2 are calculated according to Rule 2201, Sections 4.9 and 4.10, respectively. The SSIPE is compared to the SSIPE Public Notice thresholds in the following table:

Pollutant	SSPE2 (lb/year)	SSPE1 (lb/year)	SSIPE (lb/year)	SSIPE Public Notice Threshold (lb/year)	Public Notice Required?
NO <sub>x</sub>	9,512	9,512	0	20,000	No
SO <sub>x</sub>	1,718	1,718	0	20,000	No
PM <sub>10</sub>	74,217	74,217	0	20,000	No
CO	51,856	19,980	31,876	20,000	Yes
VOC	222,414	222,414	0	20,000	No

As demonstrated above, the SSIPE for CO was 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 SSIPE for CO emissions greater than 20,000 lb/year. Therefore, public notice documents will be submitted to the California Air Resources Board (CARB) and a public notice will be published in a local newspaper of general circulation prior to the issuance of the ATC for this equipment.

## **D. Daily Emission Limits (DELs)**

Daily Emissions Limitations (DELs) and other enforceable conditions are required by Section 3.15 to restrict a unit's maximum daily emissions, to a level at or below the emissions associated with the maximum design capacity. Per Sections 3.15.1 and 3.15.2, 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.

For the digester gas-fired IC engine, the DELs for NO<sub>x</sub>, PM<sub>10</sub>, CO, and VOC during normal operation are stated in the form of emission factors (g/hp-hr & ppmv), the maximum engine horsepower rating (1,215 bhp), and the maximum operational time of 24 hours per day.

- Emissions from this IC engine shall not exceed any of the following limits: 0.15 g-NO<sub>x</sub>/bhp-hr (equivalent to 12 ppmvd NO<sub>x</sub> @ 15% O<sub>2</sub>), NO<sub>x</sub> referenced as NO<sub>2</sub>; 0.081 g-PM<sub>10</sub>/bhp-hr; 2.0 g-CO/bhp-hr (equivalent to 223 ppmvd CO @ 15% O<sub>2</sub>); 0.10 g-VOC/bhp-hr (equivalent to 24 ppmvd VOC @ 15% O<sub>2</sub>), VOC referenced as methane. [District Rules 2201 and 4702]
- Operation of this engine shall not exceed 8,500 hours per year. [District Rule 2201]

## **E. Compliance Assurance**

### **1. Source Testing**

In accordance with District Policy APR 1705, source testing for NO<sub>x</sub>, CO and VOC emissions from digester gas fired IC engines served by catalyst control systems (including SCR and an oxidation catalyst) shall be conducted initially and at least once every 60 months thereafter. In addition, in order to assure compliance with the ammonia slip limit from the SCR system, source testing of the ammonia emissions will also be required initially and at least once every 60 months thereafter.

The engine is not served by any control devices for PM<sub>10</sub> emissions. Therefore, it is not expected that the PM<sub>10</sub> emissions will change much over time as long as the quality of the gas combusted in this unit remains fairly consistent. The facility will be required to monitor the sulfur content of the digester gas combusted in this unit at least once per quarter. The results of this quarterly monitoring should demonstrate that the quality of the gas combusted is consistent. Therefore, ongoing periodic source testing for PM<sub>10</sub> emissions will not be required.

An initial source test was conducted by the facility on August 2, 2017. District review of the test report showed the engine to be operating in full compliance with the permitted emission limits. The facility has requested an increase of the CO emission factor to allow for a margin of compliance while meeting the 12 ppm NO<sub>x</sub> limit and test data shows they will be in compliance with the new CO limit as well.

The following condition will be included on the ATC to ensure compliance:



- Source testing to measure NO<sub>x</sub>, CO, VOC, and ammonia (NH<sub>3</sub>) emissions from this unit shall be conducted at least once every 60 months. [District Rules 2201 and 4702]

## 2. Monitoring

As stated above the engine is subject to District Rule 4702. For engines used in agricultural operations, Section 5.8.9 of District Rule 4702 requires monitoring of NO<sub>x</sub> emissions at least once every calendar quarter for a non-agricultural spark-ignited IC engine. Therefore, quarterly monitoring of NO<sub>x</sub>, CO, and O<sub>2</sub> concentrations in accordance with pre-approved alternate monitoring plan "A" within District Policy SSP 1810 will be required. Since the engine will be equipped with SCR quarterly monitoring of ammonia slip will also be required.

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

- The permittee shall monitor and record the stack concentration of NO<sub>x</sub>, CO, and O<sub>2</sub> 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 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. 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 NH<sub>3</sub> at least once every calendar quarter in which a source test is not performed. NH<sub>3</sub> 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. [District Rules 2201 and 4102]
- If the NO<sub>x</sub>, CO, or NH<sub>3</sub> concentrations, as measured by the portable analyzer or the District approved ammonia monitoring equipment, exceed the allowable emission concentration, 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 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]

- 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]

### **3. Recordkeeping**

Recordkeeping is required to demonstrate compliance with the offset, public notification, and daily emission limit requirements of Rule 2201. The following conditions will appear on the ATC:

- 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 Rule 2201 and 4702]
- The permittee shall maintain records of: (1) the date and time of NO<sub>x</sub>, CO, O<sub>2</sub>, and NH<sub>3</sub> measurements, (2) the O<sub>2</sub> concentration in percent and the measured NO<sub>x</sub>, CO, and NH<sub>3</sub> concentrations corrected to 15% O<sub>2</sub>, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, (5) the method of determining the NH<sub>3</sub> 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 total hours of operation, the type and quantity of fuel used during commissioning period(s), 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]
- Records of any analyzer(s) installed or utilized to monitor methane, oxygen, and hydrogen sulfide shall be maintained and shall be made available for District inspection upon request. [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. All records may be maintained and submitted in an electronic format approved by the District. [District Rules 2201 and 4702]

### **4. Reporting**

No reporting is required for these units 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 C of this document for the AAQA summary sheet.

The proposed location is in an attainment area for NO<sub>x</sub>, CO, and SO<sub>x</sub>. As shown by the AAQA summary sheet the proposed equipment will not cause a violation of an air quality standard for NO<sub>x</sub>, CO, or SO<sub>x</sub>.

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

To ensure that human health risks will not exceed District allowable levels; the following shall be included as a requirement on the ATC:

- 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 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**

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.

The requirements of 40 CFR Part 60, Subpart JJJJ (*Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*) are applicable stationary engines at agricultural and non-agricultural facilities. The District has not been delegated the authority to implement this NSPS regulation for non-Major Sources. As this facility is not a major source for any pollutant, compliance with the provisions of Subpart JJJJ will not be demonstrated for the engine in this project.

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

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.

The requirements of 40 CFR Part 63, Subpart ZZZZ (*National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*) are

applicable stationary engines at agricultural and non-agricultural facilities. The District has not been delegated the authority to implement Area Source requirements from NESHAP regulations for non-Major Sources. As this facility is not a major source for any pollutant, compliance with the provisions of Subpart ZZZZ will not be demonstrated for the engine in this project.

#### **Rule 4101 Visible Emissions**

Rule 4101 states that 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.

Since this unit will combust digester gas fuel, compliance with the visible emission limits of this rule is expected. The following condition will be included on the ATC:

- 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**

Section 4.0 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.

The following nuisance prohibition condition will be included on the ATC:

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

#### **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.

An HRA was conducted for the engine in previous project S-1153321 on February 23, 2016. The analysis parameters included the amount of digester gas the engine would be fired on and the receptor distances. Since those parameters have not changed an HRA is not required for this project.

### Rule 4201 Particulate Matter Concentration

The purpose of this rule is to protect the ambient air quality by establishing a particulate matter emission standard. 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.

$$0.02 \frac{g}{hp \cdot hr} \times \frac{1hp \cdot hr}{2,545Btu} \times \frac{10^6 Btu}{9,100dscf} \times \frac{0.33Btu_{out}}{1Btu_{in}} \times \frac{15.43grain}{g} = 0.004 \frac{grain}{dscf}$$

Therefore, compliance with District Rule 4201 requirements is expected and the following condition will be included on the ATC:

- 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 (NOx), carbon monoxide (CO), and volatile organic compounds (VOC) from internal combustion engines. The requirements of this rule are applicable to any internal combustion engine, rated greater than 50 bhp that requires a Permit to Operate (PTO). The engine in this project is rated greater than 50 bhp and requires a PTO; therefore, the proposed IC engine is subject to the requirements of this rule.

However, Section 4.1 of the rule specifically exempts IC engines in agricultural operations used for the growing of crops or raising of fowl or animals. Since the engine in this project will primarily be used to generate electrical power for on-site use to run and operate the dairy, it will primarily be used for the raising of animals and is exempt from the requirements of this rule. Therefore, the following condition will be listed on the new ATC to ensure compliance.

- This IC engine shall primarily be used to generate electrical power that will offset electrical power usage for on-site stationary source operations, as allowed by the facility's Interconnection Agreement for Net Energy Metering with the main power utility. Excess electricity, beyond what is required to maintain the day to day operations of this stationary source, may be exported to the main power grid. [District Rules 2201, 4701, and 4702]

### Rule 4702 Internal Combustion Engines

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

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

The applicant operates a digester gas fired IC engine at an existing dairy facility. The engine is used to provide power for the entire dairy operation with any excess power generated being exported to the main grid. Therefore, the requirements of this rule are applicable to the engine.

## Section 5: Requirements

Sections 5.2.1 and 5.2.2 establish emission limits for non-agricultural spark ignited engines. This facility is considered an agricultural facility. Therefore, the requirements of these sections are not applicable to the engine.

Table 3 of Section 5.2.3 lists the following emission limits for lean-burn spark-ignited engines used exclusively in agricultural operations:

NO<sub>x</sub>: 150 ppmvd @ 15% O<sub>2</sub>  
CO: 2,000 ppmvd @ 15% O<sub>2</sub>  
VOC: 750 ppmvd @ 15% O<sub>2</sub>

The applicant has proposed to comply with the emissions limits of this rule for the proposed engine. The following conditions will be included on the ATC to ensure compliance with the requirements of this section:

- Emissions from this IC engine shall not exceed any of the following limits: 0.15 g-NO<sub>x</sub>/bhp-hr (equivalent to 12 ppmvd NO<sub>x</sub> @ 15% O<sub>2</sub>), NO<sub>x</sub> referenced as NO<sub>2</sub>; 0.081 g-PM<sub>10</sub>/bhp-hr; 2.0 g-CO/bhp-hr (equivalent to 223 ppmvd CO @ 15% O<sub>2</sub>); 0.10 g-VOC/bhp-hr (equivalent to 24 ppmvd VOC @ 15% O<sub>2</sub>), VOC referenced as methane. [District Rules 2201 and 4702]

Sections 5.2.4 and 5.2.5 establish emission requirements for compression-ignited engines. The proposed engine is not compression-ignited; therefore, the requirements of these sections are not applicable to the engine.

Section 5.3 requires that all continuous emission monitoring systems (CEMS) emissions measurements shall be averaged over a period of 15 consecutive minutes. Any 15-consecutive minute block average CEMS measurement exceeding the applicable emission limits of this rule shall constitute a violation of this rule. The IC engine does not have CEMS installed; therefore, this section of the rule is not applicable.

Section 5.4 specifies procedures to calculate percent emission reductions if percent emission reductions are used to comply with the NO<sub>x</sub> emission limits of Section 5.2. The use of percent emission reductions to comply with Section 5.2 is not being proposed for the IC engine under this project; therefore, this section of the rule is not applicable.

Section 5.5 requires the operator of an internal combustion engine that uses percent emission reduction to comply with the NO<sub>x</sub> emission limits of Section 5.2 shall provide an accessible inlet and outlet on the external control device or the engine as appropriate for taking emission samples and as approved by the APCO. The use of percent emission reductions to comply with Section 5.2 is not being proposed for the IC engine under this project; therefore, this section of the rule is not applicable.

Section 5.6 specifies procedures that operators of non-agricultural spark-ignited IC engines who elect to comply under Section 5.2.2.2 must use for calculation of the annual emissions fee. The applicant has proposed that the digester gas-fired engine complies with the applicable emission limits of Rule 4702; therefore, payment of annual emissions fees for the engine is not required and this section is not applicable.

Section 5.7 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 one of the following sulfur oxides (SO<sub>x</sub>) emission control requirements:

- 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<sub>2</sub> 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, which is approximately equal to 0.8 grains sulfur per 100 scf. The following condition will be listed on the ATC to ensure compliance:

- The sulfur content of the digester gas used as fuel in this engine shall not exceed 40 ppmv as H<sub>2</sub>S. The District may approve an averaging period of up to one calendar day in length for demonstration of compliance with the fuel sulfur content limit. [District Rules 2201, 4702, and 4801]

Section 5.8 specifies requirements for non-agricultural spark-ignited IC engines subject to the requirements of Section 5.2 or any engine subject to the requirements of Section 8.0. The engine is at an agricultural facility and is not subject to the requirements of Section 8.0 of this rule. Therefore, this section of the rule is not applicable.

Section 5.9 provides monitoring requirements for all other engines not subject to Section 5.8 above. Pursuant to section 5.9.1, the monitoring requirements of Sections 5.9.2 through 5.9.5 shall apply to the following engines.

- 5.9.1.1 An AO spark-ignited engine subject to the requirements of Section 5.2; or
- 5.9.1.2 A compression-ignited engine subject to the requirements of Section 5.2; or
- 5.9.1.3 An engine subject to Section 4.2;

The engine in this project is an AO spark-ignited engine subject to Section 5.2; therefore, the requirements in Sections 5.9.2 through 5.9.5 apply.

Section 5.9.2 requires the owner of an agricultural spark-ignited engine to operate and maintain the engine as recommended by the engine manufacturer or emission control system supplier. Therefore, following condition will be included on the ATC to ensure compliance:

- 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]

Section 5.9.3 requires the owner of an agricultural spark-ignited engine to monitor the engine's operating characteristics as recommended by the engine manufacturer or emission control system supplier. Therefore, following condition will be included on the ATC to ensure compliance:

- During periods of operation, the permittee shall monitor the operational characteristics of the engine as recommended by the manufacturer or emission control system supplier (for example: check engine fluid levels, battery, cables and connections; change engine oil and filters; replace engine coolant; and/or other operational characteristics as recommended by the manufacturer or supplier). [District Rule 4702]

Section 5.9.4 requires the owner of an agricultural spark-ignited engine to install and operate a non-resettable elapsed operating time meter. The following condition will be included on the ATC to ensure compliance:

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

Section 5.9.5 requires the owner of an agricultural spark-ignited engine that has been retro-fitted with a NO<sub>x</sub> exhaust control system that has not been certified in accordance with Section 9.0, to conduct periodic monitoring of the engine's NO<sub>x</sub> emissions using a District-approved portable emissions analyzer. The following condition will be included on the ATC to ensure compliance:

- The permittee shall monitor and record the stack concentration of NO<sub>x</sub>, CO, and O<sub>2</sub> 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 2 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 Rule 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 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]



Section 5.10 specifies SO<sub>x</sub> Emissions Monitoring Requirements. On and after the compliance schedule specified in Section 7.5, an operator of a non-agricultural IC engine shall comply with the following requirements:

- 5.10.1 An operator of an engine complying with Sections 5.7.2 or 5.7.5 shall perform an annual sulfur fuel 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,
- 5.10.2 An operator of an engine complying with Section 5.7.6 by installing and operating a control device with at least 95% by weight SO<sub>x</sub> reduction efficiency shall submit for approval by the APCO the proposed the key system operating parameters and frequency of the monitoring and recording not later than July 1, 2013, and
- 5.10.3 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.

The following condition will be listed on the engine's permit to ensure compliance:

- 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]

Section 5.11 requires engines used exclusively in agricultural operations to register such engines pursuant to District Rule 2250 (Permit Exempt Equipment Registration), except for engines required to have a Permit to Operate or engines that are not required to comply with Section 5.2 of this rule. The engines in this project are used exclusively in agricultural operations but are required to have a Permit to Operate and to comply with Section 5.2 of this rule. Therefore, the requirements of this section do not apply to the engine in this project.

## Section 6: Administrative Requirements

Section 6.1 specifies the requirements for owners of an engine subject to Section 5.2 to submit an Emission Control Plan. As discussed above, since the engine is in full compliance since the time of installation, the requirements to submit an Emission Control Plan are not applicable.

Section 6.2.1 requires that the operator of an engine subject to the requirements of Section 5.2 shall maintain an engine operating log to demonstrate compliance with Rule 4702. 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:

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

6.2.1.7 For an engine subject to Section 8.0, the quantity (cubic feet of gas or gallons of liquid) of fuel used on a daily basis.

The following condition will be placed on the ATC:

- 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 commissioning period(s), 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]

Section 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 listed on the ATC to ensure compliance:

- 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]

Section 6.2.3 requires that an operator claiming an exemption under Section 4.2 or Section 4.3 shall maintain annual operating records. The engine is not claiming an exemption under Sections 4.2 or 4.3. Therefore, the requirements of this section are not applicable.

Section 6.3 requires that the operator of an engine subject to the emission limits in Section 5.2 or the requirements of Section 8.2, shall comply with the compliance testing requirements of Section 6.3.1.

Section 6.3.1 specifies that the requirements of Section 6.3.2 through Section 6.3.4 shall apply to the following engines:

- 6.3.1.1 Engines that have been retrofitted with an exhaust control device, except those certified per Section 9.0;
- 6.3.1.2 Engines subject to Section 8.0;
- 6.3.1.3 An agricultural spark-ignited engine that is subject to the requirements of Section 8.0;
- 6.3.1.4 An agricultural spark-ignited engine that has been retrofitted with a catalytic emission control and is not subject to the requirements of Section 8.0

The engine has been retrofitted with an exhaust device for NO<sub>x</sub>, CO and VOC emissions. Therefore, sections 6.3.2 through 6.3.4 apply to the engine.

Section 6.3.2 requires demonstration of compliance with applicable limits, ppmv or percent reduction, in accordance with the test methods in Section 6.4, as specified below:

- 6.3.2.1 By the applicable date specified in Section 5.2, and at least once every 24 months thereafter, except for an engine subject to Section 6.3.2.2.
- 6.3.2.2 By the applicable date specified in Section 5.2 and at least once every 60 months thereafter, for an agricultural spark-ignited engine that has been retro-fitted with a catalytic emission control device.
- 6.3.2.3 A portable NO<sub>x</sub> analyzer may be used to show initial compliance with the applicable limits/standards in Section 5.2 for agricultural spark-ignited engines, provided the criteria specified in Sections 6.3.2.3.1 to 6.3.2.3.5 are met, and a source test is conducted in accordance with Section 6.3.2 within 12 months from the required compliance date.

The following condition will be included on the ATC to ensure compliance:

- Source testing to measure NO<sub>x</sub>, CO, VOC, and ammonia (NH<sub>3</sub>) emissions from this unit shall be conducted at least once every 60 months. [District Rules 2201 and 4702]

Section 6.3.3 requires the operator to conduct emissions source testing with the engine operating either at conditions representative of normal operations or conditions specified in the Permit-to-Operate or Permit-Exempt Equipment Registration. For emissions source testing performed pursuant to Section 6.3.2 for the purpose of determining compliance with an applicable standard or numerical limitation, the arithmetic average of three (3) 30-consecutive-minute test runs shall apply. If two (2) of three (3) runs are above an applicable limit, the test cannot be used to demonstrate compliance with an applicable limit. VOC shall be reported as methane. VOC, NO<sub>x</sub>, and CO concentrations shall be reported in ppmv, corrected to 15 percent oxygen. For engines that comply with a percent reduction limit, the percent reduction of NO<sub>x</sub> emissions shall also be reported.

The following conditions will be included on the ATC to assure continued compliance:

- 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. VOC, NO<sub>x</sub>, and CO concentrations shall be reported in ppmv, corrected to 15% oxygen. [District Rules 2201 and 4702]

Section 6.3.4 requires that in addition to other information, the source test protocol shall describe which critical parameters will be measured and how the appropriate range for these parameters shall be established. The range for these parameters shall be incorporated into the I&M plan.

Section 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 engine is fueled on digester gas; therefore the requirements of this section do not apply.

Section 6.3.6 specifies requirements for representative testing of identical spark-ignited engines located at the same stationary source. The digester fired IC spark-ignited IC engine is the only engine operated at this stationary source. Therefore, the facility cannot use the representative testing requirements specified in this section.

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

- 6.4.1 Oxides of nitrogen - EPA Method 7E, or ARB Method 100.
- 6.4.2 Carbon monoxide - EPA Method 10, or ARB Method 100.
- 6.4.3 Stack gas oxygen - EPA Method 3 or 3A, or ARB Method 100.
- 6.4.4 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.
- 6.4.5 Operating horsepower determination - any method approved by EPA and the APCO.
- 6.4.6 SO<sub>x</sub> Test Methods
  - 6.4.6.1 Oxides of sulfur – EPA Method 6C, EPA Method 8, or ARB Method 100.
  - 6.4.6.2 Determination of total sulfur as hydrogen sulfide (H<sub>2</sub>S) content – EPA Method 11 or EPA Method 15, as appropriate.
  - 6.4.6.3 Sulfur content of liquid fuel – American Society for Testing and Materials (ASTM) D 6920-03 or ASTM D 5453-99.
  - 6.4.6.4 The SO<sub>x</sub> emission control system efficiency shall be determined using the following:  
% Control Efficiency =  $[(C_{SO_2, \text{inlet}} - C_{SO_2, \text{outlet}}) / C_{SO_2, \text{inlet}}] \times 100$   
Where:  
 $C_{SO_2, \text{inlet}}$  = concentration of SO<sub>x</sub> (expressed as SO<sub>2</sub>) at the inlet side of the SO<sub>x</sub> emission control system, in lb/Dscf  
 $C_{SO_2, \text{outlet}}$  = concentration of SO<sub>x</sub> (expressed as SO<sub>2</sub>) at the outlet side of the SO<sub>x</sub> emission control system, in lb/Dscf
- 6.4.7 The Higher Heating Value (h<sub>h</sub>) of the fuel shall be determined by one of the following test methods:
  - 6.4.7.1 ASTM D 240-02 or ASTM D 3282-88 for liquid hydrocarbon fuels.
  - 6.4.7.2 ASTM D 1826-94 or ASTM 1945-96 in conjunction with ASTM D 3588-89 for gaseous fuel.

The following conditions will be listed on the ATC permit to ensure compliance:

- The following methods shall be used for emissions source testing: NO<sub>x</sub> (ppmv) - EPA Method 7E; CO (ppmv) - EPA Method 10; VOC (ppmv) - EPA Method 18, 25A or 25B; stack gas oxygen - EPA Method 3 or 3A; stack gas velocity - EPA Method 2 or EPA Method 19; stack gas moisture content - EPA Method 4; PM<sub>10</sub> (filterable and condensable) - EPA Method 201 and 202, EPA Method 201a and 202, ARB Method 5 (front half and back half), or ARB Method 5 (front half and back half) in combination with Method 501; NH<sub>3</sub> - BAAQMD ST-1B or SCAQMD Method 207-1. Alternative test methods, as approved by EPA and the District, may also be used to address the source testing requirements of this permit. [District Rules 1081 and 4702]

- 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]

Section 6.5 requires that the operator of an engine that is subject to the requirements of Section 5.2 or the requirements of Section 8.0 shall submit to the APCO for approval, an Inspection & Maintenance (I&M) plan that specifies all actions to be taken to satisfy the requirements of Sections 6.5.1 through Section 6.5.9 and the requirements of Section 5.8. The actions to be identified in the I&M plan shall include, but are not limited to, the information specified below. 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.

Section 6.5.1 specifies that the I&M plan requirements of Sections 6.5.2 through Section 6.5.9 shall apply to the following engines:

- 6.5.1.1 Engines that have been retrofitted with an exhaust control device, except those certified per Section 9.0;
- 6.5.1.2 Engines subject to Section 8.0;
- 6.5.1.3 An agricultural spark-ignited engine that is subject to the requirements of Section 8.0;
- 6.5.1.4 An agricultural spark-ignited engine that has been retrofitted with a catalytic emission control and is not subject to the requirements of Section 8.0.

The engine is equipped with an SCR system for NO<sub>x</sub> emission control and an oxidation catalyst for CO and VOC control. Therefore, the requirements of Sections 6.5.2 through 6.5.9 are applicable to the engine.

Section 6.5.2 requires 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 requires 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.

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 NO<sub>x</sub>, 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 NO<sub>x</sub>, CO, VOC, or oxygen concentrations.

Section 6.5.6 requires procedures for and corrective maintenance performed for the purpose of maintaining an engine in proper operating condition. The applicant has proposed that the engine is operated and maintained per the manufacturer's specifications. Therefore, the following condition will be listed on the ATC:

- {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]

Section 6.5.7 requires procedures and a schedule for using a portable NO<sub>x</sub> analyzer to take NO<sub>x</sub> emission readings pursuant to Section 5.8.9.

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.

NO<sub>x</sub> Emissions:

In order to satisfy the I&M requirements for NO<sub>x</sub> emissions, the applicant has proposed to perform the following:

1. The applicant will take periodic NO<sub>x</sub> emission concentration measurements with a portable analyzer at least once every calendar quarter.
2. To ensure that NO<sub>x</sub> emissions concentrations are not being exceeded between periodic NO<sub>x</sub> portable analyzer measurements, the applicant is proposing to determine a correlation between the SCR system's reagent injection rate and NO<sub>x</sub> emissions. The appropriate ranges for each operating load will be established during initial source testing and will be monitored at least once per month.

Ranges were established, as required by ATC S-6991-14-0, during initial testing and they will be incorporated into the permit. The following conditions will be listed on the permit as a mechanism to ensure compliance:

- The SCR system reagent injection rate shall not be less than 0.48 gallons per hour (gph) at an operating load less than 80%. The SCR system reagent injection rate shall not be less than 0.51 gph at an operating load greater than 80% and less than 90%. The SCR system reagent injection rate shall not be less than 0.54 gph at an operating load greater than 90% and less than 100%. [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 NO<sub>x</sub> 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 ranges established during the initial compliance test, 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 an 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 NO<sub>x</sub> and O<sub>2</sub> at least once every month. Monthly monitoring of the stack concentration of NO<sub>x</sub> and O<sub>2</sub> 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]
- 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]
- The permittee shall monitor and record the stack concentration of NO<sub>x</sub>, CO, and O<sub>2</sub> 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 2 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 NO<sub>x</sub>, CO, or NH<sub>3</sub> concentrations, as measured by the portable analyzer or the District approved ammonia monitoring equipment, exceed the allowable emission concentration, 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 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]

CO and VOC Emissions:

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

1. The applicant will take periodic CO emission concentration measurements with a portable analyzer at least once every calendar quarter. Per the catalyst manufacturer, if the oxidation catalyst is controlling CO emissions, it should also be achieving the desired removal efficiency for VOC emissions. Therefore, quarterly emission concentration measurements with a portable analyzer for VOC emissions will not be required.
2. To ensure that CO and VOC emissions concentrations are not being exceeded between periodic CO emission concentration measurements, the applicant is proposing to determine a correlation between the catalyst control system inlet exhaust temperature and back pressure. The appropriate ranges for each operating load will be established during initial source testing and will be monitored at least once per month.

Inlet temperature and SCR differential pressure were established, as required by ATC S-6991-14-0, during initial testing and they will be incorporated into the permit. The following conditions will be listed on the permit as a mechanism to ensure compliance:

- The SCR system inlet temperature shall not be greater than 875 °F at any operating load. [District Rule 4702]
- The SCR differential pressure shall not be greater than 8 inches water column at any operating load. [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]
- 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]



- 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 SCR system and/or the back pressure of the exhaust upstream of the catalyst control system is outside of the acceptable ranges established during the initial compliance test, the permittee shall return the inlet temperature to the SCR system and/or 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 SCR system and/or the back pressure of the exhaust upstream of the catalyst control system is not returned to within an 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 O<sub>2</sub> at least once every month. Monthly monitoring of the stack concentration of CO and O<sub>2</sub> shall continue until the operator can show that the inlet temperature to the SCR system and/or 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 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]
- The permittee shall monitor and record the stack concentration of NO<sub>x</sub>, CO, and O<sub>2</sub> 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 2 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 NO<sub>x</sub>, CO, or NH<sub>3</sub> concentrations, as measured by the portable analyzer or the District approved ammonia monitoring equipment, exceed the allowable emission concentration, 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 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]

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 or Permit-Exempt Equipment Registration. 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 listed on the proposed ATC permit to ensure compliance:

- 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 (AECPP) option of Section 8.0. The proposed IC engine was 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 specifies requirements for use of an Alternative Emission Control Plan (AECPP) to comply with the NO<sub>x</sub> emission requirements of Section 5.2 for a group of engines. Requirements for use of an AECPP include: only engines subject to Section 5.2 are eligible for inclusion in an AECPP; during any seven consecutive day period, the operator shall operate all engines in the AECPP to achieve an actual aggregate NO<sub>x</sub> emission level that is  $\leq 90\%$  of the NO<sub>x</sub> emissions that would be obtained by controlling the engines to comply individually with the NO<sub>x</sub> limits in Section 5.2; the operator shall establish a NO<sub>x</sub> emission factor limit for each engine; the operator must submit the AECPP at least 18 months before compliance with the emission limits in Section 5.2 is required and receive approval from the APCO; the operator must submit and updated or modified AECPP for approval by the APCO prior to any modifications; and the operator must

maintain records necessary to demonstrate compliance with AECF. The use of an Alternate Emission Control Plan to comply with Section 5.2 is not being proposed for the IC engine under this project; therefore this section of the rule is not applicable.

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 IC engine under this project is not currently being proposed and, in addition, certification under this section of the Rule would require that the engines or identical units with the same fuel supply and exhaust control systems were operating and could be source tested to demonstrate compliance with the applicable limits; therefore this section of the rule is not applicable at this time.

### Conclusion

As shown above, the non-agricultural, digester gas-fired, lean burn, IC engine will satisfy all the requirements of Rule 4702. Therefore, the engine will be in compliance as of the date of initial operation and no further discussion is required.

### **Rule 4801 Sulfur Compounds**

The purpose of this District Rule 4801 is to limit the emissions of sulfur compounds. The limit is that sulfur compound emissions (as SO<sub>2</sub>) shall not exceed 0.2% by volume. Using the ideal gas equation, the sulfur compound emissions are calculated as follows:

$$\text{Volume of SO}_x \text{ as (SO}_2\text{)} = (n \times R \times T) \div P$$

Where:

n = moles SO<sub>x</sub>

T (standard temperature) = 60 °F or 520 °R

R (universal gas constant) =  $\frac{10.73 \text{ psi} \cdot \text{ft}^3}{\text{lb} \cdot \text{mol} \cdot \text{°R}}$

To demonstrate compliance with the sulfur compound emission limit of Rule 4801, the maximum sulfur compound emissions from the engine will be calculated using the maximum sulfur content allowed for the digester gas, which is 40 ppmv, equivalent to 0.00965 lb-SO<sub>x</sub>/MMBtu.

$$0.00965 \frac{\text{lb}}{\text{MMBtu}} \times \frac{1 \text{ MMBtu}}{9,100 \text{ scf}_{\text{exhaust}}} \times \frac{1 \text{ lb} \cdot \text{mol}}{64 \text{ lb} \cdot \text{SO}_2} \times \frac{10.73 \text{ psi} \cdot \text{ft}^3}{\text{lb} \cdot \text{mol} \cdot \text{°R}} \times \frac{520 \text{ °R}}{14.7 \text{ psi}} \times 1,000,000 \text{ ppm} = 6.29 \text{ ppmv}$$

Since 6.29 ppmv is less than 2000 ppmv, the engine is expected to comply with Rule 4801. The following condition will be placed on the permit to ensure compliance:

- The sulfur content of the digester gas used as fuel in this engine shall not exceed 40 ppmv as H<sub>2</sub>S. The applicant may utilize an averaging period of up to 24 hours in length for demonstration of compliance with the fuel sulfur content limit. [District Rules 2201, 4102, 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**

The IC engine in this project is at a renewable energy plant at an existing dairy facility. The renewable energy plant combusts dairy digester gas in the IC engine to produce electricity. The plant diverts manure from existing open basin(s) and pond(s) at the dairy to an enclosed digester, which results in the capture of much of the methane that is currently released into the atmosphere from the open basins and pond at the dairy. Combustion of the dairy digester gas at the renewable energy plant oxidizes the methane in the gas to carbon dioxide and water vapor. Because methane has a global warming potential more than 21 times that of carbon dioxide, combustion of the methane from the dairy digesters will result in a large net decrease in the global warming potential emitted from the dairy when compared to current levels. Therefore, the project will not result in an increase in project specific greenhouse gas emissions. The District therefore concludes that the project would have a less than cumulatively significant impact on global climate change.

### District CEQA Findings

The District is the Lead Agency for this project because there is no other agency with broader statutory authority over this project. The District performed an Engineering Evaluation (this document) for the proposed project and determined that the activity will occur at an existing facility and the project involves negligible expansion of the existing use. Furthermore, the District determined that the activity will not have a significant effect on the environment. Therefore, the District finds that the activity is categorically exempt from the provisions of CEQA pursuant to CEQA Guideline § 15301 (Existing Facilities), and finds that the project is exempt per the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment (CEQA Guidelines §15061(b)(3)).

### 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 ATC S-6991-14-1 subject to the permit conditions on the attached draft ATC in Appendix F.

### X. Billing Information

Annual Permit Fees			
Permit Number	Fee Schedule	Fee Description	Annual Fee
S-6991-14-1	3020-10-F	1,215 bhp IC Engine	\$900

### Appendices

- A: Current Permit to Operate S-6991-14-0
- B: Quarterly Net Emission Change (QNEC) Calculations
- C: Ambient Air Quality Analysis (AAQA)
- D: SSPE Calculations
- E: Draft ATC S-6991-14-1

## APPENDIX A

Current Permit to Operate S-6991-14-0

# San Joaquin Valley Air Pollution Control District

PERMIT UNIT: S-6991-14-0

EXPIRATION DATE: 12/31/2020

## EQUIPMENT DESCRIPTION:

1,215 BHP GUASCOR, MODEL SFGLD, DIGESTER GAS-FIRED LEAN-BURN IC ENGINE WITH A HUG ENGINEERING, MODEL COMBIKAT, CATALYST SYSTEM (SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM WITH OXIDATION CATALYST) 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. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]
4. 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]
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 operated and maintained in proper operating condition as recommended by the engine manufacturer or emissions control system supplier. [District Rule 4702]
7. 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]
8. This engine shall be fired on digester gas fuel only. [District Rule 2201]
9. The sulfur content of the digester gas used as fuel in this engine shall not exceed 40 ppmv as H<sub>2</sub>S. The applicant may utilize an averaging period of up to 24 hours in length for demonstration of compliance with the fuel sulfur content limit. [District Rules 2201, 4102, 4702, and 4801]
10. This engine shall be equipped with an operational non-resettable elapsed time meter or other APCO approved alternative. [District Rules 2201 and 4702]
11. This engine shall not operate more than 8,500 hours per calendar year. [District Rule 2201]
12. Emissions from this IC engine shall not exceed any of the following limits: 0.15 g-NO<sub>x</sub>/bhp-hr (equivalent to 12 ppmvd NO<sub>x</sub> @ 15% O<sub>2</sub>), NO<sub>x</sub> referenced as NO<sub>2</sub>; 0.081 g-PM<sub>10</sub>/bhp-hr; 0.60 g-CO/bhp-hr (equivalent to 82 ppmvd CO @ 15% O<sub>2</sub>); 0.10 g-VOC/bhp-hr (equivalent to 24 ppmvd VOC @ 15% O<sub>2</sub>), VOC referenced as CH<sub>4</sub>. [District Rules 2201 and 4702]
13. 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]
14. 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]
15. Ammonia (NH<sub>3</sub>) emissions from this engine shall not exceed 10 ppmvd @ 15% O<sub>2</sub>. [District Rules 2201 and 4102]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

These terms and conditions are part of the Facility-wide Permit to Operate.

16. Source testing to measure NO<sub>x</sub>, CO, VOC, and ammonia (NH<sub>3</sub>) emissions from this unit shall be conducted at least once every 24 months. [District Rules 1081, 2201, and 4702]
17. 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 content analysis shall be maintained and provided to the District upon request. [District Rules 2201 and 4702]
18. 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]
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. NO<sub>x</sub>, CO, VOC, and NH<sub>3</sub> 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: NO<sub>x</sub> (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; PM<sub>10</sub> (filterable and condensable) - EPA Method 201 and 202, EPA Method 201a and 202, or ARB Method 5 in combination with Method 501; NH<sub>3</sub> - 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. 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]
23. The results of each source test shall be submitted to the District within 60 days after completion of the source test. [District Rule 1081]
24. The sulfur content of the digester gas used to fuel the engine shall be monitored and recorded at least once every calendar quarter in which a fuel sulfur analysis is not performed. 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 Rules 2201 and 4702]
25. Monitoring of the digester gas sulfur content shall be performed using gas detection tubes calibrated for H<sub>2</sub>S; a digital analyzer approved for gaseous fuel analysis; a continuous fuel gas monitor that meets the requirements specified in SCAQMD Rule 431.1, Attachment A; District-approved source test methods, including EPA Method 15, ASTM Method D1072, D4084, and D5504; District-approved in-line H<sub>2</sub>S monitors; or an alternative method approved by the District. Prior to utilization of in-line monitors to demonstrate compliance with the digester gas sulfur content limit of this permit, the permittee shall submit details of the proposed monitoring system, including the make, model, and detection limits, to the District and obtain District approval for the proposed monitor(s). [District Rules 2201 and 4702]
26. 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 NO<sub>x</sub>, CO, and O<sub>2</sub> 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]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

These terms and conditions are part of the Facility-wide Permit to Operate.



27. The permittee shall monitor and record the stack concentration of NO<sub>x</sub>, CO, and O<sub>2</sub> 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]
28. The permittee shall monitor and record the stack concentration of NH<sub>3</sub> at least once every calendar quarter in which a source test is not performed. NH<sub>3</sub> 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. Records must be maintained of the dates of non-operation to validate extended monitoring frequencies. [District Rules 2201 and 4102]
29. If the NO<sub>x</sub>, CO, or NH<sub>3</sub> concentrations corrected to 15% O<sub>2</sub>, 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]
30. 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]
31. The permittee shall maintain records of: (1) the date and time of NO<sub>x</sub>, CO, O<sub>2</sub>, and NH<sub>3</sub> measurements, (2) the O<sub>2</sub> concentration in percent and the measured NO<sub>x</sub>, CO, and NH<sub>3</sub> concentrations corrected to 15% O<sub>2</sub>, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, (5) the method of determining the NH<sub>3</sub> emission concentration, and (6) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 2201 and 4702]
32. 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]
33. 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 NO<sub>x</sub> emission limits shall be imposed as a condition in the Permit to Operate. [District Rule 4702]

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

These terms and conditions are part of the Facility-wide Permit to Operate.

34. 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 NO<sub>x</sub> and O<sub>2</sub> at least once every month. Monthly monitoring of the stack concentration of NO<sub>x</sub> and O<sub>2</sub> 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]
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 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 O<sub>2</sub> at least once every month. Monthly monitoring of the stack concentration of CO and O<sub>2</sub> 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 commissioning period(s), 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. 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]
41. The permittee shall record the total time the engine operates, in hours per calendar year. [District Rule 2201]
42. 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]

These terms and conditions are part of the Facility-wide Permit to Operate.

## APPENDIX B

### Quarterly Net Emission Change (QNEC) Calculations

## QNEC Calculations

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

$QNEC = PE2_{quarterly} - PE1_{quarterly}$ , where:

- QNEC = Quarterly Net Emissions Change for each emissions unit, lb/qtr.
- $PE2_{quarterly}$  = Post-Project Potential to Emit for each emissions unit, lb/qtr.
- $PE1_{quarterly}$  = 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:

$$\begin{aligned}
 PE2_{quarterly} &= PE2_{annual} \div 4 \text{ quarters/year} \\
 &= 3,415 \text{ lb/year} \div 4 \text{ qtr/year} \\
 &= 853.75 \text{ lb PM}_{10}/\text{qtr}
 \end{aligned}$$

$$\begin{aligned}
 PE1_{quarterly} &= PE1_{annual} \div 4 \text{ quarters/year} \\
 &= 3,415 \text{ lb/year} \div 4 \text{ qtr/year} \\
 &= 853.75 \text{ lb PM}_{10}/\text{qtr}
 \end{aligned}$$

<b>QNEC</b>			
<b>Pollutant</b>	<b>PE2<sub>quarterly</sub> (lb/qtr)</b>	<b>PE1<sub>quarterly</sub> (lb/qtr)</b>	<b>QNEC (lb/qtr)</b>
NO <sub>x</sub>	853.75	853.75	0
SO <sub>x</sub>	210.5	210.5	0
PM <sub>10</sub>	461	461	0
CO	11,384.25	3,415.25	7,969
VOC	569.25	569.25	0

## APPENDIX C

### Ambient Air Quality Analysis (AAQA)

# San Joaquin Valley Air Pollution Control District Ambient Air Quality Analysis

To: Manuel Salinas – Permit Services  
From: Adrian Ortiz – Technical Services  
Date: April 09, 2019  
Facility Name: Randy Sugarman, Trustee For Greg Tevelde  
Location: 5850 AVENUE 160, TIPTON  
Application #(s): S-6991-14-1  
Project #: S-1183921

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## 1. Summary

### 1.1 AAQA

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

Notes:

1. Results were taken from the attached AAQA Report.

### 1.2 Proposed Permit Requirements

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

#### Unit # 14-1

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 request on April 03, 2019 to perform an Ambient Air Quality Analysis (AAQA) for the following:

- Unit -14-1: MODIFICATION OF 1,215 BHP GUASCOR, MODEL SFGLD, DIGESTER GAS-FIRED LEAN-BURN IC ENGINE WITH A HUG ENGINEERING, MODEL COMBIKAT, CATALYST SYSTEM (SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM WITH OXIDATION CATALYST) POWERING AN ELECTRICAL GENERATOR: INCREASE CO EMISSION FACTOR FROM 0.60 G-CO/BHP-HR (EQUIVALENT TO 8 PPMVD CO @ 15% O<sub>2</sub>) TO 2.0 G-CO/BHP-HR (EQUIVALENT TO 236 PPMVD CO @ 15% O<sub>2</sub>)

## 3. 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<sub>2</sub> 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	Fresno-Garland	Fresno	Fresno	2016

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

Emission Rates (lbs/hour)						
Unit ID	Process	NOx	SOx	CO	PM10	PM2.5
14-1	1	N/A <sup>1</sup>	N/A <sup>1</sup>	5.4	N/A <sup>1</sup>	N/A <sup>1</sup>

<sup>1</sup>The unit required an AAQA for the 14-0 project; however, the CO emissions factor change. This analysis only requires the update to CO emissions only.

Emission Rates (lbs/year)						
Unit ID	Process	NOx	SOx	CO	PM10	PM2.5
14-1	1	N/A <sup>1</sup>	N/A <sup>1</sup>	45,537	N/A <sup>1</sup>	N/A <sup>1</sup>

<sup>1</sup>The unit required an AAQA for the 14-0 project; however, the CO emissions factor change. This analysis only requires the update to CO emissions only.

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 2007-2011 from Tipton (rural dispersion coefficient selected) were used for the analysis:

The following parameters were used for the review:

<b>Point Source Parameters</b>						
<b>Unit ID</b>	<b>Unit Description</b>	<b>Release Height (m)</b>	<b>Temp. (°K)</b>	<b>Exit Velocity (m/sec)</b>	<b>Stack Diameter (m)</b>	<b>Vertical/ Horizontal/ Capped</b>
14-1	Digester Gas Engine	6.09	709.11	53.57	0.25	Vertical

#### **4. Conclusion**

##### **AAQA**

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

#### **5. Attachments**

- A. Modeling request from the project engineer
- B. Additional information from the applicant/project engineer
- C. AAQA results



APPENDIX D  
SSPE Calculations

### Pre-Project Facility Information

- Does this facility house Holstein or Jersey cows?   
Most facilities house Holstein cows unless explicitly stated on the PTO or application.
- Does the facility have an anaerobic treatment lagoon?
- Does the facility land apply liquid manure?   
Answering "yes" assumes worst case.
- Does the facility land apply solid manure?   
Answering "yes" assumes worst case.
- Is any scraped manure sent to a lagoon/storage pond?   
Answering "yes" assumes worst case.

Pre-Project Herd Size							
Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals		
Milk Cows		5,000			5,000		
Dry Cows				1,000	1,000		
Support Stock (Heifers, Calves, and Bulls)				6,100	6,100		
Large Heifers					0		
Medium Heifers					0		
Small Heifers					0		
Bulls					0		
	Calf Hutches				Calf Corrals		Total # of Calves
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed	Scraped	
Calves							0

Total Herd Summary	
Total Milk Cows	5,000
Total Mature Cows	6,000
Support Stock (Heifers, Calves, and Bulls)	6,100
Total Calves	0
Total Dairy Head	12,100

Pre-Project Silage Information			
Feed Type	Max # Open Piles	Max Height (ft)	Max Width (ft)
Corn	1	19	136
Alfalfa			
Wheat	1	22	126

### Post-Project Facility Information

- Does this facility house Holstein or Jersey cows?   
Most facilities house Holstein cows unless explicitly stated on the PTO or application.
- Does the facility have an anaerobic treatment lagoon?
- Does the facility land apply liquid manure?   
Answering "yes" assumes worst case.
- Does the facility land apply solid manure?   
Answering "yes" assumes worst case.
- Is any scraped manure sent to a lagoon/storage pond?   
Answering "yes" assumes worst case.
- Does this project result in any new lagoon/storage pond(s) or an increase in surface area for any existing lagoon/storage pond(s)?

Post-Project Herd Size							
Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals		
Milk Cows		5,000			5,000		
Dry Cows				1,000	1,000		
Support Stock (Heifers, Calves, and Bulls)				6,100	6,100		
Large Heifers					0		
Medium Heifers					0		
Small Heifers					0		
Bulls					0		
	Calf Hutches				Calf Corrals		Total # of Calves
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed	Scraped	
Calves							0

Total Herd Summary	
Total Milk Cows	5,000
Total Mature Cows	6,000
Support Stock (Heifers, Calves, and Bulls)	6,100
Total Calves	0
Total Dairy Head	12,100

Post-Project Silage Information			
Feed Type	Max # Open Piles	Max Height (ft)	Max Width (ft)
Corn	1	19	136
Alfalfa			
Wheat	1	22	126

This spreadsheet serves only as a resource to calculate potential emissions from dairies, and may not reflect the final emissions used by the District due to parameters not addressed in this spreadsheet and/or omissions from the spreadsheet. Any other permittable equipment (e.g. IC engines, gasoline tanks, etc.) at a facility will need to be calculated separately. All final calculations used in permitting projects will be conducted by District staff.

## VOC Mitigation Measures and Control Efficiencies

Milking Parlor				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
<b>Enteric Emissions Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(D) Feed according to NRC guidelines	10%	10%
<b>Total Control Efficiency</b>			10%	10%
<b>Milking Parlor Floor Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(D) Feed according to NRC guidelines	10%	10%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(D) Flush or hose milk parlor immediately prior to, immediately after, or during each milking. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.	0%	0%
<b>Total Control Efficiency</b>			10%	10%

Cow Housing				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
<b>Enteric Emissions Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	10%	10%
<b>Total Control Efficiency</b>			10%	10%
<b>Corrals/Pens Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	10%	10%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Inspect water pipes and troughs and repair leaks at least once every seven days. Note: If selected for dairies > 999 milk cows, CE is already included in EF.	0%	0%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<b>Dairies:</b> Clean manure from corrals at least four times per year with at least 60 days between cleaning, or clean corrals at least once between April and July and at least once between September and December. Note: If selected for dairies > 999 milk cows, CE is already included in EF. Note: No additional control given for increased cleaning frequency (e.g. BACT requirement). <b>Heifer/Calf Ranches:</b> Scrape corrals twice a year with at least 90 days between cleanings, excluding in-corral mounds. Note: No additional control given for increased cleaning frequency (e.g. BACT requirement).	0%	0%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Scrape, vacuum, or flush concrete lanes in corrals at least once every day for mature cows and every seven days for support stock, or clean concrete lanes such that the depth of manure does not exceed 12 inches at any point or time. Note: No additional control given for increased cleaning frequency (e.g. BACT requirement).	10%	10%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Implement one of the following: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 sq ft or less and slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 sq ft; 2) maintain corrals to ensure proper drainage preventing water from standing more than 48 hrs; 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface. Note: If selected for dairies > 999 milk cows, CE already included in EF.	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Install shade structures such that they are constructed with a light permeable roofing material. Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.	5%	5%
<input type="checkbox"/>	<input type="checkbox"/>	Install all shade structures uphill of any slope in the corral. Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.		
<input type="checkbox"/>	<input type="checkbox"/>	Clean manure from under corral shades at least once every 14 days, when weather permits access into corral. Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Install shade structure so that the structure has a North/South orientation. Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.	0%	0%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Manage corrals such that the manure depth in the corral does not exceed 12 inches at any time or point, except for in-corral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. The manure facility must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Knockdown fence line manure build-up prior to it exceeding a height of 12 inches at any time or point. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. The facility must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible.	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Use lime or a similar absorbent material in the corral according to the manufacturer's recommendation to minimize moisture in the corrals.	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Apply thymol to the corral soil in accordance with the manufacturer's recommendation.	0%	0%
<b>Total Control Efficiency</b>			23.05%	23.05%
<b>Bedding Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	10%	10%
<input type="checkbox"/>	<input type="checkbox"/>	Use non-manure-based bedding and non-separated solids based bedding for at least 90% of the bedding material, by weight, for freestalls (e.g. rubber mats, almond shells, sand, or waterbeds).	0%	0%

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	For a large dairy (1,000 milk cows or larger) or a heifer/calf ranch - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every 7 days.	10%	10%
<input type="checkbox"/>	<input type="checkbox"/>	(D) For a medium dairy only (500 to 999 milk cows) - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every 14 days.	0%	0%
<b>Total Control Efficiency</b>			<b>19.00%</b>	<b>19.00%</b>
<b>Lanes Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	10%	10%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Pave feedlanes, where present, for a width of at least 8 feet along the corral side of the feedlane fence for milk and dry cows and at least 6 feet along the corral side of the feedlane for heifers. Note: No control efficiency at this time.	0%	0%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<b>Dairies:</b> Flush, scrape, or vacuum freestall flush lanes immediately prior to or after, or during each milking; or flush or scrape freestall flush lanes at least 3 times per day. <b>Heifer/Calf Ranches:</b> Vacuum, scrape, or flush freestalls at least once every seven days.	10%	10%
<input type="checkbox"/>	<input type="checkbox"/>	(D) Have no animals in exercise pens or corrals at any time.	0%	0%
<b>Total Control Efficiency</b>			<b>19.00%</b>	<b>19.00%</b>

Liquid Manure Handling				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
<b>Lagoons/Storage Ponds Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	10%	10%
<input type="checkbox"/>	<input type="checkbox"/>	Use phototropic lagoon	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Use an anaerobic treatment lagoon designed according to NRCS Guideline No. 359, or aerobic treatment lagoon, or mechanically aerated lagoon, or covered lagoon digester vented to a control device with minimum 95% control	0%	0%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Maintain lagoon pH between 6.5 and 7.5	0%	0%
<b>Total Control Efficiency</b>			<b>10.00%</b>	<b>10.00%</b>
<b>Liquid Manure Land Application Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	10%	10%
<input type="checkbox"/>	<input type="checkbox"/>	Only apply liquid manure that has been treated with an anaerobic or aerobic treatment lagoon, aerobic lagoon, or digester system	0%	0%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Allow liquid manure to stand in the fields for no more than 24 hours after irrigation. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Apply liquid/slurry manure via injection with drag hose or similar apparatus	0%	0%
<b>Total Control Efficiency</b>			<b>10.00%</b>	<b>10.00%</b>

Solid Manure Handling				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
<b>Solid Manure Storage Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	10%	10%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<b>LARGE CAFO ONLY:</b> Within 72 hours of removal from housing, either a) remove dry manure from the facility, or b) cover dry manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed 24 hours per event.	10%	10%
<b>Total Control Efficiency</b>			<b>19.00%</b>	<b>19.00%</b>
<b>Separated Solids Piles Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	10%	10%
<input type="checkbox"/>	<input type="checkbox"/>	<b>LARGE CAFO ONLY:</b> Within 72 hours of removal from the drying process, either a) remove separated solids from the facility, or b) cover separated solids outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed 24 hours per event.	0%	0%
<b>Total Control Efficiency</b>			<b>10.00%</b>	<b>10.00%</b>
<b>Solid Manure Land Application Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	10%	10%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Incorporate all solid manure within 72 hours of land application. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF. Note: No additional control given for rapid manure incorporation (e.g. BACT requirement).	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Only apply solid manure that has been treated with an anaerobic treatment lagoon, aerobic lagoon or digester system.	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Apply no solid manure with a moisture content of more than 50%	0%	0%
<b>Total Control Efficiency</b>			<b>10.00%</b>	<b>10.00%</b>

Silage and TMR				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
<b>Corn/Alfalfa/Wheat Silage Mitigations</b>				
		1. Utilize a sealed feed storage system (e.g. Ag-Bag) for bagged silage, or		

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<p>2. Cover the surface of silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least 5 mils thick (0.005 inches), multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material within 72 hours of last delivery of material to the pile, and implement one of the following:</p> <p>a) build silage piles such that the average bulk density is at least 44 lb/cu-ft for corn silage and 40 lb/cu-ft for other silage types, as measured in accordance with Section 7.10 of Rule 4570,</p> <p>b) when creating a silage pile, adjust filling parameters to assure a calculated average bulk density of at least 44 lb/cu-ft for corn silage and at least 40 lb/cu-ft for other silage types, using a spreadsheet approved by the District,</p> <p>c) harvest silage crop at &gt; or = 65% moisture for corn; and &gt;= 60% moisture for alfalfa/grass and other silage crops; manage silage material delivery such that no more than 6 inches of materials are uncompacted on top of the pile; and incorporate the applicable Theoretical Length of Chop (TLC) and roller opening for the crop being harvested.</p> <p>For dairies - implement <u>two</u> of the following:  For heifer/calf ranches - implement <u>one</u> of the following:</p> <p><b>Manage Exposed Silage:</b> a) manage silage piles such that only one silage pile has an uncovered face and the uncovered face has a total exposed surface area of less than 2,150 sq. ft., or b) manage multiple uncovered silage piles such that the total exposed surface area of all silage piles is less than 4,300 sq ft.</p> <p><b>Maintain Silage Working Face:</b> a) use a shaver/facer to remove silage from the silage pile, or b) maintain a smooth vertical surface on the working face of the silage pile</p> <p><b>Silage Additive:</b> a) inoculate silage with homolactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage or apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at a rate specified by the manufacturer to reduce yeast counts when forming silage pile; or b) apply other additives at specified rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA.</p>	39.0%	39.0%
		<b>Total Control Efficiency*</b>	39.00%	39.00%

\*Assumes 25% control for density mitigation measures and 10% each for the two optional measures, resulting in an overall control of 39%. The same conservative control efficiency will be applied to the sealed feed storage system (Ag-Bag).

		TMR Mitigations		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(D) Push feed so that it is within 3 feet of feedlane fence within 2 hrs of putting out the feed or use a feed trough or other feeding structure designed to maintain feed within reach of the cows.	10%	10%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(D) Begin feeding total mixed rations within 2 hrs of grinding and mixing rations. Note: If selected for dairies > 999 milk cows, control efficiency already included in EF.	0%	0%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed steam-flaked, dry rolled, cracked or ground corn or other ground cereal grains.	10%	10%
<input type="checkbox"/>	<input type="checkbox"/>	Remove uneaten wet feed from feed bunks within 24 hrs after then end of a rain event.	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	(D) For total mixed rations that contain at least 30% by weight of silage, feed animals total mixed rations that contain at least 45% moisture.	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Feed according to NRC guidelines. Note: If selected for dairies, control efficiency already included in EF.	0%	0%
		<b>Total Control Efficiency</b>	19.00%	19.00%

## VOC Mitigation Measures and Control Efficiencies

Milking Parlor				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
<b>Enteric Emissions Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(D) Feed according to NRC guidelines	10%	10%
<b>Total Control Efficiency</b>			10%	10%
<b>Milking Parlor Floor Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(D) Feed according to NRC guidelines	10%	10%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(D) Flush or hose milk parlor immediately prior to, immediately after, or during each milking. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.	0%	0%
<b>Total Control Efficiency</b>			10%	10%

Cow Housing				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
<b>Enteric Emissions Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	10%	10%
<b>Total Control Efficiency</b>			10%	10%
<b>Corrals/Pens Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	10%	10%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Inspect water pipes and troughs and repair leaks at least once every seven days. Note: If selected for dairies > 999 milk cows, CE is already included in EF.	0%	0%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<b>Dairies:</b> Clean manure from corrals at least four times per year with at least 60 days between cleaning, or clean corrals at least once between April and July and at least once between September and December. Note: If selected for dairies > 999 milk cows, CE is already included in EF. Note: No additional control given for increased cleaning frequency (e.g. BACT requirement). <b>Heifer/Calf Ranches:</b> Scrape corrals twice a year with at least 90 days between cleanings, excluding in-coral mounds. Note: No additional control given for increased cleaning frequency (e.g. BACT requirement).	0%	0%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Scrape, vacuum, or flush concrete lanes in corrals at least once every day for mature cows and every seven days for support stock, or clean concrete lanes such that the depth of manure does not exceed 12 inches at any point or time. Note: No additional control given for increased cleaning frequency (e.g. BACT requirement).	10%	10%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Implement one of the following: 1) slope the surface of the corrals at least 3% where the available space for each animal is 400 sq ft or less and slope the surface of the corrals at least 1.5% where the available space for each animal is more than 400 sq ft; 2) maintain corrals to ensure proper drainage preventing water from standing more than 48 hrs; 3) harrow, rake, or scrape pens sufficiently to maintain a dry surface. Note: If selected for dairies > 999 milk cows, CE already included in EF.	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Install shade structures such that they are constructed with a light permeable roofing material. Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.	5%	5%
<input type="checkbox"/>	<input type="checkbox"/>	Install all shade structures uphill of any slope in the corral. Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.		
<input type="checkbox"/>	<input type="checkbox"/>	Clean manure from under corral shades at least once every 14 days, when weather permits access into corral. Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Install shade structure so that the structure has a North/South orientation. Note: If selected for dairies > 999 milk cows, the control efficiency will be 5% since the EF used includes a partial control for this measure.		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Manage corrals such that the manure depth in the corral does not exceed 12 inches at any time or point, except for in-coral mounding. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. The manure facility must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Knockdown fence line manure build-up prior to it exceeding a height of 12 inches at any time or point. Manure depth may exceed 12 inches when corrals become inaccessible due to rain events. The facility must resume management of the manure depth of 12 inches or lower immediately upon the corral becoming accessible.	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Use lime or a similar absorbent material in the corral according to the manufacturer's recommendation to minimize moisture in the corrals.	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Apply thymol to the corral soil in accordance with the manufacturer's recommendation.	0%	0%
<b>Total Control Efficiency</b>			23.05%	23.05%
<b>Bedding Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	10%	10%
<input type="checkbox"/>	<input type="checkbox"/>	Use non-manure-based bedding and non-separated solids based bedding for at least 90% of the bedding material, by weight, for freestalls (e.g. rubber mats, almond shells, sand, or waterbeds).	0%	0%

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	For a large dairy (1,000 milk cows or larger) or a heifer/calf ranch - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every 7 days.	10%	10%
<input type="checkbox"/>	<input type="checkbox"/>	(D) For a medium dairy only (500 to 999 milk cows) - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every 14 days.	0%	0%
<b>Total Control Efficiency</b>			<b>19.00%</b>	<b>19.00%</b>
<b>Lanes Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	10%	10%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Pave feedlanes, where present, for a width of at least 8 feet along the corral side of the feedlane fence for milk and dry cows and at least 6 feet along the corral side of the feedlane for heifers. Note: No control efficiency at this time.	0%	0%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<b>Dairies:</b> Flush, scrape, or vacuum freestall flush lanes immediately prior to or after, or during each milking; or flush or scrape freestall flush lanes at least 3 times per day. <b>Heifer/Calf Ranches:</b> Vacuum, scrape, or flush freestalls at least once every seven days.	10%	10%
<input type="checkbox"/>	<input type="checkbox"/>	(D) Have no animals in exercise pens or corrals at any time.	0%	0%
<b>Total Control Efficiency</b>			<b>19.00%</b>	<b>19.00%</b>

Liquid Manure Handling				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
<b>Lagoons/Storage Ponds Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	10%	10%
<input type="checkbox"/>	<input type="checkbox"/>	Use phototropic lagoon	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Use an anaerobic treatment lagoon designed according to NRCS Guideline No. 359, or aerobic treatment lagoon, or mechanically aerated lagoon, or covered lagoon digester vented to a control device with minimum 95% control	0%	0%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Maintain lagoon pH between 6.5 and 7.5	0%	0%
<b>Total Control Efficiency</b>			<b>10.00%</b>	<b>10.00%</b>
<b>Liquid Manure Land Application Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	10%	10%
<input type="checkbox"/>	<input type="checkbox"/>	Only apply liquid manure that has been treated with an anaerobic or aerobic treatment lagoon, aerobic lagoon, or digester system	0%	0%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Allow liquid manure to stand in the fields for no more than 24 hours after irrigation. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF.	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Apply liquid/slurry manure via injection with drag hose or similar apparatus	0%	0%
<b>Total Control Efficiency</b>			<b>10.00%</b>	<b>10.00%</b>

Solid Manure Handling				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
<b>Solid Manure Storage Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	10%	10%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<b>LARGE CAFO ONLY:</b> Within 72 hours of removal from housing, either a) remove dry manure from the facility, or b) cover dry manure outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed 24 hours per event.	10%	10%
<b>Total Control Efficiency</b>			<b>19.00%</b>	<b>19.00%</b>
<b>Separated Solids Piles Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	10%	10%
<input type="checkbox"/>	<input type="checkbox"/>	<b>LARGE CAFO ONLY:</b> Within 72 hours of removal from the drying process, either a) remove separated solids from the facility, or b) cover separated solids outside the housing with a weatherproof covering from October through May, except for times when wind events remove the covering, not to exceed 24 hours per event.	0%	0%
<b>Total Control Efficiency</b>			<b>10.00%</b>	<b>10.00%</b>
<b>Solid Manure Land Application Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	10%	10%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Incorporate all solid manure within 72 hours of land application. Note: If selected for dairies > 999 milk cows, control efficiency is already included in EF. Note: No additional control given for rapid manure incorporation (e.g. BACT requirement).	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Only apply solid manure that has been treated with an anaerobic treatment lagoon, aerobic lagoon or digester system.	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Apply no solid manure with a moisture content of more than 50%	0%	0%
<b>Total Control Efficiency</b>			<b>10.00%</b>	<b>10.00%</b>

Silage and TMR				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	VOC Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
<b>Corn/Alfalfa/Wheat Silage Mitigations</b>				
		1. Utilize a sealed feed storage system (e.g. Ag-Bag) for bagged silage, or		

<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<p>2. Cover the surface of silage piles, except for the area where feed is being removed from the pile, with a plastic tarp that is at least 5 mils thick (0.005 inches), multiple plastic tarps with a cumulative thickness of at least 5 mils (0.005 inches), or an oxygen barrier film covered with a UV resistant material within 72 hours of last delivery of material to the pile, and implement one of the following:</p> <p>a) build silage piles such that the average bulk density is at least 44 lb/cu-ft for corn silage and 40 lb/cu-ft for other silage types, as measured in accordance with Section 7.10 of Rule 4570,</p> <p>b) when creating a silage pile, adjust filling parameters to assure a calculated average bulk density of at least 44 lb/cu-ft for corn silage and at least 40 lb/cu-ft for other silage types, using a spreadsheet approved by the District,</p> <p>c) harvest silage crop at &gt; or = 65% moisture for corn; and &gt;= 60% moisture for alfalfa/grass and other silage crops; manage silage material delivery such that no more than 6 inches of materials are uncompacted on top of the pile; and incorporate the applicable Theoretical Length of Chop (TLC) and roller opening for the crop being harvested.</p> <p>For dairies - implement <u>two</u> of the following: For heifer/calf ranches - implement <u>one</u> of the following:</p> <p><b>Manage Exposed Silage.</b> a) manage silage piles such that only one silage pile has an uncovered face and the uncovered face has a total exposed surface area of less than 2,150 sq. ft., or b) manage multiple uncovered silage piles such that the total exposed surface area of all silage piles is less than 4,300 sq ft.</p> <p><b>Maintain Silage Working Face.</b> a) use a shaver/facer to remove silage from the silage pile, or b) maintain a smooth vertical surface on the working face of the silage pile</p> <p><b>Silage Additive.</b> a) inoculate silage with homolactic acid bacteria in accordance with manufacturer recommendations to achieve a concentration of at least 100,000 colony forming units per gram of wet forage or apply propionic acid, benzoic acid, sorbic acid, sodium benzoate, or potassium sorbate at a rate specified by the manufacturer to reduce yeast counts when forming silage pile; or b) apply other additives at specified rates that have been demonstrated to reduce alcohol concentrations in silage and/or VOC emissions from silage and have been approved by the District and EPA.</p>	39.0%	39.0%
		<b>Total Control Efficiency*</b>	39.00%	39.00%

\*Assumes 25% control for density mitigation measures and 10% each for the two optional measures, resulting in an overall control of 39%. The same conservative control efficiency will be applied to the sealed feed storage system (Ag-Bag).

		TMR Mitigations		
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(D) Push feed so that it is within 3 feet of feedlane fence within 2 hrs of putting out the feed or use a feed trough or other feeding structure designed to maintain feed within reach of the cows.	10%	10%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	(D) Begin feeding total mixed rations within 2 hrs of grinding and mixing rations. Note: If selected for dairies > 999 milk cows, control efficiency already included in EF.	0%	0%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed steam-flaked, dry rolled, cracked or ground corn or other ground cereal grains.	10%	10%
<input type="checkbox"/>	<input type="checkbox"/>	Remove uneaten wet feed from feed bunks within 24 hrs after the end of a rain event.	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	(D) For total mixed rations that contain at least 30% by weight of silage, feed animals total mixed rations that contain at least 45% moisture.	0%	0%
<input type="checkbox"/>	<input type="checkbox"/>	Feed according to NRC guidelines. Note: If selected for dairies, control efficiency already included in EF.	0%	0%
		<b>Total Control Efficiency</b>	19.00%	19.00%



## Ammonia Mitigation Measures and Control Efficiencies

Milking Parlor				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	NH3 Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
<b>Milking Parlor Floor Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	28%	28%
<b>Total Control Efficiency</b>			28%	28%

Cow Housing				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	NH3 Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
<b>Corrals/Pens Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	28%	28%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Clean manure from corrals at least four times per year with at least 60 days between cleaning, or clean corrals at least once between April and July and at least once between September and December. OR Use lime or a similar absorbent material in the corral according to the manufacturer's recommendation to minimize moisture in the corrals. OR Apply thymol to the corral soil in accordance with the manufacturer's recommendation.	50%	50%
<b>Total Control Efficiency</b>			64%	64%
<b>Bedding Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	28%	28%
<input type="checkbox"/>	<input type="checkbox"/>	Use non-manure-based bedding and non-separated solids based bedding for at least 90% of the bedding material, by weight, for freestalls (e.g. rubber mats, almond shells, sand, or waterbeds). OR For a large dairy only (1,000 milk cows or larger) - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every 7 days. OR For a medium dairy only (500 to 999 milk cows) - Remove manure that is not dry from individual cow freestall beds or rake, harrow, scrape, or grade freestall bedding at least once every 14 days.	0.0%	0.0%
<b>Total Control Efficiency</b>			28.00%	28.00%
<b>Lanes Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	28%	28%
<b>Total Control Efficiency</b>			28%	28%

Liquid Manure Handling				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	NH3 Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
<b>Lagoons/Storage Ponds Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	28%	28%
<input type="checkbox"/>	<input type="checkbox"/>	Use phototropic lagoon OR Remove solids from the waste system with a solid separator system, prior to the waste entering the lagoon.	0%	0%
<b>Total Control Efficiency</b>			28.0%	28.0%
<b>Liquid Manure Land Application Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	28%	28%
<input type="checkbox"/>	<input type="checkbox"/>	Only apply liquid manure that has been treated with an anaerobic treatment lagoon	0%	0%
<b>Total Control Efficiency</b>			28.00%	28.00%

Solid Manure Handling				
Measure Proposed?		Mitigation Measure(s) per Emissions Point	NH3 Control Efficiency (%)	
Pre-Project	Post-Project		Pre-Project	Post-Project
<b>Solid Manure Land Application Mitigations</b>				
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Feed according to NRC guidelines	28%	28%
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Incorporate all solid manure within 72 hours of land application. AND Only apply solid manure that has been treated with an anaerobic treatment lagoon, aerobic lagoon or digester system. AND Apply no solid manure with a moisture content of more than 50%	42%	42%
<b>Total Control Efficiency</b>			58.24%	58.24%





## Post-Project PM10 Mitigation Measures

Post-Project PM10 Mitigation Measures														
Housing Name(s) or #s	Type of Housing	Type of cow	Total # of cows in Each Housing Structure(s)	Maximum Design Capacity of Each Structure	# of Combined Housing Structures in row	Shaded Corrals	Downwind Shelterbelts	Upwind Shelterbelts	No exercise pens, non-manure bedding	No exercise pens, manure bedding	Fibrous layer	Bi-weekly scraping Corrals/Pens	Sprinkling Corrals/Pens	Feed Young Stock Near Dusk
1	freestall	milk cows	5,000	5,000	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	open corral	dry cows	1,000	1,000	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	open corral	support stock	6,100	6,100	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Post-Project PM10 Mitigation Measures for New Housing Units at an Expanding Dairy</b>														
Housing Name(s) or #s	Type of Housing	Type of cow	Total # of cows in Each Housing Structure(s)	Maximum Design Capacity of Each Structure	# of Combined Housing Structures in row	Shaded Corrals	Downwind Shelterbelts	Upwind Shelterbelts	No exercise pens, non-manure bedding	No exercise pens, manure bedding	Fibrous layer	Bi-weekly scraping Corrals/Pens	Sprinkling Corrals/Pens	Feed Young Stock Near Dusk
			10,051											

Post-Project PM10 Control Efficiencies and Emission Factors															
Housing Name(s) or #s	Type of Housing	Type of cow	Total # of cows in Each Housing Structure(s)	Maximum Design Capacity of Each Structure	Uncontrolled EF (lb/hd-yr)	Shaded Corrals	Downwind Shelterbelts	Upwind Shelterbelts	No exercise pens, non-manure bedding	No exercise pens, manure bedding	Fibrous layer	Bi-weekly scraping Corrals/Pens	Sprinkling Corrals/Pens	Feed Young Stock Near Dusk	Controlled EF (lb/hd-yr)
1	freestall	milk cows	5,000	5,000	1,370										1.37
2	open corral	dry cows	1,000	1,000	5,460	16.7%									4.55
3	open corral	support stock	6,100	6,100	10,550	8.3%									9.67
4															
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Post-Project PM10 Control Efficiencies and Emission Factors for New Housing Emissions Units															
Housing Name(s) or #s	Type of Housing	Type of cow	Total # of cows in Each Housing Structure(s)	Maximum Design Capacity of Each Structure	Uncontrolled EF (lb/hd-yr)	Shaded Corrals	Downwind Shelterbelts	Upwind Shelterbelts	No exercise pens, non-manure bedding	No exercise pens, manure bedding	Fibrous layer	Bi-weekly scraping Corrals/Pens	Sprinkling Corrals/Pens	Feed Young Stock Near Dusk	Controlled EF (lb/hd-yr)

**Pre-Project Potential to Emit - Cow Housing**

Pre-Project Potential to Emit - Cow Housing												
	Housing Name(s) or #s	Type of Cow	# of Cows	Controlled VOC EF (lb/hd-yr)	Controlled NH3 EF (lb/hd-yr)	Controlled PM10 EF (lb/hd-yr)	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
1	1	milk cows	5,000	9.86	23.29	1.37	135.1	49,300	319.1	116,460	18.8	6,850
2	2	dry cows	1,000	5.57	11.81	4.55	15.3	5,570	32.4	11,808	12.5	4,548
3	3	support stock	6,100	4.27	6.12	9.67	71.4	26,047	102.3	37,332	161.7	59,011
<b>Pre-Project Total # of Cows</b>			<b>12,100</b>				<b>221.8</b>	<b>80,917</b>	<b>453.8</b>	<b>165,600</b>	<b>193.0</b>	<b>70,409</b>

\*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows.

Pre-Project Totals						
Total # of Cows	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
12,100	221.8	80,917	453.8	165,600	193.0	70,409

**Calculations:**

Annual PE 1 for each pollutant (lb/yr) = Controlled EF (lb/hd-yr) x # of cows (hd)  
 Daily PE1 for each pollutant (lb/day) = [Controlled EF (lb/hd-yr) x # of cows (hd)] + 365 (day/yr)

**Post-Project Potential to Emit - Cow Housing**

Post-Project Potential to Emit - Cow Housing												
	Housing Name(s) or #s	Type of Cow	# of Cows	Controlled VOC EF (lb/hd-yr)	Controlled NH3 EF (lb/hd-yr)	Controlled PM10 EF (lb/hd-yr)	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
1	1	milk cows	5,000	9.86	23.29	1.37	135.1	49,300	319.1	116,460	18.8	6,850
2	2	dry cows	1,000	5.57	11.81	4.55	15.3	5,570	32.4	11,808	12.5	4,548
3	3	support stock	6,100	4.27	6.12	9.67	71.4	26,047	102.3	37,332	161.7	59,011
<b>Post-Project # of Cows (non-expansion)</b>			<b>12,100</b>				<b>221.8</b>	<b>80,917</b>	<b>453.8</b>	<b>165,600</b>	<b>193.0</b>	<b>70,409</b>

\*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows.

Post-Project Potential to Emit - Cow Housing: New Housing Units at an Expanding Dairy												
	Housing Name(s) or #s	Type of Cow	# of Cows	Controlled VOC EF (lb/hd-yr)	Controlled NH3 EF (lb/hd-yr)	Controlled PM10 EF (lb/hd-yr)	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
<b>Total # of Cows From Expansion</b>			<b>0</b>				<b>0.0</b>	<b>0</b>	<b>0.0</b>	<b>0</b>	<b>0.0</b>	<b>0</b>

\*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows.

Post-Project Totals						
Total # of Cows	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
12,100	221.8	80,917	453.8	165,600	193.0	70,409

**Calculations:**

Annual PE 2 for each pollutant (lb/yr) = Controlled EF (lb/hd-yr) x # of cows (hd)  
 Daily PE2 for each pollutant (lb/day) = [Controlled EF (lb/hd-yr) x # of cows (hd)] ÷ 365 (day/yr)

**Pre-Project Worst Case BACT Calculations - Cow Housing**

This table uses the worst case emission factor for each cow type and the maximum design capacity of the housing unit. This should only be used for BACT calculation purposes.

Worst-Case Pre-Project Potential to Emit - Cow Housing											
Housing Name(s) or #s	Type of Cow	Capacity per housing unit	Controlled VOC EF (lb/hd-yr)	Controlled NH3 EF (lb/hd-yr)	Controlled PM10 EF (lb/hd-yr)	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)
1	milk cows	5,000	9.86	23.29	10.55	135.1	49,300	319.1	116,460	144.5	52,750
2	dry cows	1,000	9.86	23.29	8.79	27.0	9,860	63.8	23,292	24.1	8,788
3	support stock	6,100	9.86	23.29	9.67	164.8	60,146	389.3	142,081	161.7	59,011
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						<b>326.9</b>	<b>119,306</b>	<b>772.2</b>	<b>281,833</b>	<b>330.3</b>	<b>120,549</b>

\*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows. BACT applicability has been calculated for EACH emissions unit in this row.

Pre-Project Totals				
VOC (lb/day)	NH3 (lb/day)	PM10 (lb/day)	NH3 (lb/yr)	PM10 (lb/yr)
326.9	119,306	772.2	281,833	120,549

Calculations:  
 Annual PE1 for each pollutant (lb/yr) = Controlled EF (lb/hd-yr) x # of cows (hd)  
 Daily PE1 for each pollutant (lb/day) = [Controlled EF (lb/hd-yr) x # of cows (hd)] ÷ 365 (day/yr)

**Post-Project Worst Case BACT Calculations - Existing Cow Housing**

This table uses the worst case emission factor for each cow type and the maximum design capacity of the housing unit. This should only be used for BACT calculation purposes.

Post-Project Worst Case BACT Calculations - Existing Cow Housing																	
Housing Name(s) or #s	Type of Cow	Capacity per housing unit	Controlled VOC EF (lb/hd-yr)	Controlled NH3 EF (lb/hd-yr)	Controlled PM10 EF (lb/hd-yr)	VOC (lb/day)	VOC (lb/yr)	NH3 (lb/day)	NH3 (lb/yr)	PM10 (lb/day)	PM10 (lb/yr)	VOC AIPE	NH3 AIPE	PM10 AIPE	BACT Triggered for VOC?	BACT Triggered for NH3?	BACT Triggered for PM10?
1	milks cows	5,000	9.86	23.29	10.55	135.1	49,300	319.1	116,460	144.5	52,750	0.0	0.0	0.0	No	No	No
2	dry cows	1,000	9.86	23.29	8.79	27.0	9,860	63.8	23,292	24.1	8,788	0.0	0.0	0.0	No	No	No
3	support stock	6,100	9.86	23.29	9.67	164.8	60,146	389.3	142,081	161.7	59,011	0.0	0.0	0.0	No	No	No
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							<b>326.9</b>	<b>119,306</b>	<b>772.2</b>	<b>281,833</b>	<b>330.3</b>						<b>120,549</b>

\*Multiple emissions units (freestalls, corrals, calf hutch areas, etc.) are combined in these rows. BACT applicability has been calculated for EACH emissions unit in this row.

Calculations:

Annual PE 2 for each pollutant (lb/yr) = Controlled EF (lb/hd-yr) x # of cows (hd)  
 Daily PE2 for each pollutant (lb/day) = [Controlled EF (lb/hd-yr) x # of cows (hd)] ÷ 365 (day/yr)



BACT Applicability

Milking Parlor					
VOC Emissions					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	5.5	5.5	0.40	0.40	0.0
<b>Total</b>					<b>0.0</b>
NH3 Emissions					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	1.9	1.9	0.14	0.14	0.0
<b>Total</b>					<b>0.0</b>

**Cow Housing**  
See detailed cow housing AIPE calculations on the BACT Calc's page.

Liquid Manure Handling					
VOC Emissions - Lagoon/Storage Pond(s)					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	16.0	16.0	1.17	1.17	0.0
Dry Cows	1.8	1.8	0.64	0.64	0.0
Support Stock (Heifers, Calves, and Bulls)	8.2	8.2	0.49	0.49	0.0
Large Heifers	0.0	0.0	0.49	0.49	0.0
Medium Heifers	0.0	0.0	0.33	0.33	0.0
Small Heifers	0.0	0.0	0.19	0.19	0.0
Calves	0.0	0.0	0.09	0.09	0.0
Bulls	0.0	0.0	0.30	0.30	0.0
<b>Total</b>					<b>0.0</b>

VOC Emissions - Land Application					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	17.3	17.3	1.26	1.26	0.0
Dry Cows	1.9	1.9	0.69	0.69	0.0
Support Stock (Heifers, Calves, and Bulls)	8.8	8.8	0.53	0.53	0.0
Large Heifers	0.0	0.0	0.53	0.53	0.0
Medium Heifers	0.0	0.0	0.36	0.36	0.0
Small Heifers	0.0	0.0	0.20	0.20	0.0
Calves	0.0	0.0	0.10	0.10	0.0
Bulls	0.0	0.0	0.32	0.32	0.0
<b>Total</b>					<b>0.0</b>

NH3 Emissions - Lagoon/Storage Pond(s)					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	80.9	80.9	5.90	5.90	0.0
Dry Cows	8.3	8.3	3.02	3.02	0.0
Support Stock (Heifers, Calves, and Bulls)	26.5	26.5	1.58	1.58	0.0
Large Heifers	0.0	0.0	1.58	1.58	0.0
Medium Heifers	0.0	0.0	1.08	1.08	0.0
Small Heifers	0.0	0.0	0.86	0.86	0.0
Calves	0.0	0.0	0.25	0.25	0.0
Bulls	0.0	0.0	2.16	2.16	0.0
<b>Total</b>					<b>0.0</b>

NH3 Emissions - Land Application					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	87.8	87.8	6.41	6.41	0.0
Dry Cows	8.9	8.9	3.24	3.24	0.0
Support Stock (Heifers, Calves, and Bulls)	27.7	27.7	1.66	1.66	0.0
Large Heifers	0.0	0.0	1.66	1.66	0.0
Medium Heifers	0.0	0.0	1.22	1.22	0.0
Small Heifers	0.0	0.0	0.94	0.94	0.0
Calves	0.0	0.0	0.27	0.27	0.0
Bulls	0.0	0.0	2.33	2.33	0.0
<b>Total</b>					<b>0.0</b>

H2S Emissions - Lagoon/Storage Pond(s)					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	8.1	8.1	0.59	0.59	0.0
Dry Cows	0.8	0.8	0.30	0.30	0.0
Support Stock (Heifers, Calves, and Bulls)	2.6	2.6	0.16	0.16	0.0
Large Heifers	0.0	0.0	0.16	0.16	0.0
Medium Heifers	0.0	0.0	0.11	0.11	0.0
Small Heifers	0.0	0.0	0.09	0.09	0.0
Calves	0.0	0.0	0.03	0.03	0.0
Bulls	0.0	0.0	0.22	0.22	0.0
<b>Total</b>					<b>0.0</b>

Solid Manure Handling					
VOC Emissions - Solid Manure Storage/Separated Solids Piles					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	2.4	2.4	0.18	0.18	0.0
Dry Cows	0.3	0.3	0.10	0.10	0.0
Support Stock (Heifers, Calves, and Bulls)	1.2	1.2	0.10	0.10	0.0
Large Heifers	0.0	0.0	0.07	0.07	0.0
Medium Heifers	0.0	0.0	0.05	0.05	0.0
Small Heifers	0.0	0.0	0.03	0.03	0.0
Calves	0.0	0.0	0.01	0.01	0.0
Bulls	0.0	0.0	0.05	0.05	0.0
<b>Total</b>					<b>0.0</b>

VOC Emissions - Land Application					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	4.1	4.1	0.30	0.30	0.0
Dry Cows	0.4	0.4	0.16	0.16	0.0
Support Stock (Heifers, Calves, and Bulls)	2.1	2.1	0.12	0.12	0.0
Large Heifers	0.0	0.0	0.12	0.12	0.0
Medium Heifers	0.0	0.0	0.08	0.08	0.0
Small Heifers	0.0	0.0	0.05	0.05	0.0
Calves	0.0	0.0	0.02	0.02	0.0
Bulls	0.0	0.0	0.07	0.07	0.0
<b>Total</b>					<b>0.0</b>

NH3 Emissions - Solid Manure Storage/Separated Solids Piles					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	18.2	18.2	1.33	1.33	0.0
Dry Cows	1.8	1.8	0.67	0.67	0.0
Support Stock (Heifers, Calves, and Bulls)	5.8	5.8	0.35	0.35	0.0
Large Heifers	0.0	0.0	0.35	0.35	0.0
Medium Heifers	0.0	0.0	0.25	0.25	0.0
Small Heifers	0.0	0.0	0.18	0.18	0.0
Calves	0.0	0.0	0.06	0.06	0.0
Bulls	0.0	0.0	0.49	0.49	0.0
<b>Total</b>					<b>0.0</b>

NH3 Emissions - Land Application					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Milk Cows	12.0	12.0	0.87	0.87	0.0
Dry Cows	1.2	1.2	0.44	0.44	0.0
Support Stock (Heifers, Calves, and Bulls)	3.8	3.8	0.23	0.23	0.0
Large Heifers	0.0	0.0	0.23	0.23	0.0
Medium Heifers	0.0	0.0	0.16	0.16	0.0
Small Heifers	0.0	0.0	0.13	0.13	0.0
Calves	0.0	0.0	0.04	0.04	0.0
Bulls	0.0	0.0	0.32	0.32	0.0
<b>Total</b>					<b>0.0</b>

Feed Storage and Handling					
VOC Emissions - Silage					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
Corn Silage	11.5	11.5	21,155	21,155	0.0
Alfalfa Silage	0.0	0.0	10,649	10,649	0.0
Wheat Silage	16.2	16.2	26,745	26,745	0.0
<b>Total</b>					<b>0.0</b>

VOC Emissions - TMR					
	PE2 (lb/day)	PE1 (lb/day)	EF2	EF1	AIPE (lb/day)
TMR	266.7	266.7	10,575	10,575	0.0
<b>Total</b>					<b>0.0</b>

Pre-Project Potential to Emit (PE1)

Pre-Project Herd Size						
Herd	Flushed Freestalls	Scraped Freestalls	Flushed Corrals	Scraped Corrals	Total # of Animals	
Milk Cows	0	5,000	0	0	5,000	
Dry Cows	0	0	0	1,000	1,000	
Support Stock (Heifers, Calves and Bulls)	0	0	0	6,100	6,100	
Large Heifers	0	0	0	0	0	
Medium Heifers	0	0	0	0	0	
Small Heifers	0	0	0	0	0	
Bulls	0	0	0	0	0	
	Calf Hutches			Calf Corrals		Total # of Calves
	Aboveground Flushed	Aboveground Scraped	On-Ground Flushed	On-Ground Scraped	Flushed	
Calves	0	0	0	0	0	0

Silage Information				
Feed Type	Maximum # Open Piles	Maximum Height (ft)	Maximum Width (ft)	Open Face Area (ft <sup>2</sup> )
Corn	1	19	136	1,853
Alfalfa	0	0	0	
Wheat	1	22	126	2,057

Milking Parlor				
Cow	VOC		NH3	
	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	5.5	2,000	1.9	684

Cow Housing						
Cow	VOC		NH3		PM10	
	lb/day	lb/yr	lb/day	lb/yr	lb/day	lb/yr
Total	221.8	80,917	453.8	165,600	193.0	70,409

Liquid Manure Handling						
Cow	VOC		NH3		H2S*	
	lb/day	lb/yr	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	33.3	12,150	168.6	61,550	8.1	2,952
Dry Cows	3.6	1,330	17.2	6,260	0.8	302
Support Stock (Heifers, Calves and Bulls)	17.0	6,222	54.1	19,764	2.6	966
Large Heifers	0.0	0	0.0	0	0	0
Medium Heifers	0.0	0	0.0	0	0	0
Small Heifers	0.0	0	0.0	0	0	0
Calves	0.0	0	0.0	0	0	0
Bulls	0.0	0	0.0	0	0	0
Total	53.9	19,702	239.9	87,574	11.5	4,221

Solid Manure Handling				
Cow	VOC		NH3	
	lb/day	lb/yr	lb/day	lb/yr
Milk Cows	6.4	2,350	30.1	11,000
Dry Cows	0.7	260	3.0	1,110
Support Stock (Heifers, Calves and Bulls)	3.3	1,220	9.7	3,538
Large Heifers	0.0	0	0.0	0
Medium Heifers	0.0	0	0.0	0
Small Heifers	0.0	0	0.0	0
Calves	0.0	0	0.0	0
Bulls	0.0	0	0.0	0
Total	10.4	3,830	42.8	15,648

Feed Handling and Storage		
	Daily PE (lb-VOC/day)	Annual PE (lb-VOC/yr)
Corn Emissions	11.5	4,210
Alfalfa Emissions	0.0	0
Wheat Emissions	16.2	5,910
TMR	266.7	97,361
Total	294.4	107,481

Total Daily Pre-Project Potential to Emit (lb/day)							
Permit	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0.0	0.0	0.0	0.0	5.5	1.9	0.0
Cow Housing	0.0	0.0	193.0	0.0	221.8	453.8	0.0
Liquid Manure	0.0	0.0	0.0	0.0	53.9	239.9	11.5
Solid Manure	0.0	0.0	0.0	0.0	10.4	42.8	0.0
Feed Handling	0.0	0.0	0.0	0.0	294.4	0.0	0.0
Total	0.0	0.0	193.0	0.0	586.0	738.4	11.5

Total Annual Pre-Project Potential to Emit (lb/yr)							
Permit	NOx	SOx	PM10	CO	VOC	NH3	H2S
Milking Parlor	0	0	0	0	2,000	684	0
Cow Housing	0	0	70,409	0	80,917	165,600	0
Liquid Manure	0	0	0	0	19,702	87,574	4,221
Solid Manure	0	0	0	0	3,830	15,648	0
Feed Handling	0	0	0	0	107,481	0	0
Total	0	0	70,409	0	213,930	269,506	4,221

Calculations for milking parlor:

Annual PE = (# milk cows) x (EF1 lb-pollutant/hd-yr)

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

Calculations for cow housing:

See detailed calculations under Cow Housing Calculations worksheet.

Calculations for liquid manure and solid manure handling:

Annual PE = [(# milk cows) x (EF1 lb-pollutant/hd-yr)] + [(# dry cows) x (EF1 lb-pollutant/hd-yr)] + [(# large heifers) x (EF1 lb-pollutant/hd-yr)] + [(# medium heifers) x (EF1 lb-pollutant/hd-yr)] + [(# small heifers) x (EF1 lb-pollutant/hd-yr)] + [(# calves) x (EF1 lb-pollutant/hd-yr)] + [(# bulls) x (EF1 lb-pollutant/hd-yr)]

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

The H2S emission factor is assumed to be 10% of the NH3 lagoon/storage pond(s) emission factor, for each respective herd size.

Calculations for silage emissions:

Annual PE = (EF1) x (area ft<sup>2</sup>) x (0.0929 m<sup>2</sup>/ft<sup>2</sup>) x (8,760 hr/yr) x (60 min/hr) x 2.20E-9 lb/μg

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

Calculation for TMR emissions:

Annual PE = (# cows) x (EF1) x (0.658 m<sup>2</sup>) x (525,600 min/yr) x (2.20E-9 lb/μg)

Daily PE = (Annual PE lb/yr) ÷ (365 day/yr)

Calves are not included in TMR calculation.

\*Since there will be no change to the lagoons/storage ponds surface area, no change in H2S emissions is expected. Therefore, it will be assumed that PE1 for H2S emissions is equal to PE2 for H2S emissions.

Major Source Emissions (lb/yr)						
Permit	NOx	SOx	PM10	CO	VOC	H2S
Milking Parlor	0	0	0	0	0	0
Cow Housing	0	0	0	0	0	0
Liquid Manure	0	0	0	0	0	9,479
Solid Manure	0	0	0	0	0	0
Feed Handling	0	0	0	0	0	0
Total	0	0	0	0	0	9,479



S-6991-10-0

As calculated in previous project S-1065149.

Assumptions:

Non-emergency operating schedule:	100 hours/year
Density of diesel fuel:	7.1 lb/gal
EPA F-factor (adjusted to 60°F):	9,051 dscf/MMBtu
Fuel heating value:	137,000 Btu/gal
BHP to Btu/hr conversion:	2,542.5 Btu/hp-hr
Thermal efficiency of engine:	commonly ≈ 30%
PM <sub>10</sub> fraction of diesel exhaust:	0.96 (CARB, 1988)

Emission Factors:

<b>Diesel-fired IC Engine Emission Factors</b>			
	lb/hp-hr	g/hp-hr*	Source
NO <sub>x</sub>	0.02205	10.00	Carl Moyer Program
SO <sub>x</sub>	-	0.0051	Mass Balance Equation Below
PM <sub>10</sub>	0.0011	0.50	Rule 4201 Compliance
CO	0.0067	3.04	AP-42 (10/96) Table 3.3-1
VOC	0.0025	1.14	AP-42 (10/96) Table 3.3-1

\*g/hp-hr is calculated using the lb/hp-hr value multiplied by 453.6 g/lb.

$$0.0015\%S \times \frac{7.1\text{lb} \cdot \text{fuel}}{\text{gallon}} \times \frac{2\text{lb} \cdot \text{SO}_2}{1\text{lb} \cdot \text{S}} \times \frac{1\text{gal}}{137,000 \text{Btu}} \times \frac{1\text{hp input}}{0.35 \text{hp out}} \times \frac{2,542.5 \text{Btu}}{\text{hp} \cdot \text{hr}} \times \frac{453.6 \text{g}}{\text{lb}} = 0.0051 \frac{\text{g} \cdot \text{SO}_x}{\text{hp} \cdot \text{hr}}$$

Calculations:

<b>Annual Actual Emissions (AE)</b>							
NO <sub>x</sub>	10.00	(g/hp-hr) x	450	(hp) x	100	(hr/year) ÷ 453.6 (g/lb) =	992 (lb/yr)
SO <sub>x</sub>	0.0051	(g/hp-hr) x	450	(hp) x	100	(hr/year) ÷ 453.6 (g/lb) =	1 (lb/yr)
PM <sub>10</sub>	0.50	(g/hp-hr) x	450	(hp) x	100	(hr/year) ÷ 453.6 (g/lb) =	50 (lb/yr)
CO	3.04	(g/hp-hr) x	450	(hp) x	100	(hr/year) ÷ 453.6 (g/lb) =	302 (lb/yr)
VOC	1.14	(g/hp-hr) x	450	(hp) x	100	(hr/year) ÷ 453.6 (g/lb) =	113 (lb/yr)

S-6991-11-0

As calculated in previous project S-1065149.

Assumptions:

This permit unit may operate 24 hours per day, 365 days per year.  
 VOC is the only pollutant emitted from this operation.

Emission Factors:

These emission factors were obtained from Appendix A - Emission Factors For Gasoline Stations published by CAPCOA Air Toxic "Hot Spots" Program in the Gasoline Service Station Industrywide Risk Assessment Guidelines dated December 1997.

8.4	lb/1,000 gal	Tank filling loss
2.1	lb/1,000 gal	Breathing loss
8.4	lb/1,000 gal	Vehicle fueling loss
0.61	lb/1,000 gal	Spillage
19.5	lb/1,000 gal	Total VOC losses

Calculations:

Annual Actual Emissions (AE)					
VOC	19.5	(lb/1000 gal)	x	18000	(gal/year) = 351 (lb/year)

## Appendix E

Draft ATC S-6991-14-1

San Joaquin Valley  
Air Pollution Control District

**AUTHORITY TO CONSTRUCT**

ISSUANCE DATE: DRAFT

PERMIT NO: S-6991-14-1

LEGAL OWNER OR OPERATOR: RANDY SUGARMAN, TRUSTEE FOR GREG TEVELDE

MAILING ADDRESS: 1120 LELAND AVE  
TULARE, CA 93274

LOCATION: 5850 AVENUE 160  
TIPTON, CA 93272

**EQUIPMENT DESCRIPTION:**

MODIFICATION OF 1,215 BHP GUASCOR, MODEL SFGLD, DIGESTER GAS-FIRED LEAN-BURN IC ENGINE WITH A HUG ENGINEERING, MODEL COMBIKAT, CATALYST SYSTEM (SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM WITH OXIDATION CATALYST) POWERING AN ELECTRICAL GENERATOR: INCREASE CO EMISSION FACTOR FROM 0.60 G-CO/BHP-HR (EQUIVALENT TO 82 PPMVD CO @ 15% O<sub>2</sub>) TO 2.0 G-CO/BHP-HR (EQUIVALENT TO 223 PPMVD CO @ 15% O<sub>2</sub>)

**CONDITIONS**

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. This IC engine shall primarily be used to generate electrical power that will offset electrical power usage for on-site stationary source operations, as allowed by the facility's Interconnection Agreement for Net Energy Metering with the main power utility. Excess electricity, beyond what is required to maintain the day to day operations of this stationary source, may be exported to the main power grid. [District Rules 2201, 4701, and 4702]
3. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]
5. {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]
6. {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]
7. {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]

CONDITIONS CONTINUE ON NEXT PAGE

**YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (661) 392-5500 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

Arnaud Marjollet, Director of Permit Services

S-6991-14-1 : Aug 6 2019 1:37PM - SALINASM : Joint Inspection NOT Required

8. {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]
9. This engine shall be fired on digester gas fuel only. [District Rule 2201]
10. The sulfur content of the digester gas used as fuel in this engine shall not exceed 40 ppmv as H<sub>2</sub>S. The applicant may utilize an averaging period of up to 24 hours in length for demonstration of compliance with the fuel sulfur content limit. [District Rules 2201, 4102, 4702, and 4801]
11. This engine shall be equipped with an operational non-resettable elapsed time meter or other APCO approved alternative. [District Rules 2201 and 4702]
12. This engine shall not operate more than 8,500 hours per calendar year. [District Rule 2201]
13. Emissions from this IC engine shall not exceed any of the following limits: 0.15 g-NO<sub>x</sub>/bhp-hr (equivalent to 12 ppmvd NO<sub>x</sub> @ 15% O<sub>2</sub>), NO<sub>x</sub> referenced as NO<sub>2</sub>; 0.081 g-PM<sub>10</sub>/bhp-hr; 2.0 g-CO/bhp-hr (equivalent to 223 ppmvd CO @ 15% O<sub>2</sub>); 0.10 g-VOC/bhp-hr (equivalent to 24 ppmvd VOC @ 15% O<sub>2</sub>), VOC referenced as CH<sub>4</sub>. [District Rules 2201 and 4702]
14. 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]
15. 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]
16. Ammonia (NH<sub>3</sub>) emissions from this engine shall not exceed 10 ppmvd @ 15% O<sub>2</sub>. [District Rules 2201 and 4102]
17. Source testing to measure NO<sub>x</sub>, CO, VOC, and ammonia (NH<sub>3</sub>) emissions from this unit shall be conducted at least once every 60 months. [District Rules 1081, 2201, and 4702]
18. 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 content analysis shall be maintained and provided to the District upon request. [District Rules 2201 and 4702]
19. {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]
20. 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. NO<sub>x</sub>, CO, VOC, and NH<sub>3</sub> concentrations shall be reported in ppmv, corrected to 15% oxygen. [District Rules 2201 and 4702]
21. The following methods shall be used for source testing: NO<sub>x</sub> (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; PM<sub>10</sub> (filterable and condensable) - EPA Method 201 and 202, EPA Method 201a and 202, or ARB Method 5 in combination with Method 501; NH<sub>3</sub> - 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]
22. 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]
23. {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]
24. The results of each source test shall be submitted to the District within 60 days after completion of the source test. [District Rule 1081]

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CONDITIONS CONTINUE ON NEXT PAGE



25. The sulfur content of the digester gas used to fuel the engine shall be monitored and recorded at least once every calendar quarter in which a fuel sulfur analysis is not performed. 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 Rules 2201 and 4702]
26. Monitoring of the digester gas sulfur content shall be performed using gas detection tubes calibrated for H<sub>2</sub>S; a digital analyzer approved for gaseous fuel analysis; a continuous fuel gas monitor that meets the requirements specified in SCAQMD Rule 431.1, Attachment A; District-approved source test methods, including EPA Method 15, ASTM Method D1072, D4084, and D5504; District-approved in-line H<sub>2</sub>S monitors; or an alternative method approved by the District. Prior to utilization of in-line monitors to demonstrate compliance with the digester gas sulfur content limit of this permit, the permittee shall submit details of the proposed monitoring system, including the make, model, and detection limits, to the District and obtain District approval for the proposed monitor(s). [District Rules 2201 and 4702]
27. 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 NO<sub>x</sub>, CO, and O<sub>2</sub> 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]
28. The permittee shall monitor and record the stack concentration of NO<sub>x</sub>, CO, and O<sub>2</sub> 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]
29. The permittee shall monitor and record the stack concentration of NH<sub>3</sub> at least once every calendar quarter in which a source test is not performed. NH<sub>3</sub> 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]
30. If the NO<sub>x</sub>, CO, or NH<sub>3</sub> concentrations corrected to 15% O<sub>2</sub>, 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]
31. {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]

CONDITIONS CONTINUE ON NEXT PAGE

32. The permittee shall maintain records of: (1) the date and time of NO<sub>x</sub>, CO, O<sub>2</sub>, and NH<sub>3</sub> measurements, (2) the O<sub>2</sub> concentration in percent and the measured NO<sub>x</sub>, CO, and NH<sub>3</sub> concentrations corrected to 15% O<sub>2</sub>, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, (5) the method of determining the NH<sub>3</sub> emission concentration, and (6) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 2201 and 4702]
33. 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]
34. The SCR system reagent injection rate shall not be less than 0.48 gallons per hour (gph) at an operating load less than 80%. The SCR system reagent injection rate shall not be less than 0.51 gph at an operating load greater than 80% and less than 90%. The SCR system reagent injection rate shall not be less than 0.54 gph at an operating load greater than 90% and less than 100%. [District Rule]
35. 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 NO<sub>x</sub> emission limits shall be imposed as a condition in the Permit to Operate. [District Rule 4702]
36. 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 NO<sub>x</sub> and O<sub>2</sub> at least once every month. Monthly monitoring of the stack concentration of NO<sub>x</sub> and O<sub>2</sub> 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]
37. The SCR system inlet temperature shall not be greater than 875 °F at any operating load. [District Rule 4702]
38. The SCR differential pressure shall not be greater than 8 inches water column at any operating load. [District Rule 4702]
39. 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]
40. 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]
41. 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 O<sub>2</sub> at least once every month. Monthly monitoring of the stack concentration of CO and O<sub>2</sub> 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]

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CONDITIONS CONTINUE ON NEXT PAGE

42. {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]
43. 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 commissioning period(s), 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]
44. 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]
45. {4051} The permittee shall record the total time the engine operates, in hours per calendar year. [District Rule 2201]
46. 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]

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