San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

JUN 3 0 2016

Matt Schmitt
Colony Energy Partners - Tulare, LLC
4940 Campus Dr, Ste C
Newport Beach, CA 92660

**Re: Notice of Preliminary Decision - Authority to Construct**
**Facility Number: S-8153**
**Project Number: S-1161129**

Dear Mr. Schmitt:

Enclosed for your review and comment is the District's analysis of Colony Energy Partners - Tulare, LLC's application for an Authority to Construct for the installation of two cogeneration (heat and electric) systems each equipped with 831 bhp MWM Model TCG 2016 V12 C lean burn natural gas-fired internal combustion (IC) engines each driving a 600 kW electrical generator served by two 41 MMBtu/hr Bekaert Model CEB 1200 digester gas-fired air-assisted ground level enclosed flares, at Paige Avenue (west of Enterprise Street) in Tulare, CA (S/2 Section 16, Township 20S, Range 24E Mount Diablo Base and Meridian).

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. George Heinen of Permit Services at (559) 230-5811.

Sincerely,

El Vij

for Arnaud Marjollet
Director of Permit Services

AM:gh

Enclosures

cc: Tung Le, CARB (w/ enclosure) via email

**Seyed Sadredin**
Executive Director/Air Pollution Control Officer

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# San Joaquin Valley Air Pollution Control District

## Authority to Construct Application Review

Digester Gas System with Two Natural Gas-Fired IC Engines
and Two Digester Gas-Fired Flares

| | | | |
|---|---|---|---|
| Facility Name: | Colony Energy Partners – Tulare, LLC | Date: | June 16, 2016 |
| Mailing Address: | 4940 Campus Drive, Ste C<br>Newport Beach, CA 92660 | Engineer: | G Heinen |
| | | Lead Engineer: | Joven Refuerzo |
| Contact Person: | Matt Schmitt | | |
| Telephone: | (949) 842-4827 | | |
| E-Mail: | matt@colonyenergypartners.com | | |
| Application No: | S-8153-1-2, '4-1, and '5-1 | | |
| Project No: | S-1161129 | | |
| Deemed Complete: | March 31, 2016 | | |

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## I. Proposal

Colony Energy Partners – Tulare, LLC (CEP) has requested reissuance of the Authority to Construct (ATC) permits for installation of an anaerobic digester system with a digester gas conditioning system and two 41 MMBtu/hr Bekaert Model CEB 1200 digester gas-fired air-assisted ground level enclosed flares and two cogeneration (heat and electric) systems each equipped with 831 bhp MWM Model TCG 2016 V12 C lean burn natural gas-fired internal combustion (IC) engines each driving a 600 kW electrical generator.

This facility was originally permitted in project S-1130032 but the ATC permits expired before construction has commenced. No application was received to renew the ATCs before the expiration date. The applicant still plans to proceed with the project and has requested the ATC be reissued. The applicant stated that the project specifications are identical to those proposed under project S-1130032. This request will be treated as a new facility that is subject to District Rule 2201 (New and Modified Stationary Source Review Rule) requirements. Draft ATCs for this project are found in Appendix A.

## II. Applicable Rules

| | |
|---|---|
| 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 Emissions Standards for Hazardous Air Pollutants (5/20/04) |
| Rule 4101 | Visible Emissions (2/17/05) |
| Rule 4102 | Nuisance (12/17/92) |
| Rule 4201 | Particulate Matter Concentration (12/17/92) |

Rule 4311 Flares (6/18/09)
Rule 4565 Biosolids, Animal Manure, and Poultry Litter Operations (3/15/07)
Rule 4566 Organic Material Composting Operations (8/18/11)
Rule 4701 Internal Combustion Engines (8/21/03)
Rule 4702 Internal Combustion Engines – Phase 2 (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

## II. Project Location

The facility is located at Paige Avenue (west of Enterprise Street) in Tulare, CA (S/2 Section 16, Township 20S, Range 24E Mount Diablo Base and Meridian). 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.

## III. Process Description

CEP is proposing to construct and operate a digester gas plant in Tulare, CA. The plant will consist of two anaerobic digesters that will process incoming organic materials (substrates) and produce digester gas and digestate. The facility will operate up to 24 hours per day and 365 days per year.

Organic Material Delivery

The proposed facility will continuously receive organic material (substrates) in both liquid and solid form. All solid unloading will occur in the enclosed solid reception bunker under a slightly negative air pressure. The liquid feedstock unloading will be conducted using the two hose connections located at the side of the solid reception building. The trucks will connect their content outlet to the appropriate hose for the delivery of the liquids into the reception tanks.

Liquid Feedstock

Liquid feedstocks will be delivered to the site by waste haulers. Operators will drive their trucks to the liquid reception area/dock. The truck operator will then proceed to the discharge coupling protruding from the building wall and choose one of the flexible hoses with the correct cam and groove couplings to accommodate trucks discharge valve. The truck operator will activate the liquid organics pump to allow the feedstock to flow to its destination storage tank selected by the plant operator. Any inadvertently spilled organics will be immediately washed from the concrete and containment area by the truck operator into floor drains which are plumbed to the reception pit.

Solid Feedstock

Solid feedstocks will be delivered to the site by waste haulers. Truck operators will back their trucks up to the solid reception building and the plant operator to open the exterior door of the building. Once the door is open, the truck operator will back the truck into the solid reception building. After the exterior door is closed, the plant operator will open the hydraulic lid of the underground pit to receive the incoming solid organic feedstock. The truck operator empties the load of solid organic feedstock into the reception pit.

Odor emissions are mitigated in the solid feedstock offloading area by using an air lock system comprised of the exterior door and underground pit lid. Trucks handling the solids will also be covered, preventing direct exposure to the atmosphere at any time.

The air lock system ensures that the feedstock processing will not be directly exposed to the atmosphere at any time by using interior and exterior doors. When a truck arrives to unload feedstock, it will enter the exterior set of doors and the interior doors will be closed. Once the truck is between the two sets of doors, the exterior doors will close and the interior doors will open to allow access to the unloading area. Upon exit, the exterior door is only permitted to open when a) all interior doors and/or the reception pit cover is closed; and b) 15 minutes have passed since the last closing of the interior door.

This system will vent potential odors from the area between the interior and exterior doors to the air duct which is attached to the cogeneration engines for combustion. The delay of 15 minutes is based on a circulation rate of four air changes per hour. The delay allows for truck inspection, washing of tires, area cleanup, and completion of administrative duties with the plant operator.

Feedstock Pre-Treatment

Pre-treatment of organic feedstock is intended to render all materials received into a form that can be pumped and is compatible with the anaerobic digestion system. All pre-treatment will occur prior to materials entering the reception tanks. Examples of pre-treatment include: 1) chopping – fine size reduction of organic materials and 2) dilution – addition of process, condensate, and/or treated water to substrates. Solid organic feedstock will be tipped into the below-ground reception pit. The pit will be outfitted with a mixer and a chopper pump. The pumping system will include a recirculation loop to allow for the reduction of large particles into smaller ones. Smaller particles are easier to pump and expose more surface area for a more thorough digestion. The slurry will be pumped into a bio-separator which will capture and remove debris such as plastic, stones, etc. that may be entrained in the solid organic feedstocks. A centrifugal force system will allow the lighter particles to be screened off and send to a loadout bin.

Feedstock Storage

The feedstocks that arrive in the facility are separated in categories depending upon their physical composition and compatibility with other materials. Based on this categorization the incoming substrates of each category will arrive at the facility throughout the year and will be stored in separate storage tanks. There will be two reception tanks used for receiving the feedstock, and a dilution water tank used for receiving filtrate that will be used for diluting the feedstock when necessary.

The hard top reception tanks will be constructed above grade with a completely sealed wall surface that is water tight and air tight. The dilution water tank is a pre-manufactured tank.

All feedstock storage tanks will have one liquid inlet above the liquid level, and two liquid outlets below the liquid level; one for transferring the feedstock to the anaerobic digestion system; the other for evacuation during shutdown or emergency.

The reception tanks will each contain an internal mixer to avoid settling of solid sediments in these tanks. Flangeless hot water piping will be installed around the circumference of the tanks to heat the feedstock (cheese whey permeate and fat, oil, and grease). A hot water circuit, using recovered heat from the cogeneration engines, heats the digesters, reception tanks, and desulfurization unit. Continuous temperature and liquid level monitoring will regulate the tanks and avoid mixing and pumping issues.

Digester

The anaerobic digestion of the substrate occurs in the digester tanks. Each digester is identical in construction. The inner ring where the final digestion process will occur will be constructed of a dual layer flexible membrane. The outer and inner ring of each digester will be mixed with submersible hydraulic mixers which ensure thorough mixing and homogenization of incoming feedstock and substrates in the digesters.

In the engine building, plate heat exchangers (one per engine) will transfer the jacket water heat from the engines to the digesters hot water circuit. The heat will then be transferred from the pipes surrounding the inner walls of the digester's rings to the digesting feedstock providing the appropriate temperature to the naturally present microorganisms which are responsible for the anaerobic digestion.

In order to maintain mesophilic temperature range in the digesters, the rings will be insulated. The malodorous compounds within the organic substrate, known as volatile organic acids (e.g. acetic acid, propanoic acid, butanoic acid) are what the anaerobic microorganisms (methanogenic bacteria) eventually consume to produce digester gas. In the process of digesting these volatile organic acids odors are minimized. The hydraulic retention time inside the digesters is between 25 and 35 days. The hydraulic retention time is the average time that one unit of feedstock (organic matter) remains within the digester.

The digester gas production from the input substrates is optimized through the anaerobic digestion system. The outer ring is used as a primary digester, for introduction of the feedstock, and the inner ring is used as a secondary digester. The biological anaerobic

digestion of the feedstock will first take place in the outer ring producing digester gas as a result of the process. The partly digested feedstock is then moved to the inner ring where further anaerobic digestion occurs and yields additional digester gas.

The dual layer flexible membrane of the inner rings allows mixing and storage of the digester gas produced. The inner membrane has a special coating for gas tightness and gas resistance and the outer membrane is UV-stabilized. Each cover includes a dedicated air blower that keeps the external membrane inflated which the internal membrane fluctuates in position based on the digester gas production and the digester gas use (i.e. differential pressure). A level transducer mounted in the outside membrane tracks the relative position of the internal membrane. A methane detector is provided at the backpressure valve air outlet of the inter-membrane space. The methane sensor measures methane content in the existing air and alarms at present methane concentrations. This security system indicates if there is a leak in the internal membrane. The membrane will have low permeability, preventing the release of odors or gaseous compounds to the atmosphere.

Each digester is equipped with a pair of flash-back (flame) arresters and pressure/vacuum relief valves connected to the digester roof piped in parallel with a three-way manual change over valve installed in the common supply piping so that there shall be only one of the flash-back arrester and pressure/vacuum relief valves in effective service at all times.

Buffer Storage Tank

Digestate, the remainder of the substrates following anaerobic digestion, is pumped intermittently from each digester to the buffer storage tank. The roof will consist of a dual layer flexible membrane. The buffer storage tank has two submerged mixers to prevent settling of solids.

This tank provides additional residence time required for the digestate, thus greatly reducing the likelihood of undigested organic matter leaving the system. The buffer storage allows degasification and liberates the entrapped gases thereby reducing the odor level of post-digestion handling to an almost undetectable level, and prevents the unwanted release of methane during the next stage of pressing (i.e., composting or land application). Furthermore, the buffer storage tank provides capacity to handle any scheduled and unscheduled maintenance situation for downstream process equipment such as solid separation or wastewater treatment.

The buffer storage tank also provides for digester gas storage in its double membrane gas holder roof. The inner membrane has a special coating for gas tightness and gas resistance and the outer membrane is UV-stabilized. Each cover includes a dedicated air blower that keeps the external membrane inflated, which the internal membrane fluctuates in position base on gas production as gas use (e.g. differential pressure). A level transducer mounted in the outside membrane tracks the relative position of the internal membrane. A methane detector is provided at the backpressure valve air outlet of the inter-membrane space. The methane sensor measures methane content in the existing air and alarms at present methane concentrations. This security system indicates if there is a leak in the internal membrane.

The buffer storage tank is equipped with a pair of flash-back (flame) arresters and pressure/vacuum relief valves connected to the digester roof piped in parallel with a three-way manual change over valve installed in the common supply piping so that there shall be only one of the flash-back arrester and pressure/vacuum relief valves in effective service at all times.

The buffer storage tank acts as a digestate storage and volume buffering tank. Depending on the digestate management strategy, digestate may be processed intermittently, therefore the tank is large enough to provide several days of storage.

Digester Gas Conditioning

The Greenlane Biogas Upgrading System will accept raw digester gas from a receiving pit which is controlled by a biofilter not equipped with a stack (area source). The raw digester gas is sent into a compressor driven by an electric motor, where the raw digester gas is compressed to a pressure suitable for processing. It will then be sent to a scrubbing vessel for water scrubbing, a flash vessel for methane recovery, and a stripping vessel for regeneration of the process water. The drying system will then dry the upgraded gas after the scrubbing vessel. Waste gas from the stripping vessel will incorporate a biofilter equipped with a stack to control H2S gas.

The digester gas flows through an inlet separator to a stage one compressor. The compression process is two stage, complete with inter and after-cooling via water-cooled shell and tube heat exchangers. Temperature, pressure and level instrumentation monitor operation and provide control and safe operation. Discharge check valves are provided to prevent reverse flow of digester gas when the system is stopped.

A condensate collector vessel and coalescing filter follow the stage one and two discharge coolers respectively. These devices collect and remove condensate and compressor lube oil from the digester gas. The condensate collectors also act as receivers for the gas recovered from the flashing vessel. The coalescing filter discharge and scrubbing vessel weir decant drain lines are also connected to this collector vessel.

After compression, the digester gas enters the bottom of the scrubbing vessel. Inside the vessel the digester gas rises to the top, which is counter-flow to the process water flowing downwards. The water preferentially absorbs the more soluble gases such as CO2 and H2S. Product gas, which is now almost pure CH4, exists from the top of the vessel. Packing balls and distributors inside the scrubbing vessel provide increase surface contact area between the gas and water to maximize absorption efficiency.

After the scrubbing vessel the product gas passes through an adsorber. The molecular sieve media in the drier vessels adsorbs moisture and further purifies the product gas. The dried product gas passes through a filter and a pressure control valve, before being discharged at the skid boundary. The control valve maintains a steady set pressure at the scrubbing vessel, thus ensuring consistent CO2 and H2S adsorption.

For the air stripper, air is drawn through an air filter and inverted U-bend before entering the base of the stripping vessel. The inverted U-bend prevents water from discharging through the stripping air inlet in the event of vessel flooding. Inside the vessel, the air is

drawn upwards in counter-flow to the water flowing downwards. The air strips the dissolved CO2 and H2S out of the water and the air/gas mixture exists from the top of the vessel. Stripping air/gas is discharged continuously during operation, regardless of the operating capacity. This stream contains air, CO2, H2S, and other gases. The air/gas mixture is discharged to a biofilter equipped with a stack.

Digester Gas Desulfurization Unit

Hydrogen sulfide (H2S) is present in the digester gas produced during anaerobic digestion due to the degradation of proteins and other sulfur containing compounds present in the feedstock. In the cogeneration engines, H2S reacts with water to form sulfuric acid (H2SO4) which is highly corrosive.

An external physical contact scrubber (iron sponge) is integrated into the process design to effect H2S reduction.

External H2S removal will be effected with an iron sponge system. Iron sponge is a non-renewable method of removing H2S. The H2S reacts with the iron to form iron sulfide. The iron sponge consists of wood shavings or wood chips impregnated with hydrated iron oxide. Exposing H2S to mercaptans produces iron sulfides and iron mercaptides. The chemical process of H2S removal with the iron sponge produces iron sulfides.

$$2FeO3 + H2O + 6H2S \rightarrow 2Fe2S3 + 8H2O$$

The process occurs after gas/liquid separation and prior to the dehydration process. For the iron sponge to effectively perform, it must be maintained within a defined range of sufficient moisture content. This requirement is typically satisfied if the gas is saturated with water vapor, as is frequently the case with digester gas or digester gas. Therefore, no water spray is required for a digester gas application. Excess water is well tolerated by the iron sponge as long as the excess is drained off so as not to flood the bed. Also, the reaction of iron oxide with H2S produces water contributing to proper hydration. The moisture drained is collected in the condensate tank and used for process dilution in the front end of the process along with other condensate.

Iron oxide impregnated into the wood surface will not wash off or migrate with the gas. If the iron sponge has dried in storage it can be re-wet and remain effective. A maximum temperature 120 degrees F should not be exceeded. The minimum temperature is 50 degrees F, or whatever is necessary to avoid hydrate formation relative to the system pressure and composition of the digester gas. The iron sponge reaction is not pressure sensitive and is not affected by other gas constituents.

The equipment needed for iron sponge treatment consists of a vessel which is filled with iron oxide. The gas is passed down flow with the H2S removed to meet the designed 40 ppmv requirement until the iron sponge is exhausted. The sponge is then either revivified or replaced. For continuous operation there will be an alternate vessel provided (standby unit) all piped to operate the process without any interruption. Valves can be arranged so either bed can operate while the other is serviced. The system is total enclosed and there is no potential of leaks. The multi stage method of desulfurization is capable of reducing H2S levels in the digester gas from 1,500 ppm down to between 10 and 50 ppm.

Digestate Management System

The digestate that leaves the buffer storage tank will be low solid organic slurry that will be dewatered by a filter screw press. The press will separate the digestate into liquid and solid fractions. The liquid fraction (filtrate) is sent to a Dissolved Air Floatation (DAF) unit for further solid separation. The solids removed from the DAF unit are dewatered using a horizontal decanter/centrifuge. The solids fraction of the digestate has a commercial value and shall be sold as a byproduct. All process liquid effluent that meet specified discharge requirements will be directed to the nearby Tulare Industrial WWTP for further treatment.

A feed pump will be used to transfer digestate from the buffer holding tank to the filter screw press. The flow to the press will be monitored and controlled using a Magmeter. The press will be elevated and dewater solids and will discharge by gravity to a solids pad directly below.

The liquid effluent from the filtrate will flow by gravity to an intermediary tank from which it will be pumped to a DAF system. Polymer is added to the DAF influent to promote flocculation and removal of suspended solids. The polymer system doses polymer based on the DAF influent rate measured using a Magmeter. Through primary and secondary solid separation with a filter screw press and DAF of the pressage, suspended solids are significantly reduced to < 0.5% total solids. The float from the DAF is collected and pumped to a centrifuge for further dewatering. The dewatered solids fall by gravity to the solids pad to be combined with the press cake from the filter screw press for sale as compost. Clarified effluent from both the DAF and centrifuge is discharged directly to the Tulare Industrial WWTP for further treatment.

The polymer make down system will utilize a dry polymer which is diluted and aged prior to dosing into the DAF system. The dry polymer is supplied in bead-form (crystals) which eliminates dust while handling. The beads are packaged in small 25 kg bags from which the operator transfer them to a polymer hopper. The polymer make down system will use a vacuum polymer unloading and conveying system to transfer powder into the polymer mixing system for dilution with water. An air blower will transfer the polymer via a venture educator to a wetting head above the polymer mixing tank. The system utilizes totally enclosed conveying, mixing and storage units.

Digester Gas Flare

The flare will combust the digester gas produced by the facility during the commissioning period as the digester gas may have not yet reached the adequate quality to send to the pipeline.

Natural Gas-Fired Cogeneration Engines

The natural gas-fired IC engines will create electricity for use at the plant and the waste heat will be used for the anaerobic digestion process and solids heating to destroy pathogens in the biosolids prior to be sold as fertilizer.

## V. Equipment Listing

**S-8153-1-2**: DIGESTER GAS PRODUCTION OPERATION CONSISTING OF ONE MANURE RECEPTION TANK, ONE DILUTION TANK, ONE FAT, OIL, GREASE, VEGETABLE WASTE RECEPTION TANK, ONE MIXING (FEED) TANK, TWO ANAEROBIC DIGESTER TANKS, ONE DIGESTATE (BUFFER) HOLDING TANK, DIGESTER GAS TREATMENT SYSTEM CONSISTING OF A CHILLER, COMPRESSOR, IRON SPONGE SCRUBBER, AND TWO 41 MMBTU/HR BEKAERT MODEL CEB 1200 DIGESTER GAS-FIRED AIR-ASSIST GROUND LEVEL ENCLOSED FLARES AND DIGESTATE MANAGEMENT SYSTEM CONSISTING OF ONE FILTER SCREW PRESS WITH ONE OVERFLOW BUFFER TANK, ONE SCREW PRESS BUFFER TANK, A POLYMER MAKE-DOWN SYSTEM, A DISSOLVED AIR FLOATATION (DAF) SYSTEM, ONE DIGESTATE BY-PRODUCT LOADOUT STATION, AND ONE BIOSOLIDS HEATING TANK AND TWO BIOMETHANE UPGRADING SYSTEMS EACH CONSISTING OF GAS COMPRESSORS, WATER SCRUBBING VESSEL, FLASH VESSEL, DRIER/PURIFIER VESSEL, AIR STRIPPING VESSEL SERVED BY A BIOFILTER, AND RECEIVING PIT SERVED BY A SECOND BIOFILTER

**S-8153-4-1**: 831 BHP MWM MODEL TCG 2016 V12 C LEAN BURN NATURAL GAS-FIRED IC ENGINE WITH TURBOCHARGER, INTERCOOLER, AIR/FUEL RATIO CONTROLLER, POSITIVE CRANKCASE VENTILATION, AND SELECTIVE CATALYTIC REDUCTION WITH UREA INJECTION COGENERATION SYSTEM

**S-8153-5-1**: 831 BHP MWM MODEL TCG 2016 V12 C LEAN BURN NATURAL GAS-FIRED IC ENGINE WITH TURBOCHARGER, INTERCOOLER, AIR/FUEL RATIO CONTROLLER, POSITIVE CRANKCASE VENTILATION, AND SELECTIVE CATALYTIC REDUCTION WITH UREA INJECTION COGENERATION SYSTEM

## VI. Emission Control Technology Evaluation

S-8153-1-2

Iron Sponge

An external physical contact scrubber (iron sponge) is integrated into the process design to effect H2S reduction of the digester gas. The equipment needed for iron sponge treatment consists of a vessel which is filled with iron oxide. The gas is passed down flow with the H2S removed to meet the designed 40 ppmv requirement until the iron sponge is exhausted. The sponge is then either revivified or replaced. For continuous operation there will be an alternate vessel provided (standby unit) all piped to operate the process without any interruption. Valves can be arranged so either bed can operate while the other is serviced. The system is total enclosed and there is no potential of leaks. The multi stage method of desulfurization is capable of reducing H2S levels in the digester gas from 1,500 ppm down to between 10 and 50 ppm.

Biofilter

When applied to air filtration and purification, biofilters use microorganisms to remove air pollution. They are reactors in which humid polluted air streams are passed through a porous packed bed. The media provides a large surface area for the absorption and adsorption of contaminants. The media also serves as a nutrient source for the microbial population and creates situations for air to meet its specific empty bed residence time (EBRT) requirements. The empty bed residence time is the empty bed filter volume divided by the airflow rate, is a very common term used to describe biofilters, because it readily allows one to estimate the filter size for a given airflow.

$$EBRT = V_f/Q, \text{ where } V_f \text{ is the filter bed volume } (m^3) \text{ and } Q \text{ the airflow rate } (m^3/s)$$

The air flows through a packed compost and rot wood media/bed and the pollutant transfers into a thin biofilm on the surface of the packing material. The elimination of the gaseous pollutants is the result of a complex combustion of different physicochemical and biological phenomena. Microorganisms, including bacteria and fungi are propagated and immobilized in the biofilm and degrade the influent pollutant (typically mixed VOCs and various sulfur compounds, including hydrogen sulfide). These fungi and bacteria feed on the VOCs and odor-causing organics to metabolize and neutralize the organic compounds.

Contaminated air is moistened by a humidifier and is pumped into the biofilter through a chamber below the filter medium. While the air slowly flows upward through the filter media, the contaminants in the air stream are absorbed and metabolized. The purified air passes out of the top of the biofilter and into the atmosphere. The biofilter can efficiently treat odor, VOCs, and H2S at an efficiency of 99%. The moist filter medium provides physical and chemical conditions appropriate for the transfer of contaminants from the air to the liquid phase and the biodegradation of the contaminants in the biofilm layer. The mechanisms of the biofiltration process include a combination of adsorption, absorption, and microbial degradation. Microorganisms contained in the biofilm layer continually metabolize the contaminants, as they are absorbed, converting them ultimately to water, carbon dioxide and salts.

Flare

The digester gas-fired enclosed flares proposed in this project has the potential to emit NOx, SOx, PM10, CO, and VOC emissions due to the incineration of digester gas generated by the anaerobic digester system. The enclosed flares use a digester gas-fired automatic ignition pilot.

S-8153-4-1 and '5-1

Natural Gas-Fired Engines

The engines are equipped with:

[X] Turbocharger
[X] Positive Crankcase Ventilation (PCV)
[X] Lean Burn Technology
[X] Intercooler
[X] Air/Fuel Ratio Controller
[X] Selective Catalytic Reduction

The turbocharger reduces the $NO_X$ emission rate from the engine by approximately 10% by increasing the efficiency and promoting more complete burning of the fuel.

The intercooler functions in conjunction with the turbocharger to reduce the inlet air temperature. By reducing the inlet air temperature, the peak combustion temperature is lowered, which reduces the formation of thermal $NO_X$. $NO_X$ emissions are reduced by approximately 15% with this control technology.

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

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

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

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

## VII. General Calculations

### A. Assumptions

- Operation schedule = 24 hr/day and 365 days/year (per applicant)
- Digester gas heating value = 600 Btu/scf (per applicant)
- Natural gas heating value = 1000 Btu/scf (District Practice)
- Digester gas F-factor = 9,100 dscf/MMBtu (per applicant)
- Natural gas F-factor (adjusted to 60 °F) = 8,578 dscf/MMBtu (40 CFR 60 Appendix B)
- Post desulfurization unit digester gas H2S concentration = 40 ppmv (per applicant based on BACT limit and four hour averaging period)
- Natural gas sulfur concentration = 1.0 gr-S/100 scf or 0.00285 lb-SO2/MMBtu (District Policy APR 1720)

S-8153-1-2

- Maximum flare digester gas flow rate (each flare) = 41,667 scf/hr, 1,000,000 scf/day, 36.5 MMscf/year (per applicant)
- Maximum air stripper/biofilter waste gas flow rate = 1,840 scf/min (per applicant)
- Maximum receiving pit open biofilter waste gas flow rate = 1,440 scf/min (per applicant)

S-8153-4-1 and '5-1

- Engine exhaust flow rate = 1,686.85 cfm (per manufacturer)
- Engine natural gas fuel consumption rate = 4,975 scf/hr (based on manufacturer specification sheet of 4,975 MBtu/hr x scf/1000 Btu)
- BHP to Btu/hr conversion: 2,542.5 Btu/bhp-hr
- Thermal efficiency of engine: commonly ≈ 35%
- The ammonia (NH3) emission concentration shall not exceed 5 ppmvd @ 15% O2 (per application).

**B. Emission Factors**

S-8153-1-2

Air Stripper/Biofilter

| Controlled Waste Gas Sulfur Content | | |
|---|---|---|
| Pollutant | ppmv | Source |
| H2S (Uncontrolled) | 2,000 | Per Applicant |
| H2S (Controlled) | 7.0 | Per Applicant |

Receiving Pit Open Biofilter

| Controlled Waste Gas Sulfur Content | | |
|---|---|---|
| Pollutant | ppmv | Source |
| H2S (Uncontrolled) | 200 | Per Applicant |
| H2S (Controlled) | 2.0 | Per Applicant |

Flare

The flare will only be fired on digester gas fuel at all times.

| Commissioning SOx Emission Factors Digester Gas Fuel (Each Flare) | | |
|---|---|---|
| Period | ppmvd in Fuel Gas | lb/MMBtu |
| First 30 days of Commissioning Period | 4,000 | 1.124 |
| Next 15 days of Commissioning Period | 2,500 | 0.70 |
| Final 15 days of Commissioning Period | 1,000 | 0.281 |
| Stable Performance, Final Sulfur Content Limit after 60 days for Commissioning | 40 | 0.0112 |

$$\left(\frac{1000\,ft^3 - H_2S}{10^6\,ft^3 - fuel}\right)\left(\frac{lb-mol\,H_2S}{379.5\,scf\,H_2S}\right)\left(\frac{lb-mol\,SO_2}{lb-mol\,H_2S}\right)\left(\frac{64\,lb\,SO_2}{lb-mol\,SO_2}\right)\left(\frac{scf\,fuel}{600\,Btu}\right) = 0.281\frac{lb-SO_2}{MMBtu}$$

| Steady State Digester Gas Fuel (Each Flare) | | |
|---|---|---|
| Pollutant | lb/MMBtu | Source |
| $NO_X$ | 0.03 | Manufacturer Guarantee |
| $SO_X$ | 0.0112 | Mass balance equation below based on BACT limit of 40 ppmv H2S in fuel and four hour averaging period |
| $PM_{10}$ | 0.008 | Manufacturer Guarantee |
| CO | 0.30 | Manufacturer Guarantee |
| VOC | 0.068 | Manufacturer Guarantee |

$$SOx = \frac{\left(41{,}667\frac{ft^3-fuel}{hr}\right)\left(\frac{40\,ft^3-H_2S}{10^6\,ft^3-fuel}\right)\left(34\frac{lb-H_2S}{lb-mol}\right)}{\left(379.5\frac{ft^3-H_2S}{lb-mol}\right)\left(\frac{34\,lb-H_2S}{32\,lb-S}\right)\left(\frac{32\,lb-S}{64\,lb-SO_2}\right)}$$

SOx = 0.28 lb/hr

SOx = 0.28 lb/hr ÷ (41,667 scf/hr x 600 Btu/scf) x 1E6/MM
= 0.0112 lb/MMBtu

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Natural Gas-Fired Engines

The following emission factors are for each engine after the SCR treatment.

| Natural Gas Fuel (Each Engine) | | | |
|---|---|---|---|
| Pollutant | g/hp-hr | ppmv @ 15% O2 | Source |
| $NO_X$ | 0.07 | 5 | Applicant proposal for BACT |
| $SO_X$ | 0.0094 | -- | Mass Balance Equation Below |
| $PM_{10}$ | 0.033 | -- | AP-42 (7/00) Table 3.2-2* |
| CO | 0.60 | 82.4 | Manufacturer Guarantee |
| VOC | 0.15 | 25 | Applicant proposal for BACT |

$$0.00285\ \frac{lb-SO_x}{MMBtu}\times\frac{1\,MMBtu}{1{,}000{,}000\,Btu}\times\frac{2{,}542.5\,Btu}{bhp-hr}\times\frac{1\,bhp\ input}{0.35\,bhp\ out}\times\frac{453.6\,g}{lb}=\ 0.0094\ \frac{g-SO_x}{bhp-hr}$$

* PM10 value includes both filterable ($7.71 \times 10^{-5}$ lb/MMBtu) and condensable ($9.91 \times 10^{-3}$ lb/MMBtu) emissions.

**C. Calculations**

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

The operations proposed in this project are new emission units. Therefore, PE1 = 0.

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

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Air Stripper/Biofilter Emissions

Daily H2S Emissions = 1,840 scf-waste gas/min x 7.0 scf-H2S/$10^6$ scf-waste gas x lb-mol/379.5 scf x 34 lb/lb-mol x 1,440 min/day
= 1.7 lb-H2S/day

Annual H2S Emissions = 1,840 scf-waste gas/min x 7.0 scf-H2S/$10^6$ scf-waste gas x lb-mol/379.5 scf x 34 lb/lb-mol x 1,440 min/day x 365 days/year
= 607 lb-H2S/year

Receiving Pit Open Biofilter

Daily H2S Emissions = 1,440 scf-waste gas/min x 2.0 scf-H2S/$10^6$ scf-waste gas x lb-mol/379.5 scf x 34 lb/lb-mol x 1,440 min/day
= 0.4 lb-H2S/day

Annual H2S Emissions = 1,440 scf-waste gas/min x 2.0 scf-H2S/$10^6$ scf-waste gas x lb-mol/379.5 scf x 34 lb/lb-mol x 1,440 min/day x 365 days/year
= 136 lb-H2S/year

Daily Flare Emissions

| **Steady State Daily Post-Project Emissions for each Flare (Digester Gas Fuel)** | | | | | |
|---|---|---|---|---|---|
| Pollutant | Emission Factors (lb/MMBtu) | Heat input (MMBtu/day) | | | PE2 Total (lb/day) |
| $NO_X$ | 0.03 | x | 600 | = | 18.0 |
| $SO_X$ | 0.0112 | x | 600 | = | 6.7 |
| $PM_{10}$ | 0.008 | x | 600 | = | 4.8 |
| CO | 0.30 | x | 600 | = | 180.0 |
| VOC | 0.068 | x | 600 | = | 40.8 |

The applicant has stated the worst case daily SOx emissions during each commissioning period will be limited to 140.7 lb/day.

| Commissioning Daily Post-Project Emissions for each Flare (Digester Gas Fuel) | | | | | |
|---|---|---|---|---|---|
| Pollutant | Emission Factors (lb/MMBtu) | Heat input (MMBtu/day) | | | PE2 Total (lb/day) |
| $NO_X$ | 0.03 | x | 600 | = | 18.0 |
| $SO_X$ | | | | | 140.7 |
| $PM_{10}$ | 0.008 | x | 600 | = | 4.8 |
| CO | 0.30 | x | 600 | = | 180.0 |
| VOC | 0.068 | x | 600 | = | 40.8 |

| Daily Worst Case Post-Project Emissions for each Flare (Digester Gas Fuel) | |
|---|---|
| Pollutant | PE2 Total (lb/day) |
| $NO_X$ | 18.0 |
| $SO_X$ | 140.7 |
| $PM_{10}$ | 4.8 |
| CO | 180.0 |
| VOC | 40.8 |

Annual Flare Emissions

| Steady State Annual Post-Project Emissions for each Flare (Digester Gas Fuel) | | | | | |
|---|---|---|---|---|---|
| Pollutant | Emission Factors (lb/MMBtu) | | Heat input (MMBtu/yr) | | PE2 Total (lb/yr) |
| $NO_X$ | 0.03 | x | 21,900 | = | 657 |
| $PM_{10}$ | 0.008 | x | 21,900 | = | 175 |
| CO | 0.30 | x | 21,900 | = | 6,570 |
| VOC | 0.068 | x | 21,900 | = | 1,489 |

As stated above, the worst case daily SOx emissions during each commissioning period will be limited to 140.7 lb/day. The corresponding digester gas fuel flow rate and annual emissions using the 140.7 lb/day limit will be calculated below (i.e. 140.7 lb/day x MMBtu/1.124 lb x scf/600 Btu = 208,630 scf).

The steady state digester gas fuel flow rate is calculated as the difference between the maximum proposed annual digester gas fuel flow rate of 36.5 MMscf/year and the combined digester gas fuel flow during each commissioning period

Steady State Fuel = 36,500,000 scf/year – (208,630 scf/day x 30 days/year) – (335,000 scf/day x 15 days/year – (834,520 scf/day x 15 days/year)

= 12,698,300 scf/year

| Post-Project Annual SOx Emissions (Commissioning + Steady State) for each Flare (Digester Gas Fuel) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Emission Factors (lb/MMBtu) | | Heat input (scf/day) | | Operation days/yr | | Btu/scf | | PE2 Total (lb/yr) |
| $SO_X$ | 1.124 | x | 208,630 | x | 30 | x | 600 | = | 4,221 |
| | 0.70 | x | 335,000 | x | 15 | x | 600 | = | 2,111 |
| | 0.281 | x | 834,520 | x | 15 | x | 600 | = | 2,111 |
| | 0.0112 | x | 12,698,300 | | | | 600 | = | 85 |
| | Total | | 36,500,000 | | | | | | 8,528 |

The SOx emissions in the table above are added to the emissions calculations for the annual flare emissions shown in the following table:

| Post-Project Annual Emissions (Commissioning + Steady State) for each Flare (Digester Gas Fuel) | | | | | |
|---|---|---|---|---|---|
| Pollutant | Emission Factors (lb/MMBtu) | | Heat input (MMBtu/year) | | PE2 Total (lb/year) |
| $NO_X$ | 0.03 | x | 21,900 | = | 657 |
| $SO_X$ | (See table above) | | | | 8,528 |
| $PM_{10}$ | 0.008 | x | 21,900 | = | 175 |
| CO | 0.30 | x | 21,900 | = | 6,570 |
| VOC | 0.068 | x | 21,900 | = | 1,489 |

Since there are two flares, the total flare emissions equals two times the amounts calculated above:

| Annual Worst Case Post-Project Emissions for both Flares (Digester Gas Fuel) | |
|---|---|
| Pollutant | PE2 Total (lb/year) |
| $NO_X$ | 657 x 2 = 1,314 |
| $SO_X$ | 8,528 x 2 = 17,056 |
| $PM_{10}$ | 175 x 2 = 350 |
| CO | 6,570 x 2 = 13,140 |
| VOC | 1,489 x 2 = 2,978 |

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The daily emission calculations for the natural gas fired engines are as shown in the following table:

| Daily Post-Project Emissions for each Engine (Natural Gas Fuel) | | | | | |
|---|---|---|---|---|---|
| Pollutant | Emission Factor (g/bhp-hr) | Horsepower Rating (bhp) | Operation (hr/day) | Conversion (g/lb) | PE2 Total (lb/day) |
| $NO_X$ | 0.07 | 831 | 24 | 453.6 | 3.1 |
| $SO_X$ | 0.0094 | 831 | 24 | 453.6 | 0.4 |
| $PM_{10}$ | 0.033 | 831 | 24 | 453.6 | 1.5 |
| CO | 0.60 | 831 | 24 | 453.6 | 26.4 |
| VOC | 0.15 | 831 | 24 | 453.6 | 6.6 |
| $NH_3$ | *(see below)* | | | | 0.5 |

*Ammonia*

Ammonia ($NH_3$) emissions will be emitted by the operation of the SCR system. The proposed daily $NH_3$ emissions can be calculated as follows:

PE = ppm x MW x ($2.64 \times 10^{-9}$) x exhaust flow rate x 1440 min/day

Where:

- ppm is the emission concentration in ppmvd @ 15% $O_2$
- MW is the molecular weight of the pollutant ($MW_{NH3}$ = 17 lb/lb-mol)
- 2.64 x $10^{-3}$ is the inverse of the molar specific volume (lb/scf, at 60 °F)
- exhaust flow rate = 4,281.3 scf/min (per manufacturer)
- engine is operated a maximum of 1,440 min/day and 8,760 hours/year

$NH_3$ PE (lb/day) = $5 \times 10^{-6}$ x 17 x ($2.64 \times 10^{-3}$) (lb-mol/scf) x 1,686.85 (scf/min) x 1,440 (min/day)
= **0.5 lb-$NH_3$/day**

The annual emission calculations for the natural gas fired engines are as shown in the following table:

| Annual Post-Project Emissions for each Engine (Natural Gas Fuel) | | | | | |
|---|---|---|---|---|---|
| Pollutant | Emission Factor (g/bhp-hr) | Horsepower Rating (bhp) | Operation (hr/year) | Conversion (g/lb) | PE2 Total (lb/year) |
| $NO_X$ | 0.07 | 831 | 8,760 | 453.6 | 1,123 |
| $SO_X$ | 0.0094 | 831 | 8,760 | 453.6 | 151 |
| $PM_{10}$ | 0.033 | 831 | 8,760 | 453.6 | 530 |
| CO | 0.60 | 831 | 8,760 | 453.6 | 9,629 |
| VOC | 0.15 | 831 | 8,760 | 453.6 | 2,407 |
| $NH_3$ | *(see below)* | | | | 199 |

*Ammonia*

The proposed annual $NH_3$ emissions can be calculated as follows:

PE = ppm x MW x ($2.64 \times 10^{-9}$) x exhaust flow rate x 1440 min/day x 365 day/year

$NH_3$ PE (lb/year) = $5 \times 10^{-6}$ x 17 x ($2.64 \times 10^{-3}$) (lb-mol/scf) x 1,686.85 (scf/min) x 1440 (min/day) x 365 day/year

= **199 lb-$NH_3$/year**

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

Pursuant to 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 facility will be treated as new in this project; therefore, the SSPE1 is equal to zero.

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

Pursuant to 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 that have occurred at the source, and which have not been used on-site.

Using the annual emissions calculated above, the SSPE2 is calculated as shown in the following table:

| SSPE2 (lb/year) | | | | | |
|---|---|---|---|---|---|
| Permit Unit | $NO_X$ | $SO_X$ | $PM_{10}$ | CO | VOC |
| S-8153-1-2 | 1,314 | 17,056 | 350 | 13,140 | 2,978 |
| S-8153-4-1 | 1,123 | 151 | 530 | 9,629 | 2,407 |
| S-8153-5-1 | 1,123 | 151 | 530 | 9,629 | 2,407 |
| SSPE2 | 3,560 | 17,358 | 1,410 | 32,398 | 7,792 |

Note: PM2.5 assumed to be equal to PM10

## 5. Major Source Determination

**Rule 2201 Major Source Determination**

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

- Any ERCs associated with the stationary source,
- Emissions from non-road IC engines (i.e. IC engines at a particular site at the facility for less than 12 months), and
- Fugitive emissions, except for the specific source categories specified in 40 CFR 51.165.

| Rule 2201 Major Source Determination (lb/year) | | | | | | |
|---|---|---|---|---|---|---|
| | $NO_X$ | $SO_X$ | $PM_{10}$ | $PM_{2.5}$ | CO | VOC |
| SSPE1 | 0 | 0 | 0 | 0 | 0 | 0 |
| SSPE2 | 4,780 | 17,358 | 1,410 | 1,410 | 32,398 | 3,376 |
| Major Source Threshold | 20,000 | 140,000 | 140,000 | 140,000 | 200,000 | 20,000 |
| Major Source? | No | No | No | No | No | No |

Note: PM2.5 assumed to be equal to PM10

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

**Rule 2410 Major Source Determination**

The facility or the equipment evaluated under this project is not listed as one of the categories specified in 40 CFR 52.21 (b)(1)(i). Therefore the following PSD Major Source thresholds are applicable.

| PSD Major Source Determination (tons/year) | | | | | | |
|---|---|---|---|---|---|---|
| | NO2 | VOC | SO2 | CO | PM | PM10 |
| Estimated Facility PE before Project Increase | 0 | 0 | 0 | 0 | 0 | 0 |
| PSD Major Source Thresholds | 250 | 250 | 250 | 250 | 250 | 250 |
| PSD Major Source ? (Y/N) | N | N | N | N | N | N |

## 6. Baseline Emissions (BE)

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

Pursuant to District Rule 2201, BE = 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 District Rule 2201.

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

Therefore BE = PE1 = 0.

**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. Additionally, since the facility is not a major source for $PM_{10}$ (140,000 lb/year), it is not a major source for $PM_{2.5}$ (140,000 lb/year).

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

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

- NO2 (as a primary pollutant)
- SO2 (as a primary pollutant)
- CO
- PM
- PM10
- Greenhouse gases (GHG): CO2, N2O, CH4, HFCs, PFCs, and SF6

The first step of this PSD evaluation consists of determining whether the facility is an existing PSD Major Source or not (See Section VII.C.5 of this document).

In the case the facility is an existing PSD Major Source, the second step of the PSD evaluation is to determine if the project results in a PSD significant increase.

In the case the facility is NOT an existing PSD Major Source but is an existing source, the second step of the PSD evaluation is to determine if the project, by itself, would be a PSD major source.

In the case the facility is new source, the second step of the PSD evaluation is to determine if this new facility will become a new PSD major Source as a result of the project and if so, to determine which pollutant will result in a PSD significant increase.

**I. Potential to Emit for New or <u>Modified</u> Emission Units vs PSD Major Source Thresholds**

As a screening tool, the project potential to emit from all new and modified units is compared to the PSD major source threshold, and if total project potential to emit from all new and modified units is below this threshold, no futher analysis will be needed.

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). Therefore the following PSD Major Source thresholds are applicable.

| PSD Major Source Determination: Potential to Emit (tons/year) | | | | | | |
|---|---|---|---|---|---|---|
| | NO2 | VOC | SO2 | CO | PM | PM10 |
| Total PE from New and Modified Units | 1.9 | 1.7 | 8.7 | 16.2 | 0.7 | 0.7 |
| PSD Major Source Thresholds | 250 | 250 | 250 | 250 | 250 | 250 |
| New PSD Major Source ? (Y/N) | N | N | N | N | N | N |

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

**10. Quarterly Net Emissions Change (QNEC)**

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

QNEC = PE2 - PE1, where:

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

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| Quarterly NEC [QNEC] | | | |
|---|---|---|---|
| | PE2 (lb/qtr) | PE1 (lb/qtr) | QNEC (lb/qtr) |
| $NO_X$ | 329 | 0 | 329 |
| $SO_X$ | 4,264 | 0 | 4,264 |
| $PM_{10}$ | 88 | 0 | 88 |
| CO | 3,285 | 0 | 3,285 |
| VOC | 745 | 0 | 745 |

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| Quarterly NEC [QNEC] | | | |
|---|---|---|---|
| | PE2 (lb/qtr) | PE1 (lb/qtr) | QNEC (lb/qtr) |
| $NO_X$ | 281 | 0 | 281 |
| $SO_X$ | 38 | 0 | 38 |
| $PM_{10}$ | 133 | 0 | 133 |
| CO | 2,407 | 0 | 2,407 |
| VOC | 602 | 0 | 602 |

## VIII. Compliance

### 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**

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The applicant is proposing to install a new digester system served by two digester gas-fired flares with a PE greater than 2 lb/day for $NO_X$, $SO_X$, $PM_{10}$, CO, and VOC.

As the flare has VOC emissions greater than 2 lb/day, it can be reasonably concluded that the digester system uncontrolled VOC emissions are greater than 2 lb/day. BACT is required for emission units with a PE greater than 2 lb/day; therefore, the digester system triggers BACT for VOC. The flare is a control device to the digester system that is combusting the digester gas produced by the digester system such that it is not vented directly to the atmosphere. Therefore, the digester gas-fire flare is considered a control device and will not be considered an emission unit for the purposes of this project.

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As seen in Section VII.C.2 above, the applicant is proposing to install a new natural gas-fired IC engine with a PE greater than 2 lb/day for $NO_X$, CO, and VOC. BACT is triggered for $NO_X$ and VOC since the PEs are greater than 2 lb/day. However BACT is not triggered for CO since the SSPE2 for CO is not greater than 200,000 lb/year, as demonstrated in Section VII.C.5 above.

| Natural Gas Fuel – Each Engine | | |
|---|---|---|
| **Pollutant** | **Daily PE2** | **BACT Triggered?** |
| $NO_X$ | 3.1 | Yes |
| $SO_X$ | 0.4 | No |
| $PM_{10}$ | 1.5 | No |
| CO | 26.4 | No* |
| VOC | 6.6 | Yes |
| $NH_3$ | 0.5 | No |

* BACT is not triggered for CO since the SSPE2 for CO is not greater than 200,000 lb/year

**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 relocated units.

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

As discussed in Section I above, there are no modified emissions units associated with this project. Therefore, BACT is not triggered for AIPE > 2 lb/day.

**d. SB 288/Federal Major Modification**

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

## 2. BACT Discussion/Guideline

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There are increases in emissions associated with the two flares. The flares are used to control the digester gas that is generated by the digester system and therefore is an emission control device. In accordance with District definitions, an emission control device is not an emission unit. Per District Rule 2201, only emission units can trigger BACT. Therefore, an emission control device cannot be subject to BACT requirements.

District BACT Guideline 1.4.4 applies to digester gas-fired flares. This BACT guideline was established prior to the District formalizing a position of BACT on control equipment. The guideline was simply a place to list the criteria to be a well-controlled flare, but as the flare would not trigger BACT, it is inappropriate to have a BACT guideline for a flare. However, upon review of the BACT Guideline 1.4.4, the proposed flares will operate with NOx emissions of 0.03 lb/MMBtu, operate with dry absorption such that fuel sulfur content ≤ 40 ppmv (as $H_2S$), smokeless operation with a 5% opacity limit, and VOC emissions of 0.068 lb/MMBtu which meets the Achieved-in-Practice BACT requirements for this type of operation. Therefore, the proposed flares are minimizing the generation of collateral pollutants and are equivalent to the best control alternatives available for this type of operation.

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BACT Guideline 3.3.12 applies to the natural gas-fired IC engines. [Fossil Fuel-Fired I.C. Engine] (See Attachment A)

## 3. Top-Down BACT Analysis

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

Pursuant to the attached Top-Down BACT Analysis (see Attachment A), BACT has been satisfied with the following:

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$NO_X$: 5 ppmvd @ 15% O2 and 0.07 g/bhp-hr
VOC: 25 ppmvd @ 15% O2 and 0.15 g/bhp-hr

The applicant is proposing to meet the BACT emission levels so compliance with BACT is expected.

## B. Offsets

### 1. Offset Applicability

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

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

| Offset Determination (lb/year) | | | | | |
|---|---|---|---|---|---|
| | $NO_X$ | $SO_X$ | $PM_{10}$ | CO | VOC |
| SSPE2 | 3,560 | 17,358 | 1,410 | 32,398 | 7,792 |
| Offset Threshold | 20,000 | 54,750 | 29,200 | 200,000 | 20,000 |
| Offsets triggered? | No | No | No | No | No |

### 2. Quantity of Offsets Required

As seen above, the SSPE2 is not greater than the offset thresholds for all pollutants; therefore offset calculations are not necessary and offsets will not be required for this project.

## C. Public Notification

### 1. Applicability

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, and/or
d. Any project with an SSIPE of greater than 20,000 lb/year for any pollutant.

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

New Major Sources are new facilities, which are also Major Sources. As shown in Section VII.C.5 above, the SSPE2 is not greater than the Major Source threshold for any pollutant. Therefore, public noticing is not required for this project for new Major Source purposes.

As demonstrated in VII.C.7, 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**

The PE2 for this new unit is compared to the daily PE Public Notice thresholds in the following table:

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| PE > 100 lb/day Public Notice Thresholds | | | |
|---|---|---|---|
| Pollutant | PE2 (lb/day) | Public Notice Threshold | Public Notice Triggered? |
| $NO_X$ | 18.0 | 100 lb/day | No |
| $SO_X$ | 140.7 | 100 lb/day | Yes |
| $PM_{10}$ | 4.8 | 100 lb/day | No |
| CO | 180.0 | 100 lb/day | Yes |
| VOC | 40.8 | 100 lb/day | No |

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| PE > 100 lb/day Public Notice Thresholds | | | |
|---|---|---|---|
| Pollutant | PE2 (lb/day) | Public Notice Threshold | Public Notice Triggered? |
| $NO_X$ | 4.7 | 100 lb/day | No |
| $SO_X$ | 0.4 | 100 lb/day | No |
| $PM_{10}$ | 1.5 | 100 lb/day | No |
| CO | 26.4 | 100 lb/day | No |
| VOC | 6.6 | 100 lb/day | No |

Therefore, public noticing for PE > 100 lb/day purposes is required.

**c. Offset Threshold**

The following table compares pollutant will trigger public noticing requirements. As seen the SSPE1 with the SSPE2 in order to determine if any offset thresholds have been surpassed with this project.

| Offset Threshold | | | | |
|---|---|---|---|---|
| Pollutant | SSPE1 (lb/year) | SSPE2 (lb/year) | Offset Threshold | Public Notice Required? |
| $NO_X$ | 0 | 3,560 | 20,000 lb/year | No |
| $SO_X$ | 0 | 17,358 | 54,750 lb/year | No |
| $PM_{10}$ | 0 | 1,410 | 29,200 lb/year | No |
| CO | 0 | 32,398 | 200,000 lb/year | No |
| VOC | 0 | 7,792 | 20,000 lb/year | No |

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

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

Public notification is required for any permitting action that results in a 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 SSPE2 and SSPE1 are calculated according to Rule 2201. The SSIPE is compared to the SSIPE Public Notice thresholds in the following table:

| Stationary Source Increase in Permitted Emissions [SSIPE] – Public Notice | | | | | |
|---|---|---|---|---|---|
| Pollutant | SSPE2 (lb/year) | SSPE1 (lb/year) | SSIPE (lb/year) | SSIPE Public Notice Threshold | Public Notice Required? |
| $NO_x$ | 3,560 | 0 | 3,560 | 20,000 lb/year | No |
| $SO_x$ | 17,358 | 0 | 17,358 | 20,000 lb/year | No |
| $PM_{10}$ | 1,410 | 0 | 1,410 | 20,000 lb/year | No |
| CO | 32,398 | 0 | 32,398 | 20,000 lb/year | Yes |
| VOC | 7,792 | 0 | 7,792 | 20,000 lb/year | No |

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

### 2. Public Notice Action

As discussed above, public noticing is required for this project for the flare SOx and CO emissions in excess of 100 lb/day and for SSIPE greater than 20,000 lb/year for CO. 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 ATCs for this equipment.

## D. Daily Emission Limits (DELs)

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

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As explained above, the digester gas plant will undergo a commissioning period until the digester gas reaches a certain quality and composition. Therefore, each flare will be operated during the commissioning period.

- The amount of digester gas combusted in each flare shall not exceed any of the following limits: 1.0 MMscf in any one day or 36.5 MMscf in any rolling 12-month period. [District Rule 2201]

- Emissions from each flare shall not exceed any of the following limits: 0.03 lb-NOx/MMBtu; 0.008 lb-PM10/MMBtu; 0.30 lb-CO/MMBtu; or 0.068 lb-VOC/MMBtu. [District Rule 2201]
- Emissions from each flare, except during the commissioning period, shall not exceed 0.0112 lb-SOx/MMBtu (based on 40 ppmv sulfur content in fuel (as H2S) and four hour averaging period). [District Rule 2201]
- Emissions from each flare, including the commissioning period, shall not exceed either of the following limits: 140.7 lb-SOx/day or 8,528 lb-SOx/year. [District Rule 2201]
- The amount of digester gas sent through the biofilter serving the air stripper and solids dryer shall not exceed 1,840 scfm. [District Rule 4102]
- The amount of digester gas sent through the biofilter serving the receiving pit shall not exceed 1,440 scfm. [District Rule 4102]
- Emissions from the biofilter serving the air stripper shall not exceed 7 ppmv-H2S. [District Rule 4102]
- Emissions from the biofilter serving the receiving pit shall not exceed 2 ppmv-H2S. [District Rule 4102]

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- Emissions from the IC engine when fired on natural gas shall not exceed any of the following limits: 5 ppmv @ 15% O2 or 0.0.07 g-NOx/bhp-hr, 0.0094 g-SOx/bhp-hr, 0.033 g-PM10/bhp-hr, 82.4 ppmv @ 15% O2 or 0.60 g-CO/bhp-hr, or 25 ppmv @ 15% O2 or 0.15 g-VOC/bhp-hr. [District Rules 2201 and 4702, and 40 CFR 60 Subpart JJJJ]
- The ammonia (NH3) emission concentration shall not exceed 5 ppmvd @ 15% O2. [District Rules 2201 and 4102]

## E. Compliance Assurance

### 1. Source Testing

Pursuant to District Policy APR 1705, source testing is required to demonstrate compliance with Rule 2201.

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The following conditions will be placed on the permit to ensure compliance with the assumptions made for Rule 2201. Source testing will be required within 120 days of initial start-up since there will be a commissioning period of up to 60 days.

- Source testing to measure NOx, CO and VOC emissions from the digester-fired flare shall be conducted within 120 days of initial start-up and at least once every twelve (12) months thereafter. [District Rule 2201]
- For source test purposes, NOx emissions from the flare shall be determined using EPA Method 19 on a heat input basis, or EPA Method 3A, EPA Method 7E, or ARB Method 100 on a ppmv basis. [District Rule 2201]

- For source test purposes, CO emissions from the flare shall be determined using EPA Method 10 or 10B, ARB Methods 1 through 5 with 10, or ARB Method 100. [District Rule 2201]
- For source test purposes, VOC emissions from the flare shall be determined using EPA Method 25 or 25a. [District Rule 2201]
- Stack gas oxygen (O2) shall be determined using EPA Method 3A, EPA Method 7E, or ARB Method 100. [District Rule 2201]
- Operator shall determine digester gas fuel higher heating value annually by ASTM D 1826 or D 1945 in conjunction with ASTM D 3588 for gaseous fuels. [District Rule 2201]

To validate the assumption that the solid fraction produced in the digestate management system does not result in any VOC emissions, an initial source test will be required. The VOC content of the loaded out wet cake and pressed fiber will be determined using EPA Test Methods 413.2 and 418.1 and/or if necessary SCAQMD Test Method 25.3 and/or EPA Test Method 8240.

Based on the maximum throughput of the wet cake and pressed fiber, a calculation will be performed to determine if the VOC emissions exceed two pounds per day. If the VOC emissions exceed two pounds per day, the applicant will be required to submit an Authority to Construct application to assess VOC emissions for the wet cake and pressed fiber loadout operation. The following condition will be placed on the permit to ensure compliance:

- Within 60 days of production of wet cake/pressed fiber, the VOC content of the material shall be determined using EPA Test Methods 413.2 and 418.1 and EPA Test Method 8260, and if necessary EPA Test Method 204 and 204D with either EPA Test Method 25A and 18 or SCAQMD Test Method 25.3, or any other test method approved by the District. If VOC emissions are greater than two pounds per day (based on maximum throughput of the loaded out material), the permittee shall submit an Authority to Construct application for the wet cake/pressed fiber loadout operation within 15 days of the test results. [District Rule 2201]

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As required by District Rule 4702, *Stationary Internal Combustion Engines - Phase 2*, this IC engine is subject to source testing requirements. Source testing requirements, in accordance with District Rule 4702, will be discussed in Section VIII, *District Rule 4702*, of this evaluation.

**2. Monitoring**

The following conditions will be placed on the permit to ensure compliance with the assumptions made for Rule 2201.

- During commissioning, the sulfur content of the digester gas combusted in each flare shall be monitored and recorded weekly. [District Rule 2201]

- After commissioning, the sulfur content of the digester gas combusted in this flare shall be monitored and recorded monthly. After eight (8) consecutive monthly tests show compliance, the digester gas sulfur content monitoring frequency may be reduced to once every calendar quarter. If quarterly monitoring shows a violation of the digester gas sulfur content limit of this permit, then monthly monitoring shall resume and continue until eight consecutive months of monitoring show compliance with the gas sulfur content limit. Once compliance with the gas sulfur content limit is shown for eight consecutive months, then the monitoring frequency may return to quarterly. Monitoring of the sulfur content of the digester gas shall not be required if the flare does not operate during that period. Records of the results of monitoring of the digester gas sulfur content shall be maintained. [District Rule 2201]
- After commissioning, the H2S content of the digester gas at the outlet of the biofilter serving the air stripper shall be monitored and recorded monthly. After eight (8) consecutive monthly tests show compliance, the digester gas H2S content monitoring frequency may be reduced to once every calendar quarter. If quarterly monitoring shows a violation of the digester gas H2S content limit of this permit, then monthly monitoring shall resume and continue until eight consecutive months of monitoring show compliance with the gas H2S content limit. Once compliance with the gas H2S content limit is shown for eight consecutive months, then the monitoring frequency may return to quarterly. Monitoring of the H2S content of the digester gas shall not be required if the air stripper does not operate during that period. Records of the results of monitoring of the digester gas H2S content shall be maintained. [District Rule 4102]
- Monitoring of the digester gas sulfur content shall be performed using a Testo 350 XL portable emission monitor; District-approved in-line H2S monitors; gas detection tubes calibrated for H2S; District-approved source test methods, including EPA Method 11 or EPA Method 15, ASTM Method D1072, D4084, and D5504; 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 Rule 2201]

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As required by District Rule 4702, *Stationary Internal Combustion Engines - Phase 2*, this IC engine is subject to monitoring requirements. Monitoring requirements, in accordance with District Rule 4702, will be discussed in Section VIII, *District Rule 4702*, of this evaluation.

**3. Recordkeeping**

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

- All records shall be maintained and retained on-site for a period of at least 5 years and shall be made available for District inspection upon request. [District Rule 1070]

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- Permittee shall maintain daily and monthly records of quantity of digester gas combusted in the flare, quantity of digester gas sent to each biofilter, and annual test results of higher heating value of digester gas. [District Rules 1070 and 2201]

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As required by District Rule 4702, *Stationary Internal Combustion Engines - Phase 2*, this IC engine is subject to recordkeeping requirements. Recordkeeping requirements, in accordance with District Rule 4702, will be discussed in Section VIII, *District Rule 4702*, of this evaluation.

**4. Reporting**

No reporting is required to demonstrate compliance with Rule 2201.

**F. Ambient Air Quality Analysis (AAQA)**

An AAQA shall 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 Attachment B of this document for the AAQA summary sheet.

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

The proposed location is in a non-attainment area for the state's PM10 as well as federal and state PM2.5 thresholds. As shown by the AAQA summary sheet the proposed equipment will not cause a violation of an air quality standard for PM10 and PM2.5.

**Rule 2410 Prevention of Significant Deterioration**

The prevention of significant deterioration (PSD) program is a construction permitting program for new major stationary sources and major modifications to existing major stationary sources located in areas classified as attainment or in areas that are unclassifiable for any criteria air pollutant.

As demonstrated above, this project is not subject to the requirements of Rule 2410 due to a significant emission increase and no further discussion is required.

**Rule 2520 Federally Mandated Operating Permits**

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

**Rule 4001 New Source Performance Standards (NSPS)**

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

S-8153-4-1 and '5-1

This rule incorporates NSPS from Part 60, Chapter 1, Title 40, Code of Federal Regulations (CFR); and applies to all new sources of air pollution and modifications of existing sources of air pollution listed in 40 CFR Part 60. 40 CFR Part 60, Subpart JJJJ applies to spark-ignited internal combustion engines.

Section 60.4230(a) states the provisions of this subpart are applicable to manufacturers, owners, and operators of stationary spark ignition (SI) internal combustion engines (ICE) as specified in paragraphs (a)(1) through (5) of this section. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator.

Section 60.4230(a)(4) states owners and operators of stationary SI ICE that commence construction after June 12, 2006, where the stationary SI ICE are manufactured: (i) on or after July 1, 2007, for engines with a maximum engine power greater than or equal to 500 HP (except lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP); (ii) on or after January 1, 2008, for lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP; (iii) on or after July 1, 2008, for engines with a maximum engine power less than 500 HP; or (iv) on or after January 1, 2009, for emergency engines with a maximum engine power greater than 19 KW (25 HP) are applicable to the provisions of this subpart.

The engines in this project commenced construction and were manufactured in 2012 and are non-emergency lean burn engines with a maximum engine power of 831 HP each. Therefore, this section is applicable and the engines in this project are subject to this subpart.

Sections 60.4231 and 60.4232 apply only to the manufacturers of stationary SI internal combustion engines. These sections do not apply to owners or operators of such engines. Therefore, these sections do not apply.

Section 60.4233 lists emission standards for owners and operators. Per Section 60.4233(e), owners and operators of stationary SI ICE with a maximum engine power greater than or equal to 75 KW (100 HP) (except gasoline and rich burn engines that use LPG) must comply with the emission standards in Table 1 to this subpart for their stationary SI ICE. For owners and operators of stationary SI ICE with a maximum engine power greater than or equal to 100 HP (except gasoline and rich burn engines that use LPG) manufactured prior to January 1, 2011 that were certified to the certification emission

standards in 40 CFR part 1048 applicable to engines that are not severe duty engines, if such stationary SI ICE was certified to a carbon monoxide (CO) standard above the standard in Table 1 to this subpart, then the owners and operators may meet the CO certification (not field testing) standard for which the engine was certified.

Table 1 of this subpart for non-emergency natural gas-fired engines HP ≥ 500 and manufacture date 7/1/2010 for later lists the NOx standard as 1.0 g/bhp-hr (equivalent to 82 ppmv @ 15% O2), the CO standard as 2.0 g/bhp-hr (equivalent to 270 ppmv @ 15% O2), and the VOC standard as 0.7 g/bhp-hr (equivalent to 60 ppmv @ 15% O2). Emissions from the proposed engines meet the required emissions standards. The following condition will be placed on the permit to ensure compliance:

- Emissions from the IC engine when fired on natural gas shall not exceed any of the following limits: 5 ppmv @ 15% O2 or 0.07g-NOx/bhp-hr, 0.0094 g-SOx/bhp-hr (based on 1.0 grain-S/100 scf fuel), 0.033 g-PM10/bhp-hr, 82.4 ppmv @ 15% O2 or 0.60 g-CO/bhp-hr, or 36.1 ppmv @ 15% O2 or 0.15 g-VOC/bhp-hr. [District Rules 2201 and 4702, and 40 CFR 60 Subpart JJJJ]

Section 60.4234 states owners and operators of stationary SI ICE must operate and maintain stationary SI ICEs that achieve the emission standards as required in Section 60.4233 over the entire life of the engines.

District Rule 4702 requires periodic monitoring to ensure that the applicable emission limits contained in the permit are met. Additionally, the emissions rates for the engines will be listed as a permit condition for the life of the permit. Therefore, the requirements of this section are satisfied.

Section 60.4235 applies only to SI ICE that use gasoline. The proposed engines do not use gasoline. Therefore, this section does not apply.

Section 60.4236(b) states that after July 1, 2009, owners and operators may not install stationary SI ICE with a maximum engine power of greater than or equal to 500 HP that do not meet the applicable requirements in §60.4233, except that lean burn engines with a maximum engine power greater than or equal to 500 HP and less than 1,350 HP that do not meet the applicable requirements in §60.4233 may not be installed after January 1, 2010.

As previously discussed, the proposed engines meet the applicable requirements of Section 60.4233. Therefore, the requirements of Section 60.4236 are satisfied.

Section 60.4237 lists monitoring requirements for emergency stationary SI ICE. The proposed engines are not used for emergency operation. Therefore, this section does not apply.

Sections 60.4238 through 60.4242 apply only to manufacturers of stationary SI ICE. Therefore, these sections do not apply.

Section 60.4243 lists compliance requirements for owners and operators of stationary SI ICE. Section 60.4243(b)(2)(ii) states that owners or operators of a stationary SI internal

combustion engine greater than 500 HP must keep a maintenance plan and records of conducted maintenance and must, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions. In addition, the owner or operator must conduct an initial performance test and conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance.

As Rule 4702 requires source testing once every 24 months, the 24 month source testing requirement will be required since it is more stringent than the 3 year source testing requirement of this subpart. Source testing will be required within 60 days of initial start-up. The following conditions will be placed on the permit to ensure compliance:

- The permittee shall maintain an engine operating log to demonstrate compliance. The engine operating log shall include, on a monthly basis, the following information: total hours of operation, type and quantity of fuel used, maintenance or modifications performed, monitoring data, compliance source test results, and any other information necessary to demonstrate compliance. [District Rule 4702 and 40 CFR 60 Subpart JJJJ]
- Source testing to measure natural gas fuel combustion NOx, CO, VOC and ammonia emissions from this unit shall be conducted within 60 days of initial start-up and once every 8,760 hours of operation or 24 months, whichever comes first, thereafter. [District Rules 2201 and 4702 and 40 CFR 60 Subpart JJJJ]
- This engine shall be operated and maintained in proper operating condition according to the manufacturer's specifications. [District Rule 4702 and 40 CFR 60 Subpart JJJJ]

Section 60.4243(g) states that it is expected that air-to-fuel ratio controllers will be used with the operation of three-way catalysts/non-selective catalytic reduction. The ARF controller must be maintained and operated appropriately in order to ensure proper operation of the engine and control device to minimize emissions at all times.

The following condition will be added to the permits to ensure compliance:

- 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 and 40 CFR 60 Subpart JJJJ]

Section 60.4244 lists test methods and other procedures for owners and operators of stationary SI ICE who conduct performance tests. Three separate test runs are required for each performance test, and each performance test must be conducted within 10 percent of 100 percent peak (or the highest achievable) load. Additionally, performance tests may not be conducted during periods of startup, shutdown, or malfunction.

The following condition will be added to the permits to ensure compliance:

- For initial emissions source testing, the arithmetic average of three 60-consecutive-minute test runs shall apply. Each test run shall be conducted within 10 percent of 100 percent peak (or the highest achievable) load. If two of three runs are above an applicable limit, the test cannot be used to demonstrate compliance with an applicable limit. NOx, CO and VOC concentrations shall be reported in ppmv, corrected to 15% oxygen. [District Rule 4702 and 40 CFR 60 Subpart JJJJ]
- 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 and 40 CFR 60 Subpart JJJJ]

Section 60.4245(a) states that owners and operators of all stationary SI ICE must keep records of the following information:

- All notifications submitted to comply with this subpart and all documentation supporting any notification.
- Maintenance conducted on the engine.
- If the stationary SI internal combustion engine is a certified engine, documentation from the manufacturer that the engine is certified to meet the emission standards and information as required in 40 CFR parts 90, 1048, 1054, and 1060, as applicable.
- If the stationary SI internal combustion engine is not a certified engine or is a certified engine operating in a non-certified manner and subject to §60.4243(a)(2), documentation that the engine meets the emission standards.

The following condition will be placed on the permit to ensure compliance:

- The permittee shall maintain an engine operating log to demonstrate compliance. The engine operating log shall include, on a monthly basis, the following information: total hours of operation, type and quantity of fuel used, maintenance or modifications performed, monitoring data, compliance source test results, and any other information necessary to demonstrate compliance. [District Rule 4702 and 40 CFR 60 Subpart JJJJ]

Section 60.4245(c) states owners and operators of stationary SI ICE greater than or equal to 500 HP that have not been certified by an engine manufacturer to meet the emission standards in §60.4231 must submit an initial notification as required in §60.7(a)(1). The notification must include the information in paragraphs (c)(1) through (5) of this section.

(1) Name and address of the owner or operator;
(2) The address of the affected source;
(3) Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement;
(4) Emission control equipment; and
(5) Fuel used.

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

- Notification of the date construction of this engine commenced shall be submitted to the District and EPA and shall be postmarked no later than 30 days after such date as construction commenced. The notification shall contain the following information: 1) Name and address of the owner or operator; 2) The address of the affected source; 3) Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement; 4) Emission control equipment; and 5) Fuel used. [40 CFR 60, Subpart JJJJ]

Section 60.4245(d) states owners and operators of stationary SI ICE that are subject to performance testing must submit a copy of each performance test within 60 days after the test has been completed.

The following condition will be placed on the permit to ensure compliance:

- The results of each source test shall be submitted to the District and EPA within 60 days after completion of the source test. [District Rule 1081 and 40 CFR 60 Subpart JJJJ]

Therefore, compliance with the requirements of this rule is expected.

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

<u>40 CFR Part 63, Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines</u>

<u>S-8153-4-1 and '5-1</u>

Subpart ZZZZ establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emission limitations and operating limitations.

Section 63.6585 states you are subject to this subpart if you own or operate a stationary RICE at a major or area source of HAP emissions, except if the stationary RICE is being tested at a stationary RICE test cell/stand.

(a) A stationary RICE is any internal combustion engine which uses reciprocating motion to convert heat energy into mechanical work and which is not mobile. Stationary RICE differ from mobile RICE in that a stationary RICE is not a non-road engine as defined at 40 CFR 1068.30, and is not used to propel a motor vehicle or a vehicle used solely for competition.
(b) A major source of HAP emissions is a plant site that emits or has the potential to emit any single HAP at a rate of 10 tons (9.07 megagrams) or more per year or any combination of HAP at a rate of 25 tons (22.68 megagrams) or more per year, except that for oil and gas production facilities, a major source of HAP emissions is determined for each surface site.
(c) An area source of HAP emissions is a source that is not a major source.

(d) If you are an owner or operator of an area source subject to this subpart, your status as an entity subject to a standard or other requirements under this subpart does not subject you to the obligation to obtain a permit under 40 CFR part 70 or 71, provided you are not required to obtain a permit under 40 CFR 70.3(a) or 40 CFR 71.3(a) for a reason other than your status as an area source under this subpart. Notwithstanding the previous sentence, you must continue to comply with the provisions of this subpart as applicable.

(e) If you are an owner or operator of a stationary RICE used for national security purposes, you may be eligible to request an exemption from the requirements of this subpart as described in 40 CFR part 1068, subpart C.

The proposed engines are stationary and the facility is an area source of HAP emissions. Therefore, the provisions of this subpart are applicable.

Section 63.6590 states this subpart applies to each affected source.

(a) Affected source. An affected source is any existing, new, or reconstructed stationary RICE located at a major or area source of HAP emissions, excluding stationary RICE being tested at a stationary RICE test cell/stand.

The proposed engines in this project are new and located at an area source of HAP emissions.

(1) Existing stationary RICE.

(i) For stationary RICE with a site rating of more than 500 brake horsepower (HP) located at a major source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before December 19, 2002.

(ii) For stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before June 12, 2006.

(iii) For stationary RICE located at an area source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before June 12, 2006.

(iv) A change in ownership of an existing stationary RICE does not make that stationary RICE a new or reconstructed stationary RICE.

The proposed engines in this project are not existing stationary RICE.

(2) New stationary RICE.

(i) A stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions is new if you commenced construction of the stationary RICE on or after December 19, 2002.

(ii) A stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions is new if you commenced construction of the stationary RICE on or after June 12, 2006.

(iii) A stationary RICE located at an area source of HAP emissions is new if you commenced construction of the stationary RICE on or after June 12, 2006.

The proposed engines in this project are new stationary RICE.

(3) Reconstructed stationary RICE.
   (i) A stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions is reconstructed if you meet the definition of reconstruction in §63.2 and reconstruction is commenced on or after December 19, 2002.
   (ii) A stationary RICE with a site rating of equal to or less than 500 brake HP located at a major source of HAP emissions is reconstructed if you meet the definition of reconstruction in §63.2 and reconstruction is commenced on or after June 12, 2006.
   (iii) A stationary RICE located at an area source of HAP emissions is reconstructed if you meet the definition of reconstruction in §63.2 and reconstruction is commenced on or after June 12, 2006.

The proposed engines in this project are not reconstructed stationary RICE.

(b) Stationary RICE subject to limited requirements.

The proposed engines in this project are not stationary RICE subject to limited requirements.

(c) Stationary RICE subject to Regulations under 40 CFR Part 60. An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines or 40 CFR part 60 subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part.
   (1) A new or reconstructed stationary RICE located at an area source;
   (2) A new or reconstructed 2SLB stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions;
   (3) A new or reconstructed 4SLB stationary RICE with a site rating of less than 250 brake HP located at a major source of HAP emissions;
   (4) A new or reconstructed spark ignition 4 stroke rich burn (4SRB) stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions;
   (5) A new or reconstructed stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions which combusts landfill or digester gas equivalent to 10 percent or more of the gross heat input on an annual basis;
   (6) A new or reconstructed emergency or limited use stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions;
   (7) A new or reconstructed compression ignition (CI) stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions.

The proposed engines in this project are new stationary RICE located at an area source subject to 40 CFR part 60 subpart JJJJ. Therefore, no further requirements apply for such engines under this part.

Therefore, compliance with the requirements of this rule is expected.

**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.

The following condition will be added to the permit to ensure compliance:

S-8153-1-2

- 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 ¼ or 5% opacity. [District Rules 2201 and 4101]

S-8153-4-1 and '5-1

- 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 and the following condition will be added to the permits to ensure compliance:

- {98} 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 is not required for a project with a total facility prioritization score of less than one. According to the Technical Services Memo for this project (Attachment B), the total facility prioritization score including this project was greater than one. Therefore, an HRA was required to determine the short-term acute and long-term chronic exposure from this project.

The cancer risk for this project is shown below:

| HRA Summary | | |
|---|---|---|
| Unit | Cancer Risk | T-BACT Required |
| S-8153-1-2 | 0.334 per million | No |
| S-8153-4-1 | 0.112 per million | No |
| S-8153-5-1 | 0.112 per million | No |

**Discussion of T-BACT**

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

District policy APR 1905 also specifies that the increase in emissions associated with a proposed new source or modification not have acute or chronic indices, or a cancer risk greater than the District's significance levels (i.e. acute and/or chronic indices greater than 1 and a cancer risk greater than 10 in a million). As outlined by the HRA Summary in Attachment B of this report, the emissions increases for this project was determined to be less than significant.

**Rule 4201 Particulate Matter Concentration**

Section 3.0 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.

S-8153-1-2

Particulate matter calculations were performed for each piece of equipment by the following equation:

F-Factor for digester gas: 9,100 dscf/MMBtu
$PM_{10}$ Emission Factor: 0.008 lb-$PM_{10}$/MMBtu
Percentage of PM as $PM_{10}$ in Exhaust: 100%

$$GL = \left( \frac{0.008\ lb-PM}{MMBtu} \times \frac{7{,}000\ grain}{lb-PM} \right) / \left( \frac{9{,}100\ ft^3}{MMBtu} \right)$$

$$GL = 0.006\ grain/dscf < 0.1\ grain/dscf$$

Since the particulate matter concentration is ≤ 0.1 grains per dscf, compliance with Rule 4201 is expected.

S-8153-4-1 and '5-1

$$0.033 \quad \frac{g-PM_{10}}{bhp-hr} \times \frac{1 bhp-hr}{2{,}542.5 Btu} \times \frac{10^6 Btu}{8{,}578 dscf} \times \frac{0.35 Btu_{out}}{1 Btu_{in}} \times \frac{15.43 grain}{g} = \quad 0.008 \quad \frac{grain-PM}{dscf}$$

Since the particulate matter concentration is ≤ 0.1 grains per dscf, compliance with Rule 4201 is expected.

Therefore, the following condition will be listed on the permits to ensure compliance:

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

**Rule 4301 Fuel Burning Equipment**

This rule specifies maximum emission rates in lb/hr for $SO_2$, $NO_2$, and combustion contaminants (defined as total PM in Rule 1020). This rule also limits combustion contaminants to ≤ 0.1 gr/scf. According to AP 42 (Table 1.4-2, footnote c), all PM emissions from natural gas combustion are less than 1 μm in diameter. As shown below, each unit's maximum hourly emission rates are below the Rule 4301 limits.

| District Rule 4301 Limits | | | |
|---|---|---|---|
| **Unit** | **$NO_2$** | **Total PM** | **$SO_2$** |
| S-8153-1-2 (Digester Gas) | 0.75 | 0.20 | 5.8 |
| S-8153-4-1 or '5-1 (Natural Gas) | 0.13 | 0.06 | 0.017 |
| **Rule 4301 Limit** | **140 lb/hr** | **10 lb/hr** | **200 lb/hr** |

As shown above, compliance with this rule is expected.

**Rule 4311 Flares**

Rule 4311 limits the emissions of volatile organic compounds (VOCs) and oxides of nitrogen (NOx), and sulfur oxides (SOx) from the operation of flares.

Pursuant to Section 4.3, except for the record keeping requirement of Section 6.1.4 the requirements of this rule do not apply to any flare located at a stationary source with potential emissions less than 10.0 tons per year of VOC and 10.0 tons per year of NOx.

Section 6.1.4 requires an operator claiming exemption under Section 4.3 to record annual throughput, material usage, or other information necessary to demonstrate compliance with the terms of the exemption. The following condition will ensure compliance with this recordkeeping requirement:

- The facility shall maintain records of annual throughput, material usage, or other information necessary to demonstrate that facility-wide emissions are less than ten tons per year for both NOx and VOC. [District Rule 4311]

Therefore, compliance with the requirements of this rule is expected.

**Rule 4565 Biosolids, Animal Manure, and Poultry Litter Operations**

The purpose of this rule is to limit the emissions volatile organic compounds (VOC) from operations involving the management of biosolids, animal manure, or poultry litter.

This rule applies to all facilities whose throughput consists entirely or in part of biosolids, animal manure, or poultry litter and the operator who landfills, land applies, composts, or co-composts these materials.

Compost is defined in Section 3.14 as the controlled biological decomposition of organic material, such as sewage sludge, animal manures, or crop residues, under aerobic (with air) or anaerobic (without air) conditions to form a humus-like material. This facility does not incorporate controlled biological decomposition of organic material. Therefore, this facility does not perform composting.

Co-compost is defined in Section 3.12 as composting where biosolids and/or animal manure and/or poultry litter are mixed with other materials, including amendments, to produce compost. Co-composting includes both the active and curing phases of the composting process. This facility does not mix biosolids and/or animal manure and/or poultry litter with other materials, including amendments, to produce compost.

This facility does not landfill, land apply, compost, or co-compost biosolids, animal manure, or poultry litter. Therefore, the requirements of this rule are not applicable to this project.

**Rule 4566 Organic Material Composting Operations**

The purpose of this rule is to limit emissions of volatile organic compounds (VOC) from composting operations.

The provisions of this rule apply to composting facilities that compost and/or stockpile organic material.

Section 3.13 defines composting as a process in which solid organic waste materials are decomposed in the presence of oxygen through the action of bacteria and other microorganisms.

This facility does not perform composting as a process in which solid organic waste materials are decomposed in the presence of oxygen through the action of bacteria and other microorganisms. Therefore, this facility is not subject to the requirements of this rule.

**Rule 4701 Stationary Internal Combustion Engines – Phase I**

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

**Rule 4702 Internal Combustion Engines – Phase 2**

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

Section 2.0 states that this rule applies to any internal combustion engine rated at 25 brake horsepower or greater. Each of the proposed engines for the cogeneration system is rated at 831 bhp. Therefore, this rule is applicable to each engine.

Section 5.2, Table 2, Category 2.d. for spark-ignited internal combustion engine rated at >50 bhp used exclusively in non-agricultural operations engine type lean-burn engines four-stroke requires the owner or operator to comply with the following emission limits:

**Table 2 Emission Limits for a Spark-Ignited Internal Combustion Engine Rated at >50 bhp Used Exclusively in Non-AO (All ppmv limits are corrected to 15% oxygen on a dry basis). Emission Limits are effective according to the compliance schedule specified in Section 7.5.**

| Engine Type | NOx Limit (ppmv) | CO Limit (ppmv) | VOC Limit (ppmv) |
|---|---|---|---|
| 2. Lean-Burn Engines | | | |
| d. Lean-Burn Engine, not listed above | 11 | 2000 | 750 |

The facility has proposed to achieve the following emissions:

Natural Gas Fuel

$NO_x$: 5 ppmvd @ 15 % $O_2$;
CO: 82.4 ppmvd @ 15 % $O_2$; and
VOC: 25 ppmvd @ 15 % $O_2$

The proposed emissions are less than the Table 2 limits. Therefore, compliance with this section is expected.

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 engines involved with this project do not have a CEMS installed; therefore this section of the rule is not applicable.

Sections 5.4 and 5.5 outlines calculation methodologies and requirements for percent emission reductions, if used to comply with the NOx emission limits. The IC engines involved with this project do not propose to use percent emission reductions to comply with the NOx emission limits; therefore this section of the rule is not applicable.

Section 5.6 outlines the requirements for payment of an annual fee in lieu of complying with a NOx emission limit. The IC engines involved with this project do not propose to pay

an annual fee in lieu of complying with the NOx emission limits; therefore this section of the rule is not applicable.
Section 5.7 outlines sulfur oxides (SOx) emission control requirements. On and after the compliance schedule specified in Section 7.5, operators of non-AO spark-ignited engines and non-AO compression-ignited engines shall comply with one of the following 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 SO2 emissions by at least 95% by weight as determined by the test method specified in Section 6.4.6.

The facility is proposing to use natural gas fuel with a sulfur content no more than five (5) grains of total sulfur per one hundred (100) standard cubic feet. Therefore, compliance with this section is expected.

Section 5.8.1 outlines monitoring requirements for non-AO spark-ignited engines subject to the requirements of Section 5.2 or any engine subject to the requirements of Section 8.0. The IC engines involved with this project are non-AO spark-ignited engines subject to the requirements of Section 5.2.

Section 5.8.1 requires that for each engine with a rated brake horsepower of 1,000 bhp or greater and which is allowed by Permit-to-Operate or Permit-Exempt Equipment Registration condition to operate more than 2,000 hours per calendar year, or with an external emission control device, either install, operate, and maintain continuous monitoring equipment for NOx, CO, and oxygen, as identified in Rule 1080 (Stack Monitoring), or install, operate, and maintain APCO approved alternate monitoring. The monitoring system may be a continuous emissions monitoring system (CEMS), a parametric emissions monitoring system (PEMS), or an alternative monitoring system approved by the APCO. APCO-approved alternate monitoring shall consist of one or more of the following:

5.8.1.1 Periodic NOx and CO emission concentrations,
5.8.1.2 Engine exhaust oxygen concentration,
5.8.1.3 Air-to-fuel ratio,
5.8.1.4 Flow rate of reducing agents added to engine exhaust,
5.8.1.5 Catalyst inlet and exhaust temperature,
5.8.1.6 Catalyst inlet and exhaust oxygen concentration, or
5.8.1.7 Other operational characteristics.

The applicant has chosen to meet the requirements of Section 5.8.1 of the rule by proposing a pre-approved alternate emissions monitoring plan that specifies that the

permittee perform periodic $NO_x$, CO, and $O_2$ emissions concentrations as specified in District Policy SSP-1810, dated 4/29/04. Therefore, the following conditions will be listed on the permit to ensure compliance:

- The permittee shall monitor and record the stack concentration of NOx, CO, $O_2$, and NH3 at least once every month (in which a source test is not performed). NOx, CO, and $O_2$ concentrations shall be performed using a portable emission monitor that meets District specifications. NH3 monitoring shall be conducted utilizing District approved gas-detection tubes or a District approved equivalent method. 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]
- If the NOx or CO concentrations corrected to 15% O2, as measured by the portable analyzer, or the NH3 concentrations corrected to 15% O2, as measured by District approved gas-detection tubes, exceed the allowable emissions concentration, 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 readings continue to exceed the allowable emissions concentration after 1 hour 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]
- {2994} 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 5.8.6 requires that for each engine, install and operate a nonresettable elapsed operating time meter. In lieu of installing a nonresettable time meter, the owner or operator may use an alternative device, method, or technique in determining operating time provided that the alternative is approved by the APCO and is allowed by a Permit-to-Operate condition. The owner of the engine shall properly maintain and operate the time meter or alternative device in accordance with the manufacturer's instructions.

The applicant has proposed this engine will be equipped with a nonresettable elapsed operating time meter. The following condition will be listed on the permit to ensure compliance:

- This engine shall be equipped with a nonresettable elapsed operating time meter and a non-resettable, totalizing mass or volumetric fuel flow meter or other APCO approved alternative. [District Rules 2201 and 4702 and 40 CFR 60 Subpart JJJJ]

Section 5.8.7 requires that for each engine, the permittee implement the Inspection and Monitoring (I&M) plan, if any, submitted to and approved by the APCO pursuant to Section 6.5. The following condition will be listed on the permit to ensure compliance:

- {3202} This engine shall be operated and maintained in proper operating condition per the manufacturer's requirements as specified on the Inspection and Monitoring (I&M) plan submitted to the District. [District Rule 4702]

Section 5.8.8 requires that for each engine, collect data through the I&M plan in a form approved by the APCO. The applicant has submitted an I&M plan and the implementation of this plan will be explained below in the discussion of Section 6.5 of this rule.

Section 5.8.9 requires that for each engine, the operator shall use a portable $NO_x$ analyzer to take $NO_x$ emission readings to verify compliance with the emission requirements of Section 5.2 or Section 8.0 during each calendar quarter in which a source test is not performed. All emission readings shall be taken with the engine 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. All $NO_x$ emissions readings shall be reported to the APCO in a manner approved by the APCO. $NO_x$ emission readings taken pursuant to this section 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.

The alternate monitoring scheme proposed in Section 5.8.1 will satisfy the requirements of Section 5.8.9. The following conditions will be listed on the permit to ensure compliance:

- The permittee shall monitor and record the stack concentration of NOx, CO, $O_2$, and NH3 at least once every month (in which a source test is not performed). NOx, CO, and $O_2$ concentrations shall be performed using a portable emission monitor that meets District specifications. NH3 monitoring shall be conducted utilizing District approved gas-detection tubes or a District approved equivalent method. 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]
- {2994} 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 5.9 of the rule presents the alternative monitoring requirements for various engines not subject to the normal monitoring requirements of Section 5.8. These engines are required to monitor emissions under Section 5.8, so Section 5.9 does not apply.

Section 5.10 requires that on and after the compliance schedule specified in Section 7.5, an operator of a non-AO 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 SOx 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.

This unit is fired on PUC-Regulated natural gas. Therefore, the following requirement will be included on the permit to comply with the SOx emissions monitoring requirement:

- The permittee shall submit an analysis showing the natural gas fuel sulfur content at least once every year. Valid purchase contracts, supplier certifications, tariff sheets, or transportation contacts may be used to satisfy this requirement, provided they establish the fuel parameters mentioned above. [District Rules 2201 and 4702]

Section 6.1 requires that the operator of an engine subject to the requirements of Section 5.2 of this rule shall submit to the APCO an APCO-approvable emission control plan of all actions to be taken to satisfy the emission requirements of Section 5.2 and the compliance schedules of Section 7.0. If there is no change to the previously-approved emission control plan, the operator shall submit a letter to the District indicating that the previously approved plan is still valid.

Section 6.1.2 requires that the emission control plan shall identify the type of emission control device or technique to be applied to each engine and a construction/removal schedule, or shall provide support documentation sufficient to demonstrate that the engine is in compliance with the emission requirements of this rule.

This submitted ATC application satisfies the requirements of this section.

Section 6.2.1 requires that the owner of an engine subject to the requirements of this rule shall maintain an engine operating log to demonstrate compliance with this rule. This information shall be retained for a period of at least five years, shall be readily available,

and be made available to the APCO upon request. The engine operating log shall include, on a monthly basis, the following information:

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

Therefore, the following condition will be included on the permit to ensure compliance:

- The permittee shall maintain records of: (1) the date and time of NOx, CO, O2, and NH3 measurements, (2) the O2 concentration in percent and the measured NOx, CO, and NH3 concentrations corrected to 15% O2, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, (5) the method of determining the NH3 emission concentration, and (6) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 2201 and 4702]
- The permittee shall maintain an engine operating log to demonstrate compliance. The engine operating log shall include, on a monthly basis, the following information: total hours of operation, type and quantity of fuel used, maintenance or modifications performed, monitoring data, compliance source test results, and any other information necessary to demonstrate compliance. [District Rule 4702 and 40 CFR 60 Subpart JJJJ]

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. Therefore, the following condition will be included on the permit to ensure compliance:

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

Section 6.3.1 states 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 AO spark-ignited engine that is subject to the requirements of Section 8.0;
6.3.1.4 An AO spark-ignited engine that has been retrofitted with a catalytic emission control and is not subject to the requirements of Section 8.0.

The engines in this project have been retrofitted with an exhaust control device. Therefore, Sections 6.3.2 through Section 6.3.4 are applicable to the engines in this project.

Section 6.3.2 requires that the operator of an engine subject to the requirements of Section 5.2, which engine equipped with an exhaust control device, to demonstrate compliance

with the applicable emission limits during the initial start-up and at least once every 24 months thereafter.

Section 6.3.3 requires that the test must be conducted with the unit operating at normal operating conditions and using three 30-consecutive minute test runs. In addition, VOC shall be reported as methane, VOC, NOx, and CO concentrations shall be reported in ppmv, corrected to 15 percent oxygen.

Section 6.3.5 specifies that engine that is limited by PTO condition to be fueled exclusively with PUC-quality natural gas shall not be subject to reoccurring source test requirements of Section 6.3.2 for VOC emissions.

Source testing will be required within 60 days of initial start-up. The following conditions will be included on the permit to ensure compliance:

- Source testing to measure natural gas fuel combustion NOx, CO, VOC and ammonia emissions from this unit shall be conducted within 60 days of initial start-up and once every 8,760 hours of operation or 24 months, whichever comes first, thereafter. [District Rules 2201 and 4702 and 40 CFR 60 Subpart JJJJ]
- 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 and 40 CFR 60 Subpart JJJJ]
- For initial emissions source testing, the arithmetic average of three 60-consecutive-minute test runs shall apply. Each test run shall be conducted within 10 percent of 100 percent peak (or the highest achievable) load. If two of three runs are above an applicable limit, the test cannot be used to demonstrate compliance with an applicable limit. NOx, CO and VOC concentrations shall be reported in ppmv, corrected to 15% oxygen. [District Rule 4702 and 40 CFR 60 Subpart JJJJ]

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

- Oxides of nitrogen - EPA Method 7E, or ARB Method 100.
- Carbon monoxide - EPA Method 10, or ARB Method 100.
- Stack gas oxygen - EPA Method 3 or 3A, or ARB Method 100.
- Volatile organic compounds - EPA Method 25A or 25B, or ARB Method 100.
- Operating horsepower determination - any method approved by EPA and the APCO.

Therefore, the following condition will be included on the permit to ensure compliance:

- The following test methods shall be used: NOx (ppmv) - EPA Method 7E or ARB Method 100, CO (ppmv) - EPA Method 10 or ARB Method 100, stack gas oxygen - EPA Method 3 or 3A or ARB Method 100, and VOC (ppmv) - EPA Method 25A or 25B, or ARB Method 100. [District Rules 1081 and 4702]
- Source testing for ammonia slip shall be conducted utilizing BAAQMD method ST-1B. [District Rule 1081]

Section 6.5 requires that the owner of an engine subject to the emission limits in Section 5.2 or the requirements of Section 8.0, shall submit to the APCO for approval, an I&M plan that specifies all actions to be taken to satisfy the following requirements 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.

Section 6.5.1 states the requirements of Section 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 AO spark-ignited engine that is subject to the requirements of Section 8.0.
6.5.1.4 An AO spark-ignited engine that has been retrofitted with a catalytic emission control and is not subject to the requirements of Section 8.0.

The engines in this project have been retrofitted with an exhaust control device. Therefore, Sections 6.5.2 through Section 6.5.9 are applicable to the engines in this project.

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

Section 6.5.3 specifies procedures for monthly inspections as approved by the APCO. The applicable control equipment parameters and engine operating parameters will be inspected and monitored monthly in conformance with a regular inspection schedule listed in the I&M plan. The applicant has previously proposed that the alternate monitoring program will ensure compliance with Sections 6.5.2 and 6.5.3 of the Rule. Therefore, the following condition will ensure compliance with the I&M requirements of this rule:

- The permittee shall monitor and record the stack concentration of NOx, CO, O2, and NH3 at least once every month (in which a source test is not performed). NOx, CO, and O2 concentrations shall be performed using a portable emission monitor that meets District specifications. NH3 monitoring shall be conducted utilizing District approved gas-detection tubes or a District approved equivalent method. 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]

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

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

The applicant has proposed that the alternate monitoring program will ensure compliance with these two sections of the Rule. The following condition will be listed on the permits to ensure compliance with these requirements:

- If the NOx or CO concentrations corrected to 15% O2, as measured by the portable analyzer, or the NH3 concentrations corrected to 15% O2, as measured by District approved gas-detection tubes, exceed the allowable emissions concentration, 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 readings continue to exceed the allowable emissions concentration after 1 hour 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]

Section 6.5.6 specifies procedures for preventive and corrective maintenance performed for the purpose of maintaining an engine in proper operating condition. The applicant has proposed that the engines will be operated and maintained per the manufacturer's specifications. Therefore, the following condition will be included on the permit to ensure compliance:

- {3202} This engine shall be operated and maintained in proper operating condition per the manufacturer's requirements as specified on the Inspection and Monitoring (I&M) plan submitted to the District. [District Rule 4702]

Section 6.5.7 specifies procedures and a schedule for using a portable $NO_x$ analyzer to take $NO_x$ emission readings pursuant to Section 5.8.9. The applicant has proposed that the alternate monitoring program will ensure compliance with this Section of the Rule. The following condition will ensure compliance with this requirement:

- {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]

Section 6.5.8 specifies procedures for collecting and recording required data and other information in a form approved by the APCO including, but not limited to, data collected through the I&M plan and the monitoring systems described in Sections 5.8.1 and 5.8.2. Data collected through the I&M plan shall have retrieval capabilities as approved by the APCO. The applicant has proposed that the alternate monitoring program will ensure compliance with this Section of the Rule. The following condition will ensure compliance with this requirement:

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

Section 6.5.9 specifies procedures for revising the I&M plan. The I&M plan shall be updated to reflect any change in operation. The I&M plan shall be updated prior to any planned change in operation. An engine operator that changes significant I&M plan elements must notify the District no later than seven days after the change and must submit an updated I&M plan to the APCO no later than 14 days after the change for approval. The date and time of the change to the I&M plan shall be recorded in the engine operating log. For new engines and modifications to existing engines, the I&M plan shall be submitted to and approved by the APCO prior to issuance of the Permit-to-Operate 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 that they will modify their I&M plan per this section of the Rule. Therefore, the following condition will be placed on the permit to ensure continued 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 7.1 requires that the owner of an engine which becomes subject to the emission limits of this rule through loss of exemption shall not operate the subject engine, except as required for obtaining a new or modified Permit-to-Operate for the engine, until the owner demonstrates full compliance with the requirements of this rule.

The engines in this project did not become subject to this rule through a loss of exemption; therefore, the requirements of this section are not applicable.

Section 7.5.1 requires an operator with non-AO spark-ignited engines at a stationary source subject to Table 2 or Section 8.0 emission limits, SOx control requirements of Section 5.7, and the SOx monitoring requirements of Section 5.10 shall comply with the schedule specified in Table 5.

The engines involved with this project will meet all the requirements of Rule 4702 at the time of initial operation. Therefore, the engines are in meet the compliance schedule requirements of Table 5.

Section 8.0 allows that an operator may comply with the NOx emission requirements of Section 5.2 for a group of engines by meeting the requirements below. An operator that is subject to the requirements below shall also comply with all the applicable requirements of Sections 5.0, 6.0, and 7.0. Only engines subject to Section 5.2 are eligible for inclusion in an AECP.

The applicant has not proposed an Alternative Emission Control Plan (AECP). Therefore, this section of the Rule is not applicable to the engines involved with this project.

Therefore, compliance with the requirements of this Rule is expected.

**Rule 4801 Sulfur Compounds**

Rule 4801 requires that sulfur compound emissions (as $SO_2$) shall not exceed 0.2% by volume. Using the ideal gas equation, the sulfur compound emissions are calculated as follows:

Volume $SO_2$ = (n x R x T) ÷ P
n = moles $SO_2$
T (standard temperature) = 60 °F or 520 °R
R (universal gas constant) = $\frac{10.73\,\text{psi}\cdot\text{ft}^3}{\text{lb}\cdot\text{mol}\cdot{}^\circ\text{R}}$

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F-Factor for Digester gas: 9,100 dscf/MMBtu

$$\frac{1.124\,lb-SOx}{MMBtu}\times\frac{MMBtu}{9{,}100\,dscf}\times\frac{1\,lb\cdot mol}{64\,lb}\times\frac{10.73\,psi\cdot ft^3}{lb\cdot mol\cdot{}^\circ R}\times\frac{520{}^\circ R}{14.7\,psi}\times\frac{1{,}000{,}000\cdot parts}{million}=733\frac{parts}{million}$$

Since the SOx concentration is ≤ 2,000 ppmv, the flare is expected to comply with Rule 4801.

Natural Gas Fuel

$$2.85 \quad \frac{lb-S}{MMscf-gas} \times \frac{1 scf-gas}{1{,}000\,Btu} \times \frac{1\,MMBtu}{8{,}578\,scf} \times \frac{1 lb-mol}{64\,lb-S} \times \frac{10.73\,psi-ft^3}{lb-mol-°R} \times \frac{520°R}{14.7\,psi} \times 1{,}000{,}000 = \quad 1.97 \quad \text{ppmv}$$

Since the SOx concentration is ≤ 2,000 ppmv, the engine is expected to comply with Rule 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)**

The California Environmental Quality Act (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 San Joaquin Valley Unified Air Pollution Control District (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.
- 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.

The City of Tulare (Tulare) is the public agency having principal responsibility for approving the project. As such, Tulare served as the Lead Agency (CCR §15367). In approving the project, the Lead Agency prepared and adopted a Mitigated Negative Declaration. The Lead Agency filed a Notice of Determination, stating that the environmental document was adopted pursuant to the provisions of CEQA and concluding that the project would not have a significant effect on the environment.

The District is a Responsible Agency for the project because of its discretionary approval power over the project via its Permits Rule (Rule 2010) and New Source Review Rule (Rule 2201), (CCR §15381). As a Responsible Agency the District complies with CEQA by considering the environmental document prepared by the Lead Agency, and by reaching its own conclusion on whether and how to approve the project (CCR §15096).

The District has considered the Lead Agency's environmental document. Furthermore, the District has conducted an engineering evaluation of the project, this document, which demonstrates that Stationary Source emissions from the project would be below the District's thresholds of significance for criteria pollutants. Thus, the District finds that through a combination of project design elements, compliance with applicable District rules and regulations, and compliance with District air permit conditions, project specific stationary source emissions will have a less than significant impact on air quality. The District does not have authority over any of the other project impacts and has, therefore, determined that no additional findings are required (CEQA Guidelines §15096(h)).

**Indemnification Agreement/Letter of Credit Determination**

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

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

## IX. Recommendation

Compliance with all applicable rules and regulations is expected. Pending a successful NSR Public Noticing period, issue Authorities to Construct S-8153-1-2, '4-1, '5-1 subject to the permit conditions on the attached draft Authorities to Construct in Attachment C.

## X. Billing Information

| Annual Permit Fees | | | |
|---|---|---|---|
| Permit Number | Fee Schedule | Fee Description | Annual Fee |
| S-8153-1-2 | 3020-02-H | 82 MMBtu/hr flares | $1,080.00 |
| S-8153-4-1 | 3020-10-E | 831 bhp IC engine | $ 631.00 |
| S-8153-5-1 | 3020-10-E | 831 bhp IC engine | $ 631.00 |

Attachments

A: BACT Guideline 3.3.12 and Top Down BACT Analysis
B: Health Risk Assessment and Ambient Air Quality Analysis
C: Draft ATCs
D: Quarterly Net Emissions Change (QNEC) Calculations

# Attachment A

BACT Guideline 3.3.12 and Top Down BACT Analysis

**Best Available Control Technology (BACT ) Guideline 3.3.12**
**Last Update: 3/19/2015**

## Non-Agricultural Fossil** Fuel-Fired IC Engines > 50 bhp

| Pollutant | Achieved in Practice or in the SIP | Technologically Feasible | Alternate Basic Equipment |
|---|---|---|---|
| NOx | 0.07 g/bhp-hr or 5 ppmvd @ 15% O2 | | 1. 2 ppmvd @ 15% O2 Natural Gas-Fired Turbine 2. Electric Motor (except for engines that will be used to generate electricity) |
| SOx | Compliance with District Rule 4702 SOx Emission Control Requirements | | Electric Motor (except for engines that will be used to generate electricity) |
| PM10 | 0.06 g/bhp-hr (Total PM)*** | | Electric Motor (except for engines that will be used to generate electricity) |
| CO | 1. For compression-ignited engines > 300 bhp and < or = 500 bhp: 49 ppmvd @ 15% O2 2. For compression-ignited engines > 500 bhp: 23 ppmvd @ 15% O2 3. For four stroke lean burn spark-ignited engines > 500 bhp: 47 ppmvd @ 15% O2 4. For all engines rated > or = 2,064 bhp: 33 pmvd @ 15% O2 5. For all other engines (not included in categroies 1 through 4 above): 56 ppmvd @ 15% O2 or 0.6 g/bhp-hr | For all compression-ignited engines: 12 ppmvd @ 15% O2 using an oxidation catalyst | Electric Motor (except for engines that will be used to generate electricity) |
| VOC | 1. For all compression-ignited engines: Use of an engine meeting the latest Tier standard 2. For all spark-ignited engines: 25 ppmvd @ 15% O2 or 0.15 g/bhp-hr | 1. For all compression-ignited engines: 50 percent reduction of latest Tier standard for VOC emissions using a catalytic oxidation system. 2. For rich-burn spark-ignited engines: 12 ppmvd @ 15% O2 or 0.069 g/bhp-hr | Electric Motor (except for engines that will be used to generate electricity) |

*** For the purposes of this determination, fossil fuels include diesel, gasoline, natural gas, propane, kerosene, and similar hydrocarbon compounds derived from petroleum oil or natural gas. Fossil fuels also include similar synthetic fuels such as biodiesel and/or any fuel containing one or more fossil fuels.*

****This total PM10 emission limit is based on EPA Method 5 (front half and back half) testing, which typically yields results as much as four times higher than when using the ISO 8178 Test Method. The ISO 8178 Test Method only reports filterable (i.e. front half) emissions.*

## 1. NOx Top-Down BACT Analysis for Permit Unit S-8153-4-1 and '5-1

### Step 1 – Identify all control technologies

The following control technologies and alternative equipment options have been identified for fossil fuel-fired IC engines.

1) $NO_X$ emissions 5 ppmvd @ 15% O2 (Achieved in Practice)
2) Turbine (2 ppmv, natural gas fuel) (Alternate Basic Equipment)
3) Electric Motor (except for engines that will be used to generate electricity) (Alternate Basic Equipment)

### Step 2 - Eliminate Technologically Infeasible Options

Since the engines are proposed to generate electricity, the third option will be eliminated.

### Step 3 - Rank Remaining Control Technologies by Control Effectiveness

| Rank | Control Technology | Achieved in Practice |
|---|---|---|
| 1 | Turbine (2 ppmv, natural gas fuel) | N |
| 2 | $NO_X$ emissions 5 ppmvd @ 15% O2 | Y |

### Step 4 - Cost Effectiveness Analysis

Pursuant to Section IX.D of District Policy APR 1305 – BACT Policy, a cost effectiveness analysis is required for the options that have not been determined to be achieved in practice. In accordance with the District's Revised BACT Cost Effectiveness Thresholds Memo (5/14/08), to determine the cost effectiveness of particular technologically feasible control options or alternate equipment options, the amount of emissions resulting from each option will be quantified and compared to the District Standard Emissions allowed by the District Rule that is applicable to the particular unit. The emission reductions will be equal to the difference between the District Standard Emissions and the emissions resulting from the particular option being evaluated.

The proposed engines are lean burn, natural gas-fired, engine is subject to the District Rule 4702 emission limits for non-agricultural, lean burn, natural gas-fired IC engines. Therefore, in accordance with the District's Revised BACT Cost Effectiveness Thresholds Memo, the District Standard Emissions used for the BACT cost analysis below for the proposed engine will be based on the emission limits for non-agricultural, lean burn, natural gas-fired IC engines contained in District Rule 4702, Section 5.1.1, Table 2, 2.d (11 ppmvd $NO_X$, 2,000 ppmvd CO, and 750 ppmvd VOC (all measured @ 15% $O_2$)).

Option 1: Turbine (2 ppmv, natural gas fuel) (Alternate Basic Equipment)

The following cost analysis demonstrates that replacement of the proposed engine with a turbine is not cost effective when considering the capital costs.

Assumptions

Assumptions for Proposed Natural Gas-Fired IC Engines

- Hours of Operation for the Engine = 8,760 (worst case)
- Natural gas F-Factor: 8,578 dscf/MMBtu (60 °F)
- Molar Specific Volume = 379.5 scf/lb-mol (60 °F)
- BHP to Btu/hr conversion: 2,542.5 Btu/hp-hr
- Btu to kW-hr conversion: 3,413 Btu/kW-hr
- Typical mechanical efficiency for engine: 35%
- Rule 4702 $NO_X$ emission limit for non-agricultural, lean burn, natural gas-fired IC engines: 11 ppmv @ 15% $O_2$ (0.132 g/bhp-hr)

Capital Cost

Per 2G Cenergy, the MWM engine supplier (vendor), the estimated increased incremental capital cost for installation of a similar sized turbine with SCR as a replacement of one of the proposed 831 bhp IC engines is calculated as follows as the difference in cost of a turbine and the IC engine.

Capital Cost Turbine with SCR = $3,045,000
Capital Cost Proposed Engine with SCR = $1,480,119

Incremental Capital Cost = $3,045,000 - $1,480,119 = $1,564,881

Annualized Capital Cost

Pursuant to District Policy APR 1305, section X (11/09/99), the incremental capital cost for the purchase of the equipment will be spread over the expected life of the system using the capital recovery equation. The expected life of the equipment will be estimated at 10 years. A 10% interest rate is assumed in the equation and the assumption will be made that the equipment has no salvage value at the end of the ten-year cycle.

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

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

$$A = \$1,564,881 \times [0.1(1.1)^{10}]/[(1.1)^{10}-1]$$
$$= \mathbf{\$254,677/year}$$

Emission Reductions

Pursuant to the District's Revised BACT Cost Effectiveness Thresholds Memo (5/14/08), District Standard Emissions that will be used to compare with the alternative equipment will be based on the emission limits for lean burn non-agricultural IC engines contained in District Rule 4702, Section 5.2, Table 2, 2.d. The following emissions factors will be used for the cost analysis:

District Standard Emissions = 0.132 g-$NO_X$/bhp-hr (11 ppmv @ 15% O2 and 35% engine efficiency)

Emissions from Turbine as Alternative Equipment = 0.024 g-$NO_X$/bhp-hr (2 ppmv @ 15% O2 and 35% engine efficiency)

$NO_X$ Emission Reductions = 831 bhp x 8,760 hours/year x (0.132 g-$NO_X$/bhp-hr – 0.024 g-$NO_X$/bhp-hr) x lb/453.6 g
= 1,733 lb-$NO_X$/year (0.87 ton/year)

Cost Effectiveness

Cost Effectiveness = Annualized Cost ÷ Annual Emission Reductions

**Cost Effectiveness = $254,677 ÷ 0.87 tons-NOx = $293,876/ton-NOx**

As shown above, the cost of NOx reduction by installation of a turbine would be greater than the $24,500/ton cost effectiveness threshold for NOx in the District BACT policy, based only on the incremental capital cost of the turbine. Therefore this option is not cost-effective and is being removed from consideration.

Option 2: $NO_X$ emissions 5 ppmvd @ 15% O2 (Selective Catalytic Reduction, or equal) (Achieved in Practice)

The applicant has proposed this option and it is considered to be Achieved in Practice; therefore a cost analysis is not required.

**Step 5 - Select BACT**

Pursuant to the above Top-Down BACT Analysis, BACT for the natural gas-fired engine must be satisfied with the following:

$NO_X$: $NO_X$ emissions 5 ppmvd @ 15% O2 and 0.07 g/bhp-hr (Achieved in Practice)

The applicant has proposed to apply an SCR system to a lean burn IC engine to reduce $NO_X$ emissions to 5 ppmvd @ 15% O2 and 0.07 g/bhp-hr. Therefore, the BACT requirements are satisfied.

## 2. VOC Top-Down BACT Analysis for Permit Unit S-8153-4-1 and '5-1

### Step 1 – Identify all control technologies

The following control technology has been identified for fossil fuel-fired IC engines.

1) VOC emissions 25 ppmvd @ 15% O2, 0.15 g/bhp-hr, or 0.5 lb/MW-hr (Achieved in Practice)
2) Electric Motor (except for engines that will be used to generate electricity) (Alternate Basic Equipment)

### Step 2 - Eliminate Technologically Infeasible Options

Since the engines are proposed to generate electricity, the second option will be eliminated.

### Step 3 - Rank Remaining Control Technologies by Control Effectiveness

There is only one remaining control option.

| Rank | Control Technology | Achieved in Practice |
|---|---|---|
| 1 | VOC emissions 25 ppmvd @ 15% O2, 0.15 g/bhp-hr, or 0.5 lb/MW-hr | Y |

### Step 4 - Cost Effectiveness Analysis

Option 1: VOC Emissions 25 ppmvd @ 15% O2, 0.15 g/bhp-hr, or 0.5 lb/MW-hr (Achieved in Practice)

The applicant has proposed this option and it is considered to be Achieved in Practice; therefore a cost analysis is not required.

### Step 5 - Select BACT

Pursuant to the above Top-Down BACT Analysis, BACT for the natural gas-fired engine must be satisfied with the following:

VOC: VOC emissions 25 ppmvd @ 15% O2, 0.15 g/bhp-hr, or 0.5 lb/MW-hr (Achieved in Practice)

The applicant has proposed a VOC emission limit of 0.15 g/bhp-hr. Therefore, the BACT requirements are satisfied.

# Attachment B

Health Risk Assessment and Ambient Air Quality Analysis

# Attachment C

Draft ATCs

# Attachment D

## Quarterly Net Emissions Change (QNEC) Calculation

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

QNEC = PE2 - PE1, where:

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

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| Quarterly NEC [QNEC] | | | |
|---|---|---|---|
| | PE2 (lb/qtr) | PE1 (lb/qtr) | QNEC (lb/qtr) |
| $NO_X$ | 329 | 0 | 329 |
| $SO_X$ | 4,264 | 0 | 4,264 |
| $PM_{10}$ | 88 | 0 | 88 |
| CO | 3,285 | 0 | 3,285 |
| VOC | 745 | 0 | 745 |

S-8153-4-1 and '5-1

| Quarterly NEC [QNEC] | | | |
|---|---|---|---|
| | PE2 (lb/qtr) | PE1 (lb/qtr) | QNEC (lb/qtr) |
| $NO_X$ | 281 | 0 | 281 |
| $SO_X$ | 38 | 0 | 38 |
| $PM_{10}$ | 133 | 0 | 133 |
| CO | 2,407 | 0 | 2,407 |
| VOC | 602 | 0 | 602 |