San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

MAR 12 2013

N. Ross Buckenham
ABEC Bidart-Old River LLC
c/o California Bioenergy, LLC
2828 Routh Street Suite 500
Dallas, TX 75201-1438

Re: Notice of Preliminary Decision - Authority to Construct
Project Number: S-1120734

Dear Mr. Buckenham:

Enclosed for your review and comment is the District's analysis of ABEC Bidart-Old River LLC's application for an Authority to Construct for installation of an anaerobic digester system and three 1,676 bhp digester gas-fired IC engines equipped with selective catalytic reduction (SCR) systems for emissions control, at Bidart Dairy located at 20400 Old River Road, Bakersfield, CA.

The notice of preliminary decision for this project will be published approximately three days from the date of this letter. Please submit your written comments on this project within the 30-day public comment period which begins on the date of publication of the public notice.

Thank you for your cooperation in this matter. If you have any questions regarding this matter, please contact Mr. Ramon Norman of Permit Services at (559) 230-5909.

Sincerely,

David Warner
Director of Permit Services

DW:rn

Enclosures

Seyed Sadredin
Executive Director/Air Pollution Control Officer

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
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www.valleyair.org www.healthyairliving.com

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

MAR 12 2013

Mike Tollstrup, Chief
Project Assessment Branch
Stationary Source Division
California Air Resources Board
PO Box 2815
Sacramento, CA 95812-2815

Re: Notice of Preliminary Decision - Authority to Construct
Project Number: S-1120734

Dear Mr. Tollstrup:

Enclosed for your review and comment is the District's analysis of ABEC Bidart-Old River LLC's application for an Authority to Construct for installation of an anaerobic digester system and three 1,676 bhp digester gas-fired IC engines equipped with selective catalytic reduction (SCR) systems for emissions control, at Bidart Dairy located at 20400 Old River Road, Bakersfield, CA.

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www.valleyair.org www.healthyairliving.com

Bakersfield Californian

NOTICE OF PRELIMINARY DECISION
FOR THE PROPOSED ISSUANCE OF
AN AUTHORITY TO CONSTRUCT

NOTICE IS HEREBY GIVEN that the San Joaquin Valley Unified Air Pollution Control District solicits public comment on the proposed issuance of Authority to Construct to ABEC Bidart-Old River LLC for installation of an anaerobic digester system and three 1,676 bhp digester gas-fired IC engines equipped with selective catalytic reduction (SCR) systems for emissions control, at Bidart Dairy located at 20400 Old River Road, Bakersfield, CA.

The analysis of the regulatory basis for this proposed action, Project #S-1120734, is available for public inspection at http://www.valleyair.org/notices/public_notices_idx.htm and at any District office. For additional information, please contact the District at (559) 230-6000. Written comments on this project must be submitted by April 15, 2013 to **DAVID WARNER, DIRECTOR OF PERMIT SERVICES, SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT, 1990 EAST GETTYSBURG AVENUE, FRESNO, CA 93726.**

San Joaquin Valley Air Pollution Control District

Authority to Construct Application Review

Digester System and Three Digester Gas-Fired IC Engines with SCR

Facility Name:	ABEC Bidart-Old River LLC	Date:	February 6, 2013
Mailing Address:	ABEC Bidart-Old River LLC C/O California Bioenergy, LLC 2828 Routh Street, Suite 500	Engineer: Lead Engineer:	Ramon Norman Martin Keast
Contact Person:	N. Ross Buckenham - California Bioenergy/ABEC Bidart-Old River		
Telephone:	(214) 849-9886		
E-Mail:	rbuckenham@calbioenergy.com		
Application #s:	S-7767-13-0, -14-0, -15-0, and -16-0		
Project #:	S-1120734		
Deemed Complete:	October 9, 2012		

I. Proposal

ABEC Bidart-Old River LLC, a subsidiary of California Bioenergy, LLC, has requested Authority to Construct (ATC) permits to construct an anaerobic digester system consisting of two continuous stirred tank reactor (CSTR) anaerobic digester tanks and two covered lagoon anaerobic digesters (ATC S-7767-13-0) and install three 1,676 bhp digester gas-fired IC engines (ATCs S-7767-14-0, -15-0, and -16-0) at Bidart Dairy, LLC (Facility S-4751). Each engine will be equipped with a selective catalytic reduction (SCR) system for emissions control and will power a 1,200 kW electrical generator. Under a separate project (Project S-1120761), Bidart Dairy has requested an ATC permit to remove four existing settling basins at the dairy for construction of the ABEC Bidart-Old River LLC digester facility and to send manure from the dairy to the ABEC Bidart-Old River LLC anaerobic digester facility located at the dairy site. The digester system will be used to produce renewable biogas that will be used to fuel the IC engine generator sets. ABEC Bidart-Old River LLC previously received ATC permits under project S-1100455 to install 12 841 bhp digester gas-fired IC engines at the facility (ATCs S-7767-1-0, -2-0, -3-0, -4-0, -5-0, -6-0, -7-0, -8-0, -9-0, -10-0, -11-0, & -12-0). These ATC permits will be cancelled and replaced by the ATC permits issued under this project.

ABEC Bidart-Old River LLC and Bidart Dairy, which are separate companies, are undertaking the project as a partnership. ABEC Bidart-Old River LLC has provided information supporting that the dairy and the ABEC biogas facility will be separately owned and operated. The following is a summary of some of the information provided by the applicant. The proposed digester system at the dairy will be operated and maintained by ABEC Bidart-Old River LLC. The responsibility of the dairy will be limited to providing the manure feedstock and disposing of the effluent, which the dairy already must do for compliance with water quality regulations. ABEC Bidart-Old River LLC will not be involved at all in the dairy's primary activity, production of milk. The feedstock and lease agreements specify that ABEC Bidart-Old River LLC will build, own, and operate the biogas facility and also allows ABEC to make plant and equipment improvements. The proposed digester gas-fired IC engine generator sets that will be

constructed on land leased from the dairy site and will be owned, operated, and maintained by ABEC Bidart-Old River LLC. ABEC Bidart-Old River LLC will be solely responsible for ensuring that the digester system and digester gas-fired IC engines comply with all applicable air quality regulations. The generator sets will sell all the power generated to the grid and will not provide any power directly to the dairy. Because the dairy and the proposed digester gas power plant at the site will be separately owned and operated and will have different two-digit Standard Industrial Classification (SIC) codes (Industry Group 24: Dairy Farms for the Dairy vs. Industry Group 49: Electric, Gas, And Sanitary Services for the IC engine generator set), pursuant to Section 3.37 of District Rule 2201, the proposed digester system and the digester gas-fired IC engines will not be part of the dairy agricultural stationary source. Therefore, the digester system and digester gas-fired IC engines will be permitted at the non-agricultural stationary source (S-7767).

II. Applicable Rules

Rule 2201	New and Modified Stationary Source Review Rule (4/21/11)
Rule 2410	Prevention of Significant Deterioration (6/16/11)
Rule 2520	Federally Mandated Operating Permits (6/21/01)
Rule 4101	Visible Emissions (2/17/05)
Rule 4102	Nuisance (12/17/92)
Rule 4201	Particulate Matter Concentration (12/17/92)
Rule 4701	Stationary Internal Combustion Engines – Phase 1 (8/21/03)
Rule 4702	Stationary Internal Combustion Engines – Phase 2 (8/18/11)
Rule 4801	Sulfur Compounds (12/17/92)

40 CFR Part 60, Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines
40 CFR Part 63, Subpart ZZZZ - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines
CH&SC 41700 Health Risk Assessment
CH&SC 42301.6 School Notice
Public Resources Code 21000-21177: California Environmental Quality Act (CEQA)
California Code of Regulations, Title 14, Division 6, Chapter 3, Sections 15000-15387: CEQA Guidelines

III. Project Location

The ABEC Bidart-Old River Stationary Source (Facility S-7767) is located at Bidart Dairy at 20400 Old River Road near Bakersfield, CA (Mt. Diablo Meridian T 32S, R 27E, Sec 5 in Kern County). The facility is not located within 1,000 feet of the outer boundary of a K-12 school. Therefore, the public notification requirement of California Health and Safety Code 42301.6 is not applicable to this project.

IV. Process Description

Anaerobic Digester System

An anaerobic digester is a sealed basin or tank that is designed to accelerate and control the decomposition of organic matter by microorganisms in the absence of oxygen. The process of anaerobic decomposition results in the conversion of organic compounds in the substrate into

methane (CH_4), carbon dioxide (CO_2), and water rather than intermediate Volatile Organic Compounds (VOCs). The gas generated by this process is known as biogas, waste gas, or digester gas. In addition to methane and carbon dioxide, biogas may also contain small amounts of Nitrogen (N_2), Oxygen (O_2), Hydrogen Sulfide (H_2S), and Ammonia (NH_3). Biogas may also include trace amounts of various VOCs that remain from incomplete digestion of the volatile solids in the incoming substrate. Because biogas is mostly composed of methane, the main component of natural gas, the gas produced in the digester can be cleaned to remove H_2S and other impurities and used as fuel.

The proposed anaerobic digester system will be designed to process the manure generated by the cattle at Bidart Dairy. The manure will be flushed from the cow housing areas at the dairy to a mechanical separation system prior to the digester system. This pre-digester mechanical separation system will remove fibrous solids from the manure. After this mechanical separation, the liquid fraction of the manure will be pumped to the proposed covered lagoon digesters and the separated solid fraction will be transferred into the digester tanks. After digestion in the tanks, the digested substrate will flow to a post-digester mechanical separation system. The post-digester mechanical separation system will remove remaining solids which will be used as bedding for the cows or as a soil amendment. Following the post-digester solids separation, the liquid fraction from the digester tanks as well as the effluent from the covered lagoon digesters will be pumped to a storage pond at the dairy for use to irrigate and fertilize adjacent cropland.

The proposed anaerobic digester system will consist of two continuous stirred tank reactor (CSTR) anaerobic digester tanks and two covered lagoon anaerobic digesters. A CSTR digester is an enclosed, heated tank with a mechanical, hydraulic, or gas mixing system. Each digester tank will have an approximate internal diameter of 105 feet and a height of 26 feet, resulting in a volume of approximately 1,600,000 gallons for each tank. Heating pipes are installed on the walls inside the digester tanks. The digester tank slab and walls will be insulated to maintain the substrate within the mesophilic temperature range (~104-107°F). The digester tanks will be equipped with submerged mechanical agitators that will mix the substrate on an automated timed cycle to create a uniform mixture, prevent settling of materials in the tanks, and enhance biological control. The solid fraction of the dairy manure from the pre-digester separation system will be pumped into each of the digester tanks from a collection tank. The substrate will be mixed and digested in the tanks producing biogas. The digester tanks are gas-tight and sealed with an air-supported conical double membrane foil covering. The outer foil covering provides protection from the weather, and the inner foil membrane serves as a flexible gas collector. This membrane moves up and down depending on the internal gas volume and pressure. An external air blower creates a slight pressure between the two conical foils. This provides stability to the external weather protection foil cover and exerts pressure below 0.05 psig on the gas collection membrane. Iron chlorides, such as ferrous chloride ($FeCl_2$) or ferric chloride ($FeCl_3$), will be added to the CSTR digester tanks to reduce the H_2S concentration in the digester gas. Iron-chlorides reduce the H_2S concentration in the digester liquid by combining with dissolved sulfide in the liquid to form an iron sulfide precipitate, which is removed from the digester tanks. The reduced concentration of H_2S in the digester liquid results in a lower H_2S concentration in the digester gas. The CSTR digester tanks may also use air injection to promote biological removal of H_2S from the digester gas. However, as described below, the removal of H_2S by air injection will primarily occur in the covered lagoon digesters where the much larger area under the lagoon covers, as

opposed to the CSTR tanks, will allow more contact with the digester gas and lagoon surface, which enables improved oxidation and biological reduction of sulfides. The digester gas produced in the tanks will flow to the covered lagoon digester system, which will provide biological desulfurization of the gas and additional storage capacity. The digester gas will be captured by the covered the lagoon gas collector system and will be piped to the gas conditioning system for removal of moisture and for final polishing to remove H_2S. The gas will then be sent to the engines for use as fuel to generate electricity for sale to the utility and heat for operation of the digester system. When the engines are not operational the gas generated in the digester tanks will be stored under the gas collection foil cover. Excess digester gas can also be piped to the covered lagoon anaerobic digesters for additional storage under the lagoon covers.

As mentioned above, the digester system will include up to two, in-ground covered lagoon anaerobic digesters. The covered lagoon anaerobic digesters will process the liquid fraction from the dairy manure separation system. This liquid fraction is too dilute to be processed by the CSTR digester tanks. The first covered lagoon anaerobic digester will have a total volume of approximately 24 million gallons and will operate at ambient temperatures. The second covered lagoon digester, to be added at a later stage, will have a total volume of approximately 6.6 million gallons and will utilize remaining available heat from the engines to maintain the substrate within the mesophilic temperature range (~104-107°F). The area of existing settling basins at the dairy, including some free space, will be excavated and expanded to create the two new covered lagoon anaerobic digesters. The bottom and the walls of the new lagoons will be lined with a system of high-density polyethylene (HDPE) membranes and a gas collection system will be installed. The new lagoons will be fitted with HDPE covers. The gas collection system will consist of perforated piping under the HDPE covers at the perimeter of the covered lagoons. As mentioned above, the covered lagoon digesters will utilize an air injection system for removal of H_2S from the digester gas. The continuous injection of controlled quantities of air under the digester covers increases the amount of oxygen in the space under the digester covers and in the surface layer of the digester liquid, which facilitates oxidation of sulfides in the digester gas and surface of the liquid to elemental sulfur and water. Injection of air also promotes biological removal of H_2S from the digester gas by facilitating the establishment of sulfur oxidizing microorganisms, such as Thiobacillus species, which have the ability to grow under various environmental conditions and oxidize H_2S to elemental sulfur. The gas collected from the lagoons will be piped to the gas conditioning system for removal of moisture and for final polishing to remove H_2S and then sent to the engines for use as fuel. The lagoon system will include gas relief valves or venting system. When the gas cannot be used in the engines, the digester gas from both the digester tanks and the covered lagoons will be collected under the lagoon covers. As the gas collects under the lagoon covers, the pressure in the digesters will rise. In rare emergency situations when the gas cannot be combusted in the engines for an extended period, the pressure will cause the relief valves to open and release the digester gas, composed primarily of methane and carbon dioxide, into the atmosphere. As the pressure decreases, the gas relief valves will automatically close and normal operation will proceed.

When operating at full capacity, the digester system is expected to produce an average of 1,164,384 ft^3 of biogas per day. The applicant has indicated that the biogas produced by the CSTRs will be principally composed of 50-60% methane and 40-50% carbon dioxide and the biogas produced by the covered lagoon digesters will be composed of approximately 60-70%

methane and 30-40% carbon dioxide. Because the proposed digester system will be able to store the biogas for extended periods under the covers of the digester tanks and covered lagoon digesters and the proposed engines at the ABEC Bidart-Old River Stationary Source (Facility S-7767) on the dairy will have more than sufficient capacity to combust all of gas generated, no flare is being proposed for this digester installation at this facility.

Digester Gas-Fired IC Engines

The applicant is proposing to install three 1,676 bhp Caterpillar model CG170-12 lean burn digester gas-fired IC engines. The applicant originally proposed to install three 1,676 bhp MWM model 2G Avus TGC 2020 engines; however, as a result of Caterpillar's recent acquisition of MWM, the Caterpillar model CG170-12 engines will be installed, which are based on the same engine design as the MWM model but distributed under the Caterpillar name. Each engine will be equipped with an SCR system and power a 1,200 kW generator. Digester gas, which consists mostly of methane, the main component of natural gas, will be combusted in the IC engines to produce power. After initial removal of H_2S in the digester system, the digester gas will be piped to the gas conditioning system for removal of moisture. Final polishing and removal of H_2S will be accomplished using an activated carbon filter scrubber or an equivalent H_2S removal system and the gas will then be piped to the IC engines. The engines will power electrical generators that will produce power to be sold to a utility. Excess heat from the engine will be used to heat the digester tanks and possibly also the liquid from the covered lagoon digesters for more efficient production of biogas. The engines will be permitted to operate up to 24 hr/day and 8,760 hr/year.

V. Equipment Listing

S-7767-13-0: ANAEROBIC DIGESTER SYSTEM CONSISTING OF TWO CONTINUOUS STIRRED TANK REACTOR (CSTR) MESOPHILIC ANAEROBIC DIGESTER TANKS (EACH 1,600,000 GALLONS, 104' DIA X 26' HIGH) AND TWO COVERED LAGOON ANAEROBIC DIGESTERS (1 X 24 MILLION GALLONS, 1 X 6.6 MILLION GALLONS)

S-7767-14-0: 1,676 BHP CATERPILLAR MODEL CG170-12 (OR DISTRICT APPROVED EQUIVALENT) DIGESTER GAS-FIRED LEAN-BURN IC ENGINE WITH A JOHNSON MATTHEY SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM, AND A SILOX OR SCS ENERGY CARBON FILTER (OR EQUIVALENT) H2S REMOVAL SYSTEM POWERING AN ELECTRICAL GENERATOR

S-7767-15-0: 1,676 BHP CATERPILLAR MODEL CG170-12 (OR DISTRICT APPROVED EQUIVALENT) DIGESTER GAS-FIRED LEAN-BURN IC ENGINE WITH A JOHNSON MATTHEY SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM, AND A SILOX OR SCS ENERGY CARBON FILTER (OR EQUIVALENT) H2S REMOVAL SYSTEM POWERING AN ELECTRICAL GENERATOR

S-7767-16-0: 1,676 BHP CATERPILLAR MODEL CG170-12 (OR DISTRICT APPROVED EQUIVALENT) DIGESTER GAS-FIRED LEAN-BURN IC ENGINE WITH A JOHNSON MATTHEY SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM, AND A SILOX OR SCS ENERGY CARBON FILTER (OR EQUIVALENT) H2S REMOVAL SYSTEM POWERING AN ELECTRICAL GENERATOR

VI. Emission Control Technology Evaluation

Digester System (S-7767-13-0)

The digester system will be equipped with a pressure-vacuum (PV) relief valves or an emergency venting system. The digester gas will be scrubbed to remove hydrogen sulfide and will be used to fuel engines to generate electricity. Combustion of the digester gas in the engines will convert any VOCs present in the gas into carbon dioxide and water. As stated above, because the digester system will be able to store the gas for extended periods and the engines will have more than enough capacity to combust all of the gas generated, no flare is being proposed for this digester project.

H_2S Removal

As described above, iron chlorides, such as ferrous chloride ($FeCl_2$) and ferric chloride ($FeCl_3$), will be added to the digester tanks for removal of H_2S. H_2S is a weak acid and disassociates resulting in the formation of dissolved sulfide. Iron-chlorides reduce the H_2S concentration in the digester liquid by combining with dissolved sulfide in the liquid to form an iron sulfide precipitate, which is removed from the digester tanks. The reduced concentration of H_2S in the digester liquid results in a lower H_2S concentration in the digester gas. Ferrous chloride ($FeCl_2$) and ferric chloride ($FeCl_3$) reduces the dissolved sulfides according to the following reactions:

$$FeCl_2 + H_2S \rightarrow FeS + 2\ HCl$$

$$2\ FeCl_3 + 3\ H_2S \rightarrow Fe_2S_3 + 6\ HCl$$

Also as mentioned above, the covered lagoon anaerobic digesters will utilize an air injection system for additional removal of H_2S from the digester gas. The continuous injection of controlled quantities of air under the lagoon covers increases the amount of oxygen in the space under the digester covers and the surface layer of the liquid in the covered lagoon digesters, which facilitates oxidation of sulfides in the digester gas and surface of the liquid to elemental sulfur and water. The sulfur dissolves in the water in the digester and can be removed from the digester system by deposition and filtration. Injection of air also promotes biological removal of H_2S from the digester gas by facilitating the establishment of sulfur oxidizing microorganisms, such as Thiobacillus species, which have the ability to grow under various environmental conditions and oxidize H_2S to elemental sulfur and sulfates that can be removed from the digester system. Use of air injection to remove H_2S from digester gas has shown greater effectiveness in covered lagoon digesters as opposed to digesters tanks because the larger areas under covered lagoon digesters allow more contact with the digester gas and lagoon surface, which will enable improved oxidation and biological reduction of sulfides. Successful installations of the air injection sulfur removal system have demonstrated significantly reduced operation and maintenance costs when compared to other methods of sulfur removal.

For final polishing, the digester gas will be sent through a Silox or SCS Energy carbon filter (or equivalent system) to remove H_2S from the gas prior to combustion in the proposed engines. The carbon filters will remove H_2S from the gas stream by adsorption onto activated carbon grains. The carbon is "activated" for this purpose by processing the carbon to create porous

particles with a large internal surface area that attracts and adsorbs organic molecules as well as certain metal and inorganic molecules. Targeted compounds diffuse into these pores and are retained on the carbon surface due to both chemical and physical forces. For removal of H_2S, the activated carbon is impregnated with sodium hydroxide, potassium hydroxide, potassium iodide, or other chemicals to increase adsorption of H_2S and/or facilitate the conversion of H_2S to elemental sulfur.

The proposed carbon filter system will consist of enclosed vessels mounted on skids filled with activated carbon. The digester gas will first flow through the dryer and chiller to remove moisture and then will be sent to the carbon filter for H_2S removal. For continuous operation, there will be secondary unit that will be brought online at specified times or when monitoring indicates that the primary unit is nearing saturation. Valves can be arranged so either bed can operate while the other is serviced. The useful life of the activated carbon vessels will vary depending on the inlet concentration of H_2S, the flow rate, and the mass of the activated carbon. Before the activated carbon is completely spent, it must be regenerated or replaced. Spent activated carbon vessels will be sent to a regeneration facility or to appropriate disposal facility. The proposed carbon filter system will be capable of reducing H_2S concentrations in the digester gas down to 40 ppmv. Reducing the H_2S concentration in the gas will minimize SO_X emissions from combustion and will also reduce the maintenance requirements for engines and emission control equipment and protects from masking, plugging, and poisoning of catalysts.

Digester Gas-Fired IC Engines (S-7767-14-0, -15-0, & -16-0)
The proposed engines will be equipped with:

- Turbocharger
- Intercooler
- Air/Fuel Ratio or an O_2 Controller
- Lean Burn Technology
- Positive Crankcase Ventilation (PCV) or 90% efficient control device
- Selective Catalytic Reduction (SCR)

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

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

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.

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

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

VII. General Calculations

A. Assumptions

- ABEC Bidart-Old River LLC (Facility S-7767) and Bidart Dairy (Facility S-4751) are separate stationary sources at the same site.
- Because of the high moisture content of separated manure solids, PM emissions from the handling of separated solids for the digester system are considered negligible.
- Because the manure for the digester system will be taken from the mechanical separation system at Bidart Dairy and the digested solids and effluent from the digester system will be returned to Bidart Dairy for use, all emissions from the manure processed in the digester system will be will be allocated to the liquid manure handling system at Bidart Dairy.
- The proposed digester system will reduce potential VOC emissions from manure generated by the cattle at Bidart Dairy. Manure that is currently stored in uncovered lagoons and ponds will instead be placed in sealed tanks and covered ponds at the ABEC Bidart-Old River facility, thereby decreasing volatilization of compounds from the manure. In the digester system most VOCs present will be converted to methane (an exempt compound) and carbon dioxide further reducing the potential for VOC emissions. Because results of dairy digester analyses have indicated very low VOC content (less than 1% by weight), fugitive VOC emissions from the digester system are assumed to be negligible, consistent with District Policy SSP 2015. During operation, the digester gas will be directed to the engines where the gas will be combusted resulting in the oxidation of gaseous hydrocarbons into carbon dioxide and water. Therefore, VOC emissions from the digester system are considered negligible.
- Molar composition of typical digester gas is about 60% methane and 40% carbon dioxide with trace amounts of hydrogen sulfide, VOC, and other compounds. [1]
- Typical Higher Heating Value for Digester Gas: 600 Btu/scf (Per AP-42 (4/00), notes to Tables Table 3.1-1, Table 3.1-2b, Table 3.1-7, and Table 3.1-8.)
- Typical EPA F-factor for Biogas: 9,100 dscf/MMBtu (Dry, adjusted to 60 °F), (Estimated based on previous biogas fuel analyses for source tests for Permits N-1660-7 & -9 and Project S-1053738)

[1] EPA AgSTAR – frequent questions (http://www.epa.gov/agstar/anaerobic/faq.html#q4). "Anaerobic Digestion of Animal Wastes: Factors to Consider", ATTRA - National Sustainable Agriculture Information Service (https://attra.ncat.org/attra-pub/summaries/summary.php?pub=307) & "Anaerobic Digestion Overview", David Schmidt, University of Minnesota Department of Biosystems and Agricultural Engineering (http://www.mnproject.org/presentations/Schmidt/Anaerobicdigestion101.pdf)

- Sulfur content of the scrubbed biogas: 40 ppmv as H_2S (required as BACT)
- bhp to Btu/hr conversion: 2,545 Btu/hp-hr
- Thermal efficiency of engine: commonly ≈ 33%
- Molar Specific Volume = 379.5 scf/lb-mol (60°F)
- Molecular weights:
  NO_X (as NO_2) = 46 lb/lb-mol CO = 28 lb/lb-mol NH3 = 17 lb/lb-mol
  VOC (as CH_4) = 16 lb/lb-mol SO_X (as SO_2) = 64.06 lb/lb-mol
- The SCR systems that will be installed on the proposed IC engines to satisfy the BACT requirement for NO_X are expected to reduce NO_X emissions to 0.15 g/bhp-hr or less; therefore NO_X emissions from the engines will be calculated based on this emission factor. However, to ensure that all potential NSR requirements (i.e. public notice and any applicable offsetting) are satisfied if it is later determined that the BACT requirement must be revised because the units cannot consistently meet the 0.15 g-NO_X/bhp-hr BACT requirement, NO_X emissions from the engines will also be calculated in this evaluation based on the previous achieved in practice BACT emission limit of 0.6 g-NO_X/bhp-hr, which will be the maximum emission limit permitted even if a revised BACT determination is required.
- Each of the engines will be permitted to operate 24 hours/day and 365 days per year.
- To avoid surpassing the 20,000 lb/yr offset threshold for NO_X, the applicant has proposed to limit the total NO_X emissions from the engines to 19,999 lb during any consecutive 12-month rolling period. Compliance with this limit will be determined based on the monthly fuel input and monitoring and source test results.

Assumptions for Commissioning Period

- The applicant has requested that the ATC permits include a commissioning period to allow testing, adjustment, tuning, and calibration of the engines without the SCR systems installed. The duration of the commissioning period shall consist of no more than 120 hours of operation of each engine without an SCR system installed.
- Engine emissions during the commissioning period will be calculated as uncontrolled based on information provided by the engine supplier.
- Only one of the engines shall operate for commissioning purposes at any one time.

B. Emission Factors

Emission Factors during the Commissioning Period:

The commissioning period precedes normal operation of a power plant. Activities conducted during the commissioning period typically include: checking all mechanical, electrical, and control systems for the units and related equipment; confirming the performance measures specified for the equipment; test firing the units; and tuning of the units and the generators. The early stages of commissioning are conducted prior to the installation of the emission control equipment to prevent its damage. In accordance with EPA's guidance, the commissioning period is considered the final phase of the construction

process rather than initial startup of the equipment.[2] Therefore, other than quantifying emissions for New and Modified Source Review (NSR), source-specific emission limitations from applicable rules and regulations are generally not effective until completion of the commissioning period. Because emission control devices are not in place and functioning during commissioning, higher emission limits are required during this time.

The emission factors for NO_X (1.1 g/bhp-hr), CO (2.5 g/bhp-hr), and VOC (0.2 g/bhp-hr) for the commissioning period are emissions from the engine without an SCR system in place and were provided by the engine supplier. The emission factors for SO_X (0.04 g/bhp-hr), PM_{10} (0.028 g/bhp-hr), and ammonia slip (0.05 g/bhp-hr) after initial installation of the SCR system during the commissioning period are assumed to be the same emissions factors as during normal operation. SO_X emissions are based on the maximum sulfur content of the dairy digester gas (40 ppmv – required as BACT). The PM_{10} emission factor was required as a result of the Ambient Air Quality Analysis (AAQA) for PM emissions. The ammonia emission factor was based on an ammonia slip limit of 10 ppmv NH_3.

Commissioning Period Emission Factors for Digester Gas-Fired Engines				
Pollutant	g/hp·hr	lb/MMBtu	ppmvd (@ 15%O_2)	Source
NO_X	1.1	0.3145	80 ppmvd	Manufacturer's Information – See equation below
SO_X	0.04	0.0113	40 ppmvd in fuel gas	BACT Requirement/Mass Balance Equation Below
PM_{10}	0.028	0.008	--	Required by the AAQA for $PM_{2.5}$
CO	2.5	0.7147	300 ppmvd	Manufacturer's Information – See equation below
VOC	0.20	0.057	42 ppmvd as CH_4	Manufacturer's Information – See equation below
NH_3	0.05	0.0144	10 ppmvd	Required/Proposed – See equation below

NO_X – 1.1 g/bhp-hr

$$1.1\frac{g\,NOx}{bhp-hr}\times\frac{1\,lb}{453.59\,g}\times\frac{1\,hp-hr}{2{,}545\,Btu}\times\frac{0.33Btu_{out}}{1Btu_{in}}\times\frac{10^6\,Btu}{1MMBtu}=0.3145\,\frac{lb\,NOx}{MMBtu}$$

$$0.3145\,\frac{lb\,NOx}{MMBtu}\times\frac{(20.9-15)\%\,O_2}{20.9\%\,O_2}\times\frac{1MMBtu}{9{,}100\,ft^3}\times\frac{379.5\,ft^3}{lb-mole}\times\frac{lb-mole}{46\,lb\,NO_x}\times\frac{10^6\,ppmv}{1}=80\ \text{ppmvd NOx @ 15\% } O_2$$

SO_X – 40 ppmvd H_2S in fuel gas

$$\frac{40\,ft^3\,H_2S}{10^6\,ft^3}\times\frac{32.06\,lb\,S}{lb\,H_2S}\times\frac{lb-mole}{379.5\,ft^3}\times\frac{64.06\,lb\,SO_2}{32.06\,S\,lb}\times\frac{ft^3}{600\,Btu}\times\frac{10^6\,Btu}{MMBtu}=0.0113\,\frac{lb\,SOx}{MMBtu}$$

$$0.0113\,\frac{lb\,SOx}{MMBtu}\times\frac{1MMBtu}{10^6Btu}\times\frac{Btu_{in}}{0.33Btu_{out}}\times\frac{2{,}545\,Btu}{hp-hr}\times\frac{453.59\,g}{lb}=0.040\,\frac{g\,SOx}{bhp-hr}$$

[2] See US EPA Memorandum: National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE) – Questions and Answers, September 30, 2005, Attachment A, Question 41 (http://www.epa.gov/ttn/atw/rice/riceq_a_9-30-05.pdf)

CO – 2.5 g/bhp-hr

$$2.5\frac{g\,CO}{bhp-hr}\times\frac{1\,lb}{453.59\,g}\times\frac{1\,hp-hr}{2{,}545\,Btu}\times\frac{0.33Btu_{out}}{1Btu_{in}}\times\frac{10^6\,Btu}{1\,MMBtu}=0.7147\frac{lb\,CO}{MMBtu}$$

$$0.7147\frac{lb\,CO}{MMBtu}\times\frac{(20.9-15)\%\,O_2}{20.9\%\,O_2}\times\frac{1\,MMBtu}{9{,}100\,ft^3}\times\frac{379.5\,ft^3}{lb-mole}\times\frac{lb-mole}{28\,lb\,CO}\times\frac{10^6\,ppmv}{1}=300\,ppmvd\,CO\,@\,15\%\,O_2$$

VOC – 0.20 g/bhp-hr

$$0.20\frac{g\,VOC}{bhp-hr}\times\frac{1\,lb}{453.59\,g}\times\frac{1\,hp-hr}{2{,}545\,Btu}\times\frac{0.33Btu_{out}}{1Btu_{in}}\times\frac{10^6\,Btu}{1\,MMBtu}=0.057\frac{lb\,VOC}{MMBtu}$$

$$0.057\frac{lb\,VOC}{MMBtu}\times\frac{(20.9-15)\%\,O_2}{20.9\%\,O_2}\times\frac{1\,MMBtu}{9{,}100\,ft^3}\times\frac{379.5\,ft^3}{lb-mole}\times\frac{lb-mole}{16\,lb\,VOC}\times\frac{10^6\,ppmv}{1}=42\,ppmvd\,VOC\,@\,15\%\,O_2$$

NH_3 – 10 ppmvd @ 15% O_2

$$\frac{10\,ppmv\,NH_3}{10^6}\times\frac{17\,lb\,NH_3}{lb-mole}\times\frac{lb-mole}{379.5\,ft^3}\times\frac{9{,}100\,ft^3}{MMBtu}\times\frac{20.9\%\,O_2}{(20.9-15)\%\,O_2}=0.0144\frac{lb\,NH_3}{MMBtu}$$

$$0.0144\frac{lb\,NH_3}{MMBtu}\times\frac{1\,MMBtu}{10^6\,Btu}\times\frac{Btu_{in}}{0.33Btu_{out}}\times\frac{2{,}545\,Btu}{hp-hr}\times\frac{453.59\,g}{lb}=0.05\frac{g\,NH_3}{bhp-hr}$$

Emission Factors during Normal Operation after the Commissioning Period:

The emission factors for NO_X (0.15 g/bhp-hr), CO (1.75 g/bhp-hr), and VOC (0.10 g/bhp-hr) from the proposed engines during normal operation were proposed by the applicant and supported by information provided by the engine supplier. The emission factors for NO_X and VOC were required as BACT. As stated above, maximum NO_X emissions will also be calculated based on the previous achieved in practice BACT requirement of 0.6 g-NO_X/bhp-hr to ensure that all potential NSR requirements are satisfied if it is later determined that a revised BACT requirement for NO_X is needed for the engines. The emission factors for SO_X (0.04 g/bhp-hr), PM_{10} (0.028 g/bhp-hr), and ammonia slip (0.05 g/bhp-hr) during normal operation are same as the emission factors presented above for the commissioning period.

Emission Factors for Digester Gas-Fired Engines (Normal Operation)				
Pollutant	g/hp·hr	lb/MMBtu	ppmvd (@ 15%O_2)	Source
NO_X	0.15	0.0429	11.0 ppmvd	BACT Requirement; Proposed by Applicant – See equation below
NO_X Worst-case	0.60	0.172	44.0 ppmvd	Previous Achieved in Practice BACT Requirement – See equation below
SO_X	0.04	0.0113	40 ppmvd in fuel gas	BACT Requirement/Mass Balance Equation Above
PM_{10}	0.028	0.008	--	Required by the AAQA for $PM_{2.5}$
CO	1.75	0.500	210 ppmvd	Proposed by Applicant – See equation below
VOC	0.10	0.0286	21 ppmvd as CH_4	BACT Requirement; Proposed by Applicant – See equation below
NH_3	0.05	0.0144	10 ppmvd	Required/Proposed – See equation above

NO_X – 0.15 g/bhp-hr

$$0.15\frac{g\,NOx}{bhp-hr}\times\frac{1\,lb}{453.59\,g}\times\frac{1\,hp-hr}{2{,}545\,Btu}\times\frac{0.33Btu_{out}}{1Btu_{in}}\times\frac{10^6\,Btu}{1\,MMBtu}=0.0429\frac{lb\,NOx}{MMBtu}$$

$$0.0429\frac{lb\,NOx}{MMBtu}\times\frac{(20.9-15)\%\,O_2}{20.9\%\,O_2}\times\frac{1\,MMBtu}{9{,}100\,ft^3}\times\frac{379.5\,ft^3}{lb-mole}\times\frac{lb-mole}{46\,lb\,NOx}\times\frac{10^6\,ppmv}{1}=11.0\ \text{ppmvd NOx @ 15\% } O_2$$

Worst Case NO_X – 0.60 g/bhp-hr

$$0.60\frac{g\,NOx}{bhp-hr}\times\frac{1\,lb}{453.59\,g}\times\frac{1\,hp-hr}{2{,}545\,Btu}\times\frac{0.33Btu_{out}}{1Btu_{in}}\times\frac{10^6\,Btu}{1\,MMBtu}=0.172\frac{lb\,NOx}{MMBtu}$$

$$0.172\frac{lb\,NOx}{MMBtu}\times\frac{(20.9-15)\%\,O_2}{20.9\%\,O_2}\times\frac{1\,MMBtu}{9{,}100\,ft^3}\times\frac{379.5\,ft^3}{lb-mole}\times\frac{lb-mole}{46\,lb\,NOx}\times\frac{10^6\,ppmv}{1}=44\ \text{ppmvd NOx @ 15\% } O_2$$

CO – 1.75 g/bhp-hr

$$1.75\frac{g\,CO}{bhp-hr}\times\frac{1\,lb}{453.59\,g}\times\frac{1\,hp-hr}{2{,}545\,Btu}\times\frac{0.33Btu_{out}}{1Btu_{in}}\times\frac{10^6\,Btu}{1\,MMBtu}=0.500\frac{lb\,CO}{MMBtu}$$

$$0.500\frac{lb\,CO}{MMBtu}\times\frac{(20.9-15)\%\,O_2}{20.9\%\,O_2}\times\frac{1\,MMBtu}{9{,}100\,ft^3}\times\frac{379.5\,ft^3}{lb-mole}\times\frac{lb-mole}{28\,lb\,CO}\times\frac{10^6\,ppmv}{1}=210\ \text{ppmvd CO @ 15\% } O_2$$

VOC – 0.10 g/bhp-hr

$$0.10\frac{g\,VOC}{bhp-hr}\times\frac{1\,lb}{453.59\,g}\times\frac{1\,hp-hr}{2{,}545\,Btu}\times\frac{0.33Btu_{out}}{1Btu_{in}}\times\frac{10^6\,Btu}{1\,MMBtu}=0.0286\frac{lb\,VOC}{MMBtu}$$

$$0.0286\frac{lb\,VOC}{MMBtu}\times\frac{(20.9-15)\%\,O_2}{20.9\%\,O_2}\times\frac{1\,MMBtu}{9{,}100\,ft^3}\times\frac{379.5\,ft^3}{lb-mole}\times\frac{lb-mole}{16\,lb\,VOC}\times\frac{10^6\,ppmv}{1}=21\ \text{ppmvd VOC @ 15\% } O_2$$

C. Calculations

1. Pre-Project Potential to Emit (PE1)

Since the digester system and engines are new emissions units, PE1 = 0 for all affected pollutants.

2. Post Project Potential to Emit (PE2)

Digester System (S-7767-13-0)

As explained above, the digester system will be composed of sealed tanks and basins that will reduce VOC emissions from the manure and will have negligible fugitive emissions; therefore, VOC emissions from the manure will only be attributed to Bidart Dairy for manure prior to entering the digester system and when returned to Bidart Dairy and emissions from the digester system are considered negligible.

Digester Gas-Fired Engines (S-7767-14-0, -15-0, & -16-0)

Daily PE2 for Each Engine during the Commissioning Period:

Daily PE during the commissioning period for each of the proposed engines is calculated in the table below:

Daily PE for Engines S-7767-14-0, -15-0, &-16-0 During the Commissioning Periods								
NO_X	1.1	(g/hp·hr) x	1,676	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	**97.5**	(lb/day)
SO_X	0.04	(g/hp·hr) x	1,676	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	**3.5**	(lb/day)
PM_{10}	0.028	(g/hp·hr) x	1,676	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	**2.5**	(lb/day)
CO	2.5	(g/hp·hr) x	1,676	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	**221.7**	(lb/day)
VOC	0.20	(g/hp·hr) x	1,676	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	**17.7**	(lb/day)
NH_3	0.05	(g/hp·hr) x	1,676	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	**4.4**	(lb/day)

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

Daily PE for each of the proposed engines after completion of the commissioning periods is calculated in the table below:

Daily PE for Engines S-7767-14-0, -15-0, &-16-0 After Commissioning								
NO_X	0.15	(g/hp·hr) x	1,676	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	**13.3**	(lb/day)
NO_X Worst Case	0.60	(g/hp·hr) x	1,676	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	**53.2**	(lb/day)
SO_X	0.04	(g/hp·hr) x	1,676	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	**3.5**	(lb/day)
PM_{10}	0.028	(g/hp·hr) x	1,676	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	**2.5**	(lb/day)
CO	1.75	(g/hp·hr) x	1,676	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	**155.2**	(lb/day)
VOC	0.10	(g/hp·hr) x	1,676	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	**8.9**	(lb/day)
NH_3	0.05	(g/hp·hr) x	1,676	(hp) x	24	(hr/day) ÷ 453.59 (g/lb) =	**4.4**	(lb/day)

Maximum Annual PE2 for Each Engine Including the Commissioning Periods:

As discussed above, each of the proposed engines will be allowed to operate up to 120 hours for commissioning during the first year of operation. The maximum annual PE for each engine will calculated based on the maximum hours of operation during the commissioning period and the remaining hours during normal operation. As stated above, total maximum NO_X emissions from all of the proposed engines will be limited to a maximum of 19,999 lb/yr.

PE2 for Engines S-7767-14-0, -15-0, &-16-0 During the Commissioning Periods								
NO_X	1.1	(g/hp·hr) x	1,676	(hp) x	120	(hr) ÷ 453.59 (g/lb) =	**488**	(lb/yr)
SO_X	0.04	(g/hp·hr) x	1,676	(hp) x	120	(hr) ÷ 453.59 (g/lb) =	**18**	(lb/yr)
PM_{10}	0.028	(g/hp·hr) x	1,676	(hp) x	120	(hr) ÷ 453.59 (g/lb) =	**12**	(lb/yr)
CO	2.5	(g/hp·hr) x	1,676	(hp) x	120	(hr) ÷ 453.59 (g/lb) =	**1,108**	(lb/yr)
VOC	0.20	(g/hp·hr) x	1,676	(hp) x	120	(hr) ÷ 453.59 (g/lb) =	**89**	(lb/yr)
NH_3	0.05	(g/hp·hr) x	1,676	(hp) x	120	(hr) ÷ 453.59 (g/lb) =	**22**	(lb/yr)

1st Year PE2 for Engines S-7767-14-0, -15-0, &-16-0 After Commissioning								
NO_X	0.15	(g/hp·hr) x	1,676	(hp) x	8,640	(hr) ÷ 453.59 (g/lb) =	**4,789**	(lb/yr)
NO_X Worst Case	0.60	(g/hp·hr) x	1,676	(hp) x	8,640	(hr) ÷ 453.59 (g/lb) =	**19,155**	(lb/yr)
SO_X	0.04	(g/hp·hr) x	1,676	(hp) x	8,640	(hr) ÷ 453.59 (g/lb) =	**1,277**	(lb/yr)
PM_{10}	0.028	(g/hp·hr) x	1,676	(hp) x	8,640	(hr) ÷ 453.59 (g/lb) =	**894**	(lb/yr)
CO	1.75	(g/hp·hr) x	1,676	(hp) x	8,640	(hr) ÷ 453.59 (g/lb) =	**55,868**	(lb/yr)
VOC	0.10	(g/hp·hr) x	1,676	(hp) x	8,640	(hr) ÷ 453.59 (g/lb) =	**3,192**	(lb/yr)
NH_3	0.05	(g/hp·hr) x	1,676	(hp) x	8,640	(hr) ÷ 453.59 (g/lb) =	**1,596**	(lb/yr)

Maximum PE2 from Each Engine during 1st year, Including Commissioning:

NO_X: 488 lb-NO_X/yr + 4,789 lb-NO_X/yr = **5,277 lb-NO_X/yr**
NO_X worst case: 488 lb-NO_X/yr + 19,155 lb-NO_X/yr = **19,643 lb-NO_X/yr**
SO_X: 18 lb-SO_X/yr + 1,277 lb-SO_X/yr = **1,295 lb-SO_X/yr**
PM_{10}: 12 lb-PM_{10}/yr + 894 lb-PM_{10}/yr = **906 lb-PM_{10}/yr**
CO: 1,108 lb-CO/yr + 55,868 lb-CO/yr = **56,976 lb-CO/yr**
VOC: 89 lb-VOC/yr + 3,192 lb-VOC/yr = **3,281 lb-VOC/yr**
NH_3: 22 lb-VOC/yr + 1,596 lb-VOC/yr = **1,618 lb-NH_3/yr**

Maximum Total Combined Annual PE2 from all Engines, Including Commissioning:

The maximum total combined annual PE2 for all the engines, including emissions during commissioning, is calculated as follows:

NO_X: 5,277 lb-NO_X/yr-engine x 3 engines = **15,831 lb-NO_X/yr**
NO_X worst case: total annual emissions limited by SLC to **19,999 lb-NO_X/yr**
SO_X: 1,295 lb-SO_X/yr-engine x 3 engines = **3,885 lb-SO_X/yr**
PM_{10}: 906 lb-PM_{10}/yr-engine x 3 engines = **2,718 lb-PM_{10}/yr**
CO: 56,976 lb-CO/yr-engine x 3 engines = **170,928 lb-CO/yr**
VOC: 3,281 lb-VOC/yr-engine x 3 engines = **9,843 lb-VOC/yr**
NH_3: 1,618 lb-NH_3/yr-engine x 3 engines = **4,854 lb-NH_3/yr**

Annual PE2 for Each Engine in years with no Commissioning:

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

Annual PE2 for Engines S-7767-14-0, -15-0, &-16-0 with no Commissioning								
NO_X	0.15	(g/hp·hr) x	1,676	(hp) x	8,760	(hr) ÷ 453.59 (g/lb) =	**4,855**	(lb/yr)
NO_X Worst Case	0.60	(g/hp·hr) x	1,676	(hp) x	8,760	(hr) ÷ 453.59 (g/lb) =	**19,421**	(lb/yr)
SO_X	0.04	(g/hp·hr) x	1,676	(hp) x	8,760	(hr) ÷ 453.59 (g/lb) =	**1,295**	(lb/yr)
PM_{10}	0.028	(g/hp·hr) x	1,676	(hp) x	8,760	(hr) ÷ 453.59 (g/lb) =	**906**	(lb/yr)
CO	1.75	(g/hp·hr) x	1,676	(hp) x	8,760	(hr) ÷ 453.59 (g/lb) =	**56,644**	(lb/yr)
VOC	0.10	(g/hp·hr) x	1,676	(hp) x	8,760	(hr) ÷ 453.59 (g/lb) =	**3,237**	(lb/yr)
NH_3	0.05	(g/hp·hr) x	1,676	(hp) x	8,760	(hr) ÷ 453.59 (g/lb) =	**1,618**	(lb/yr)

Maximum Total Combined Annual PE2 from Engines in years with no Commissioning:

The maximum total combined annual PE2 for all the engines in years with no commissioning is calculated as follows:

The maximum total combined annual PE2 for all the engines is calculated as follows:

NO_X: 4,855 lb-NO_X/yr-engine x 3 engines = **14,565 lb-NO_X/yr**
$NO_{X\ worst\ case}$: total annual emissions limited by SLC to **19,999 lb-NO_X/yr**
SO_X: 1,295 lb-SO_X/yr-engine x 3 engines = **3,885 lb-SO_X/yr**
PM_{10}: 906 lb-PM_{10}/yr-engine x 3 engines = **2,718 lb-PM_{10}/yr**
CO: 56,644 lb-CO/yr-engine x 3 engines = **169,932 lb-CO/yr**
VOC: 3,237 lb-VOC/yr-engine x 3 engines = **9,711 lb-VOC/yr**
NH_3: 1,618 lb-NH_3/yr-engine x 3 engines = **4,854 lb-NH_3/yr**

Maximum Daily and Annual PE2 from Calculations Above:

The maximum daily and annual emissions for each pollutant calculated above, including commissioning emissions, are shown in the table below.

Max. Post-Project Potential to Emit (PE2) for S-7767-14-0, -15-0, &-16-0			
	Max. Daily Emissions for each engine (lb/day)	Max. Annual Emissions for each engine (lb/year)	Max. Total Combined Annual Emissions for all engines (lb/year)
NO_X	97.5	5,277	15,831
NO_X Worst Case	97.5	19,643	19,999
SO_X	3.5	1,295	3,885
PM_{10}	2.5	906	2,718
CO	221.7	56,976	170,928
VOC	17.7	3,281	9,843
NH_3	4.4	1,618	4,854

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

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

Since this is a new facility, there are no valid ATCs, PTOs, or ERCs at the Stationary Source; therefore, the SSPE1 is equal to zero.

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

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

Post-Project Stationary Source Potential to Emit [SSPE2] (lb/year)							
	NO_X	$NO_{X(max)}$*	SO_X	PM_{10}	CO	VOC	NH_3
S-7767-13-0 (Digester System)	0	0	0	0	0	0	0
S-7767-14-0 (1,676 bhp Digester Gas Engine)	5,277	19,643	1,295	906	56,976	3,281	1,618
S-7767-15-0 (1,676 bhp Digester Gas Engine)	5,277	19,643	1,295	906	56,976	3,281	1,618
S-7767-16-0 (1,676 bhp Digester Gas Engine)	5,277	19,643	1,295	906	56,976	3,281	1,618
Post-Project SSPE (SSPE2)	**15,831**	**19,999**	**3,885**	**2,718**	**170,928**	**9,843**	**4,854**

*Total combined NO_X emissions from the engines are limited by permit to no more than 19,999 lb/yr

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)
- Fugitive emissions, except for the specific source categories specified in 40 CFR 51.165

Major Source Determination (lb/year)						
	NO_X	$NO_{X(max)}$	SO_X	PM_{10}	CO	VOC
SSPE1	0	0	0	0	0	0
SSPE2	15,831	19,999	3,885	2,718	170,928	9,843
Major Source Threshold	20,000	20,000	140,000	140,000	200,000	20,000
Major Source?	No	No	No	No	No	No

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	CO2e
Estimated Facility PE before Project Increase	0	0	0	0	0	0	0
PSD Major Source Thresholds	250	250	250	250	250	250	100,000
PSD Major Source ? (Y/N)	N	N	N	N	N	N	N

Because this is a new facility, the PE for affected pollutants and GHG emissions prior to the project is equal to zero.

As shown above, the facility is not an existing major source for PSD for at least one pollutant. Therefore the facility is not an existing major source for PSD.

6. Baseline Emissions (BE)

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

Pursuant to District Rule 2201, BE = PE1 for:

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

otherwise,

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

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

Therefore BE=PE1. Since the proposed digester system and engines are new emissions units, BE = PE1 = 0 for all pollutants from each unit.

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 PM2.5 (200,000 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:

- NO_2 (as a primary pollutant)
- SO_2 (as a primary pollutant)
- CO
- PM
- PM_{10}
- Greenhouse gases (GHG): CO_2, N_2O, CH_4, HFCs, PFCs, and SF_6

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 Modified 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.

Greenhouse Gas Emissions Calculation

The District has evaluated potential greenhouse gas emissions from the 1,676 bhp digester gas-fired IC engines.

Basis and Assumptions

- Each engine is fired on digester gas fuel
- Each engine will operate at full rated load
- bhp to Btu/hr conversion: 2,545 Btu/hp-hr
- Thermal efficiency of engine: commonly ≈ 33%
- Engine operates 8,760 hours per year.
- Emission factors for combustion of the methane in the digester gas are taken from EPA 40 CFR Part 98, Subpart A, Tables C-1 and C-2
- CO_2 emissions from CO_2 contained in the digester gas are estimated based on the molar composition of the digester gas
- Molar composition digester gas is approximately 60% methane and 40% carbon dioxide
- Molecular weights:
  CO_2 = 44 g/mol CH_4 = 16 g/mol
- Global warming potentials (GWP) for greenhouse gases are taken from EPA 40 CFR Part 98, Subpart A, Table A-1

GHG Emissions from the Combustion of Methane in the Digester Gas

CO_2 52.07 kg/MMBtu
CH_4 3.2×10^{-3} kg/MMBtu
N_2O 6.3×10^{-4} kg/MMBtu

CO_2 Emissions Contained in the Digester Gas

Moles CH_4 Entering Engine per MMBtu:
(52.07 kg-CO_2/MMBtu x 1,000 g/kg x 1 mol-CO_2/44 g-CO_2 x 1 mol-CH_4/mol-CO_2) + (3.2×10^{-3} kg-CH_4/MMBtu x 1,000 g/kg x 1 mol-CH_4/16 g-CH_4)
= 1,183.6 mol-CH_4/MMBtu in fuel entering the engines

kg CO_2 Entering Engine per MMBtu:
1,183.6 mol-CH_4/MMBtu x 0.40 mol-CO_2/0.60 mol-CH_4
= 789.1 mol-CO_2/MMBtu in digester entering the engines

789.1 mol-CO_2/MMBtu x 44 g-CO_2/mol-CO_2 x 1 kg/1,000 g
= 34.72 kg-CO_2/MMBtu

Total CO_2 Emissions for Combustion of Digester Gas

52.07 kg-CO_2/MMBtu (combustion of methane) + 34.72 kg-CO_2/MMBtu (CO_2 contained in digester gas)
= 86.79 kg-CO_2/MMBtu

Global warming Potential for GHGs

GWP for CH_4 = 21 lb-CO_2(eq) per lb-CH_4
GWP for N_2O = 310 lb-CO_2(eq) per lb-N_2O

GHG Emission Calculations

Annual Fuel Consumption for Each Engine:
1,676 bhp_{out} x 1 bhp_{in}/0.33 bhp_{out} x 2,545 Btu_{in}/bhp_{in}-hr x 1 MMBtu/10^6 Btu x 8,760 hr/year = 113,227.513 MMBtu/yr

CO_2 Emissions for Each Engine:
113,227.513 MMBtu/yr x 86.79 kg-CO_2/MMBtu x 2.20462 lb/kg
= 21,664,836 lb-CO_2/year

21,664,836 lb-CO_2/year x 1 lb-CO_{2e}/lb-CO_2
= 21,664,836 lb-CO_{2e}/year

CH_4 Emissions for Each Engine:
113,227.513 MMBtu/yr x 3.2 x 10^{-3} kg-CH_4/MMBtu x 2.20462 lb/kg
= 799 lb-CH_4/year

799 lb-CH_4/year x 21 lb-CO_{2e}/lb-CH_4
= 16,779 lb-CO_{2e}/year

N_2O Emissions for Each Engine:
113,227.513 MMBtu/yr x 6.3 x 10^{-4} kg-N_2O/MMBtu x 2.20462 lb/kg
= 157 lb-N_2O/year

157 lb-N_2O/year x 310 lb-CO_{2e}/lb-N_2O
= 48,670 lb-CO_{2e}/year

Total Annual GHG Emissions in CO_{2e}

Total for Each Engine:
21,664,836 lb-CO_{2e}/year + 16,779 lb-CO_{2e}/year + 48,670 lb-CO_{2e}/year
= 21,730,285 lb-CO_{2e}/year

21,730,285 lb-CO_{2e}/year x 1 short ton/2,000 lb
= 10,865.14 short ton-CO_{2e}/year

Total for all Three Engines:
21,730,285 lb-CO_{2e}/year x 3
= 65,190,855 lb-CO_{2e}/year

65,190,855 lb-CO_{2e}/year x 1 short ton/2,000 lb
= 32,595.43 short ton-CO_{2e}/year

PSD Major Source Determination: Potential to Emit (tons/year)							
	NO_2	VOC	SO_2	CO	PM	PM_{10}	CO_{2e}
Total PE from New and Modified Units	10	4.9	1.9	85.5	1.4	1.4	32,595
PSD Major Source threshold	250	250	250	250	250	250	100,000
New PSD Major Source?	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 QNEC is calculated solely to establish emissions that are used to complete the District's PAS emissions profile screen. Detailed QNEC calculations are included in the project file.

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. Unless specifically exempted by Rule 2201, BACT shall be required for the following actions*:

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

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

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

As seen in Section VII.C.2 above, the applicant is proposing to install three new digester gas-fired IC engines, each with a PE greater than 2.0 lb/day for NO_X, SO_X,

PM_{10}, CO, VOC, and NH_3. Therefore, BACT is triggered for NO_X, SO_X, PM_{10}, VOC, and NH_3. The PE for CO from each unit also exceeds 2.0 lb/day; however, BACT is not triggered for CO since the SSPE2 for CO is not greater than 200,000 lbs/year, as demonstrated in Section VII.C.5 above.

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 for relocation of an emissions unit.

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 modification of an emissions unit.

d. SB 288/Federal Major Modification

As discussed in Section VII.C.7 above, this project does not constitute an SB 288 or Federal Major Modification for NO_X emissions. Therefore BACT is not triggered for SB 288 Major Modification or Federal Major Modification purposes.

2. BACT Guideline

S-7767-14-0, -15-0, -16-0

BACT Guideline 3.3.15 established under recently completed Project N-1121205 and revised under this project applies to the proposed digester gas-fired IC engines. (See Appendix 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 Top-Down BACT Analysis (See Appendix A), BACT has been satisfied with the following:

NO_X: NO_X emissions ≤ 0.15 g/bhp-hr
SO_X: Fuel sulfur content ≤ 40 ppmv (as H_2S)
PM_{10}: Fuel sulfur content ≤ 40 ppmv (as H_2S)
VOC: VOC ernissions ≤ 0.10 g/bhp-hr (note: BACT for VOC revised down from 0.15 g/bhp-hr under this project)
NH_3: NH_3 slip emissions ≤ 10 ppmv @ 15% O_2 (note: BACT for NH_3 slip added under this project)

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	$NO_{X(max)}$	SO_X	PM_{10}	CO	VOC
SSPE2	15,831	19,999	3,885	2,718	170,928	9,843
Offset Thresholds	20,000	20,000	54,750	29,200	200,000	20,000
Offsets triggered?	No	No	No	No	No	No

2. Quantity of Offsets Required

As seen above, the SSPE2 is not greater than the offset thresholds for all the 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.

b. PE > 100 lb/day

Applications which include a new emissions unit with a PE greater than 100 pounds during any one day for any pollutant will trigger public noticing requirements. The PE2 for the proposed new IC Engines is compared to the daily PE Public Notice thresholds in the following table:

Digester Gas-Fired IC Engines (S-7767-14-0, -15-0, & -16-0)

PE > 100 lb/day Public Notice Thresholds			
Pollutant	PE2 (lb/day)	Public Notice Threshold	Public Notice Triggered?
NO_X	97.5	100 lb/day	No
SO_X	3.5	100 lb/day	No
PM_{10}	2.5	100 lb/day	No
CO	221.7	100 lb/day	**Yes**
VOC	17.7	100 lb/day	No
NH_3	4.4	100 lb/day	No

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

c. Offset Threshold

The SSPE1 and SSPE2 are compared to the offset thresholds in the following table.

Offset Thresholds				
Pollutant	SSPE1 (lb/year)	SSPE2 (lb/year)	Offset Threshold	Public Notice Required?
NO_X	0	15,831	20,000 lb/year	No
$NO_{X(max)}$	0	19,999	20,000 lb/year	No
SO_X	0	3,885	54,750 lb/year	No
PM_{10}	0	2,718	29,200 lb/year	No
CO	0	170,928	200,000 lb/year	No
VOC	0	9,843	20,000 lb/year	No

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

d. SSIPE > 20,000 lb/year

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

SSIPE Public Notice Thresholds					
Pollutant	SSPE2 (lb/year)	SSPE1 (lb/year)	SSIPE (lb/year)	SSIPE Public Notice Threshold	Public Notice Required?
NO_x	15,831	0	15,831	20,000 lb/year	No
$NO_{X(max)}$	19,999	0	19,999	20,000 lb/year	No
SO_x	3,885	0	3,885	20,000 lb/year	No
PM_{10}	2,718	0	2,718	20,000 lb/year	No
CO	170,928	0	170,928	20,000 lb/year	**Yes**
VOC	9,843	0	14,634	20,000 lb/year	No
NH_3	4,854	0	4,854	20,000 lb/year	No

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

2. Public Notice Action

As discussed above, public noticing is required for this project for CO emissions in excess of 100 lb/day and for an SSIPE for CO that exceeds 20,000 lb/yr. Therefore, public notice documents will be submitted to the California Air Resources Board (ARB) and a public notice will be published in a local newspaper of general circulation prior to the issuance of the ATC for this equipment.

D. Daily Emission Limits (DELs)

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.

Proposed Rule 2201 (DEL) Conditions for the Digester System (S-7767-13-0)

As stated above, the digester system will reduce emissions from the manure produced by cattle at Bidart Dairy. The following condition will be placed on the ATC permit to ensure that fugitive emissions from the digester system will be negligible:

- The VOC content of the digester gas produced by the digester system shall not exceed 10% by weight. [District Rule 2201]

Proposed Rule 2201 (DEL) Conditions for the Digester Gas-Fired Engines (S-7767-14-0, -15-0, & -16-0)

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

- This engine shall be fired only on digester gas. [District Rule 2201]

- The sulfur content of the digester gas used as fuel in this engine shall not exceed 40 ppmv as H2S. The District may approve an averaging period of up to one calendar day in length for demonstration of compliance with the fuel sulfur content limit. [District Rules 2201, 4702, and 4801]

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

- The total combined NOx (as NO2) emissions from permit units S-7767-14, S-7767-15, and S-7767-16 (digester gas-fired IC engines) shall not exceed 19,999 lb during any consecutive 12-month rolling period. To demonstrate compliance with the 12-month rolling combined NOx emission limit, monthly emissions for each engine shall be calculated by multiplying the heat input (MMBtu) (based on the HHV of the fuel) of the engine during commissioning periods and normal operation during that month by the applicable emissions factors given in this permit or approved by the District. The emission factor used for during commissioning shall be: 0.315 lb-NOx/MMBtu. The following emission factors shall be used for during normal operation: 0.045 lb-NOx/MMBtu if the engine demonstrates compliance with the 0.15 g-NOx/bhp-hr emission limit, otherwise 0.173 lb-NOx/MMBtu. The District may approve use of alternate emission factor(s) to calculate NOx emissions during normal operation based on the most recently completed fuel analysis and monitoring or source test results to determine NOx emissions provided that the alternate emission factor is at least as great as the emission factor determined by the source test or monthly monitoring for the period for which the alternate emission factor will be used to demonstrate compliance with the limit. The minimum alternate emission factor used shall be calculated as follows or using another method approved by the District: (lb-NOx/MMBtu) = (measured ppmv @15% O2) x (Fuel F-Factor dry) x (4.294E-7). The permittee shall obtain written approval from the District prior to use of alternative emission factor(s). The District will respond to a permittee request for use of an alternate emission factor based on supporting source test data within 30 days following the receipt of the request from the permittee. [District Rule 2201]

Proposed Rule 2201 (DEL) Conditions during Commissioning Period:

For these digester gas-fired IC engines, the DELs for NO_X, PM_{10}, CO, and VOC are stated in the form of maximum emission factors (g/bhp-hr) and maximum number of hours allowed for commissioning activities.

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

- Only one of the digester gas-fired IC engines at this facility (Permit Units S-7767-14, S-7767-15, and S-7767-16) shall be operated for commissioning purposes at any one time. [District Rule 2201]

- Emission rates from this engine unit during the commissioning period shall not exceed any of the following limits: 1.1 g-NOx/bhp-hr, 0.028 g-PM10/bhp-hr, 2.5 g-CO/bhp-hr, 0.20 g-VOC/bhp-hr. [District Rule 2201]
- The total number of firing hours of this unit without abatement of emissions by the SCR system shall not exceed 120 hours during the commissioning period. Such operation of this unit without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system. Upon completion of these activities, the permittee shall provide written notice to the District and the unused balance of the 120 firing hours without abatement shall expire. [District Rule 2201]

Proposed Rule 2201 (DEL) Conditions during Normal Operation:

For these digester gas-fired IC engines, the DELs for NO_X, PM_{10}, CO, and VOC during normal operation are stated in the form of emission factors (g/hp-hr & ppmv), the maximum engine horsepower rating (1,676 bhp), and the maximum operational time of 24 hours per day.

- Emissions from this IC engine shall not exceed any of the following limits: 0.15 g-NOx/bhp-hr (equivalent to 11.0 ppmvd NOx @ 15% O2), NOx referenced as NO2; 0.028 g-PM10/bhp-hr; 1.75 g-CO/bhp-hr (equivalent to 210 ppmvd CO @ 15% O2); 0.10 g-VOC/bhp-hr (equivalent to 20 ppmvd VOC @ 15% O2), VOC referenced as methane. [District Rules 2201 and 4702]
- The District has preliminarily determined that an emission limit of 0.15 g-NOx/bhp-hr constitutes BACT for NOx emissions from this engine. The permittee shall perform actions necessary to comply with this NOx limit to the extent feasible. If NOx emissions from the engine continue to exceed 0.15 g/bhp-hr after 12 months of operation, the permittee may submit a report to the District requesting a revised BACT determination for NOx emissions from this engine. The report shall contain all monitoring and source test information and shall include an explanation of the steps taken to operate and maintain the engine in a manner as to minimize NOx emissions and a detailed analysis of all factors that prevent compliance with the NOx emissions limit. In the report, the permittee may also propose a revised BACT emission limit for NOx for inclusion in this permit. If the permittee does not submit a report requesting a revised BACT determination within 18 months of initial startup of this engine, the 0.15 g-NOx/bhp-hr emission limit shall be confirmed. [District Rule 2201]
- Until the BACT limit for NOx from this engine is confirmed or an Authority to Construct permit that includes a revised NOx emission limit established by the District has been issued, NOx emissions (as NO2) from this engine in excess of 0.15 g/bhp-hr but not exceeding 0.60 g/bhp-hr shall not constitute a violation of this permit provided that NOx emissions are limited to the lowest achievable emission rate to satisfy BACT and the permittee complies with all other emission limitations and operational and design conditions contained in this permit. [District Rule 2201]

E. Compliance Assurance

1. Source Testing

The proposed 1,676 bhp digester gas-fired engines are subject to District Rule 4702 - Internal Combustion Engines – Phase 2. Section 6.3.2.1 of District Rule 4702 requires source testing of NO_X, CO, and VOC emissions at least once every 24 months for a non-agricultural spark-ignited IC engine. The proposed engine is also subject to 40 CFR 60, Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines. 40 CFR 60, Subpart JJJJ requires uncertified engines rated 500 bhp or more to be source tested every 8,760 hours of operation or every 3 years, whatever comes first. The periodic source testing required by District Rule 4702 and 40 CFR 60, Subpart JJJJ will ensure compliance with the applicable New Source Review (NSR) requirements NO_X, CO, and VOC. Therefore, source testing for NO_X, CO, and VOC will be required within 120 days of initial start-up and at least once every 8,760 hours of operation or 24 months thereafter, whichever comes first. Since the control equipment will include an SCR system, periodic testing of ammonia slip will also be required. Initial source testing will also be required to demonstrate compliance with the PM10 emission limit.

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

- Source testing to measure NOx, CO, VOC, PM10, and ammonia (NH3) emissions from this unit shall be conducted within 120 days of initial start-up. [District Rules 1081, 2201, and 4702 and 40 CFR 60, Subpart JJJJ]
- Source testing to measure NOx, CO, VOC, and ammonia (NH3) emissions from this unit shall be conducted at least once every 8,760 hours of operation or 24 months, whichever comes first. [District Rules 1081, 2201, and 4702 and 40 CFR 60, Subpart JJJJ]
- {3791} Emissions source testing shall be conducted with the engine operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. [District Rule 4702]
- For 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. VOC emissions shall be reported as both methane and propane. NOx, CO, VOC, and NH3 concentrations shall be reported in ppmv, corrected to 15% oxygen. [District Rule 4702 and 40 CFR 60, Subpart JJJJ]
- The following methods shall be used for source testing: NOx (ppmv) - EPA Method 7E; CO (ppmv) - EPA Method 10; VOC (ppmv) - EPA Method 25A or 25B; stack gas oxygen - EPA Method 3 or 3A; stack gas velocity - EPA Method 2 or EPA Method 19; stack gas moisture content - EPA Method 4; PM10 (filterable and condensable) - EPA Method 201 and 202, EPA Method 201a and 202, or ARB Method 5 in combination with 501; NH3 - BAAQMD ST-1B or SCAQMD Method 207-1. Alternative test methods as approved by EPA and the District may also be used to

address the source testing requirements of this permit. [District Rules 1081 and 4702 and 40 CFR 60, Subpart JJJJ]

- {109} Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]
- The results of each source test shall be submitted to the District and EPA within 60 days after completion of the source test. [District Rule 1081 and 40 CFR 60, Subpart JJJJ]

2. Monitoring

As stated above the engines are subject to District Rule 4702. Section 5.8.1 of District Rule 4702 requires engines rated at least 1,000 bhp that can operate more than 2,000 hour per calendar year or equipped with external control devices to install, operate, and maintain an APCO-approved alternate monitoring plan. Section 5.8.9 of District Rule 4702 requires monitoring of NO_X emissions at least once every calendar quarter for a non-agricultural spark-ignited IC engine. However, Section 6.5.3 of District Rule 4702 requires monthly monitoring for engines equipped with non-certified control devices in order to demonstrate compliance with the emission limits in District Rule 4702. Therefore, monthly monitoring of NO_X, CO, and O_2 concentrations in accordance pre-approved alternate monitoring plan "A" will be required. Since the engine will be equipped with SCR quarterly monitoring of ammonia slip will also be required. The following conditions will be placed on the permits to ensure compliance:

- The permittee shall monitor and record the stack concentration of NOx, CO, and O2 at least once every month (in which a source test is not performed) using a portable emission monitor that meets District specifications. [In-stack emission monitors may be allowed if they satisfy the standards required for portable analyzers as specified in District policies and are approved in writing by the APCO.] Monitoring shall not be required if the engine is not in operation, i.e. the engine need not be started solely to perform monitoring. Monitoring shall be performed within 5 days of restarting the engine unless monitoring has been performed within the last month. Records must be maintained of the dates of non-operation to validate extended monitoring frequencies. [District Rules 2201 and 4702]
- The permittee shall monitor and record the stack concentration of NH3 at least once every calendar quarter in which a source test is not performed. NH3 monitoring shall be conducted utilizing District approved gas-detection tubes or a District approved equivalent method. Monitoring shall not be required if the unit is not in operation, i.e. the unit need not be started solely to perform monitoring. Monitoring shall be performed within 5 days of restarting the unit unless monitoring has been performed within the last quarter. [District Rules 2201 and 4102]
- If the NOx, CO, or NH3 concentrations, as measured by the portable analyzer or the District approved ammonia monitoring equipment, exceed the allowable emission concentration, the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 8 hours after detection. If the portable analyzer readings continue to exceed the allowable emissions concentration after 8

hours, the permittee shall notify the District within the following 1 hour, and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100 in lieu of performing the notification and testing required by this condition. Until the BACT limit for NOx from this engine is confirmed or an Authority to Construct permit that includes a revised NOx emission limit established by the District has been issued, NOx emissions not exceeding 0.60 g-NOx/bhp-hr (equivalent to 44 ppmvd NOx @ 15% O2) are not subject to the requirements contained in this condition to source test or stipulate that an emissions violation has occurred. [District Rules 2201 and 4702]

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

In addition, Section 5.10.1 of District Rule 4702 requires an annual analysis of the sulfur content of engine fuel. Because of the variable content of digester gas, additional monitoring of the fuel sulfur content and monitoring of the methane content and heating value of the digester gas will be required. The following conditions will be placed on the permits to ensure compliance:

- Fuel sulfur analysis shall be performed at least annually using EPA Method 11 or EPA Method 15, as appropriate. Records of the fuel sulfur analysis shall be maintained and provided it to the District upon request. [District Rules 2201 and 4702]
- The sulfur content of the digester gas used to fuel the engine shall be monitored and recorded at least once every calendar quarter in which a fuel sulfur analysis is not performed. If quarterly monitoring shows a violation of the fuel sulfur content limit of this permit, monthly monitoring will be required until six consecutive months of monitoring show compliance with the fuel sulfur content limit. Once compliance with the fuel sulfur content limit is shown for six consecutive months, then the monitoring frequency may return to quarterly. Monitoring of the sulfur content of the digester gas fuel shall not be required if the engine does not operate during that period. Records of the results of monitoring of the digester gas fuel sulfur content shall be maintained. [District Rule 2201]
- Monitoring of the digester gas sulfur content shall be performed using gas detection tubes calibrated for H2S; a Testo 350 XL portable emission monitor; a continuous fuel gas monitor that meets the requirements specified in SCAQMD Rule 431.1, Attachment A; District-approved source test methods, including EPA Method 15, ASTM Method D1072, D4084, and D5504; District-approved in-line H2S monitors; or

an alternative method approved by the District. Prior to utilization of in-line monitors to demonstrate compliance with the digester gas sulfur content limit of this permit, the permittee shall submit details of the proposed monitoring system, including the make, model, and detection limits, to the District and obtain District approval for the proposed monitor(s). [District Rule 2201]

- The methane content of the digester gas used to fuel the engines shall be measured and the heating value of the digester gas shall be determined at least once every calendar quarter. Records of the measured methane content and heating value of the digester gas shall be maintained. [District Rule 2201]

3. Recordkeeping

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

- The inlet and outlet temperature of the SCR catalyst and the reagent injection rate shall be monitored and recorded during times in which NOx emissions are being source tested or monitored with a portable analyzer. [District Rule 2201 and 4702]
- The SCR catalyst shall be maintained and replaced in accordance with the recommendations of the catalyst manufacturer or emission control supplier. Records of catalyst maintenance and replacement shall be maintained. [District Rule 2201 and 4702]
- The permittee shall maintain records of: (1) the date and time of 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: the total hours of operation, quantity of fuel used (scf) and calculated heat input (MMBtu) during commissioning period(s), the quantity of fuel used (scf) and calculated heat input (MMBtu) during normal operation, maintenance and modifications performed, monitoring data, compliance source test results, and any other information necessary to demonstrate compliance. Quantity of fuel used shall be recorded in standard cubic feet using a non-resettable, totalizing mass or volumetric fuel flow meter or other APCO approved-device. [District Rules 2201 and 4702 and 40 CFR 60, Subpart JJJJ]
- For each of the following permit units: S-7767-14, S-7767-15, and S-7767-16 (digester gas-fired IC engines), the permittee shall maintain records of the calculated NOx emissions (in lbs) from the engine for the previous month. [District Rule 2201]
- The permittee shall compile and maintain the following records for permit units S-7767-14, S-7767-15, and S-7767-16 (digester gas-fired IC engines): 1) the total amount of gas (scf) used in the units each month, 2) the total amount of gas (scf) used in the units during the previous 12-month rolling period, 3) the calculated total

heat input (MMBtu) for the units each month, 4) the calculated total heat input (MMBtu) for the units during the previous 12-month rolling period, 5) the calculated total NOx emissions for the units each month, and 6) the calculated total NOx emissions for the units during the previous 12-month rolling period. [District Rule 2201]

- Records of any analyzer(s) installed or utilized to monitor methane, oxygen, and hydrogen sulfide shall be maintained and shall be made available for District inspection upon request. [District Rule 2201]
- All records shall be maintained and retained for a minimum of five (5) years, and shall be made available for District inspection upon request. All records may be maintained and submitted in an electronic format approved by the District. [District Rules 2201 and 4702 and 40 CFR 60, Subpart JJJJ]

4. Reporting

As stated above, the proposed 1,676 bhp digester gas-fired engines are subject to 40 CFR 60, Subpart JJJJ. 40 CFR 60, Subpart JJJJ requires uncertified engines rated 500 bhp or more to submit an initial notification to EPA. 40 CFR 60, Subpart JJJJ and District Rule 4702 also require the operator or owner of the engine to report source test results within 60 day of the completion of testing. Therefore, the following conditions will be listed on the permit:

- 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]
- 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. Notification of construction and copies of source test results shall be submitted to EPA at the following address: Director, Air Division, U.S. Environmental Protection Agency, 75 Hawthorne Street, San Francisco, CA 94105. [40 CFR 60, Subpart JJJJ]

F. Ambient Air Quality Analysis (AAQA)

Section 4.14.1 of District Rule 2201 requires that an ambient air quality analysis (AAQA) be conducted for the purpose of determining whether a new or modified Stationary Source will cause or make worse a violation of an air quality standard. The Technical Services Division of the SJVAPCD conducted the required analysis. Refer to Appendix B of this document for the AAQA summary sheet. The results of the Criteria Pollutant Modeling conducted for the AAQA are summarized in the following table:

Criteria Pollutant Modeling Results*					
Digester Gas-Fired IC Engines	**1 Hour**	**3 Hours**	**8 Hours.**	**24 Hours**	**Annual**
CO	Pass	X	Pass	X	X
NO_X	Pass	X	X	X	Pass
SO_X	Pass	Pass	X	Pass	Pass
PM_{10}	X	X	X	Pass[1]	Pass[1]
$PM_{2.5}$	X	X	X	Pass[1]	Pass[1]

*Results were taken from the PSD spreadsheet.
[1]The criteria pollutants are below EPA's level of significance as found in 40 CFR Part 51.165 (b)(2).

As shown by the AAQA summary, the proposed equipment will not cause a violation of an ambient air quality standard for NO_X, SO_X, PM_{10}, $PM_{2.5}$, or CO.

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 4101 Visible Emissions

Rule 4101 states that no air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity.

Since the IC engines are fired solely on gaseous fuel, visible emissions are not expected to exceed Ringelmann 1 or 20% opacity. The following condition will be listed on the proposed ATC permits to ensure compliance:

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

Rule 4102 Nuisance

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

California Health & Safety Code 41700 (Health Risk Assessment)

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

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 (Appendix 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 results of the health risk assessment are summarized in the table below.

Risk Summary			
Categories	**1,676 bhp Digester Gas-Fired IC Engines (S-7767-14-0, -15-0, -16-0)**	**Project Totals**	**Facility Totals**
Prioritization Score[1]	5.15	5.15	>1
Acute Hazard Index	0.01	0.01	0.01
Chronic Hazard Index	0.00	0.00	0.00
Maximum Individual Cancer Risk (10^{-6})	**3.93E-07**	3.93E-07	3.93E-07
T-BACT Required?	**No**		
Special Permit Conditions?	**Yes**		

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 Appendix B of this report, the emissions increases for this project was determined to be less than significant.

To ensure that human health risks will not exceed District allowable levels; the following permit condition is required:

Digester Gas-Fired IC Engines (S-7767-14-0, -15-0, & -16-0)

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

Rule 4201 Particulate Matter Concentration

The purpose of this rule is to protect the ambient air quality by establishing a particulate matter emission standard. Section 3.1 prohibits discharge of dust, fumes, or total particulate matter

into the atmosphere from any single source operation in excess of 0.1 grain per dry standard cubic foot.

$$0.028 \quad \frac{g}{hp \cdot hr} \times \frac{1 hp \cdot hr}{2{,}545 Btu} \times \frac{10^6 Btu}{9{,}100 dscf} \times \frac{0.33 Btu_{out}}{1 Btu_{in}} \times \frac{15.43 grain}{g} = \quad 0.006 \quad \frac{grain}{dscf}$$

Since 0.006 grain/dscf is less than 0.1 grain/dscf, compliance with this rule is expected. The following condition will be listed on the proposed ATC permits to ensure compliance:

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

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), volatile organic compounds (VOC), and sulfur oxides (SO_X) from internal combustion engines.

This rule applies to any internal combustion engine with a rated brake horsepower of 25 brake horsepower or greater.

Section 5.2.1 requires that the operator of a spark-ignited non-agricultural internal combustion engine rated > 50 bhp shall not operate it in such a manner that results in emissions exceeding the limits in Table 1 of Rule 4702 until such time that the engine has demonstrated compliance with emission limits in Table 2 of Rule 4702 pursuant to the compliance deadlines in Section 7.5. In lieu of complying with Table 1 emission limits, the operator of a spark-ignited engine shall comply with the applicable emission limits pursuant to Section 8.0.

Rule 4702, Table 1 Emission Limits/Standards for Spark-Ignited IC Engines rated >50 bhp Used in Non-Agricultural Operations			
Engine Type	**NO_X Emission Limit (ppmv @ 15% O_2, dry)**	**CO Emission Limit (ppmv @ 15% O_2, dry)**	**VOC Emission Limit (ppmv @ 15% O_2, dry)**
1. a. Rich Burn, Waste Gas Fueled	50 ppmv or 90% reduction	2,000 ppmv	250 ppmv
1. b. Rich Burn, Cyclic Loaded, Field Gas Fueled	50 ppmv	2,000 ppmv	250 ppmv
1. c. Rich Burn, All Other Engine	25 ppmv or 96% reduction	2,000 ppmv	250 ppmv
2. a. Lean Burn 2-Stroke, Gaseous Fueled, < 100 hp	75 ppmv or 85% reduction	2,000 ppmv	750 ppmv

Rule 4702, Table 1 Emission Limits/Standards for Spark-Ignited IC Engines rated >50 bhp Used in Non-Agricultural Operations			
Engine Type	**NO_X Emission Limit (ppmv @ 15% O_2, dry)**	**CO Emission Limit (ppmv @ 15% O_2, dry)**	**VOC Emission Limit (ppmv @ 15% O_2, dry)**
2. b. Lean Burn, All Other Engines	65 ppmv or 90% reduction	2,000 ppmv	750 ppmv

Section 5.2.2 requires that on and after the compliance schedule specified in Section 7.5, the operator of a spark-ignited non-agricultural internal combustion engine rated > 50 bhp shall comply with all the applicable requirements of the rule and the requirements of Section 5.2.2.1, 5.2.2.2, or 5.2.2.3, on an engine-by-engine basis.

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

5.2.2.1.1 NO_X, CO, and VOC emission limits pursuant to Table 2;

5.2.2.1.2 SO_X control requirements of Section 5.7, pursuant to the deadlines specified in Section 7.5; and

5.2.2.1.3 Monitoring requirements of Section 5.10, pursuant to the deadlines specified in Section 7.5.

Section 5.2.2.2 allows that in lieu of complying with the NO_X emission limit requirement of Section 5.2.2.1.1, an operator may pay an annual fee to the District, as specified in Section 5.6, pursuant to Section 7.6. Pursuant to Section 5.2.2.2.1, engines in the fee payment program shall have actual emissions not greater than the applicable limits in Table 1 during the entire time the engine is part of the fee payment program. Pursuant to Section 5.2.2.2.2, compliance with Section 5.7 and 5.10, pursuant to the deadlines specified in Section 7.5, is also required as part of the fee payment option.

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

Rule 4702, Table 2 Emission Limits/Standards for Spark-Ignited IC Engines rated >50 bhp Used in Non-Agricultural Operations (Emission Limits are effective according to the compliance schedule specified in Rule 4702, Section 7.5.)			
Engine Type	**NO_X Emission Limit (ppmv @ 15% O_2, dry)**	**CO Emission Limit (ppmv @ 15% O_2, dry)**	**VOC Emission Limit (ppmv @ 15% O_2, dry)**
1. a. Rich-Burn, Waste Gas Fueled	50 ppmv	2,000 ppmv	250 ppmv
1. b. Rich-Burn, Cyclic Loaded, Field Gas Fueled	50 ppmv	2,000 ppmv	250 ppmv
1. c. Rich-Burn, Limited Use	25 ppmv	2,000 ppmv	250 ppmv

Rule 4702, Table 2 Emission Limits/Standards for Spark-Ignited IC Engines rated >50 bhp Used in Non-Agricultural Operations (Emission Limits are effective according to the compliance schedule specified in Rule 4702, Section 7.5.)			
Engine Type	**NO_X Emission Limit (ppmv @ 15% O_2, dry)**	**CO Emission Limit (ppmv @ 15% O_2, dry)**	**VOC Emission Limit (ppmv @ 15% O_2, dry)**
1. d. Rich-Burn, Not Listed Above	11 ppmv	2,000 ppmv	250 ppmv
2. a. Lean-Burn, 2-Stroke, Gaseous Fueled, >50 bhp & <100 bhp	75 ppmv	2,000 ppmv	750 ppmv
2. b. Lean-Burn, Limited Use	65 ppmv	2,000 ppmv	750 ppmv
2. c. Lean-Burn Engine used for gas compression	65 ppmv or 93% reduction	2,000 ppmv	750 ppmv
2. d. Lean-Burn, Not Listed Above	11 ppmv	2,000 ppmv	750 ppmv

These digester gas-fired engines will be operated as a separate stationary source than the dairy farm; therefore, the District has determined that the IC engines are a non-agricultural IC engines. The lean burn, digester gas-fired, engines are waste gas-fired engines and are currently required to comply with the following emissions limits from Table 1: 65 ppmvd NO_X, 2,000 ppmvd CO, and 750 ppmvd VOC (all measured @ 15% O_2). The engines will also be required to comply with the emission limits from Table 2 in accordance with the compliance schedule in Section 7.5.

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

- Emissions from this IC engine shall not exceed any of the following limits: 0.15 g-NOx/bhp-hr (equivalent to 11.0 ppmvd NOx @ 15% O2), NOx referenced as NO2; 0.028 g-PM10/bhp-hr; 1.75 g-CO/bhp-hr (equivalent to 210 ppmvd CO @ 15% O2); 0.10 g-VOC/bhp-hr (equivalent to 20 ppmvd VOC @ 15% O2), VOC referenced as methane. [District Rules 2201 and 4702]

Section 5.2.3.1 requires that the operator of a spark-ignited internal combustion engine rated > 50 bhp that is used exclusively in agricultural operations shall not operate it in such a manner that results in emissions exceeding the limits in Table 3 of Rule 4702 for the appropriate engine type on an engine-by-engine basis.

Section 5.2.3.2 allows that in lieu of complying with the NO_X, CO, and VOC limits of Table 3 on an engine-by-engine basis, an operator of a spark-ignited agricultural IC engine may elect to implement an alternative emission control plan pursuant to Section 8.0.

Section 5.2.3.3 requires an operator of an agricultural IC engine in that is subject to the applicable requirements of Table 3 shall not replace such engine with an engine that emits

more emissions of NOx, VOC, and CO, on a ppmv basis, (corrected to 15% oxygen on a dry basis) than the engine being replaced.

Rule 4702, Table 3 Emission Limits/Standards for Spark-Ignited IC Engines rated >50 bhp Used Exclusively in Agricultural Operations			
Engine Type	**NO_X Emission Limit (ppmv @ 15% O_2, dry)**	**CO Emission Limit (ppmv @ 15% O_2, dry)**	**VOC Emission Limit (ppmv @ 15% O_2, dry)**
1. Rich Burn	90 ppmv or 80% reduction	2000 ppmv	250 ppmv
2. Lean Burn	150 ppmv or 70% reduction	2000 ppmv	750 ppmv
3. Certified IC Engine installed on or before June 16, 2005	Meet Certified Spark-Ignited Engine Standard of HC+NOx < 0.6 g/bhp-hr		

As stated above, the proposed digester gas-fired engines will be operated as part of a separate non-agricultural stationary source; therefore, this section does not apply to the proposed engines.

Section 5.2.4 requires the operator of a certified compression-ignited engine rated >50 bhp shall comply with the following requirements of Sections 5.2.4.1, 5.2.4.2, 5.2.4.3, 5.2.4.3, and 5.2.4.4.

Section 5.2.4.1 requires the operator of a compression-ignited engine rated >50 bhp to repower, replace, or control the engine's emissions to comply with the applicable limits/standards in Table 4 on an engine-by-engine basis by the compliance dates as specified in Table 4.

Section 5.2.4.2 requires the annual hours of operation of a compression-ignited engine rated >50 bhp shall be determined on a calendar year basis.

Section 5.2.4.3 allows that in lieu of complying with the NO_X, CO, and VOC limits of Table 4 on an engine-by-engine basis, an operator may elect to implement an alternative emission control plan pursuant to Section 8.0.

Section 5.2.4.4 stipulates that an operator of a compression-ignited engine used in agricultural operations that is subject to the applicable requirements of Table 4 shall not replace such engine with an engine that emits more emissions of NO_X, VOC, and CO, on a ppmv basis, (corrected to 15% oxygen on a dry basis) than the engine being replaced.

Section 5.2.4.5 requires that compression-ignited engines used in non-agricultural operations shall be operated in such a manner to comply with the SO_X control requirements of Section 5.7 and the SO_X monitoring requirements of Section 5.10.

Rule 4702, Table 4 Emission Limits/Standards and Compliance Schedule for Compression-Ignited Internal Combustion Engines		
Engine Type	**Emission Limit/Standard**	**Compliance Date**
1. Non-Certified Compression-Ignited Engine Installed on or before June 1, 2006		
a. Greater than 50 bhp but not more than 500 bhp	EPA Tier 3 or Tier 4	1/1/2010
b. Greater than 500 bhp but not more than 750 bhp and less than 1,000 annual operating hours	EPA Tier 3	1/1/2010
c. Greater than 750 bhp and less than 1,000 annual operating hours	EPA Tier 4	7/1/2011
d. Greater than 500 bhp and greater than or equal to 1,000 annual operating hours	80 ppmv NOx @ 15% O_2, 2,000 ppmv CO @ 15% O_2, 750 ppmv VOC @ 15% O_2	1/1/2008 or, if owner has an agreement to electrify, comply by 1/1/2010
2. Certified Compression-Ignited Engine		
a. EPA Certified Tier 1 or Tier 2 Engine	EPA Tier 4	1/1/2015 or 12 years after installation date, but not later than 6/1/2018
b. EPA Certified Tier 3 or Tier 4 Engine	Meet Certified Compression-Ignited Engine Standard in effect at time of installation	At time of installation

The proposed digester gas-fired engines are not compression-ignited engines; therefore, this section does not apply to the proposed engines.

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 proposed under this project will not have CEMS installed; therefore this section of the Rule is not applicable.

Section 5.4 specifies procedures to calculate percent emission reductions if percent emission reductions are used to comply with the NO_X emission limits of Section 5.2. The use of percent emission reductions to comply with Section 5.2 is not being proposed for the IC engines proposed under this project; therefore this section of the Rule is not applicable.

Section 5.5 requires the operator of an internal combustion engine that uses percent emission reduction to comply with the NO_X emission limits of Section 5.2 shall provide an accessible inlet and outlet on the external control device or the engine as appropriate for taking emission samples and as approved by the APCO. The use of percent emission reductions to comply with Section 5.2 is not being proposed for the IC engines proposed under this project; therefore this section of the Rule is not applicable.

Section 5.6 specifies procedures that operators of non-agricultural spark-ignited IC engines who elect to comply under Section 5.2.2.2 must use for calculation of the annual emissions

fee. The applicant has proposed that the digester gas-fired engines comply with the applicable emission limits of Table 2 Of district Rule 4702; therefore payment of annual emissions fees for the engines are not required and this section of the Rule is not applicable.

Section 5.7 requires that on and after the compliance schedule specified in Section 7.5, operators of non-agricultural spark-ignited engines and non-agricultural compression-ignited engines shall comply shall comply with Sections 5.7.1, 5.7.2, 5.7.3, 5.7.4, 5.7.5, or 5.7.6:

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

To satisfy BACT, the sulfur content of the digester gas fuel for the engines will be limited to 40 ppmv, which is approximately equal to 2.4 grains sulfur per 100 scf. The following condition will be listed on the proposed ATC permits to ensure compliance:

- The sulfur content of the digester gas used as fuel in this engine shall not exceed 40 ppmv as H2S. The District may approve an averaging period of up to one calendar day in length for demonstration of compliance with the fuel sulfur content limit. [District Rules 2201, 4702, and 4801]

Section 5.8 requires that the operator of a non-agricultural spark-ignited IC engine subject to the requirements of Section 5.2 or any engine subject to the requirements of Section 8.0 shall comply with the following requirements of Sections 5.8.1 – 5.8.11:

Section 5.8.1 stipulates that for each engine with a rated brake horsepower of 1,000 hp or greater and which is allowed to operate more than 2,000 hours per calendar year, or with an external emission control device, shall either install, operate, and maintain continuous monitoring equipment for NO_X, 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 NO_X 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 proposed to meet this section 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 condition will be placed on the ATC permits:

- The permittee shall monitor and record the stack concentration of NOx, CO, and O2 at least once every month (in which a source test is not performed) using a portable emission monitor that meets District specifications. [In-stack emission monitors may be allowed if they satisfy the standards required for portable analyzers as specified in District policies and are approved in writing by the APCO.] 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 5.8.2 requires that for each non-agricultural spark-ignited IC engine not subject to Section 5.8.1, the operator shall monitor operational characteristics recommended by the engine manufacturer or emission control system supplier, and approved by the APCO. The proposed engines will be subject to Section 5.8.1; therefore this section is not applicable.

Section 5.8.3 requires that for each engine with an alternative monitoring system, the operator shall submit to, and receive approval from the APCO, adequate verification of the alternative monitoring system's acceptability. The proposed ATC permits for the digester gas-fired engines include 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, this section is satisfied.

Section 5.8.4 requires that for each engine with an APCO approved CEMS, operate the CEMS in compliance with the requirements of 40 Code of Federal Regulations (CFR) Part 51, 40 CFR Parts 60.7 and 60.13 (except subsection h), 40 CFR Appendix B (Performance Specifications), 40 CFR Appendix F (Quality Assurance Procedures), and applicable provisions of Rule 1080 (Stack Monitoring). The IC engines proposed under this project will not have CEMS installed; therefore this section of the Rule is not applicable.

Section 5.8.5 requires that each engine have the data gathering and retrieval capabilities of an installed monitoring system described in Section 5.8 approved by the APCO. As stated above, the proposed ATC permits for the proposed digester gas-fired engines include an alternate emissions monitoring plan that has been pre-approved by the APCO. Therefore, this section is satisfied.

Section 5.8.6 requires that for each non-agricultural spark-ignited IC engine, the operator shall install and operate a nonresettable elapsed operating time meter. In lieu of installing a nonresettable time meter, the operator may use an alternative device, method, or technique in determining operating time provided that the alternative is approved by the APCO. The operator shall maintain and operate the required meter in accordance with the manufacturer's instructions. The applicant has proposed a nonresettable elapsed operating time meter for the engines involved with this project.

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

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

Section 5.8.7 requires that for each engine, the permittee shall implement the Inspection and Monitoring (I&M) plan submitted to and approved by the APCO pursuant to Section 6.5. The applicant has submitted an I&M program with this ATC application and the requirements of this plan will be explained in detail in the section that covers Section 6.5 of this Rule.

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 program and the requirements of this plan will be explained in detail in the section that covers Section 6.5 of this Rule.

Section 5.8.9 requires for each non-agricultural spark-ignited IC engine, 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. If an engine is operated less than 120 calendar days per calendar year, the operator shall take one NO_X emission reading during the calendar year in which a source test is not performed and the engine is operated. 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 or Permit-Exempt Equipment Registration. 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. Therefore, the following conditions will be placed on the ATC permits:

- The permittee shall monitor and record the stack concentration of NOx, CO, and O2 at least once every month (in which a source test is not performed) using a portable emission monitor that meets District specifications. [In-stack emission monitors may be allowed if they satisfy the standards required for portable analyzers as specified in District policies and are approved in writing by the APCO.] 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]
- {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 5.8.10 specifies that the APCO shall not approve an alternative monitoring system unless it is documented that continued operation within ranges of specified emissions related performance indicators or operational characteristics provides a reasonable assurance of compliance with applicable emission limits and that the operator shall source test over the proposed range of surrogate operating parameters to demonstrate compliance with the applicable emission standards. The proposed ATC permits for the digester gas-fired engines include a pre-approved alternate emissions monitoring plan that srequires periodic NO_X, CO, and O_2 emissions concentrations. Therefore, this section is satisfied.

Section 5.8.11 requires that for each non-agricultural spark-ignited IC engine subject to the Alternate Emission Control Plan (AECP) of Section 8.0, the operator shall install and operate a nonresettable fuel meter. In lieu of installing a nonresettable fuel meter, the operator may use an alternative device, method, or technique in determining daily fuel consumption provided that the alternative is approved by the APCO. The operator shall maintain, operate, and calibrate the required fuel meter in accordance with the manufacturer's instructions. The use of an Alternate Emission Control Plan to comply with Section 5.2 is not being proposed for the IC engines proposed under this project; therefore this section of the Rule is not applicable.

Section 5.9 specifies monitoring requirements for all other engines that are not subject to the requirements of Section 5.8. The proposed spark-ignited non-agricultural digester gas-fired engines are subject to the requirements of Section 5.8; therefore this section of the Rule is not applicable.

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

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

5.10.2 An operator of an engine complying with Section 5.7.6 by installing and operating a control device with at least 95% by weight 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.

The following condition will be listed on the proposed ATC permits to ensure compliance:

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

Section 5.11 requires operators of engines used exclusively in agricultural operations that are not required to have a Permit-to-Operate pursuant to California Health and Safety Code Section 42301.16 but are required to comply with Section 5.2 of Rule 4702 shall register such engines pursuant to Rule 2250 (Permit-Exempt Equipment Registration). The proposed spark-

ignited non-agricultural digester gas-fired engines are required to have District Permits to Operate; therefore this section of the Rule is not applicable.

Section 6.1 requires that the operator of an engine subject to the requirements of Rule 4702 shall submit to the APCO an 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 6.1.1 specifies that the requirement to submit an emission control plan shall apply to the following engines:

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

Section 6.1.2 specifies that the emission control plan shall contain the following information, as applicable for each engine:

6.1.2.1 Permit-to-Operate number, Authority-to-Construct number, or Permit-Exempt Equipment Registration number,
6.1.2.2 Engine manufacturer,
6.1.2.3 Model designation and engine serial number,
6.1.2.4 Rated brake horsepower,
6.1.2.5 Type of fuel and type of ignition,
6.1.2.6 Combustion type: rich-burn or lean-burn,
6.1.2.7 Total hours of operation in the previous one-year period, including typical daily operating schedule,
6.1.2.8 Fuel consumption (cubic feet for gas or gallons for liquid) for the previous one-year period,
6.1.2.9 Stack modifications to facilitate continuous in-stack monitoring and to facilitate source testing,
6.1.2.10 Type of control to be applied, including in-stack monitoring specifications,
6.1.2.11 Applicable emission limits,
6.1.2.12 Documentation showing existing emissions of NO_X, VOC, and CO, and
6.1.2.13 Date that the engine will be in full compliance with this rule.

Section 6.1.3 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.

Section 6.1.4 requires that for an engine being permanently removed from service, the emission control plan shall include a letter of intent pursuant to Section 7.2.

The applicant has submitted all the required information for Section 6.1 in the application for the IC engines involved with this project.

Section 6.2.1 requires that the operator of an engine subject to the requirements of Section 5.2 shall maintain an engine operating log to demonstrate compliance with Rule 4702. This information shall be retained for a period of at least five years, shall be readily available, and be made available to the APCO upon request. The engine operating log shall include, on a monthly basis, the following information:

6.2.1.1 Total hours of operation,
6.2.1.2 Type of fuel used,
6.2.1.3 Maintenance or modifications performed,
6.2.1.4 Monitoring data,
6.2.1.5 Compliance source test results, and
6.2.1.6 Any other information necessary to demonstrate compliance with this rule.
6.2.1.7 For an engine subject to Section 8.0, the quantity (cubic feet of gas or gallons of liquid) of fuel used on a daily basis.

The following condition will be placed on the ATC permits:

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

The following previously proposed condition will be listed on the proposed ATC permits to ensure compliance:

- All records shall be maintained and retained for a minimum of five (5) years, and shall be made available for District inspection upon request. All records may be maintained and submitted in an electronic format approved by the District. [District Rules 2201 and 4702 and 40 CFR 60, Subpart JJJJ]

Section 6.2.3 requires that an operator claiming an exemption under Section 4.2 or Section 4.3 shall maintain annual operating records. This information shall be retained for at least five years, shall be readily available, and provided to the APCO upon request. The records shall include, but are not limited to, the following:

6.2.3.1 Total hours of operation,
6.2.3.2 The type of fuel used,
6.2.3.3 The purpose for operating the engine,

6.2.3.4 For emergency standby engines, all hours of non-emergency and emergency operation shall be reported, and
6.2.3.5 Other support documentation necessary to demonstrate claim to the exemption.

The applicant is not claiming an exemption for the proposed engines under Section 4.2 or Section 4.3; therefore, this section does not apply.

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

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

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

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

6.3.2.1 By the applicable date specified in Section 5.2, and at least once every 24 months thereafter, except for an engine subject to Section 6.3.2.2.
6.3.2.2 By the applicable date specified in Section 5.2 and at least once every 60 months thereafter, for an agricultural spark-ignited engine that has been retro-fitted with a catalytic emission control device.
6.3.2.3 A portable NOx analyzer may be used to show initial compliance with the applicable limits/standards in Section 5.2 for agricultural spark-ignited engines, provided the criteria specified in Sections 6.3.2.3.1 to 6.3.2.3.5 are met, and a source test is conducted in accordance with Section 6.3.2 within 12 months from the required compliance date.

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

- Source testing to measure NOx, CO, VOC, PM10, and ammonia (NH3) emissions from this unit shall be conducted within 120 days of initial start-up. [District Rules 1081, 2201, and 4702 and 40 CFR 60, Subpart JJJJ]
- Source testing to measure NOx, CO, VOC, and ammonia (NH3) emissions from this unit shall be conducted at least once every 8,760 hours of operation or 24 months, whichever comes first. [District Rules 1081, 2201, and 4702 and 40 CFR 60, Subpart JJJJ]

Section 6.3.3 requires the operator to conduct emissions source testing with the engine operating either at conditions representative of normal operations or conditions specified in the Permit-to-Operate or Permit-Exempt Equipment Registration. For emissions source testing performed pursuant to Section 6.3.2 for the purpose of determining compliance with an applicable standard or numerical limitation, the arithmetic average of three (3) 30-consecutive-

minute test runs shall apply. If two (2) of three (3) runs are above an applicable limit, the test cannot be used to demonstrate compliance with an applicable limit. VOC shall be reported as methane. VOC, NO_X, and CO concentrations shall be reported in ppmv, corrected to 15 percent oxygen. For engines that comply with a percent reduction limit, the percent reduction of NO_X emissions shall also be reported.

The following conditions will be included in the ATC permits to ensure compliance:

- {3791} Emissions source testing shall be conducted with the engine operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. [District Rule 4702]
- For 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. VOC emissions shall be reported as both methane and propane. NOx, CO, VOC, and NH3 concentrations shall be reported in ppmv, corrected to 15% oxygen. [District Rule 4702 and 40 CFR 60, Subpart JJJJ]

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

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

Section 6.3.6 specifies requirements for spark-ignited engines for testing a unit or units that represent a specified group of units, in lieu of compliance with the applicable requirements of Section 6.3.2. Testing of representative units is not being proposed for the engines and, in addition, 40 CFR 60, Subpart JJJJ requires periodic testing of each engine; therefore this section does not apply.

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

6.4.1 Oxides of nitrogen - EPA Method 7E, or ARB Method 100.
6.4.2 Carbon monoxide - EPA Method 10, or ARB Method 100.
6.4.3 Stack gas oxygen - EPA Method 3 or 3A, or ARB Method 100.
6.4.4 Volatile organic compounds - EPA Method 25A or 25B, or ARB Method 100. Methane and ethane, which are exempt compounds, shall be excluded from the result of the test.
6.4.5 Operating horsepower determination - any method approved by EPA and the APCO.
6.4.6 SO_X Test Methods
  6.4.6.1 Oxides of sulfur – EPA Method 6C, EPA Method 8, or ARB Method 100.
  6.4.6.2 Determination of total sulfur as hydrogen sulfide (H_2S) content – EPA Method 11 or EPA Method 15, as appropriate.

6.4.6.3 Sulfur content of liquid fuel – American Society for Testing and Materials (ASTM) D 6920-03 or ASTM D 5453-99.

6.4.6.4 The SO_X emission control system efficiency shall be determined using the following:

% Control Efficiency = $[(C_{SO2,\ inlet} - C_{SO2,\ outlet}) / C_{SO2,\ inlet}] \times 100$

Where:

$C_{SO2,\ inlet}$ = concentration of SO_X (expressed as SO_2) at the inlet side of the SO_X emission control system, in lb/Dscf

$C_{SO2,\ outlet}$ = concentration of SO_X (expressed as SO_2) at the outlet side of the SO_X emission control system, in lb/Dscf

6.4.7 The Higher Heating Value (hhv) of the fuel shall be determined by one of the following test methods:

6.4.7.1 ASTM D 240-02 or ASTM D 3282-88 for liquid hydrocarbon fuels.

6.4.7.2 ASTM D 1826-94 or ASTM 1945-96 in conjunction with ASTM D 3588-89 for gaseous fuel.

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

- The following methods shall be used for source testing: NOx (ppmv) - EPA Method 7E; CO (ppmv) - EPA Method 10; VOC (ppmv) - EPA Method 25A or 25B; stack gas oxygen - EPA Method 3 or 3A; stack gas velocity - EPA Method 2 or EPA Method 19; stack gas moisture content - EPA Method 4; PM10 (filterable and condensable) - EPA Method 201 and 202, EPA Method 201a and 202, or ARB Method 5 in combination with 501; NH3 - BAAQMD ST-1B or SCAQMD Method 207-1. Alternative test methods as approved by EPA and the District may also be used to address the source testing requirements of this permit. [District Rules 1081 and 4702 and 40 CFR 60, Subpart JJJJ]
- Fuel sulfur content analysis shall be performed at least annually using EPA Method 11 or EPA Method 15, as appropriate. Records of the fuel sulfur analysis shall be maintained and provided it to the District upon request. [District Rules 2201 and 4702]
- The Higher Heating Value (HHV) of the fuel gas shall be determined using ASTM D1826, ASTM 1945 in conjunction with ASTM D3588, or an alternative method approved by the District. [District Rules 2201 and 4702]

Section 6.5 requires that the operator of an engine that is subject to the requirements of Section 5.2 or the requirements of Section 8.0 shall submit to the APCO for approval, an Inspection & Maintenance (I&M) plan that specifies all actions to be taken to satisfy the requirements of Sections 6.5.1 through Section 6.5.9 and the requirements of Section 5.8. The actions to be identified in the I&M plan shall include, but are not limited to, the information specified below. If there is no change to the previously approved I&M plan, the operator shall submit a letter to the District indicating that previously approved plan is still valid.

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

6.5.1.1 Engines that have been retrofitted with an exhaust control device, except those certified per Section 9.0;

6.5.1.2 Engines subject to Section 8.0;

6.5.1.3 An agricultural spark-ignited engine that is subject to the requirements of Section 8.0.

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

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

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

The applicant has proposed that the alternate monitoring program will ensure compliance with Sections 6.5.2 and 6.5.3 of the Rule. Therefore, the following previously proposed condition will be listed on the proposed ATC permits to ensure compliance:

- The permittee shall monitor and record the stack concentration of NOx, CO, and O2 at least once every month (in which a source test is not performed) using a portable emission monitor that meets District specifications. [In-stack emission monitors may be allowed if they satisfy the standards required for portable analyzers as specified in District policies and are approved in writing by the APCO.] 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 requires procedures for the corrective actions on the noncompliant parameter(s) that the operator will take when an engine is found to be operating outside the acceptable range for control equipment parameters, engine operating parameters, and engine exhaust NO_X, CO, VOC, or oxygen concentrations.

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

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

- If the NOx, CO, or NH3 concentrations, as measured by the portable analyzer or the District approved ammonia monitoring equipment, exceed the allowable emission concentration, the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 8 hours after detection. If the portable analyzer readings continue to exceed the allowable emissions concentration after 8 hours, the permittee shall notify the District within the following 1 hour, and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully

comply with Rule 1100 in lieu of performing the notification and testing required by this condition. Until the BACT limit for NOx from this engine is confirmed or an Authority to Construct permit that includes a revised NOx emission limit established by the District has been issued, NOx emissions not exceeding 0.60 g-NOx/bhp-hr (equivalent to 44 ppmvd NOx @ 15% O2) are not subject to the requirements contained in this condition to source test or stipulate that an emissions violation has occurred. [District Rules 2201 and 4702]

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

- This engine shall be operated and maintained in proper operating condition per the manufacturer's requirements as specified in the Inspection and Monitoring (I&M) plan. [District Rule 4702]
- {3203} This engine shall be operated within the ranges that the source testing has shown result in pollution concentrations within the emissions limits as specified on this permit. [District Rule 4702]

Section 6.5.7 requires procedures and a schedule for using a portable 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 previously proposed condition will be listed on the proposed ATC permits:

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

Section 6.5.9 specifies procedures for revising the I&M plan. The I&M plan shall be updated to reflect any change in operation. The I&M plan shall be updated prior to any planned change in operation. An engine operator that changes significant I&M plan elements must notify the District no later than seven days after the change and must submit an updated I&M plan to the APCO no later than 14 days after the change for approval. The date and time of the change to the I&M plan shall be recorded in the engine operating log. For new engines and modifications to existing engines, the I&M plan shall be submitted to and approved by the APCO prior to issuance of the Permit-to-Operate or Permit-Exempt Equipment Registration. The operator of an engine may request a change to the I&M plan at any time. The applicant has proposed to comply with the I&M plan modification requirements per this section of the Rule. The following condition will be listed on the proposed ATC permits to ensure compliance:

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

Section 7.0 specifies the schedules for compliance with the general requirements of Section 5.0 and the Alternative Emission Control Plan (AECP) option of Section 8.0. The proposed IC engines will be required to comply with the applicable sections of District Rule 4702 upon initial startup of the equipment; therefore, compliance with this section is expected.

Section 8.0 specifies requirements for use of an Alternative Emission Control Plan (AECP) to comply with the NO_X emission requirements of Section 5.2 for a group of engines. Requirements for use of an AECP include: only engines subject to Section 5.2 are eligible for inclusion in an AECP; during any seven consecutive day period, the operator shall operate all engines in the AECP to achieve an actual aggregate NO_X emission level that is ≤ 90% of the NO_X emissions that would be obtained by controlling the engines to comply individually with the NO_X limits in Section 5.2; the operator shall establish a NO_X emission factor limit for each engine; the operator must submit the AECP at least 18 months before compliance with the emission limits in Section 5.2 is required and receive approval from the APCO; the operator must submit and updated or modified AECP for approval by the APCO prior to any modifications; and the operator must maintain records necessary to demonstrate compliance with AECP. The use of an Alternate Emission Control Plan to comply with Section 5.2 is not being proposed for the IC engines proposed under this project; therefore this section of the Rule is not applicable.

Section 9.0 specifies requirements for certification of exhaust control systems for compliance with District Rule 4702. Certification under this section for the exhaust control systems for the IC engines under this project is not currently being proposed and, in addition, certification under this section of the Rule would require that the engines or identical units with the same fuel supply and exhaust control systems were operating and could be source tested to demonstrate compliance with the applicable limits; therefore this section of the Rule is not applicable at this time.

Conclusion

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

Rule 4801 – Sulfur Compounds

The purpose of this District Rule 4801 is to limit the emissions of sulfur compounds. The limit is that sulfur compound emissions (as SO_2) shall not exceed 0.2% by volume. Using the ideal gas equation, the sulfur compound emissions are calculated as follows:

Volume of SO_X as (SO_2) = (n x R x T) ÷ P
Where:

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

$$0.0113 \quad \frac{lb}{MMBtu}\times\frac{1\,MMBtu}{9{,}100scf_{exhaust}}\times\frac{1\,lb\cdot mol}{64\,lb\cdot SO_2}\times\frac{10.73\,psi\cdot ft^3}{lb\cdot mol\cdot{}^\circ R}\times\frac{520^\circ R}{14.7\,psi}\times 1{,}000{,}000\,ppm = \quad 7.4 \quad \text{ppmv}$$

Since 7.4 ppmv is ≤ 2000 ppmv, the engine is expected to comply with Rule 4801.

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

- The sulfur content of the digester gas used as fuel in this engine shall not exceed 40 ppmv as H2S. The District may approve an averaging period of up to one calendar day in length for demonstration of compliance with the fuel sulfur content limit. [District Rules 2201, 4702, and 4801]

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

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

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

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

equal to 500 HP and less than 1,350 HP; (c) on or after July 1, 2008, for engines with a maximum engine power less than 500 HP; or (d) on or after January 1, 2009, for emergency engines with a maximum engine power greater than 19 KW (25 HP). The proposed engines are 1,676 bhp SI ICEs that will be constructed after June 12, 2006 and manufactured after July 1, 2007; therefore, the engines are subject to this subpart.

Pursuant to Section 60.4233(f)(5), owners and operators of stationary landfill or digester gas-fired SI ICEs with a maximum engine power greater than or equal to 19 kW (25 bhp) that are modified or reconstructed after June 12, 2006 must comply with the emission standards in 40 CFR 60, Subpart JJJJ, Table 1 for stationary landfill/digester gas engines. The proposed engines are 1,676 bhp SI ICEs that will be constructed after June 12, 2006; therefore, the engines are subject to the emission standards in Table 1 of this subpart.

The requirements contained in 40 CFR 60, Subpart JJJJ, Table 1 for spark-ignited engines subject to 40 CFR 60, Subpart JJJJ are summarized in the table below:

TABLE 1 TO SUBPART JJJJ OF PART 60—NO_X, CO, AND VOC EMISSION STANDARDS FOR STATIONARY NON-EMERGENCY SI ENGINES ≥100 HP (EXCEPT GASOLINE AND RICH BURN LPG), STATIONARY SI LANDFILL/DIGESTER GAS ENGINES, AND STATIONARY EMERGENCY ENGINES >25 HP

Engine Type and Fuel	Maximum Engine Power	Manufacture Date	Emission Standards[a]					
			g/HP-hr			ppmvd at 15% O_2		
			NO_X	CO	VOC [d]	NO_X	CO	VOC [d]
Non-Emergency SI Natural Gas [b] and Non-Emergency SI Lean Burn LPG [b]	100 ≤ bhp < 500	7/1/2008	2.0	4.0	1.0	160	540	86
		1/1/2011	1.0	2.0	0.7	82	270	60
Non-Emergency SI Lean Burn Natural Gas and LPG	500 ≤ bhp < 1,350	1/1/2008	2.0	4.0	1.0	160	540	86
		7/1/2010	1.0	2.0	0.7	82	270	60
Non-Emergency SI Natural Gas and Non-Emergency SI Lean Burn LPG (except lean burn 500≤HP<1,350)	bhp ≥ 500	7/1/2007	2.0	4.0	1.0	160	540	86
		7/1/2010	1.0	2.0	0.7	82	270	60
Landfill/Digester Gas (except lean burn 500 ≥ bhp <1,350)	bhp < 500	7/1/2008	3.0	5.0	1.0	220	610	80
		1/1/2011	2.0	5.0	1.0	150	610	80
	bhp ≥ 500	7/1/2007	3.0	5.0	1.0	220	610	80
		7/1/2010	2.0	5.0	1.0	150	610	80
Landfill/Digester Gas Lean Burn	500 ≤ bhp < 1,350	1/1/2008	3.0	5.0	1.0	220	610	80
		7/1/2010	2.0	5.0	1.0	150	610	80
Emergency	25 < bhp < 130	1/1/2009	[c] 10	387	N/A	N/A	N/A	N/A
	bhp ≥ 130		2.0	4.0	1.0	160	540	86

[a] Owners and operators of stationary non-certified SI engines may choose to comply with the emission standards in units of either g/hp-hr or ppmvd at 15 percent O2.

[b] Owners and operators of new or reconstructed non-emergency lean burn SI stationary engines with a site rating of greater than or equal to 250 brake hp located at a major source that are meeting the requirements of 40 CFR part 63, subpart ZZZZ, Table 2a do not have to comply with the CO emission standards of Table 1 of this subpart.
[c] The emission standards applicable to emergency engines between 25 hp and 130 hp are in terms of NO_X + HC.
[d] VOC emission concentrations reported as propane; For purposes of this subpart, when calculating emissions of volatile organic compounds, emissions of formaldehyde should not be included.

The proposed engines will satisfy the applicable standards of this subpart and the following previously proposed condition will ensure compliance:

- Emissions from this IC engine shall not exceed any of the following limits: 0.15 g-NOx/bhp-hr (equivalent to 11.0 ppmvd NOx @ 15% O2), NOx referenced as NO2; 0.028 g-PM10/bhp-hr; 1.75 g-CO/bhp-hr (equivalent to 210 ppmvd CO @ 15% O2); 0.10 g-VOC/bhp-hr (equivalent to 20 ppmvd VOC @ 15% O2), VOC referenced as methane. [District Rules 2201 and 4702]

Pursuant to Section 60.4234, an owner or operator of a stationary SI internal combustion engine must operate and maintain the engines such that they achieve the emission standards as required in 40 CFR 60.4233 over the entire life of the engine.

District Rule 4702 and the ATC permits for the proposed engines require adequate periodic monitoring to ensure that the applicable emission limits contained in the permit are met. Therefore, the requirements of this section will be satisfied.

Pursuant to Section 60.4243, an owner or operator of a non-certified stationary SI internal combustion engine rated greater than 500 bhp 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, an initial performance test must be conducted and subsequent performance testing must be conducted every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance. The operator of the proposed engines is also required to maintain records of maintenance and periodically source test to demonstrate compliance with District Rule 4702; therefore, the following conditions ensure compliance:

- All equipment shall be maintained in good operating condition and shall be operated in a manner consistent with good air pollution control practice to minimize emissions of air contaminants. [District Rule 2201 and 40 CFR 60, Subpart JJJJ]
- The permittee shall maintain an engine operating log to demonstrate compliance. The engine operating log shall include, on a monthly basis, the following information: the total hours of operation, quantity of fuel used (scf) and calculated heat input (MMBtu) during commissioning period(s), the quantity of fuel used (scf) and calculated heat input (MMBtu) during normal operation, maintenance and modifications performed, monitoring data, compliance source test results, and any other information necessary to demonstrate compliance. Quantity of fuel used shall be recorded in standard cubic feet using a non-resettable, totalizing mass or volumetric fuel flow meter or other APCO approved-device. [District Rules 2201 and 4702 and 40 CFR 60, Subpart JJJJ]
- Source testing to measure NOx, CO, VOC, PM10, and ammonia (NH3) emissions from this unit shall be conducted within 120 days of initial start-up. [District Rules 1081, 2201, and 4702 and 40 CFR 60, Subpart JJJJ]

- Source testing to measure NOx, CO, VOC, and ammonia (NH3) emissions from this unit shall be conducted at least once every 8,760 hours of operation or 24 months, whichever comes first. [District Rules 1081, 2201, and 4702 and 40 CFR 60, Subpart JJJJ]

Pursuant to Section 60.4243(g) air-to-fuel ratio controllers 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 placed on 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 requires that three separate test runs be conducted for each performance test and that each test run must be conducted within 10 percent of 100 percent peak (or the highest achievable) load and last at least 1 hour. The following previously proposed condition will be placed on the permits to ensure compliance:

- For 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. VOC emissions shall be reported as both methane and propane. NOx, CO, VOC, and NH3 concentrations shall be reported in ppmv, corrected to 15% oxygen. [District Rule 4702 and 40 CFR 60, Subpart JJJJ]

Section 60.4245(a) requires owners and operators of stationary SI ICE to maintain the following records:

1) All notifications submitted to comply with 40 CFR 60, Subpart JJJJ and all documentation supporting any notification;
2) For certified engines, 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;
3) For engines that are not certified engine or certified engines operating in a non-certified manner and subject to § 60.4243(a)(2), documentation that the engine meets the applicable emission standards

The following condition ensures compliance with this requirement:

- All records shall be maintained and retained for a minimum of five (5) years, and shall be made available for District inspection upon request. All records may be maintained and submitted in an electronic format approved by the District. [District Rules 2201 and 4702 and 40 CFR 60, Subpart JJJJ]

Section 60.4245(c) requires owners and operators of stationary SI ICE greater than or equal to 500 bhp that have not been certified by an engine manufacturer to meet the emission standards in Section 60.4231 to submit an initial notification as required in Section 60.7(a)(1). The notification must include the following:

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 ATC 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. Notification of construction and copies of source test results shall be submitted to EPA at the following address: Director, Air Division, U.S. Environmental Protection Agency, 75 Hawthorne Street, San Francisco, CA 94105. [40 CFR 60, Subpart JJJJ]

Section 60.4245(d) requires owners and operators of stationary SI ICE that are subject to performance testing must submit a copy of each performance test as conducted in §60.4244 within 60 days after the test has been completed. The following previously proposed condition will 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]

Table 2 of 40 CFR 60, Subpart JJJJ specifies methods and procedures for performance testing to demonstrate compliance with the applicable emission limits. The condition will be placed on the permits to ensure compliance:

- The following methods shall be used for source testing: NOx (ppmv) - EPA Method 7E; CO (ppmv) - EPA Method 10; VOC (ppmv) - EPA Method 25A or 25B; stack gas oxygen - EPA Method 3 or 3A; stack gas velocity - EPA Method 2 or EPA Method 19; stack gas moisture content - EPA Method 4; PM10 (filterable and condensable) - EPA Method 201 and 202, EPA Method 201a and 202, or ARB Method 5 in combination with 501; NH3 - BAAQMD ST-1B or SCAQMD Method 207-1. Alternative test methods as approved by EPA and the District may also be used to address the source testing requirements of this permit. [District Rules 1081 and 4702 and 40 CFR 60, Subpart JJJJ]

40 CFR 63 Subpart ZZZZ - National Emission Standards for Hazardous Air Pollutants for Stationary Internal Combustion Engines

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

As discussed above, the proposed digester gas power plant will be located at an existing dairy operation; however, the applicant has provided information demonstrating that the digester gas

power plant will be owned and operated separately from the dairy. Therefore, the existing dairy and the proposed digester gas-fired IC engines will not be under common control and the dairy and digester gas power plant will be treated as separate stationary sources when determining if the proposed digester gas-fired IC engines will constitute a major source of HAP emissions.

The total HAP emissions for the new digester gas power plant were calculated based on toxic emission factors provided by the Technical Services Division of the SJVAPCD for combustion of digester gas in IC engines (see Appendix C). The total HAP emissions from this new facility are less than the Major HAP source thresholds; therefore, this facility is an Area Source as defined in this subpart. Pursuant to Section 63.6590(c), an affected source that is a new or reconstructed stationary Reciprocating Internal Combustion Engine (RICE) located at an area source must meet the requirements of 40 CFR 63, Subpart ZZZZ by meeting the requirements of 40 CFR 60, Subpart IIII, for compression ignition engines or 40 CFR 60, Subpart JJJJ, for spark ignition engines and no further requirements apply for such engines under this part. As shown above, the proposed spark-ignited engines will comply with 40 CFR 60, Subpart JJJJ; therefore, the engines are expected to comply with this 40 CFR 63, Subpart ZZZZ.

California Health & Safety Code 42301.6 (School Notice)

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

California Environmental Quality Act (CEQA)

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

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

Greenhouse Gas (GHG) Significance Determination

It is determined that no other agency has or will prepare an environmental review document for the project. Thus the District is the Lead Agency for this project. The proposed project is for construction of a renewable energy plant at an existing dairy facility. The proposed renewable energy plant will combust dairy digester gas in I.C. engines to produce electricity. The proposed project will involve diverting manure from existing open ponds at the dairy to a digester tanks and covered lagoon digester(s),

which will result in the capture of much of the methane that is currently released into the atmosphere from the open ponds at the dairy. Combustion of the dairy digester gas at the proposed renewable energy plant will oxidize the methane in the gas to carbon dioxide and water vapor. Because methane has a global warming potential at least 21 times that of carbon dioxide, combustion of the methane from the dairy digesters will result in a large net decrease in the global warming potential emitted from the dairy when compared to current levels. Therefore, the project will not result in an increase in project specific greenhouse gas emissions. The District therefore concludes that the project would have a less than cumulatively significant impact on global climate change.

District CEQA Findings

The District is the Lead Agency for this project because there is no other agency with broader statutory authority over this project. The District performed an Engineering Evaluation (this document) for the proposed project and determined that the activity will occur at an existing facility and the project involves negligible expansion of the existing use. Furthermore, the District determined that the activity will not have a significant effect on the environment. The District finds that the activity is categorically exempt from the provisions of CEQA pursuant to CEQA Guideline § 15031 (Existing Facilities), and finds that the project is exempt per the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment (CEQA Guidelines §15061(b)(3)). Upon project approval the District will file a Notice of Determination with the Kern County.

IX. Recommendation

Compliance with all applicable rules and regulations is expected. Pending a successful NSR Public Noticing period, issue ATC Permits S-7767-13-0, -14-0, -15-0, & -16-0 subject to the permit conditions on the attached draft ATC in Appendix D.

X. Billing Information

Annual Permit Fees			
Permit Number	Fee Schedule	Fee Description	Annual Fee
S-7767-13-0	3020-05-G	Two 1,600,000 gallon tanks	$382.00
S-7767-14-0	3020-10-F	1,676 bhp IC engine	$749.00
S-7767-15-0	3020-10-F	1,676 bhp IC engine	$749.00
S-7767-16-0	3020-10-F	1,676 bhp IC engine	$749.00

Appendixes

A: BACT Analysis for the Proposed Digester Gas-Fired IC Engines
B: Summary of Health Risk Assessment (HRA) and Ambient Air Quality Analysis (AAQA)
C: Total Toxic and Hazardous Air Pollutant (HAP) Emissions from the Proposed IC Engines
D: Draft ATCs (S-7767-13-0, -14-0, -15-0, & -16-0)

APPENDIX A

BACT Analysis for Digester Gas-Fired IC Engines

Current SJVAPCD Best Available Control Technology (BACT) Guideline 3.3.15*

Last Update: 9/24/2012

Waste Gas-Fired IC Engine**

Pollutant	Achieved in Practice or contained in SIP	Technologically Feasible	Alternate Basic Equipment
NO_X	0.15 g/bhp-hr (lean-burn engine with SCR, rich-burn engine with 3-way catalyst, or other equivalent)		1. Fuel Cells (<0.05 lb/MW-hr, approximately 1.5 ppmv @ 15% O_2) 2. Microturbines (<9 ppmv @ 15% O_2) 3. Gas Turbine (<9 ppmv @ 15% O_2) *(Note: gas turbines only ABE for projects ≥ 3 MW)*
SO_X	Sulfur content of fuel gas ≤ 40 ppmv (as H_2S)	1. Dry absorption such that fuel sulfur content ≤ 40 ppmv (as H_2S) 2. Wet absorption such that fuel sulfur content ≤ 40 ppmv (as H_2S) 3. Influent fuel H_2S reduction by addition of chemicals such that fuel sulfur content ≤ 40 ppmv (as H_2S) 4. Water scrubbing such that fuel sulfur content ≤40 ppmv (as H_2S)	
PM_{10}	Sulfur content of fuel gas ≤ 40 ppmv (as H_2S)		
CO	1.9 g/bhp-hr		
VOC	0.15 g/bhp-hr (lean burn or equivalent and either positive crankcase ventilation (PCV) or a 90% efficient crankcase control device)		Fuel Cells (<0.02 lb/MW-hr ≈ 2.0 ppmv @ 15% O_2 as CH_4)

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

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

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

Proposed Pages for the BACT Clearinghouse for Revision of District BACT Guideline 3.3.15 under this Project

SJVAPCD Best Available Control Technology (BACT) Guideline 3.3.15*
Last Update: XX/XX/2013

Waste Gas-Fired IC Engine**

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

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

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

***This is a Summary Page for this Class of Source - Permit Specific BACT Determinations on Next Pages**

Draft 3.3.15 1st Qtr. 2013

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 3.3.15 B

Emission Unit: Waste Gas-Fired IC Engine

Equipment Rating: 1,676 bhp

Facility: ABEC Bidart-Old River LLC

References: ATC #s: S-7767-14-0, -15-0, and -16-0;
Project #: S-1120734

Location: 20400 Old River Road, Bakersfield, CA (Mt. Diablo Meridian T 32S, R 27E, Sec 5 in Kern County)

Date of Determination: February 6, 2013

Pollutant	BACT Requirements
NO_X	Lean-burn with SCR and NO_X emissions ≤ 0.15 g/bhp-hr
SO_X	Digester gas fuel sulfur content ≤ 40 ppmv (as H_2S)
PM_{10}	Digester gas fuel sulfur content ≤ 40 ppmv (as H_2S)
CO	BACT NOT TRIGGERED
VOC	VOC emissions ≤ 0.10 g/bhp-hr
NH_3	NH_3 slip emissions ≤ 10 ppmvd @ 15% O_2

BACT Status:

X Achieved in practice __ Small Emitter __ T-BACT

__ Technologically feasible BACT

__ At the time of this determination achieved in practice BACT was equivalent to technologically feasible BACT

__ Contained in EPA approved SIP

__ The following technologically feasible options were not cost effective:

__ Alternate Basic Equipment

X The following alternate basic equipment was not cost effective:

1) Fuel Cells (< 0.05 lb-NO_X/MW-hr)
2) Fuel Cells (< 0.02 lb-VOC/MW-hr)

Top-Down BACT Analysis for Project S-1120734
Digester Gas-Fired IC Engines

Facility Name:	ABEC Bidart-Old River LLC	Date:	February 6, 2013
Mailing Address:	ABEC Bidart-Old River LLC C/O California Bioenergy, LLC 2828 Routh Street, Suite 500	Engineer: Lead Engineer:	Ramon Norman Martin Keast
Contact Person:	N. Ross Buckenham - California Bioenergy/ABEC Bidart-Old River		
Telephone:	(214) 849-9886		
E-Mail:	rbuckenham@calbioenergy.com		
Location:	20400 Old River Road, Bakersfield, CA (Mt. Diablo Meridian T 32S, R 27E, Sec 5 in Kern County)		
Application #s:	S-7767-13-0, -14-0, -15-0, and -16-0		
Project #:	S-1120734		
Deemed Complete:	October 9, 2012		

Current District BACT Guideline 3.3.15 applies to the proposed waste gas-fired IC engines. The information from current BACT Guideline 3.3.15 and the proposed revisions to the guideline discussed in Section IV below will be utilized for the BACT analysis for the digester gas-fired engines proposed under this project.

I. Proposal and Process Description

ABEC Bidart-Old River LLC, a subsidiary of California Bioenergy, LLC, has requested Authority to Construct (ATC) permits to construct an anaerobic digester system consisting of two continuous stirred tank reactor (CSTR) anaerobic digester tanks and two covered lagoon anaerobic digesters (ATC S-7767-13-0) and install three 1,676 bhp digester gas-fired IC engines (ATCs S-7767-14-0, -15-0, and -16-0) at Bidart Dairy, LLC (Facility S-4751). Each engine will be equipped with a selective catalytic reduction (SCR) system for emissions control and will power a 1,200 kW electrical generator. Iron chlorides, such as ferrous chloride ($FeCl_2$) or ferric chloride ($FeCl_3$), will be added to the CSTR digester tanks to reduce the H_2S concentration in the digester gas. The covered lagoon digesters will utilize an air injection system for biological removal of H_2S from the digester gas. After initial removal of H_2S in the digester system, the digester gas will be piped to the gas conditioning system for removal of moisture. Final polishing and removal of H_2S will be accomplished using an activated carbon filter scrubber or an equivalent H_2S removal system and the gas will then be piped to the IC engines. The digester gas, which consists mostly of methane, the main component of natural gas, will be combusted in the IC engines. The IC engines will power electrical generators that will produce power to be sold to a utility. Total combined NO_X emissions from the engines will be limited to no more than 19,999 lb during any consecutive 12-month rolling period.

II. Equipment Listing

S-7767-14-0: 1,676 BHP CATERPILLAR MODEL CG170-12 (OR DISTRICT APPROVED EQUIVALENT) DIGESTER GAS-FIRED LEAN-BURN IC ENGINE WITH A JOHNSON MATTHEY SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM, AND A SILOX OR SCS ENERGY CARBON FILTER (OR EQUIVALENT) H2S REMOVAL SYSTEM POWERING AN ELECTRICAL GENERATOR

S-7767-15-0: 1,676 BHP CATERPILLAR MODEL CG170-12 (OR DISTRICT APPROVED EQUIVALENT) DIGESTER GAS-FIRED LEAN-BURN IC ENGINE WITH A JOHNSON MATTHEY SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM, AND A SILOX OR SCS ENERGY CARBON FILTER (OR EQUIVALENT) H2S REMOVAL SYSTEM POWERING AN ELECTRICAL GENERATOR

S-7767-16-0: 1,676 BHP CATERPILLAR MODEL CG170-12 (OR DISTRICT APPROVED EQUIVALENT) DIGESTER GAS-FIRED LEAN-BURN IC ENGINE WITH A JOHNSON MATTHEY SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM, AND A SILOX OR SCS ENERGY CARBON FILTER (OR EQUIVALENT) H2S REMOVAL SYSTEM POWERING AN ELECTRICAL GENERATOR

III. BACT Applicability

New emissions units – PE > 2.0 lb/day

New Emissions Unit BACT Applicability for S-7767-14-0, -15-0, and -16-0 After Commissioning				
Pollutant	PE2 for each unit after commissioning (lb/day)	BACT Threshold (lb/day)	SSPE2 (lb/yr)	BACT Triggered?
NO_X	13.3	> 2.0	N/A	**Yes**
NO_X Worst Case	53.2	> 2.0	N/A	
SO_X	3.5	> 2.0	N/A	**Yes**
PM_{10}	2.5	> 2.0	N/A	**Yes**
CO	155.2	> 2.0 and SSPE2 ≥ 200,000 lb/yr	169,932	No
VOC	8.9	> 2.0	N/A	**Yes**
NH_3	4.4	> 2.0	N/A	**Yes**

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

IV. Proposed Revision to SJVAPCD BACT Guideline 3.3.15 under this Project

District BACT Guideline 3.3.15 (September 24, 2012) applies to the proposed digester gas-fired IC engines. Therefore, the information from this guideline will be utilized during the BACT analysis. In addition, under this project the following revisions will be incorporated into BACT Guideline 3.3.15.

NO_X and VOC Emissions from Fuel Cells (Alternate Basic Equipment)

The current guideline lists the alternate basic option fuel cell emission limits for NOx and VOC as a lb/MW-hr emission factor and an equivalent concentration (ppmv) BACT limit. As the NOx and VOC concentration value will vary with each type gas due to differing F-factor values and engine efficiency assumptions, the NOx and VOC concentration values will be removed from the BACT guideline and only the lb/MW-hr emission factor will be listed.

SO_X

The current technologically feasible options of dry absorption, wet absorption, chemical H_2S reduction, and water scrubbing are considered equivalent so long as the resulting fuel sulfur content ≤ 40 ppmv (as H_2S). Therefore, these technologically feasible options will be listed as Achieved in Practice options such that the fuel sulfur content ≤ 40 ppmv (as H_2S). It should be noted that this limit may be averaged to up to 24 hours to demonstrate compliance since the basis for this limit was SCAQMD 431.1 and this rule allowed an averaging period of up to 24 hours for sewer digester gas.

CO

The current BACT guideline lists the Achieved in Practice limit for CO as 1.9 g/bhp-hr. This limit was established under Project N-1121205 based on the 250 ppmv @ 15 percent O_2 CO limit that California Air Resources Board (ARB) staff identified as the most stringent limit for biogas-fired engines in the ARB document entitled "Air Quality Guidance for Siting Biorefineries in California" (November 2011) (http://www.arb.ca.gov/fuels/LCFS/bioguidance/bioguidance.htm). However, the ARB Air Quality Guidance for Siting Biorefineries document actually indicates that the 250 ppmv @ 15 percent O_2 VOC limit is equivalent to 2.0 g/bhp-hr. This can be seen in the following statement from page 47 of the document: "*The most stringent CO limit for a sewage digester gas-fired reciprocating IC engine is 250 ppmvd at 15 percent O_2 (2.0 g/bhp-hr).*" Therefore, the Achieved in Practice limit for CO will be revised to 2.0 g/bhp-hr. The slight differences in the conversion of 250 ppmvd CO emission limit to a g/bhp-hr CO emission factor is probably related to differences in the assumed composition of the waste gas and/or efficiency of the equipment utilized; therefore, use of the 2.0 g/bhp-hr CO emission limit is justified to account for these potential differences.

For the pollutant CO, the Alternate Basic Equipment options of fuel cells, gas turbines, and microturbines are applicable as this pollutant would also be reduced with the use of a these options as compared to a waste gas-fired IC engine. Therefore, fuel cells, gas turbines, and microturbines will be added as Alternate Basic Equipment BACT options for CO. For waste gas-fueled fuel cells the Alternate Basic Equipment CO limit will be set at the level recommended in the ARB Air Quality Guidance for Siting Biorefineries document of 0.10 lb-CO/MW-hr for biogas-fueled fuel cells. For waste gas-fired turbines the Alternate Basic Equipment CO limit will be set at the level recommended in the ARB Air Quality Guidance for Siting Biorefineries document of 60 ppmv CO @ 15 percent O_2 for biogas-fired turbines. The Alternate Basic Equipment CO limit for waste gas-fired microturbines will also be set at same the level waste gas-fired turbines, 60 ppmv CO @ 15 percent O_2. Although the ARB Air Quality Guidance for Siting Biorefineries document recommended the Distributed Generation Certification level of 0.10 lb-CO/MW-hr

(approximately 3-4 ppmv CO @ 15 percent O_2) effective on and after January 1, 2013, no biogas-fired microturbines certified to this level were listed at the time of this evaluation. Waste gas-fired microturbines have demonstrated the ability to comply with the 60 ppmv @ 15 percent O_2 CO limit. For example, CO emissions from 30 kW landfill gas-fired Capstone microturbines at Calabasas Landfill were measured to be 0.65 lb/MW-hr (< 25 ppmv @ 15 percent O_2), CO emissions from a 250 kW digester gas-fired Ingersoll Rand microturbine at the Lancaster Water Reclamation Facility were measured to be 2.8 ppmv @ 15 percent O_2, and the Staff Report and Final Environmental Assessment for SCAQMD Rule 1110.2 (certified in 2008) indicates that average CO emissions for microturbines from source tests in SCAQMD files was 0.047 lb/MMBtu (approximately ≤ 20 ppmv @ 15 percent O_2). Therefore, the Alternate Basic Equipment CO limit for waste gas-fired microturbines was set at 60 ppmv CO @ 15 percent O_2.

VOC

The current BACT guideline lists the Achieved in Practice option for VOC as 0.15 g/bhp-hr (lean burn or equivalent and either positive crankcase ventilation (PCV) or a 90% efficient crankcase control device). This will be clarified to indicate the Achieved in Practice option for VOC shall be achieved with lean burn technology, positive crankcase ventilation, a 90% efficient crankcase control device, or equivalent.

In addition, under this project the BACT limit for VOC (as methane) will be revised from 0.15 g/bhp-hr to 0.10 g/bhp-hr to match the VOC emission limit for waste gas-fired IC engines that California Air Resources Board (ARB) staff identified as achievable and the most stringent currently permitted limit in the ARB document entitled "Air Quality Guidance for Siting Biorefineries in California" (November 2011) (http://www.arb.ca.gov/fuels/LCFS/bioguidance/bioguidance.htm).

In the section pertaining to the control of VOC emissions from waste gas-fired IC engines, the ARB Air Quality Guidance for Siting Biorefineries document states on page 48, "*The combination of permit limits and source test data for waste gas-fired reciprocating IC engines indicate VOC levels of 20 ppmvd (at 15 percent O_2) or less are achievable. Therefore, ARB staff has identified the most stringent VOC limit as 20 ppmvd at 15 percent O_2 for biogas-fired reciprocating IC engines.*" This determination was based on a review of the available information for waste gas-fired engines. For landfill gas-fired engines, the ARB document states on page 47, "*The most stringent VOC limit for an operational landfill gas-fired reciprocating IC engine is 0.1 g/bhp-hr (approximately 20 ppmvd at 15 percent O_2).*" For sewage digester gas-fired engines, the ARB document states on page 48, "*The most stringent VOC limit for a sewage digester gas-fired reciprocating IC engine is 28 ppmvd at 15 percent O_2 (approximately 0.13 g/bhp-hr).*" For manure digester gas and co-digester gas-fired engines, the ARB document states on page 48, "*The most stringent VOC limit for a co-digester gas-fired reciprocating IC engine (dairy manure and cheese waste) is 20 ppmvd at 15 percent O_2.*" The 20 ppmvd VOC limit for manure and co-digester gas-fired IC engines is from SJVAPCD permit N-1660-9 for a 545 bhp rich burn dairy digester gas-fired engine with NSCR at Gallo Cattle Company. In the original evaluation (Project N-1052089) and ATC permit for installation of this engine, the 20 ppmvd @ 15% O_2 VOC limit was considered equivalent to 0.12 g/bhp-hr. Based on the emission calculations in a later evaluation for modification of the engine (Project N-1073882, ATC N-1660-9-2 issued 4/13/2010), the 20 ppmvd @ 15% O_2 VOC limit is

approximately equivalent to 0.11 g/bhp-hr. Source tests have demonstrated that the VOC emissions from the engine have complied with the permitted limit. Based on the typical range of F-Factors for waste gas and typical engine efficiency, the 20 ppmvd @ 15% O_2 VOC limit is estimated to range from approximately 0.09 g/bhp-hr to 0.11 g/bhp-hr. Therefore, the value of 0.10 g/bhp-hr will be deemed achieved in practice BACT for VOC emissions from waste gas engines.

Ammonia (NH_3)

The current BACT guideline does not list BACT requirements for ammonia (NH_3). The BACT guideline will be revised to add BACT requirements for ammonia (NH_3) slip that will be applicable when technologies such as SCR are used.

The Environmental Protection Agency (EPA), California Air Resources Board (CARB), San Diego County Air Pollution Control District (SDCAPCD), South Coast Air Quality Management District (SCAQMD), Bay Area Air Quality Management District (BAAQMD) and the San Joaquin Valley Air Pollution Control District (SJVAPCD) BACT clearinghouses were reviewed to determine potential ammonia (NH_3) BACT requirements for this class and category of operation.

V. Top-Down BACT Analyses for the Digester Gas-Fired Engines

As stated above, the information form the existing District BACT Guideline 3.3.15 for Waste Gas-Fired IC Engines and the proposed revisions discussed above will be utilized for the BACT analysis for the proposed digester gas-fired engines under this project. As discussed above, the BACT limit for VOC (as methane) will be revised under this project from 0.15 g/bhp-hr to 0.10 g/bhp-hr to closely match the VOC emission limit for waste gas-fired IC engines identified as achievable and the most stringent currently permitted limit in the California Air Resources Board (ARB) document entitled "Air Quality Guidance for Siting Biorefineries in California" (November 2011) and BACT requirements for ammonia slip will be added.

1. BACT Analysis for NO_X Emissions:

a. Step 1 - List all control technologies

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

1) NO_X emissions ≤ 0.15 g/bhp-hr (lean-burn engine with SCR, rich-burn engine with 3-way catalyst, or other equivalent) (Achieved in Practice)
2) Fuel Cell (≤ 0.05 lb/MW-hr) (Alternate Basic Equipment)
3) Microturbine (< 9 ppmv NO_X @ 15% O_2) (Alternate Basic Equipment)
4) Waste Gas Turbine (< 9 ppmv NO_X @ 15% O_2) (Alternate Basic Equipment)

Description of Control Technologies

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

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

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

Fuel cells use an electrochemical process to produce a direct electric current without the combustion of fuel. Fuel cells use externally supplied reactant gases (hydrogen and oxygen) that are combined in a catalytic process. Like a battery, the electric potential generated by a fuel cell is accessed by connecting an external load to the anode and cathode plates of the fuel cell. Because the fuel for a fuel cell is supplied externally, it does not run down like a battery. However, the fuel cell stack must be periodically replaced because of deactivation of catalytic materials contained in the fuel cell, which results in reduced conversion efficiencies. Since fuel cells require pure hydrogen gas for fuel, hydrocarbons used to power fuel cells must be purified and reformed prior to use. The reformation process can occur in an external fuel processor or through internal reforming in the fuel cell. Both molten carbonate fuel cells and solid oxide fuel cells can internally reform the hydrocarbon fuel to hydrogen for use in the fuel cell. Additionally, these high temperature fuel cells are tolerant of CO_2 that is found biogas.

Fuel cells have recently been commercialized and offer the advantages of high efficiency, nearly negligible emissions, and very quiet power generation. The greatest deterrent to increased use of fuel cells is the significantly higher expense when compared to other generation technologies. These higher costs include the initial capital expense and, for biogas installations, the increased ongoing expenses associated with the extensive cleanup required to remove contaminants that can poison fuel cells. Although this expense can be substantial, biogas-fueled fuel cells have been installed at several wastewater treatment plants and fuel cells have also been fueled with other types of biogas (e.g. landfill gas and brewery wastewater gas). A dairy digester gas-fired fuel cell test project was also installed at Haubenschild Dairy in Minnesota. The fuel cell operated successfully but the cost of gas cleanup and reforming to hydrogen for the low temperature Proton Exchange Membrane (PEM) fuel cell was prohibitive. A Cornell University, Manure Management Program study about using fuel cells to generate energy from biogas found that fuel cells were "technically feasible on dairy farms with 1,000 cows" (See: http://www.manuremanagement.cornell.edu/Pages/Topics/General_Docs/Fuel_cell_Feasibility.pdf and Minott, S. Scott N. and Aldrich, B. Cornel University Manure Management Program Technical Note FC-1 Feasibility Study of Fuel Cells for Biogas Energy Conversion on Large Dairy Farms (September 2004))

Based on the information available, the District has determined that this alternative option is technologically feasible and therefore will be further analyzed for cost-effectiveness below.

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

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

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

Gas turbines are available in sizes ranging from 500 kW - 25 MW. Based on contacts with turbine suppliers, biogas-fired turbines used to produce electricity are expected to be available in the size range of 2 - 7 MW. According to Solar Turbines, the smaller biogas-fired turbines are no longer actively produced or marketed since this size range is generally covered by other generation technologies such as reciprocating IC engines and microturbines.

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

Microturbines are small gas turbines rated between 25 kW and 500 kW that burn gaseous and liquid fuels to generate electricity or provide mechanical power. Microturbines were developed from turbocharger technologies found in large trucks and the turbines in aircraft auxiliary power units. Microturbines can be operated on a wide variety of fuels, including natural gas, liquefied petroleum gas, gasoline, diesel, landfill gas, and digester gases. According to the California Air Resources Board (ARB), there were approximately 200 biogas-fired microturbines operating in California as of the year 2006.[3] Microturbines generally have electrical efficiencies of 25-30%; however, the electrical efficiency of larger microturbines (≥ 200 kW) can range from 30-33%. Microturbine manufacturers include Capstone Microturbines and Ingersoll Rand Energy Systems.

Microturbines without add-on controls can meet very stringent emission limits and have significantly lower emissions of NO_X, CO, and VOC emissions than

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

uncontrolled reciprocating engines because most microturbines operating on gaseous fuels utilize lean premixed (dry low NO_X, or DLN) combustion technology. Microturbines manufacturers will generally guarantee NO_X emissions of 9-15 ppmv @ 15% O_2. However, several emission tests performed on biogas-fired microturbines have indicated even lower emissions. A number of dairy digester gas-fired microturbines have been installed in Europe and some have recently been installed at dairies in the United States, including Twin Birch Dairy and New Hope Farm View Dairy in New York and den Dulk Dairy in Michigan.[4]

b. Step 2 - Eliminate technologically infeasible options

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

Option 3, waste gas-fired turbine, was determined to be infeasible for the following reasons. The available information indicates that the principal suppliers of gas turbines (Solar Turbines, Allison, and General Electric) do not currently produce or market waste gas-fired gas turbines rated less than 3 MW since this size range is generally covered by other generation technologies such as reciprocating IC engines and microturbines. The proposed project would require a gas turbine rated 1200 kW, which is below the range that is currently being marketed by turbine manufacturers; therefore, gas turbines are not considered feasible for this particular project and will be eliminated from consideration at this time.

Option 4 - Microturbines (≤ 9 ppmv NO_X @ 15% O_2) (Alternate Basic Equipment)

Option 4, waste gas-fired microturbines, will also be removed from consideration for this particular project. Waste gas-fired microturbines have generally been installed at facilities for smaller waste gas to energy projects where the amount of gas available has been limited. The proposed project is large waste gas to energy facility and, although larger microturbines have recently become available, several microturbines (at least 14) would still be required. The applicant states that when they investigated microturbines they found that they could not secure the necessary financing for a waste gas to energy project of this size using microturbines and that the major microturbines vendors were unable to secure the debt. Therefore, waste gas-fired microturbines will be eliminated from consideration for this particular project.

In addition, the applicant has proposed to apply emission controls to the proposed 1,676 bhp waste gas-fired lean burn IC engines to reduce NO_X emissions from the engine to ≤ 0.15 g/bhp-hr (approximately 11 ppmv NO_X @ 15% O_2). Large lean burn IC engines generally have higher overall efficiency than large microturbines (approximately 30-35% HHV efficiency for large lean burn IC engines compared to 25-30% HHV efficiency for large microturbines). Because of the higher efficiency of lean burn IC engines, NO_X emissions from a large lean burn IC engine complying with the 0.15 g/bhp-hr NO_X emission limit would not be significantly greater than a microturbine with NO_X emissions of 9 ppmv NO_X @ 15% O_2. For instance, information from Capstone Turbine Corporation indicates that the guaranteed NO_X emissions rate of 9 ppmvd @ 15% O_2

[4] See EPA AgStar Program "Operating Anaerobic Digester Projects" (http://www.epa.gov/agstar/projects/index.html)

for their 200 kW renewable gas fuel microturbine is equivalent to 0.14 g-NO_X/hp-hr.[5] This level is not significantly different than the current BACT requirement for waste gas-fired engines of 0.15 g-NO_X/bhp-hr. Also, these NO_X emission limits are generally guaranteed for microturbines and large engines equipped with SCR, however, the available emission measurements demonstrate that both technologies have the ability to achieve lower NO_X emissions.

c. Step 3 - Rank remaining options by control effectiveness

1) Fuel Cell (≤ 0.05 lb/MW-hr ≈ 1.5 ppmv NO_X @ 15% O_2) (Alternate Basic Equipment)
2) NO_X emissions ≤ 0.15 g/bhp-hr (lean-burn engine with SCR, rich-burn engine with 3-way catalyst, or other equivalent) (Achieved in Practice)

d. 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 digester gas-fired engines will be operated as a separate stationary source than the dairy farm; therefore, the District has determined that the IC engines are non-agricultural IC engines. The lean burn, digester gas-fired, engines are subject to the District Rule 4702 emission limits for non-agricultural, lean burn 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 engines will be based on the emission limits for non-agricultural, lean burn IC engines contained in District Rule 4702, Section 5.2.1, Table 1, 2.a (65 ppmvd NO_X, 2,000 ppmvd CO, and 750 ppmvd VOC (all measured @ 15% O_2)).

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

Since Fuel Cells have reduced NO_X and VOC emissions in comparison to a reciprocating IC engine, a Multi-Pollutant Cost Effectiveness Threshold (MCET) will be used to determine if this option is cost-effective. The following cost analysis

[5] See: http://www.capstoneturbine.com/prodsol/solutions/rrbiogas.asp. Also note that because of lower efficiencies for smaller micrioturbines, the guaranteed emission rate of 9 ppmvd NO_X @ 15% O_2 from these units will be actually be slightly higher than 0.15 g-NO_X/bhp-hr

demonstrates that replacement of the proposed engine with a fuel cell is not cost effective even when the additional operation costs of a fuel cell are not considered.

Assumptions

- Biogas F-Factor: 9,100 dscf/MMBtu (60 °F)
- Higher Heating Value for Dairy Digester Gas: 600 Btu/scf
- Molar Specific Volume = 379.5 scf/lb-mol (60°F)
- Price for electricity: $0.08103/kW-hr (based on California Renewable Energy Feed-in Tariff for 10-yr contracts beginning in 2013)
- bhp-hr to Btu conversion: 2,545 Btu/hp-hr
- Btu to kW-hr conversion: 3,413 Btu/kW-hr

Assumptions for Proposed Digester Gas-Fired IC Engines (S-7767-14, -15, & -16)

- Each of engines will operate at full load for 24 hours/day and 8,760 hours/year
- Typical mechanical efficiency for engine: 33%
- Generator Efficiency: 95%
- The total amount daily heating value for of the digester gas used by all engines will be: 930.64 MMBtu/day (1,676 bhp_{out}/engine x 1 bhp_{in}/0.33 bhp_{out} x 2,545 Btu_{in}/bhp_{in}-hr x 1 MMBtu/10^6 Btu x 24 hr/day x 3 engines)
- The total annual heating value for of the digester gas used by all engines will be: 339,682.54 MMBtu/year (1,676 bhp_{out}/engine x 1 bhp_{in}/0.33 bhp_{out} x 2,545 Btu_{in}/bhp_{in}-hr x 1 MMBtu/10^6 Btu x 8,760 hr/year x 3 engines)
- Typical purchase and Installation Cost for digester engines: $1,475/kW (estimated based on review conducted by District staff in 2009) [6]
- Typical operation costs for engines: $0.0152/kW-hr (estimated based on review conducted by District staff in 2009)
- Rule 4702 NO_X emission limit for non-agricultural, lean burn IC engines: 65 ppmv @ 15% O_2 = 0.2540 lb/MMBtu
- Rule 4702 VOC emission limit for non-agricultural, lean burn IC engines: 750 ppmv @ 15% O_2 as CH_4 = 1.0193 lb/MMBtu

Assumptions for Fuel Cell System

- Net electrical efficiency for fuel cell power plant: 40% (includes parasitic load for gas conditioning system)

[6] The EPA document Biomass Combined Heat and Power Catalog of Technologies (September 2007) prepared for the U. S. Environmental Protection Agency Combined Heat and Power Partnership (http://www.epa.gov/chp/documents/biomass_chp_catalog.pdf) gives the following similar cost estimates on Page 63, Table 6-1: Installed Cost for Biogas Engine: $800/kW – $1,500/kW; Installed Cost for Biogas Microturbines: $1,100/kW – $2,000/kW

- Typical Purchase and Installation Cost for fuel cells including cost for biogas conditioning system: $7,000/kW (Estimated based on review conducted by District staff in 2009; this was also the cost given in the South Coast AQMD Final Environmental Assessment: Proposed Amended Rule 1110.2 – Emissions from Gaseous- and Liquid-Fueled Internal Combustion Engines (ICEs) dated December 2007 (SCAQMD No. 280307JK), Appendix C. A more recent document U.S. Department of Energy Federal energy management Program (FEMP) document "Fuel Cells and Renewable Energy" (last updated 8-2-2011 and available at: http://www.wbdg.org/resources/fuelcell.php) states, "*Installation costs of a fuel cell system can range from $5,000/kW to $10,000/kW.*" Therefore $7,000/kW remains a reasonable estimate. Note that this estimate may be actually too low based on the recently reported costs for fuel cell power plants, such as the "Bloom Box".)
- Typical operation costs for fuel cells: $0.0215/kW-hr (based on review conducted by District staff in 2009)
- Fuel cell Stack Replacement Cost: $500/kW-yr (conservatively estimated based stack replacement being one quarter of initial installation cost and stack replacement being required every 3.5 years) [7]
- Fuel Cell NO_X emissions: 0.05 lb/MW-hr *(Note: fuel cells are usually certified to the ARB Distributed Generation Certification level of 0.07 lb-NO_X/MW-hr; however, measured emissions from many fuel cells have been lower)*
- Fuel Cell VOC emissions: 0.02 lb-VOC/MW-hr (≤ 2.0 ppmv VOC @ 15% O_2 as CH_4 based on ARB Distributed Generation Certification level of 0.02 lb-VOC/MW-hr and emission tests on fuel cells)
- Size of fuel cell system needed for proposed project: 4,550 kW (estimated based on 930.64 MMBtu/day and 40% efficiency)
- Unlike the proposed engines, a high-temperature fuel cell power plant must primarily operate at steady state conditions; there would not be the ability to store gas to generate more electricity during peak hours, which is the current business plan of the applicant. Because the price paid for electricity is greater during peak hours and less during other times, the price paid for electricity generated by a fuel cell power plant would be less. This would require the operator to alter their plans of operation and result in less revenue per kW-hr of electricity generated potentially offsetting the revenue from increased power generating capacity because of the higher efficiency of a fuel cell power plant. For more conservative analysis, the difference in the cost of peak and off-peak electricity was not considered in this comparison.
- Fuel cells may offer the ability for greater heat recovery in comparison to an IC engine; however, the value of this heat will not be quantified because the facility is located in an agricultural area and does not have an economical use for the recovered heat.

[7] Examples of fuel cell stack replacement costs and intervals are provided in the following links:
http://www.ornl.gov/sci/femp/pdfs/020501-Hughes-fuelcell-WashingtonDC.pdf
http://www.mtpc.org/Project%20Deliverables/GB_GSI_FeasibilityStudy_Gill_Montague.pdf
http://www.epa.gov/chp/documents/catalog_chptech_fuel_cells.pdf
http://dodfuelcell.cecer.army.mil/climate/reports/AK_PostOfficeReport.pdf
http://www.fuelcellenergy.com/files/Copy%20of%20DFC300MA%20Spec%20_9318.pdf

Capital Cost

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

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

(4,550 kW x $7,000/kW) - (3 x 1,200 kW x $1,475/kW) = $26,540,000

Annualized Capital Cost

Pursuant to District Policy APR 1305, section X (11/09/99), the incremental capital cost for the purchase of the fuel cell system will be spread over the expected life of the system using the capital recovery equation. The expected life of the entire system will be estimated at 10 years. A 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)

$$A = [\$26,540,000 \times 0.1(1.1)^{10}]/[(1.1)^{10}-1]$$
$$= \mathbf{\$4,319,263/year}$$

Annual Costs

Electricity Generated

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

Proposed IC Engines
339,682.54 MMBtu/yr x 10^6 Btu/MMBtu x 1 kW-hr/3,413 Btu x 0.33 (engine efficiency) x 0.95 (generator efficiency) = 31,201,429 kW-hr/year

Fuel Cells (Alternate Equipment)
930.64 MMBtu/day x 10^6 Btu/MMBtu x 1 day/24 hr x 1 kW-hr/3,413 Btu x 0.40 (electrical efficiency) = 4,545 kW

339,682.54 MMBtu/yr x 10^6 Btu/MMBtu x 1 kW-hr/3,413 Btu x 0.40 (electrical efficiency) = 39,810,435 kW-hr /year

Revenue from Increased Electric Generation from a Fuel Cell Power Plant
(39,810,435 kW-hr/yr - 31,201,429 kW-hr/yr) x $0.08103/kW-hr = $697,588/year

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

Proposed IC Engines
31,201,429 kW-hr/yr x $0.0152/kW-hr = $474,262/year

Fuel Cells (Alternate Equipment)
39,810,435 kW-hr/yr x $0.0215/kW-hr = $855,924/year

Annual Costs of Increased Maintenance
$855,924/yr - $474,262/yr = $381,662/year

Fuel Cell Stack replacement Costs
$500/kW-yr x 4,550 kW = $2,275,000/year

Total Increased Annual Costs for Fuel Cell System as an Alternative to Proposed Engines

$4,319,263/year - $697,588/year + $381,662/year + $2,275,000/year = **$6,278,337/year**

NO_X Emission Reductions:

NO_X Emission Factors:

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 non-agricultural, lean burn IC engines contained in District Rule 4702, Section 5.2.1, Table 1, 2.b.

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

District Standard Emissions: 0.2540 lb-NO_X/MMBtu (65 ppmv NO_X @ 15% O_2) and 1.0193 lb-VOC/MMBtu (750 ppmv VOC @ 15% O_2 as CH_4)

Emissions from Fuel Cells as Alternative Equipment: 0.05 lb-NO_X/MW-hr and 0.02 lb-VOC/MW-hr as CH_4

Emission Reductions:

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

NO_X Emission Reductions (65 ppmv @ 15% O_2 → 0.05 lb-NO_X/MW-hr)
(339,682.54 MMBtu/yr x 0.2540 lb-NO_X/MMBtu) – (39,810,435 kW-hr/yr x 1 MW/1,000 kW x 0.05 lb-NO_X/MW)
= 84,289 lb-NO_X/year (42.14 ton-NO_X/year)

VOC Emission Reductions (750 ppmv @ 15% O_2 → 0.02 lb-VOC/MW-hr)
(339,682.54 MMBtu/yr x 1.0193 lb-VOC/MMBtu) – (39,810,435 kW-hr/yr x 1 MW/1,000 kW x 0.02 lb-VOC/MW)
= 345,442 lb-VOC/year (172.72 ton-VOC/year)

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

(42.14 ton-NO_X/year x $24,500/ton-$NO_X$) + (172.72 ton-VOC/year x $17,500/ton-VOC)
= **$4,055,030/year**

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

Option 2: NO_X emissions ≤ 0.15 g/bhp-hr (lean-burn engine with SCR, rich-burn engine with 3-way catalyst, or other equivalent) (Achieved in Practice)

This option is achieved practice and has been proposed by the applicant; therefore a cost analysis is not required.

Although the District considers 0.15 g-NO_X/bhp-hr to be achieved practice BACT for biogas-fired engines, to address any concerns regarding the ability of the engines to maintain consistent compliance with this limit, conditions will be incorporated into the ATC permit that allow the District evaluate the BACT limit for NO_X and increase this limit if needed provided that the other conditions in the ATC are met and the applicant makes a satisfactory effort to reduce NO_X emissions to the lowest possible level to satisfy BACT.

e. Step 5 - Select BACT

Pursuant to the above BACT Analysis, BACT for the Digester Gas-fired Engines must be satisfied with the following: NO_X: NO_X emissions to ≤ 0.15 g/bhp-hr

The applicant has proposed to apply SCR systems to the digester gas-fired lean burn IC engines to reduce NO_X emissions to ≤ 0.15 g/bhp-hr. Therefore, the BACT requirements are satisfied.

2. BACT Analysis for SO_X Emissions:

a. Step 1 - Identify all control technologies

The following options were identified to reduce SO_X emissions from the proposed engine:

1) Sulfur Content of fuel gas not exceeding 40 ppmv H_2S (Achieved in Practice/Contained in SIP)

There are no options listed in the SJVUAPCD BACT Clearinghouse as alternate basic equipment.

b. Step 2 - Eliminate technologically infeasible options

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

c. Step 3 - Rank remaining options by control effectiveness

The control efficiency of each of the options above is estimated and the controls are ranked below based on the control effectiveness.

1) Sulfur Content of fuel gas not exceeding 40 ppmv H_2S (90-98% Achieved in Practice)

d. Step 4 - Cost Effectiveness Analysis

The only option above is achieved practice and has been proposed by the applicant; therefore a cost analysis is not required.

e. Step 5 - Select BACT

Pursuant to the above BACT Analysis, BACT for SO_X emissions from the proposed engines is fuel gas sulfur content not exceeding 40 ppmv H_2S. The applicant has proposed to use a biological sulfur removal system and carbon canister scrubbers (or an equivalent sulfur removal system) to reduce the sulfur content of the digester gas combusted in the engines to ≤ 40 ppmv as H_2S. Therefore, the BACT requirements for SO_X are satisfied.

3. BACT Analysis for PM_{10} Emissions:

a. Step 1 - Identify all control technologies

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

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

1) Sulfur Content of fuel ≤ 40 ppmv H_2S (Achieved in Practice/Contained in SIP)

b. Step 2 - Eliminate technologically infeasible options

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

c. Step 3 - Rank remaining options by control effectiveness

1) Sulfur Content of fuel gas ≤ 40 ppmv H_2S (Achieved in Practice/Contained in SIP)

d. Step 4 - Cost Effectiveness Analysis

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

e. Step 5 - Select BACT

Pursuant to the above BACT Analysis, BACT for PM_{10} emissions from the proposed engines is fuel gas sulfur content not exceeding 40 ppmv H_2S. The applicant has proposed to use a biological sulfur removal system and carbon canister scrubbers (or an equivalent sulfur removal system) to reduce the sulfur content of the digester gas combusted in the engines to ≤ 40 ppmv as H_2S. Therefore, the BACT requirements for SO_X are satisfied.

4. BACT Analysis for VOC Emissions:

a. Step 1 - Identify all control technologies

The following options were identified to reduce VOC emissions:

1) VOC emissions ≤ 0.10 g/bhp-hr (lean burn or equivalent and positive crankcase ventilation) (Achieved in Practice)
2) Fuel Cell (≤ 0.02 lb/MW-hr) (Alternate Basic Equipment)

b. Step 2 - Eliminate technologically infeasible options

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

c. Step 3 - Rank remaining options by control effectiveness

1) Fuel Cell (≤ 0.02 lb/MW-hr) (Alternate Basic Equipment)
2) VOC emissions ≤ 0.10 g/bhp-hr (Achieved in Practice)

d. Step 4 - Cost Effectiveness Analysis

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

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

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

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

e. Step 5 - Select BACT

Pursuant to the above BACT Analysis, BACT for VOC emissions from the proposed engines is VOC emissions ≤ 0.10 g/bhp-hr. The applicant has proposed IC engines with VOC emissions ≤ 0.10 g/bhp-hr. Therefore, the BACT requirements for VOC are satisfied.

5. BACT Analysis for NH_3 Slip Emissions:

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

a. Step 1 - Identify all control technologies

The District has not established a cost effectiveness threshold for ammonia. Therefore, only options that are determined to be Achieved-in-Practice controls will be considered for ammonia in this analysis.

The SCAQMD BACT Clearinghouse for non-major polluting facilities contains a BACT Guideline for stationary, non-emergency IC engines that lists an ammonia slip emission limit of 10 ppmvd @ 15% O_2. The available source test and monitoring information for waste gas-fired engines controlled by SCR indicate compliance with this limit. Therefore, this option is considered Achieved in Practice and will be listed as the Achieved in Practice BACT requirement for waste gas-fired IC engines in BACT Guideline 3.3.15.

1) NH_3 emissions ≤ 10 ppmvd @ 15% O_2 (Achieved in Practice)

b. Step 2 - Eliminate technologically infeasible options

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

c. Step 3 - Rank remaining options by control effectiveness

1) NH_3 emissions ≤ 10 ppmvd @ 15% O_2 (Achieved in Practice)

d. Step 4 - Cost Effectiveness Analysis

The only option above is achieved in practice and has been proposed by the applicant. Additionally, as stated above, a cost effectiveness threshold for ammonia has not been established by the District. Therefore a cost analysis is not required.

e. Step 5 - Select BACT

Pursuant to the above BACT Analysis, BACT for NH_3 slip emissions from the proposed engines is NH_3 slip emissions ≤ 10 ppmvd @ 15% O_2. The applicant has proposed IC engines with NH_3 slip emissions ≤ 10 ppmvd @ 15% O_2. Therefore, the BACT requirements for NH_3 slip are satisfied.

APPENDIX B

Summary of Health Risk Assessment (HRA) and Ambient Air Quality Analysis (AAQA)

San Joaquin Valley Air Pollution Control District
Risk Management Review

To:	Ramon Norman – Permit Services
From:	Cheryl Lawler – Technical Services
Date:	August 20, 2012
Facility Name:	ABEC Bidart-Old River, LLC
Location:	20400 Old River Road, Bakersfield
Application #(s):	S-7767-14-0, 15-0, 16-0
Project #:	S-1120734

A. RMR SUMMARY

RMR Summary			
Categories	**Three Digester Gas IC Engines (Units 14-0, 15-0, 16-0)**	**Project Totals**	**Facility Totals**
Prioritization Score	5.15	5.15	>1
Acute Hazard Index	0.01	0.01	0.01
Chronic Hazard Index	0.00	0.00	0.00
Maximum Individual Cancer Risk	**3.93E-07**	3.93E-07	3.93E-07
T-BACT Required?	**No**		
Special Permit Conditions?	**Yes**		

Proposed Permit Conditions

To ensure that human health risks will not exceed District allowable levels; the following permit conditions must be included for:

Units 14-0, 15-0, 16-0

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

B. RMR REPORT

I. Project Description

Technical Services received a request on July 10, 2012, to perform a Risk Management Review (RMR) and Ambient Air Quality Analysis (AAQA) for an anaerobic digester system and three 1,676 bhp digester gas IC engines powering electrical generators at Bidart Dairy 2. The engines are proposed to operate 24 hours per day and 365 days per year.

Because the digester system and engines will be owned and operated by California Bioenergy, LLC, which is a different entity than the dairy, the digester and engines are considered a separate stationary source for District permitting purposes.

Total annual NOX emissions for all the engines combined will be limited to no more than 19,999 lb/yr (including commissioning). The engines are allowed higher emissions during commissioning. Each engine can undergo one-time commissioning for up to 120 hours per year. Only one engine may undergo commissioning at a time.

The facility previously received ATCs under Project S-1100455 for the installation of 12 digester gas IC engines (Units 1-0 thru 12-0) at Bidart Dairy 2. These ATCs will be cancelled and replaced by the ATCs being issued under this current project.

II. Analysis

Toxic emissions from the units were calculated using District approved emission factors for digester gas internal combustion, as well as Ammonia emission rates calculated and supplied by the processing engineer. Because of the annual NOX limit of 19,999 lb/yr for all the units combined, only one engine was run during modeling for this project. In accordance with the District's *Risk Management Policy for Permitting New and Modified Sources* (APR 1905-1, March 2, 2001), risks from the project were prioritized using the procedures in the 1990 CAPCOA Facility Prioritization Guidelines and incorporated in the District's HEART's database. The prioritization score was greater than 1.0 (see RMR Summary Table); therefore, a refined Health Risk Assessment was required and performed for the project. AERMOD was used with point source parameters outlined below and concatenated 5-year meteorological data from Bakersfield to determine maximum dispersion factors at the nearest residential and business receptors. The dispersion factors were input into the HARP model to calculate the Chronic and Acute Hazard Indices and the Carcinogenic Risk.

The following parameters were used for the review:

Analysis Parameters			
Source Type	Point	**Nearest Receptor (m)**	145
Stack Height (m)	10.06	**Closest Receptor Type**	Bidart Dairy
Stack Diameter (m)	0.36	**Project Location**	Rural
Stack Exit Velocity (m/s)	15.65		
Stack Exit Temperature (K)	672		

Technical Services also performed modeling for criteria pollutants CO, NOx, SOx, PM_{10}, and $PM_{2.5}$, as well as the RMR for the project. Emission rates used for criteria pollutant modeling were 22.17 lb/hr CO, 5.17 lb/hr NOx, 0.55 lb/hr SOx, 0.31 lb/hr PM_{10}, and 0.31 $PM_{2.5}$.

The results from the Criteria Pollutant Modeling are as follows:

Criteria Pollutant Modeling Results*
Values are in $\mu g/m^3$

Digester Gas ICEs	1 Hour	3 Hours	8 Hours	24 Hours	Annual
CO	Pass	X	Pass	X	X
NO_x	Pass	X	X	X	Pass
SO_x	Pass	Pass	X	Pass	Pass
PM_{10}	X	X	X	Pass[1]	Pass[1]
$PM_{2.5}$	X	X	X	Pass[1]	Pass[1]

*Results were taken from the attached PSD spreadsheet.
[1]The criteria pollutants are below EPA's level of significance as found in 40 CFR Part 51.165 (b)(2).

III. Conclusion

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

The acute and chronic indices are below 1.0; and the maximum individual cancer risk associated with the project is **3.93E-07**, which is less than the 1 in a million threshold. In accordance with the District's Risk Management Policy, the project is approved **without** Toxic Best Available Control Technology (T-BACT).

To ensure that human health risks will not exceed District allowable levels; the permit conditions listed on Page 1 of this report must be included for the project.

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

Attachments:

RMR Request Form
Updated Emission Rates (8-16-12)
Project Related Emails
Prioritization
Risks Report
Facility Summary
AAQA Results

APPENDIX C

Total Toxic and Hazardous Air Pollutant (HAP) Emissions from the Proposed IC Engines

Toxic Emissions for ABEC – Bidart-Old River LLC (Facility S-7767)

The following table provides the total toxic emissions calculated for the proposed digester gas-fired IC engines. The total toxic emissions are calculated using emissions factors for toxics provided by the Technical Services Division of the SJVAPCD for combustion of digester gas in IC engines and based the maximum total combined fuel input of 536.42736 MMscf/yr for all the IC engines at the facility (178.80912 MMscf/yr for each engine).

Total Facility Toxic Emissions* (Digester Gas-Fired IC Engines)					
Pollutant ID #	Pollutant Name	Emission Factor (lb/MMScf)	Annual Usage (MMScf/yr)	Federal HAP Emissions (lb/yr)	Other Toxic Emissions (lb/yr)
50000	Formaldehyde	1.309999943	536.42736	702.71981	
71432	Benzene	0.178000003	536.42736	95.48407	
75092	Methylene Chloride (Dichloromethane)	1E-04	536.42736	0.05364	
78933	Methyl Ethyl Ketone**	1E-04	536.42736	--	0.05364
79005	1,1,2-Trichloroethane (Vinyl Trichloride)	1E-04	536.42736	0.05364	
79016	Trichloroethylene	0.0003	536.42736	0.16093	
100414	Ethyl Benzene	0.001	536.42736	0.53643	
106467	p-Dichlorobenzene	0.0018	536.42736	0.96557	
107062	Ethylene Dichloride (1,2-Dichloroethane)	0.0014	536.42736	0.75100	
108883	Toluene	0.064800002	536.42736	34.76049	
108907	Chlorobenzene	0.0002	536.42736	0.10729	
110543	n-Hexane	0.064800002	536.42736	34.76049	
127184	Perchloroethylene (Tetrachloroethylene)	0.0005	536.42736	0.26821	
1330207	Xylenes	0.0045	536.42736	2.41392	
7647010	Hydrochloric Acid (Hydrogen Chloride)	0.646000028	536.42736	346.53209	
7664417	Ammonia	0.0048	536.42736	--	2.57485
7783064	Hydrogen Sulfide***	0.021500001	536.42736	--	11.53319
		Total Federal HAP Emissions (lb/yr)		1,220	

* The emissions factors for toxics from combustion of digester gas in IC engines were developed by San Diego County Air Pollution Control District Based on Pt Loma Raw Gas (8/23/1999).

**On December 19, 2005 the EPA removed methyl ethyl ketone (MEK) from the list of Federal HAPs.

***A clerical error led to the inadvertent addition of H2S to the Section 112(b) list of Hazardous Air Pollutants but it was removed in 1991

APPENDIX D
Draft ATCs
(S-7767-13-0, -14-0, -15-0, & -16-0)

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

DRAFT

PERMIT NO: S-7767-13-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: ABEC BIDART-OLD RIVER LLC
MAILING ADDRESS: C/O CALIFORNIA BIOENERGY LLC
2828 ROUTH STREET SUITE 500
DALLAS, TX 75201-1438

LOCATION: 20400 OLD RIVER ROAD
BAKERSFIELD, CA

EQUIPMENT DESCRIPTION:
ANAEROBIC DIGESTER SYSTEM CONSISTING OF TWO CONTINUOUS STIRRED TANK REACTOR (CSTR) MESOPHILIC ANAEROBIC DIGESTER TANKS (EACH 1,600,000 GALLONS, 104' DIA X 26' HIGH) AND TWO COVERED LAGOON ANAEROBIC DIGESTERS (1 X 24 MILLION GALLONS, 1 X 6.6 MILLION GALLONS)

CONDITIONS

1. {271} All equipment shall be maintained in good operating condition and shall be operated in a manner to minimize emissions of air contaminants into the atmosphere. [District Rule 2201]
2. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
3. {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]
4. The anaerobic digester system's CSTR digester tanks and covered lagoon digester system shall be configured and operated in accordance with National Resource Conservation Service (NRCS) California Field Office Technical Guide Code 366: Anaerobic Digester or other standards approved by the District. The covered lagoon anaerobic digesters shall have an average retention time of at least thirty-eight (38) days. [District Rule 2201]
5. The permittee shall maintain records of the design specifications and calculations, including Minimum Treatment Volume (MTV), Hydraulic Retention Time (HRT), and volatile solids loading rate, of the covered lagoon anaerobic digester systems in order to demonstrate that each digester has been designed and is operating in accordance with the applicable National Resource Conservation Service (NRCS) technical guide. [District Rules 1070 and 2201]
6. The VOC content of the digester gas produced by the digester system shall not exceed 10% by weight. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (661) 392-5500 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director/APCO

DRAFT

DAVID WARNER, Director of Permit Services
S-7767-13-0 , Mar 5 2013 8:48AM – NORMANR : Joint Inspection NOT Required

7. The digester system shall be designed to allow gas generated during summer conditions to be stored for more than 24 hours prior to venting in the event that the gas cannot be combusted in digester gas-fired engines or sent to another device with a VOC control efficiency of at least 95% by weight as determined by the APCO. [District Rule 2201]
8. All records shall be maintained and retained for a minimum of five (5) years, and shall be made available for District inspection upon request. All records may be maintained and submitted in an electronic format approved by the District. [District Rules 1070 and 2201]
9. {3658} This permit does not authorize the violation of any conditions established for this facility in the Conditional Use Permit (CUP), Special Use Permit (SUP), Site Approval, Site Plan Review (SPR), or other approval documents issued by a local, state, or federal agency. [Public Resources Code 21000-21177: California Environmental Quality Act]
10. The permittee shall obtain written District approval for the use of any equivalent control equipment not specifically approved by this Authority to Construct. Approval of the equivalent control equipment shall be made only after the District's determination that the submitted design and performance of the proposed alternate control equipment is equivalent to the specifically authorized equipment. [District Rule 2010]
11. The permittee's request for approval of equivalent equipment shall include, as applicable, the make, model, manufacturer's maximum rating, equipment drawing(s), and operational characteristics/parameters. [District Rule 2010]
12. Alternate equipment shall be of the same class and category of source as the equipment authorized by the Authority to Construct. [District Rule 2201]
13. No emission factor and no emission shall be greater for the alternate equipment than for the proposed equipment. No changes in the hours of operation, operating rate, throughput, or firing rate may be authorized for any alternate equipment. [District Rule 2201]

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

DRAFT

PERMIT NO: S-7767-14-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: ABEC BIDART-OLD RIVER LLC
MAILING ADDRESS: C/O CALIFORNIA BIOENERGY LLC
2828 ROUTH STREET SUITE 500
DALLAS, TX 75201-1438

LOCATION: 20400 OLD RIVER ROAD
BAKERSFIELD, CA

EQUIPMENT DESCRIPTION:
1,676 BHP CATERPILLAR MODEL CG170-12 (OR DISTRICT APPROVED EQUIVALENT) DIGESTER GAS-FIRED LEAN-BURN IC ENGINE WITH A JOHNSON MATTHEY SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM, AND A SILOX OR SCS ENERGY CARBON FILTER (OR EQUIVALENT) H2S REMOVAL SYSTEM POWERING AN ELECTRICAL GENERATOR

CONDITIONS

1. All equipment shall be maintained in good operating condition and shall be operated in a manner consistent with good air pollution control practice to minimize emissions of air contaminants. [District Rule 2201 and 40 CFR 60, Subpart JJJJ]
2. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
3. {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]
4. {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]
5. {1898} The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]
6. This engine shall be operated and maintained in proper operating condition per the manufacturer's requirements as specified in the Inspection and Monitoring (I&M) plan. [District Rule 4702]
7. {3203} This engine shall be operated within the ranges that the source testing has shown result in pollution concentrations within the emissions limits as specified on this permit. [District Rule 4702]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (661) 392-5500 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DRAFT

DAVID WARNER, Director of Permit Services
S-7767-14-0 : Mar 5 2013 8:48AM -- NORMANR : Joint Inspection NOT Required

8. This engine shall be fired only on digester gas. [District Rule 2201]

9. The sulfur content of the digester gas used as fuel in this engine shall not exceed 40 ppmv as H2S. The District may approve an averaging period of up to one calendar day in length for demonstration of compliance with the fuel sulfur content limit. [District Rules 2201, 4702, and 4801]

10. This engine shall be equipped with an operational non-resettable elapsed time meter. [District Rules 2201 and 4702]

11. {1897} This engine shall be equipped with either a positive crankcase ventilation (PCV) system that recirculates crankcase emissions into the air intake system for combustion, or a crankcase emissions control device of at least 90% control efficiency. [District Rule 2201]

12. The owner/operator shall minimize the emissions from the engine to the maximum extent possible during the commissioning period. Conditions #13 through #23 shall apply only during the commissioning period as defined below. Unless otherwise indicated, conditions #24 through #48 shall apply after the commissioning period has ended. [District Rule 2201]

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

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

15. Only one of the digester gas-fired IC engines at this facility (Permit Units S-7767-14, S-7767-15, and S-7767-16) shall be operated for commissioning purposes at any one time. [District Rule 2201]

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

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

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

19. Emission rates from this engine unit during the commissioning period shall not exceed any of the following limits: 1.1 g-NOx/bhp-hr, 0.028 g-PM10/bhp-hr, 2.5 g-CO/bhp-hr, 0.20 g-VOC/bhp-hr. [District Rule 2201]

20. The permittee shall record total operating time of the engine in hours and total amount of gas (scf) used by the engine during the commissioning period. [District Rule 2201]

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

22. The total heat input of the engine during the commissioning period and total mass emissions of NOx that are emitted during the commissioning period shall accrue towards the consecutive twelve month limits specified in condition #51. [District Rule 2201]

23. Coincident with the end of the commissioning period, emissions from this unit shall comply with the emission limits specified in conditions #24 and #27 below. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

24. Emissions from this IC engine shall not exceed any of the following limits: 0.15 g-NOx/bhp-hr (equivalent to 11.0 ppmvd NOx @ 15% O2), NOx referenced as NO2; 0.028 g-PM10/bhp-hr; 1.75 g-CO/bhp-hr (equivalent to 210 ppmvd CO @ 15% O2); 0.10 g-VOC/bhp-hr (equivalent to 20 ppmvd VOC @ 15% O2), VOC referenced as methane. [District Rules 2201 and 4702]

25. The District has preliminarily determined that an emission limit of 0.15 g-NOx/bhp-hr constitutes BACT for NOx emissions from this engine. The permittee shall perform actions necessary to comply with this NOx limit to the extent feasible. If NOx emissions from the engine continue to exceed 0.15 g/bhp-hr after 12 months of operation, the permittee may submit a report to the District requesting a revised BACT determination for NOx emissions from this engine. The report shall contain all monitoring and source test information and shall include an explanation of the steps taken to operate and maintain the engine in a manner as to minimize NOx emissions and a detailed analysis of all factors that prevent compliance with the NOx emissions limit. In the report, the permittee may also propose a revised BACT emission limit for NOx for inclusion in this permit. If the permittee does not submit a report requesting a revised BACT determination within 18 months of initial startup of this engine, the 0.15 g-NOx/bhp-hr emission limit shall be confirmed. [District Rule 2201]

26. If required, within 60 days of receipt of the report from the permittee, the District shall confirm or revise the BACT limit for NOx, including establishment of any applicable averaging periods. The revised BACT limit shall be determined to the satisfaction of the Air Pollution Control Officer in accordance with District Rule 2201 and the District's BACT policy, after at least 12 months of operating history and a source test. Within 30 days of receipt of the District's determination of a revised BACT limit, the permittee shall submit an Authority to Construct application to incorporate the revised emissions limit(s). In no case shall the revised BACT emission limit be greater than 0.60 g-NOx/bhp-hr (equivalent to 44 ppmvd NOx @ 15% O2). If NOx emissions do not exceed 0.60 g-NOx/bhp-hr, the engine may continue to operate until the Authority to Construct permit that includes the revised NOx emission limit has been issued. [District Rule 2201]

27. Until the BACT limit for NOx from this engine is confirmed or an Authority to Construct permit that includes a revised NOx emission limit established by the District has been issued, NOx emissions (as NO2) from this engine in excess of 0.15 g/bhp-hr but not exceeding 0.60 g/bhp-hr shall not constitute a violation of this permit provided that NOx emissions are limited to the lowest achievable emission rate to satisfy BACT and the permittee complies with all other emission limitations and operational and design conditions contained in this permit. [District Rule 2201]

28. The temperature of the SCR catalyst shall be maintained within the range for the highest efficiency for NOx reduction as specified by the catalyst manufacturer or emission control supplier. [District Rule 2201 and 4702]

29. The inlet and outlet temperature of the SCR catalyst and the reagent injection rate shall be monitored and recorded during times in which NOx emissions are being source tested or monitored with a portable analyzer. [District Rule 2201 and 4702]

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

31. Ammonia (NH3) emissions from this engine shall not exceed 10 ppmvd @ 15% O2. [District Rules 2201 and 4102]

32. 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]

33. Source testing to measure NOx, CO, VOC, PM10, and ammonia (NH3) emissions from this unit shall be conducted within 120 days of initial start-up. [District Rules 1081, 2201, and 4702 and 40 CFR 60, Subpart JJJJ]

34. Source testing to measure NOx, CO, VOC, and ammonia (NH3) emissions from this unit shall be conducted at least once every 8,760 hours of operation or 24 months, whichever comes first. [District Rules 1081, 2201, and 4702 and 40 CFR 60, Subpart JJJJ]

35. {3791} Emissions source testing shall be conducted with the engine operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. [District Rule 4702]

CONDITIONS CONTINUE ON NEXT PAGE

36. For 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. VOC emissions shall be reported as both methane and propane. NOx, CO, VOC, and NH3 concentrations shall be reported in ppmv, corrected to 15% oxygen. [District Rule 4702 and 40 CFR 60, Subpart JJJJ]

37. The following methods shall be used for source testing: NOx (ppmv) - EPA Method 7E; CO (ppmv) - EPA Method 10; VOC (ppmv) - EPA Method 25A or 25B; stack gas oxygen - EPA Method 3 or 3A; stack gas velocity - EPA Method 2 or EPA Method 19; stack gas moisture content - EPA Method 4; PM10 (filterable and condensable) - EPA Method 201 and 202, EPA Method 201a and 202, or ARB Method 5 in combination with 501; NH3 - BAAQMD ST-1B or SCAQMD Method 207-1. Alternative test methods as approved by EPA and the District may also be used to address the source testing requirements of this permit. [District Rules 1081 and 4702 and 40 CFR 60, Subpart JJJJ]

38. {109} Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]

39. 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]

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

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

42. Monitoring of the digester gas sulfur content shall be performed using gas detection tubes calibrated for H2S; a Testo 350 XL portable emission monitor; a continuous fuel gas monitor that meets the requirements specified in SCAQMD Rule 431.1, Attachment A; District-approved source test methods, including EPA Method 15, ASTM Method D1072, D4084, and D5504; District-approved in-line H2S monitors; or an alternative method approved by the District. Prior to utilization of in-line monitors to demonstrate compliance with the digester gas sulfur content limit of this permit, the permittee shall submit details of the proposed monitoring system, including the make, model, and detection limits, to the District and obtain District approval for the proposed monitor(s). [District Rule 2201]

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

44. The permittee shall monitor and record the stack concentration of NOx, CO, and O2 at least once every month (in which a source test is not performed) using a portable emission monitor that meets District specifications. [In-stack emission monitors may be allowed if they satisfy the standards required for portable analyzers as specified in District policies and are approved in writing by the APCO.] 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]

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

CONDITIONS CONTINUE ON NEXT PAGE

46. If the NOx, CO, or NH3 concentrations, as measured by the portable analyzer or the District approved ammonia monitoring equipment, exceed the allowable emission concentration, the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 8 hours after detection. If the portable analyzer readings continue to exceed the allowable emissions concentration after 8 hours, the permittee shall notify the District within the following 1 hour, and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100 in lieu of performing the notification and testing required by this condition. Until the BACT limit for NOx from this engine is confirmed or an Authority to Construct permit that includes a revised NOx emission limit established by the District has been issued, NOx emissions not exceeding 0.60 g-NOx/bhp-hr (equivalent to 44 ppmvd NOx @ 15% O2) are not subject to the requirements contained in this condition to source test or stipulate that an emissions violation has occurred. [District Rules 2201 and 4702]

47. {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]

48. 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]

49. The permittee shall maintain an engine operating log to demonstrate compliance. The engine operating log shall include, on a monthly basis, the following information: the total hours of operation, quantity of fuel used (scf) and calculated heat input (MMBtu) during commissioning period(s), the quantity of fuel used (scf) and calculated heat input (MMBtu) during normal operation, maintenance and modifications performed, monitoring data, compliance source test results, and any other information necessary to demonstrate compliance. Quantity of fuel used shall be recorded in standard cubic feet using a non-resettable, totalizing mass or volumetric fuel flow meter or other APCO approved-device. [District Rules 2201 and 4702 and 40 CFR 60, Subpart JJJJ]

50. {3212} The permittee shall update the I&M plan for this engine prior to any planned change in operation. The permittee must notify the District no later than seven days after changing the I&M plan and must submit an updated I&M plan to the APCO for approval no later than 14 days after the change. The date and time of the change to the I&M plan shall be recorded in the engine's operating log. For modifications, the revised I&M plan shall be submitted to and approved by the APCO prior to issuance of the Permit to Operate. The permittee may request a change to the I&M plan at any time. [District Rule 4702]

CONDITIONS CONTINUE ON NEXT PAGE

51. The total combined NOx (as NO2) emissions from permit units S-7767-14, S-7767-15, and S-7767-16 (digester gas-fired IC engines) shall not exceed 19,999 lb during any consecutive 12-month rolling period. To demonstrate compliance with the 12-month rolling combined NOx emission limit, monthly emissions for each engine shall be calculated by multiplying the heat input (MMBtu) (based on the HHV of the fuel) of the engine during commissioning periods and normal operation during that month by the applicable emissions factors given in this permit or approved by the District. The emission factor used for during commissioning shall be: 0.315 lb-NOx/MMBtu. The following emission factors shall be used for during normal operation: 0.045 lb-NOx/MMBtu if the engine demonstrates compliance with the 0.15 g-NOx/bhp-hr emission limit, otherwise 0.173 lb-NOx/MMBtu. The District may approve use of alternate emission factor(s) to calculate NOx emissions during normal operation based on the most recently completed fuel analysis and monitoring or source test results to determine NOx emissions provided that the alternate emission factor is at least as great as the emission factor determined by the source test or monthly monitoring for the period for which the alternate emission factor will be used to demonstrate compliance with the limit. The minimum alternate emission factor used shall be calculated as follows or using another method approved by the District: (lb-NOx/MMBtu) = (measured ppmv @15% O2) x (Fuel F-Factor dry) x (4.294E-7). The permittee shall obtain written approval from the District prior to use of alternative emission factor(s). The District will respond to a permittee request for use of an alternate emission factor based on supporting source test data within 30 days following the receipt of the request from the permittee. [District Rule 2201]

52. For each of the following permit units: S-7767-14, S-7767-15, and S-7767-16 (digester gas-fired IC engines), the permittee shall maintain records of the calculated NOx emissions (in lbs) from the engine for the previous month. [District Rule 2201]

53. The permittee shall compile and maintain the following records for permit units S-7767-14, S-7767-15, and S-7767-16 (digester gas-fired IC engines): 1) the total amount of gas (scf) used in the units each month, 2) the total amount of gas (scf) used in the units during the previous 12-month rolling period, 3) the calculated total heat input (MMBtu) for the units each month, 4) the calculated total heat input (MMBtu) for the units during the previous 12-month rolling period, 5) the calculated total NOx emissions for the units each month, and 6) the calculated total NOx emissions for the units during the previous 12-month rolling period. [District Rule 2201]

54. The methane content of the digester gas used to fuel the engines shall be measured and the heating value of the digester gas shall be determined at least once every calendar quarter. Records of the measured methane content and heating value of the digester gas shall be maintained. [District Rule 2201]

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

56. Records of any analyzer(s) installed or utilized to monitor methane, oxygen, and hydrogen sulfide shall be maintained and shall be made available for District inspection upon request. [District Rule 2201]

57. During the first 18 months after initial startup, when requested by the District, the permittee shall perform and submit a fuel analysis of the digester gas. [District Rule 2201]

58. All records shall be maintained and retained for a minimum of five (5) years, and shall be made available for District inspection upon request. All records may be maintained and submitted in an electronic format approved by the District. [District Rules 2201 and 4702 and 40 CFR 60, Subpart JJJJ]

59. 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. Notification of construction and copies of source test results shall be submitted to EPA at the following address: Director, Air Division, U.S. Environmental Protection Agency, 75 Hawthorne Street, San Francisco, CA 94105. [40 CFR 60, Subpart JJJJ]

60. The permittee shall obtain written District approval for the use of any equivalent control equipment not specifically approved by this Authority to Construct. Approval of the equivalent control equipment shall be made only after the District's determination that the submitted design and performance of the proposed alternate control equipment is equivalent to the specifically authorized equipment. [District Rule 2010]

CONDITIONS CONTINUE ON NEXT PAGE

61. The permittee's request for approval of equivalent equipment shall include the make, model, manufacturer's maximum rating, manufacturer's guaranteed emission rates, equipment drawing(s), and operational characteristics/parameters. [District Rule 2010]

62. Alternate equipment shall be of the same class and category of source as the equipment authorized by the Authority to Construct. [District Rule 2201]

63. No emission factor and no emission shall be greater for the alternate equipment than for the proposed equipment. No changes in the hours of operation, operating rate, throughput, or firing rate may be authorized for any alternate equipment. [District Rule 2201]

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

DRAFT

PERMIT NO: S-7767-15-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: ABEC BIDART-OLD RIVER LLC
MAILING ADDRESS: C/O CALIFORNIA BIOENERGY LLC
2828 ROUTH STREET SUITE 500
DALLAS, TX 75201-1438

LOCATION: 20400 OLD RIVER ROAD
BAKERSFIELD, CA

EQUIPMENT DESCRIPTION:
1,676 BHP CATERPILLAR MODEL CG170-12 (OR DISTRICT APPROVED EQUIVALENT) DIGESTER GAS-FIRED LEAN-BURN IC ENGINE WITH A JOHNSON MATTHEY SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM, AND A SILOX OR SCS ENERGY CARBON FILTER (OR EQUIVALENT) H2S REMOVAL SYSTEM POWERING AN ELECTRICAL GENERATOR

CONDITIONS

1. All equipment shall be maintained in good operating condition and shall be operated in a manner consistent with good air pollution control practice to minimize emissions of air contaminants. [District Rule 2201 and 40 CFR 60, Subpart JJJJ]
2. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
3. {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]
4. {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]
5. {1898} The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]
6. This engine shall be operated and maintained in proper operating condition per the manufacturer's requirements as specified in the Inspection and Monitoring (I&M) plan. [District Rule 4702]
7. {3203} This engine shall be operated within the ranges that the source testing has shown result in pollution concentrations within the emissions limits as specified on this permit. [District Rule 4702]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (661) 392-5500 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DRAFT

DAVID WARNER, Director of Permit Services
S-7767-15-0 : Mar 5 2013 8:48AM -- NORMANR : Joint Inspection NOT Required

8. This engine shall be fired only on digester gas. [District Rule 2201]
9. The sulfur content of the digester gas used as fuel in this engine shall not exceed 40 ppmv as H2S. The District may approve an averaging period of up to one calendar day in length for demonstration of compliance with the fuel sulfur content limit. [District Rules 2201, 4702, and 4801]
10. This engine shall be equipped with an operational non-resettable elapsed time meter. [District Rules 2201 and 4702]
11. {1897} This engine shall be equipped with either a positive crankcase ventilation (PCV) system that recirculates crankcase emissions into the air intake system for combustion, or a crankcase emissions control device of at least 90% control efficiency. [District Rule 2201]
12. The owner/operator shall minimize the emissions from the engine to the maximum extent possible during the commissioning period. Conditions #13 through #23 shall apply only during the commissioning period as defined below. Unless otherwise indicated, conditions #24 through #48 shall apply after the commissioning period has ended. [District Rule 2201]
13. Commissioning activities are defined as, but not limited to, all testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the construction contractor to ensure safe and reliable operation of the reciprocating IC engine, emission control equipment, and associated electrical delivery systems. [District Rule 2201]
14. Commissioning period shall commence when all mechanical, electrical, and control systems are installed and individual system startup has been completed, or when a reciprocating engine is first fired, whichever occurs first. The commissioning period shall terminate when the engine has completed initial performance testing, completed initial engine tuning, and the engine is available for commercial operation. The total duration of the commissioning period for this engine shall not exceed 120 hours of engine operation. [District Rule 2201]
15. Only one of the digester gas-fired IC engines at this facility (Permit Units S-7767-14, S-7767-15, and S-7767-16) shall be operated for commissioning purposes at any one time. [District Rule 2201]
16. At the earliest feasible opportunity, in accordance with the recommendations of the equipment supplier and the construction contractor, the engine shall be tuned to minimize emissions. [District Rule 2201]
17. At the earliest feasible opportunity, in accordance with the recommendations of the equipment supplier and the construction contractor, the Selective Catalytic Reduction (SCR) system shall be installed, adjusted, and operated to minimize emissions from this unit. [District Rule 2201]
18. The permittee shall submit a plan to the District at least two weeks prior to the first firing of this engine unit, describing the procedures to be followed during the commissioning period. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but are not limited to, the tuning of the engine, the installation and operation of the SCR system, the installation, calibration, and testing of emissions monitors, and any activities requiring the firing of this unit without abatement by the SCR system. [District Rule 2201]
19. Emission rates from this engine unit during the commissioning period shall not exceed any of the following limits: 1.1 g-NOx/bhp-hr, 0.028 g-PM10/bhp-hr, 2.5 g-CO/bhp-hr, 0.20 g-VOC/bhp-hr. [District Rule 2201]
20. The permittee shall record total operating time of the engine in hours and total amount of gas (scf) used by the engine during the commissioning period. [District Rule 2201]
21. The total number of firing hours of this unit without abatement of emissions by the SCR system shall not exceed 120 hours during the commissioning period. Such operation of this unit without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR system. Upon completion of these activities, the permittee shall provide written notice to the District and the unused balance of the 120 firing hours without abatement shall expire. [District Rule 2201]
22. The total heat input of the engine during the commissioning period and total mass emissions of NOx that are emitted during the commissioning period shall accrue towards the consecutive twelve month limits specified in condition #51. [District Rule 2201]
23. Coincident with the end of the commissioning period, emissions from this unit shall comply with the emission limits specified in conditions #24 and #27 below. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

24. Emissions from this IC engine shall not exceed any of the following limits: 0.15 g-NOx/bhp-hr (equivalent to 11.0 ppmvd NOx @ 15% O2), NOx referenced as NO2; 0.028 g-PM10/bhp-hr; 1.75 g-CO/bhp-hr (equivalent to 210 ppmvd CO @ 15% O2); 0.10 g-VOC/bhp-hr (equivalent to 20 ppmvd VOC @ 15% O2), VOC referenced as methane. [District Rules 2201 and 4702]

25. The District has preliminarily determined that an emission limit of 0.15 g-NOx/bhp-hr constitutes BACT for NOx emissions from this engine. The permittee shall perform actions necessary to comply with this NOx limit to the extent feasible. If NOx emissions from the engine continue to exceed 0.15 g/bhp-hr after 12 months of operation, the permittee may submit a report to the District requesting a revised BACT determination for NOx emissions from this engine. The report shall contain all monitoring and source test information and shall include an explanation of the steps taken to operate and maintain the engine in a manner as to minimize NOx emissions and a detailed analysis of all factors that prevent compliance with the NOx emissions limit. In the report, the permittee may also propose a revised BACT emission limit for NOx for inclusion in this permit. If the permittee does not submit a report requesting a revised BACT determination within 18 months of initial startup of this engine, the 0.15 g-NOx/bhp-hr emission limit shall be confirmed. [District Rule 2201]

26. If required, within 60 days of receipt of the report from the permittee, the District shall confirm or revise the BACT limit for NOx, including establishment of any applicable averaging periods. The revised BACT limit shall be determined to the satisfaction of the Air Pollution Control Officer in accordance with District Rule 2201 and the District's BACT policy, after at least 12 months of operating history and a source test. Within 30 days of receipt of the District's determination of a revised BACT limit, the permittee shall submit an Authority to Construct application to incorporate the revised emissions limit(s). In no case shall the revised BACT emission limit be greater than 0.60 g-NOx/bhp-hr (equivalent to 44 ppmvd NOx @ 15% O2). If NOx emissions do not exceed 0.60 g-NOx/bhp-hr, the engine may continue to operate until the Authority to Construct permit that includes the revised NOx emission limit has been issued. [District Rule 2201]

27. Until the BACT limit for NOx from this engine is confirmed or an Authority to Construct permit that includes a revised NOx emission limit established by the District has been issued, NOx emissions (as NO2) from this engine in excess of 0.15 g/bhp-hr but not exceeding 0.60 g/bhp-hr shall not constitute a violation of this permit provided that NOx emissions are limited to the lowest achievable emission rate to satisfy BACT and the permittee complies with all other emission limitations and operational and design conditions contained in this permit. [District Rule 2201]

28. The temperature of the SCR catalyst shall be maintained within the range for the highest efficiency for NOx reduction as specified by the catalyst manufacturer or emission control supplier. [District Rule 2201 and 4702]

29. The inlet and outlet temperature of the SCR catalyst and the reagent injection rate shall be monitored and recorded during times in which NOx emissions are being source tested or monitored with a portable analyzer. [District Rule 2201 and 4702]

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

31. Ammonia (NH3) emissions from this engine shall not exceed 10 ppmvd @ 15% O2. [District Rules 2201 and 4102]

32. 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]

33. Source testing to measure NOx, CO, VOC, PM10, and ammonia (NH3) emissions from this unit shall be conducted within 120 days of initial start-up. [District Rules 1081, 2201, and 4702 and 40 CFR 60, Subpart JJJJ]

34. Source testing to measure NOx, CO, VOC, and ammonia (NH3) emissions from this unit shall be conducted at least once every 8,760 hours of operation or 24 months, whichever comes first. [District Rules 1081, 2201, and 4702 and 40 CFR 60, Subpart JJJJ]

35. {3791} Emissions source testing shall be conducted with the engine operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. [District Rule 4702]

CONDITIONS CONTINUE ON NEXT PAGE

36. For 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. VOC emissions shall be reported as both methane and propane. NOx, CO, VOC, and NH3 concentrations shall be reported in ppmv, corrected to 15% oxygen. [District Rule 4702 and 40 CFR 60, Subpart JJJJ]

37. The following methods shall be used for source testing: NOx (ppmv) - EPA Method 7E; CO (ppmv) - EPA Method 10; VOC (ppmv) - EPA Method 25A or 25B; stack gas oxygen - EPA Method 3 or 3A; stack gas velocity - EPA Method 2 or EPA Method 19; stack gas moisture content - EPA Method 4; PM10 (filterable and condensable) - EPA Method 201 and 202, EPA Method 201a and 202, or ARB Method 5 in combination with 501; NH3 - BAAQMD ST-1B or SCAQMD Method 207-1. Alternative test methods as approved by EPA and the District may also be used to address the source testing requirements of this permit. [District Rules 1081 and 4702 and 40 CFR 60, Subpart JJJJ]

38. {109} Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]

39. 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]

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

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

42. Monitoring of the digester gas sulfur content shall be performed using gas detection tubes calibrated for H2S; a Testo 350 XL portable emission monitor; a continuous fuel gas monitor that meets the requirements specified in SCAQMD Rule 431.1, Attachment A; District-approved source test methods, including EPA Method 15, ASTM Method D1072, D4084, and D5504; District-approved in-line H2S monitors; or an alternative method approved by the District. Prior to utilization of in-line monitors to demonstrate compliance with the digester gas sulfur content limit of this permit, the permittee shall submit details of the proposed monitoring system, including the make, model, and detection limits, to the District and obtain District approval for the proposed monitor(s). [District Rule 2201]

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

44. The permittee shall monitor and record the stack concentration of NOx, CO, and O2 at least once every month (in which a source test is not performed) using a portable emission monitor that meets District specifications. [In-stack emission monitors may be allowed if they satisfy the standards required for portable analyzers as specified in District policies and are approved in writing by the APCO.] 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]

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

CONDITIONS CONTINUE ON NEXT PAGE

46. If the NOx, CO, or NH3 concentrations, as measured by the portable analyzer or the District approved ammonia monitoring equipment, exceed the allowable emission concentration, the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 8 hours after detection. If the portable analyzer readings continue to exceed the allowable emissions concentration after 8 hours, the permittee shall notify the District within the following 1 hour, and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100 in lieu of performing the notification and testing required by this condition. Until the BACT limit for NOx from this engine is confirmed or an Authority to Construct permit that includes a revised NOx emission limit established by the District has been issued, NOx emissions not exceeding 0.60 g-NOx/bhp-hr (equivalent to 44 ppmvd NOx @ 15% O2) are not subject to the requirements contained in this condition to source test or stipulate that an emissions violation has occurred. [District Rules 2201 and 4702]

47. {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]

48. 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]

49. The permittee shall maintain an engine operating log to demonstrate compliance. The engine operating log shall include, on a monthly basis, the following information: the total hours of operation, quantity of fuel used (scf) and calculated heat input (MMBtu) during commissioning period(s), the quantity of fuel used (scf) and calculated heat input (MMBtu) during normal operation, maintenance and modifications performed, monitoring data, compliance source test results, and any other information necessary to demonstrate compliance. Quantity of fuel used shall be recorded in standard cubic feet using a non-resettable, totalizing mass or volumetric fuel flow meter or other APCO approved-device. [District Rules 2201 and 4702 and 40 CFR 60, Subpart JJJJ]

50. {3212} The permittee shall update the I&M plan for this engine prior to any planned change in operation. The permittee must notify the District no later than seven days after changing the I&M plan and must submit an updated I&M plan to the APCO for approval no later than 14 days after the change. The date and time of the change to the I&M plan shall be recorded in the engine's operating log. For modifications, the revised I&M plan shall be submitted to and approved by the APCO prior to issuance of the Permit to Operate. The permittee may request a change to the I&M plan at any time. [District Rule 4702]

CONDITIONS CONTINUE ON NEXT PAGE

51. The total combined NOx (as NO2) emissions from permit units S-7767-14, S-7767-15, and S-7767-16 (digester gas-fired IC engines) shall not exceed 19,999 lb during any consecutive 12-month rolling period. To demonstrate compliance with the 12-month rolling combined NOx emission limit, monthly emissions for each engine shall be calculated by multiplying the heat input (MMBtu) (based on the HHV of the fuel) of the engine during commissioning periods and normal operation during that month by the applicable emissions factors given in this permit or approved by the District. The emission factor used for during commissioning shall be: 0.315 lb-NOx/MMBtu. The following emission factors shall be used for during normal operation: 0.045 lb-NOx/MMBtu if the engine demonstrates compliance with the 0.15 g-NOx/bhp-hr emission limit, otherwise 0.173 lb-NOx/MMBtu. The District may approve use of alternate emission factor(s) to calculate NOx emissions during normal operation based on the most recently completed fuel analysis and monitoring or source test results to determine NOx emissions provided that the alternate emission factor is at least as great as the emission factor determined by the source test or monthly monitoring for the period for which the alternate emission factor will be used to demonstrate compliance with the limit. The minimum alternate emission factor used shall be calculated as follows or using another method approved by the District: (lb-NOx/MMBtu) = (measured ppmv @15% O2) x (Fuel F-Factor dry) x (4.294E-7). The permittee shall obtain written approval from the District prior to use of alternative emission factor(s). The District will respond to a permittee request for use of an alternate emission factor based on supporting source test data within 30 days following the receipt of the request from the permittee. [District Rule 2201]

52. For each of the following permit units: S-7767-14, S-7767-15, and S-7767-16 (digester gas-fired IC engines), the permittee shall maintain records of the calculated NOx emissions (in lbs) from the engine for the previous month. [District Rule 2201]

53. The permittee shall compile and maintain the following records for permit units S-7767-14, S-7767-15, and S-7767-16 (digester gas-fired IC engines): 1) the total amount of gas (scf) used in the units each month, 2) the total amount of gas (scf) used in the units during the previous 12-month rolling period, 3) the calculated total heat input (MMBtu) for the units each month, 4) the calculated total heat input (MMBtu) for the units during the previous 12-month rolling period, 5) the calculated total NOx emissions for the units each month, and 6) the calculated total NOx emissions for the units during the previous 12-month rolling period. [District Rule 2201]

54. The methane content of the digester gas used to fuel the engines shall be measured and the heating value of the digester gas shall be determined at least once every calendar quarter. Records of the measured methane content and heating value of the digester gas shall be maintained. [District Rule 2201]

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

56. Records of any analyzer(s) installed or utilized to monitor methane, oxygen, and hydrogen sulfide shall be maintained and shall be made available for District inspection upon request. [District Rule 2201]

57. During the first 18 months after initial startup, when requested by the District, the permittee shall perform and submit a fuel analysis of the digester gas. [District Rule 2201]

58. All records shall be maintained and retained for a minimum of five (5) years, and shall be made available for District inspection upon request. All records may be maintained and submitted in an electronic format approved by the District. [District Rules 2201 and 4702 and 40 CFR 60, Subpart JJJJ]

59. 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. Notification of construction and copies of source test results shall be submitted to EPA at the following address: Director, Air Division, U.S. Environmental Protection Agency, 75 Hawthorne Street, San Francisco, CA 94105. [40 CFR 60, Subpart JJJJ]

60. The permittee shall obtain written District approval for the use of any equivalent control equipment not specifically approved by this Authority to Construct. Approval of the equivalent control equipment shall be made only after the District's determination that the submitted design and performance of the proposed alternate control equipment is equivalent to the specifically authorized equipment. [District Rule 2010]

CONDITIONS CONTINUE ON NEXT PAGE

61. The permittee's request for approval of equivalent equipment shall include the make, model, manufacturer's maximum rating, manufacturer's guaranteed emission rates, equipment drawing(s), and operational characteristics/parameters. [District Rule 2010]

62. Alternate equipment shall be of the same class and category of source as the equipment authorized by the Authority to Construct. [District Rule 2201]

63. No emission factor and no emission shall be greater for the alternate equipment than for the proposed equipment. No changes in the hours of operation, operating rate, throughput, or firing rate may be authorized for any alternate equipment. [District Rule 2201]

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

DRAFT

PERMIT NO: S-7767-16-0 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: ABEC BIDART-OLD RIVER LLC
MAILING ADDRESS: C/O CALIFORNIA BIOENERGY LLC
2828 ROUTH STREET SUITE 500
DALLAS, TX 75201-1438

LOCATION: 20400 OLD RIVER ROAD
BAKERSFIELD, CA

EQUIPMENT DESCRIPTION:
1,676 BHP CATERPILLAR MODEL CG170-12 (OR DISTRICT APPROVED EQUIVALENT) DIGESTER GAS-FIRED LEAN-BURN IC ENGINE WITH A JOHNSON MATTHEY SELECTIVE CATALYTIC REDUCTION (SCR) SYSTEM, AND A SILOX OR SCS ENERGY CARBON FILTER (OR EQUIVALENT) H2S REMOVAL SYSTEM POWERING AN ELECTRICAL GENERATOR

CONDITIONS

1. All equipment shall be maintained in good operating condition and shall be operated in a manner consistent with good air pollution control practice to minimize emissions of air contaminants. [District Rule 2201 and 40 CFR 60, Subpart JJJJ]
2. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
3. {14} Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201]
4. {15} No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark as, or darker than, Ringelmann 1 or 20% opacity. [District Rule 4101]
5. {1898} The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]
6. This engine shall be operated and maintained in proper operating condition per the manufacturer's requirements as specified in the Inspection and Monitoring (I&M) plan. [District Rule 4702]
7. {3203} This engine shall be operated within the ranges that the source testing has shown result in pollution concentrations within the emissions limits as specified on this permit. [District Rule 4702]

CONDITIONS CONTINUE ON NEXT PAGE

YOU MUST NOTIFY THE DISTRICT COMPLIANCE DIVISION AT (661) 392-5500 WHEN CONSTRUCTION IS COMPLETED AND PRIOR TO OPERATING THE EQUIPMENT OR MODIFICATIONS AUTHORIZED BY THIS AUTHORITY TO CONSTRUCT. This is NOT a PERMIT TO OPERATE. Approval or denial of a PERMIT TO OPERATE will be made after an inspection to verify that the equipment has been constructed in accordance with the approved plans, specifications and conditions of this Authority to Construct, and to determine if the equipment can be operated in compliance with all Rules and Regulations of the San Joaquin Valley Unified Air Pollution Control District. Unless construction has commenced pursuant to Rule 2050, this Authority to Construct shall expire and application shall be cancelled two years from the date of issuance. The applicant is responsible for complying with all laws, ordinances and regulations of all other governmental agencies which may pertain to the above equipment.

Seyed Sadredin, Executive Director / APCO

DRAFT

DAVID WARNER, Director of Permit Services
S-7767-16-0 : Mar 5 2013 8:48AM -- NORMANR : Joint Inspection NOT Required

8. This engine shall be fired only on digester gas. [District Rule 2201]

9. The sulfur content of the digester gas used as fuel in this engine shall not exceed 40 ppmv as H2S. The District may approve an averaging period of up to one calendar day in length for demonstration of compliance with the fuel sulfur content limit. [District Rules 2201, 4702, and 4801]

10. This engine shall be equipped with an operational non-resettable elapsed time meter. [District Rules 2201 and 4702]

11. {1897} This engine shall be equipped with either a positive crankcase ventilation (PCV) system that recirculates crankcase emissions into the air intake system for combustion, or a crankcase emissions control device of at least 90% control efficiency. [District Rule 2201]

12. The owner/operator shall minimize the emissions from the engine to the maximum extent possible during the commissioning period. Conditions #13 through #23 shall apply only during the commissioning period as defined below. Unless otherwise indicated, conditions #24 through #48 shall apply after the commissioning period has ended. [District Rule 2201]

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

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

15. Only one of the digester gas-fired IC engines at this facility (Permit Units S-7767-14, S-7767-15, and S-7767-16) shall be operated for commissioning purposes at any one time. [District Rule 2201]

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

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

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

19. Emission rates from this engine unit during the commissioning period shall not exceed any of the following limits: 1.1 g-NOx/bhp-hr, 0.028 g-PM10/bhp-hr, 2.5 g-CO/bhp-hr, 0.20 g-VOC/bhp-hr. [District Rule 2201]

20. The permittee shall record total operating time of the engine in hours and total amount of gas (scf) used by the engine during the commissioning period. [District Rule 2201]

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

22. The total heat input of the engine during the commissioning period and total mass emissions of NOx that are emitted during the commissioning period shall accrue towards the consecutive twelve month limits specified in condition #51. [District Rule 2201]

23. Coincident with the end of the commissioning period, emissions from this unit shall comply with the emission limits specified in conditions #24 and #27 below. [District Rule 2201]

CONDITIONS CONTINUE ON NEXT PAGE

24. Emissions from this IC engine shall not exceed any of the following limits: 0.15 g-NOx/bhp-hr (equivalent to 11.0 ppmvd NOx @ 15% O2), NOx referenced as NO2; 0.028 g-PM10/bhp-hr; 1.75 g-CO/bhp-hr (equivalent to 210 ppmvd CO @ 15% O2); 0.10 g-VOC/bhp-hr (equivalent to 20 ppmvd VOC @ 15% O2), VOC referenced as methane. [District Rules 2201 and 4702]

25. The District has preliminarily determined that an emission limit of 0.15 g-NOx/bhp-hr constitutes BACT for NOx emissions from this engine. The permittee shall perform actions necessary to comply with this NOx limit to the extent feasible. If NOx emissions from the engine continue to exceed 0.15 g/bhp-hr after 12 months of operation, the permittee may submit a report to the District requesting a revised BACT determination for NOx emissions from this engine. The report shall contain all monitoring and source test information and shall include an explanation of the steps taken to operate and maintain the engine in a manner as to minimize NOx emissions and a detailed analysis of all factors that prevent compliance with the NOx emissions limit. In the report, the permittee may also propose a revised BACT emission limit for NOx for inclusion in this permit. If the permittee does not submit a report requesting a revised BACT determination within 18 months of initial startup of this engine, the 0.15 g-NOx/bhp-hr emission limit shall be confirmed. [District Rule 2201]

26. If required, within 60 days of receipt of the report from the permittee, the District shall confirm or revise the BACT limit for NOx, including establishment of any applicable averaging periods. The revised BACT limit shall be determined to the satisfaction of the Air Pollution Control Officer in accordance with District Rule 2201 and the District's BACT policy, after at least 12 months of operating history and a source test. Within 30 days of receipt of the District's determination of a revised BACT limit, the permittee shall submit an Authority to Construct application to incorporate the revised emissions limit(s). In no case shall the revised BACT emission limit be greater than 0.60 g-NOx/bhp-hr (equivalent to 44 ppmvd NOx @ 15% O2). If NOx emissions do not exceed 0.60 g-NOx/bhp-hr, the engine may continue to operate until the Authority to Construct permit that includes the revised NOx emission limit has been issued. [District Rule 2201]

27. Until the BACT limit for NOx from this engine is confirmed or an Authority to Construct permit that includes a revised NOx emission limit established by the District has been issued, NOx emissions (as NO2) from this engine in excess of 0.15 g/bhp-hr but not exceeding 0.60 g/bhp-hr shall not constitute a violation of this permit provided that NOx emissions are limited to the lowest achievable emission rate to satisfy BACT and the permittee complies with all other emission limitations and operational and design conditions contained in this permit. [District Rule 2201]

28. The temperature of the SCR catalyst shall be maintained within the range for the highest efficiency for NOx reduction as specified by the catalyst manufacturer or emission control supplier. [District Rule 2201 and 4702]

29. The inlet and outlet temperature of the SCR catalyst and the reagent injection rate shall be monitored and recorded during times in which NOx emissions are being source tested or monitored with a portable analyzer. [District Rule 2201 and 4702]

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

31. Ammonia (NH3) emissions from this engine shall not exceed 10 ppmvd @ 15% O2. [District Rules 2201 and 4102]

32. 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]

33. Source testing to measure NOx, CO, VOC, PM10, and ammonia (NH3) emissions from this unit shall be conducted within 120 days of initial start-up. [District Rules 1081, 2201, and 4702 and 40 CFR 60, Subpart JJJJ]

34. Source testing to measure NOx, CO, VOC, and ammonia (NH3) emissions from this unit shall be conducted at least once every 8,760 hours of operation or 24 months, whichever comes first. [District Rules 1081, 2201, and 4702 and 40 CFR 60, Subpart JJJJ]

35. {3791} Emissions source testing shall be conducted with the engine operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. [District Rule 4702]

CONDITIONS CONTINUE ON NEXT PAGE

36. For 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. VOC emissions shall be reported as both methane and propane. NOx, CO, VOC, and NH3 concentrations shall be reported in ppmv, corrected to 15% oxygen. [District Rule 4702 and 40 CFR 60, Subpart JJJJ]

37. The following methods shall be used for source testing: NOx (ppmv) - EPA Method 7E; CO (ppmv) - EPA Method 10; VOC (ppmv) - EPA Method 25A or 25B; stack gas oxygen - EPA Method 3 or 3A; stack gas velocity - EPA Method 2 or EPA Method 19; stack gas moisture content - EPA Method 4; PM10 (filterable and condensable) - EPA Method 201 and 202, EPA Method 201a and 202, or ARB Method 5 in combination with 501; NH3 - BAAQMD ST-1B or SCAQMD Method 207-1. Alternative test methods as approved by EPA and the District may also be used to address the source testing requirements of this permit. [District Rules 1081 and 4702 and 40 CFR 60, Subpart JJJJ]

38. {109} Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test, and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]

39. 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]

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

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

42. Monitoring of the digester gas sulfur content shall be performed using gas detection tubes calibrated for H2S; a Testo 350 XL portable emission monitor; a continuous fuel gas monitor that meets the requirements specified in SCAQMD Rule 431.1, Attachment A; District-approved source test methods, including EPA Method 15, ASTM Method D1072, D4084, and D5504; District-approved in-line H2S monitors; or an alternative method approved by the District. Prior to utilization of in-line monitors to demonstrate compliance with the digester gas sulfur content limit of this permit, the permittee shall submit details of the proposed monitoring system, including the make, model, and detection limits, to the District and obtain District approval for the proposed monitor(s). [District Rule 2201]

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

44. The permittee shall monitor and record the stack concentration of NOx, CO, and O2 at least once every month (in which a source test is not performed) using a portable emission monitor that meets District specifications. [In-stack emission monitors may be allowed if they satisfy the standards required for portable analyzers as specified in District policies and are approved in writing by the APCO.] 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]

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

CONDITIONS CONTINUE ON NEXT PAGE

46. If the NOx, CO, or NH3 concentrations, as measured by the portable analyzer or the District approved ammonia monitoring equipment, exceed the allowable emission concentration, the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 8 hours after detection. If the portable analyzer readings continue to exceed the allowable emissions concentration after 8 hours, the permittee shall notify the District within the following 1 hour, and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100 in lieu of performing the notification and testing required by this condition. Until the BACT limit for NOx from this engine is confirmed or an Authority to Construct permit that includes a revised NOx emission limit established by the District has been issued, NOx emissions not exceeding 0.60 g-NOx/bhp-hr (equivalent to 44 ppmvd NOx @ 15% O2) are not subject to the requirements contained in this condition to source test or stipulate that an emissions violation has occurred. [District Rules 2201 and 4702]

47. {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]

48. 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]

49. The permittee shall maintain an engine operating log to demonstrate compliance. The engine operating log shall include, on a monthly basis, the following information: the total hours of operation, quantity of fuel used (scf) and calculated heat input (MMBtu) during commissioning period(s), the quantity of fuel used (scf) and calculated heat input (MMBtu) during normal operation, maintenance and modifications performed, monitoring data, compliance source test results, and any other information necessary to demonstrate compliance. Quantity of fuel used shall be recorded in standard cubic feet using a non-resettable, totalizing mass or volumetric fuel flow meter or other APCO approved-device. [District Rules 2201 and 4702 and 40 CFR 60, Subpart JJJJ]

50. {3212} The permittee shall update the I&M plan for this engine prior to any planned change in operation. The permittee must notify the District no later than seven days after changing the I&M plan and must submit an updated I&M plan to the APCO for approval no later than 14 days after the change. The date and time of the change to the I&M plan shall be recorded in the engine's operating log. For modifications, the revised I&M plan shall be submitted to and approved by the APCO prior to issuance of the Permit to Operate. The permittee may request a change to the I&M plan at any time. [District Rule 4702]

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51. The total combined NOx (as NO2) emissions from permit units S-7767-14, S-7767-15, and S-7767-16 (digester gas-fired IC engines) shall not exceed 19,999 lb during any consecutive 12-month rolling period. To demonstrate compliance with the 12-month rolling combined NOx emission limit, monthly emissions for each engine shall be calculated by multiplying the heat input (MMBtu) (based on the HHV of the fuel) of the engine during commissioning periods and normal operation during that month by the applicable emissions factors given in this permit or approved by the District. The emission factor used for during commissioning shall be: 0.315 lb-NOx/MMBtu. The following emission factors shall be used for during normal operation: 0.045 lb-NOx/MMBtu if the engine demonstrates compliance with the 0.15 g-NOx/bhp-hr emission limit, otherwise 0.173 lb-NOx/MMBtu. The District may approve use of alternate emission factor(s) to calculate NOx emissions during normal operation based on the most recently completed fuel analysis and monitoring or source test results to determine NOx emissions provided that the alternate emission factor is at least as great as the emission factor determined by the source test or monthly monitoring for the period for which the alternate emission factor will be used to demonstrate compliance with the limit. The minimum alternate emission factor used shall be calculated as follows or using another method approved by the District: (lb-NOx/MMBtu) = (measured ppmv @15% O2) x (Fuel F-Factor dry) x (4.294E-7). The permittee shall obtain written approval from the District prior to use of alternative emission factor(s). The District will respond to a permittee request for use of an alternate emission factor based on supporting source test data within 30 days following the receipt of the request from the permittee. [District Rule 2201]

52. For each of the following permit units: S-7767-14, S-7767-15, and S-7767-16 (digester gas-fired IC engines), the permittee shall maintain records of the calculated NOx emissions (in lbs) from the engine for the previous month. [District Rule 2201]

53. The permittee shall compile and maintain the following records for permit units S-7767-14, S-7767-15, and S-7767-16 (digester gas-fired IC engines): 1) the total amount of gas (scf) used in the units each month, 2) the total amount of gas (scf) used in the units during the previous 12-month rolling period, 3) the calculated total heat input (MMBtu) for the units each month, 4) the calculated total heat input (MMBtu) for the units during the previous 12-month rolling period, 5) the calculated total NOx emissions for the units each month, and 6) the calculated total NOx emissions for the units during the previous 12-month rolling period. [District Rule 2201]

54. The methane content of the digester gas used to fuel the engines shall be measured and the heating value of the digester gas shall be determined at least once every calendar quarter. Records of the measured methane content and heating value of the digester gas shall be maintained. [District Rule 2201]

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

56. Records of any analyzer(s) installed or utilized to monitor methane, oxygen, and hydrogen sulfide shall be maintained and shall be made available for District inspection upon request. [District Rule 2201]

57. During the first 18 months after initial startup, when requested by the District, the permittee shall perform and submit a fuel analysis of the digester gas. [District Rule 2201]

58. All records shall be maintained and retained for a minimum of five (5) years, and shall be made available for District inspection upon request. All records may be maintained and submitted in an electronic format approved by the District. [District Rules 2201 and 4702 and 40 CFR 60, Subpart JJJJ]

59. 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. Notification of construction and copies of source test results shall be submitted to EPA at the following address: Director, Air Division, U.S. Environmental Protection Agency, 75 Hawthorne Street, San Francisco, CA 94105. [40 CFR 60, Subpart JJJJ]

60. The permittee shall obtain written District approval for the use of any equivalent control equipment not specifically approved by this Authority to Construct. Approval of the equivalent control equipment shall be made only after the District's determination that the submitted design and performance of the proposed alternate control equipment is equivalent to the specifically authorized equipment. [District Rule 2010]

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61. The permittee's request for approval of equivalent equipment shall include the make, model, manufacturer's maximum rating, manufacturer's guaranteed emission rates, equipment drawing(s), and operational characteristics/parameters. [District Rule 2010]

62. Alternate equipment shall be of the same class and category of source as the equipment authorized by the Authority to Construct. [District Rule 2201]

63. No emission factor and no emission shall be greater for the alternate equipment than for the proposed equipment. No changes in the hours of operation, operating rate, throughput, or firing rate may be authorized for any alternate equipment. [District Rule 2201]