San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING

June 8, 2023

Mr. Gary Grillette
TRC Cypress Group LLC
PO Box 227
Taft, CA 93268

Re: Proposed ATC / Certificate of Conformity (Significant Mod)
Facility Number: S-3088
Project Number: S-1221387

Dear Mr. Grillette:

Enclosed for your review is the District's analysis of an application for Authorities to Construct for the facility identified above. You requested that Certificates of Conformity with the procedural requirements of 40 CFR Part 70 be issued with this project. The proposed project is to modify three existing 62.5 MMBtu/hr natural gas/produced gas-fired oilfield steam generators to reduce their NOx emissions 5 ppmv @ 3% O2 to comply with District Rules 4306 and 4320 and to limit total SOx emissions from the stationary source to 139,999 lb/year.

The notice of preliminary decision for this project has been posted on the District's website (www.valleyair.org). After addressing all comments made during the 30-day public notice and the 45-day EPA comment periods, the District intends to issue the Authorities to Construct with Certificates of Conformity. Please submit your comments within the 30-day public comment period, as specified in the enclosed public notice. Prior to operating with modifications authorized by the Authorities to Construct, the facility must submit an application to modify the Title V permit as an administrative amendment, in accordance with District Rule 2520, Section 11.5.

If you have any questions, please contact Mr. Nick Peirce, Permit Services Manager, at (209) 557-6400.

Samir Sheikh
Executive Director/Air Pollution Control Officer

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Modesto, CA 95356-8718
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Central Region (Main Office)
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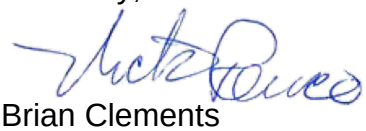
Southern Region
34946 Flyover Court
Bakersfield, CA 93308-9725
Tel: (661) 392-5500 FAX: (661) 392-5585

www.valleyair.org www.healthyairliving.com

Thank you for your cooperation in this matter.

Sincerely,



Brian Clements
Director of Permit Services

Enclosures

cc: Courtney Graham, CARB (w/enclosure) via email
cc: Gerardo Rios, EPA (w/enclosure) via EPS

San Joaquin Valley Air Pollution Control District

Authority to Construct Application Review

Modify Three Natural Gas/Produced Gas-Fired Steam Generators to Reduce NO_X Emissions to 5 ppmv @ 3% O_2 for Compliance with District Rules 4306 and 4320

Facility Name:	TRC Cypress Group LLC	Date:	June 7, 2023
Mailing Address:	PO Box 227 Taft, CA 93268	Engineer:	Ramon Norman
		Lead Engineer:	Dustin Brown
Applicant:	Gary Grillette, Operations Engineer		
Telephone:	(661) 763-0081	Email:	gary@trcopco.com
Contact Person:	Nicholas Diercks, EnviroTech Consultants, Inc.		
Telephone:	(661) 345-8166	Email:	ndiercks@envirotechteam.com
Application #s:	S-3088-7-12, -20-10, and -24-8		
Project #:	S-1221387		
Deemed Complete:	December 15, 2022		

I. Proposal

The primary business of TRC Cypress Group LLC is oil production. TRC Cypress Group LLC has requested Authority to Construct (ATC) permits to modify three existing 62.5 MMBtu/hr natural gas/produced gas-fired oilfield steam generators, currently operating under Permits to Operate (PTOs) S-3088-7-11, -20-9, and -24-7, by installing new programmable logic controllers (PLCs), modifying their fuel trains, upgrading the existing flue gas recirculation (FGR) systems for two of the steam generators (Permit Units S-3088-7 and -20), and installing an FGR system on the other steam generator (Permit Unit S-3088-24) to reduce the NO_X emissions from the units to 5 ppmv @ 3% O_2 to comply with the Tier 2 NO_X emission limits of District Rule 4306 - Boilers, Steam Generators, and Process Heaters – Phase 3 and District Rule 4320 - Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr. When TRC Cypress Group LLC originally submitted this ATC application they proposed to modify the steam generators to comply with the District Rule 4306 Tier 2 NO_X emission limit of 9 ppmv @ 3% O_2 and to pay annual emissions fees for compliance with District Rule 4320. TRC Cypress Group LLC subsequently amended this ATC application to comply with the lower Tier 2 NO_X emission limit of District Rule 4320, and District reevaluated the application based on the amended proposal.

As part of the project, TRC Cypress Group LLC has also proposed to limit the total SO_X emissions from the stationary source, which includes Facility S-3088 (TRC Cypress Group LLC) and Facility S-2622 (TRC Operation Company, Inc.), to no more than 139,999 lb/year so that the total potential emissions from the stationary source will be below the major source threshold for SO_X. Limiting the potential SO_X emissions from the stationary source to no more than 139,999 lb/year will not require any physical changes or changes in the method of operation of the

equipment at the stationary source because, as shown below, the potential SO_X emissions from the stationary source cannot exceed this limit without the SO_X emissions from Facility S-2622 and all of the permitted units at Facility S-2622 have been dormant since 2016 and District records indicate actual SO_X emissions from the stationary source have not exceeded 139,999 lb/year for at least 20 years. Additionally, the VOC emission limit for each the steam generators will be lowered from 0.0055 lb-VOC/MMBtu to 0.0027 lb-VOC/MMBtu to satisfy the Best Available Control Technology (BACT) requirements for VOC for the project.

Current PTOs S-3088-7-11, -20-9, and -24-7 for the steam generators are included in Appendix A. Draft ATCs S-3088-7-12, -20-10, and -24-8 for the proposed modifications are included in Appendix B.

TRC Cypress Group LLC received their Title V Permit on September 4, 2012. This modification can be classified as a Title V significant modification pursuant to Rule 2520, and can be processed with a Certificate of Conformity (COC). Since the facility has specifically requested that this project be processed in that manner, the 45-day EPA comment period will be satisfied prior to the issuance of the Authority to Construct. TRC Cypress Group LLC Company must apply to administratively amend their Title V permit.

II. Applicable Rules

Rule 1070	Inspections (12/17/92)
Rule 2201	New and Modified Stationary Source Review Rule (8/15/19)
Rule 2410	Prevention of Significant Deterioration (6/16/11)
Rule 2520	Federally Mandated Operating Permits (8/15/19)
Rule 4001	New Source Performance Standards (4/14/99)
Rule 4002	National Emissions Standards for Hazardous Air Pollutants (5/20/04)
Rule 4101	Visible Emissions (2/17/05)
Rule 4102	Nuisance (12/17/92)
Rule 4201	Particulate Matter Concentration (12/17/92)
Rule 4301	Fuel Burning Equipment (12/17/92)
Rule 4305	Boilers, Steam Generators, and Process Heaters – Phase 2 (8/21/03)
Rule 4306	Boilers, Steam Generators, and Process Heaters – Phase 3 (12/17/20)
Rule 4320	Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr (12/17/20)
Rule 4351	Boilers, Steam Generators and Process Heaters – Phase 1 (8/21/03)
Rule 4405	Oxides of Nitrogen Emissions from Existing Steam Generators Used in Thermally Enhanced Oil Recovery – Central and Western Kern County Fields (12/17/92)
Rule 4406	Sulfur Compounds from Oil-Field Steam Generators – Kern County (12/17/92)
Rule 4801	Sulfur Compounds (12/17/92)
40 CFR Part 60	Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units
40 CFR Part 63	Subpart JJJJJJ - National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources
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 equipment is located in the southwest (SW) quarter of Section 22, Township 32S, Range 23E, Mount Diablo Meridian in the Midway Sunset Oil Field in the Heavy Oil Western Stationary Source in Kern County, CA. The equipment is not located within 1,000 feet of the outer boundary of a K-12 school. Therefore, the public notification requirement of California Health and Safety Code 42301.6 is not applicable to this project.

IV. Process Description

The primary business of TRC Cypress Group LLC is oil production. The existing 62.5 MMBtu/hr natural gas/produced gas-fired oilfield steam generators (Permit Units S-3088-7, -20, and -24) produce steam that is injected into crude oil reservoirs via injection wells to reduce the viscosity of oil so it can be pumped to the surface and recovered. The process of using the injection of steam into oil reservoirs to recover more oil is called thermally enhanced oil recovery (TEOR). The steam generators are fueled with natural gas and produced gas from the TEOR operation and from oil tanks that is collected through the well vent and tank vapor collection and control systems and treated to remove sulfur.

The 62.5 MMBtu/hr natural gas/produced gas-fired oilfield steam generators are permitted to operate up to 24 hours per day and 365 days per year. When one of the existing steam generators are not operating, vapors from the TEOR operation and oil tanks may be combusted in the existing standby flare that is authorized under PTO S-3088-8-17.

V. Equipment Listing

ATC S-3088-7-12

Pre-Project Equipment Description:

S-3088-7-11: 62.5 MMBTU/HR NATURAL GAS/WASTE GAS FIRED STEAM GENERATOR WITH NORTH AMERICAN MAGNA-FLAME G-LE ULTRA LOW NOX BURNER AND FLUE GAS RECIRCULATION (CYPRESS LEASE)

Proposed Modification:

Install new programmable logic controller (PLC), modify fuel train, and upgrade existing FGR system to reduce NO_X emissions to 5 ppmv @ 3% O_2 to comply with the Tier 2 NO_X emission limits of District Rules 4306 and 4320; reduce VOC emission limit to 0.0027 lb/MMBtu; and limit total stationary source SO_X emissions to 139,999 lb/year

S-3088-7-12: MODIFICATION OF 62.5 MMBTU/HR NATURAL GAS/PRODUCED GAS FIRED STEAM GENERATOR WITH A NORTH AMERICAN MODEL MAGNA-FLAME G-LE ULTRA-LOW NOX BURNER AND FLUE GAS RECIRCULATION (FGR) (CYPRESS LEASE): INSTALL NEW PROGRAMMABLE LOGIC CONTROLLER (PLC), MODIFY FUEL TRAIN, AND UPGRADE EXISTING FGR SYSTEM TO REDUCE NOX EMISSIONS TO 5 PPMV @ 3% O2 TO COMPLY WITH DISTRICT RULES 4306 AND 4320; AND LIMIT TOTAL STATIONARY SOURCE SOX EMISSIONS TO 139,999 LB/YEAR

Post-Project Equipment Description:

S-3088-7-12: 62.5 MMBTU/HR NATURAL GAS/PRODUCED GAS FIRED STEAM GENERATOR WITH A NORTH AMERICAN MODEL MAGNA-FLAME G-LE ULTRA-LOW NOX BURNER AND FLUE GAS RECIRCULATION (FGR) (CYPRESS LEASE)

ATC S-3088-20-10

Pre-Project Equipment Description:

S-3088-20-9: 62.5 MMBTU/HR C.E. NATCO NATURAL GAS/WASTE GAS-FIRED STEAM GENERATOR WITH A NORTH AMERICAN MODEL MAGNA-FLAME G-LE, ULTRA LOW NOX BURNER AND FLUE GAS RECIRCULATION - CYPRESS LEASE

Proposed Modification:

Install new programmable logic controller, modify fuel train, and upgrade existing FGR system to reduce NO_X emissions to 5 ppmv @ 3% O_2 to comply with the Tier 2 NO_X emission limits of District Rules 4306 and 4320; reduce VOC emission limit to 0.0027 lb/MMBtu; and limit total stationary source SO_X emissions to 139,999 lb/year

S-3088-20-10: MODIFICATION OF 62.5 MMBTU/HR C.E. NATCO NATURAL GAS/PRODUCED GAS-FIRED STEAM GENERATOR WITH A NORTH AMERICAN MODEL MAGNA-FLAME G-LE ULTRA-LOW NOX BURNER AND FLUE GAS RECIRCULATION (FGR) (CYPRESS LEASE): INSTALL NEW PROGRAMMABLE LOGIC CONTROLLER (PLC), MODIFY FUEL TRAIN, AND UPGRADE EXISTING FGR SYSTEM TO REDUCE NOX EMISSIONS TO 5 PPMV @ 3% O2 TO COMPLY WITH DISTRICT RULES 4306 AND 4320; AND LIMIT TOTAL STATIONARY SOURCE SOX EMISSIONS TO 139,999 LB/YEAR

Post-Project Equipment Description:

S-3088-20-10: 62.5 MMBTU/HR C.E. NATCO NATURAL GAS/PRODUCED GAS-FIRED STEAM GENERATOR WITH A NORTH AMERICAN MODEL MAGNA-FLAME G-LE ULTRA-LOW NOX BURNER AND FLUE GAS RECIRCULATION (FGR) (CYPRESS LEASE)

ATC S-3088-24-8

Pre-Project Equipment Description:

S-3088-24-7: 62.5 MMBTU/HR C.E. NATCO NATURAL GAS/WASTE GAS FIRED STEAM GENERATOR (#92 DIS# 27572-80) WITH NORTH AMERICAN MAGNA FLAME GLE ULTRA LOW NOX BURNER

Proposed Modification:

Install new programmable logic controller, modify fuel train, and install an FGR system to reduce NO_X emissions to 5 ppmv @ 3% O_2 to comply with the Tier 2 NO_X emission limits of District Rules 4306 and 4320; reduce VOC emission limit to 0.0027 lb/MMBtu; and limit total stationary source SO_X emissions to 139,999 lb/year

S-3088-24-8: MODIFICATION OF 62.5 MMBTU/HR C.E. NATCO NATURAL GAS/PRODUCED GAS FIRED STEAM GENERATOR (#92 DIS# 27572-80) WITH A NORTH AMERICAN MAGNA FLAME GLE ULTRA-LOW NOX BURNER: INSTALL NEW PROGRAMMABLE LOGIC CONTROLLER (PLC), MODIFY FUEL TRAIN, AND INSTALL FLUE GAS RECIRCULATION (FGR) SYSTEM TO REDUCE NOX EMISSIONS TO 5 PPMV @ 3% O2 TO COMPLY WITH DISTRICT RULES 4306 AND 4320; AND LIMIT TOTAL STATIONARY SOURCE SOX EMISSIONS TO 139,999 LB/YEAR

Post-Project Equipment Description:

S-3088-24-8: 62.5 MMBTU/HR C.E. NATCO NATURAL GAS/PRODUCED GAS FIRED STEAM GENERATOR (#92 DIS# 27572-80) WITH A NORTH AMERICAN MAGNA FLAME GLE ULTRA-LOW NOX BURNER AND FLUE GAS RECIRCULATION (FGR) (CYPRESS LEASE)

VI. Emission Control Technology Evaluation

Emissions from the natural gas/produced gas-fired steam generators include NO_X, SO_X, PM_{10}, CO, and VOC.

NO_X and SO_X are the main pollutants of concern when burning natural gas and oilfield produced gas. NO_X formation is either due to thermal fixation of atmospheric nitrogen in the combustion air (thermal NO_X) or due to conversion of chemically bound nitrogen in the fuel (fuel NO_X). Due to the low fuel nitrogen content of natural gas and oilfield produced gas, nearly all NO_X emissions from the combustion of natural gas and oilfield produced gas are thermal NO_X. Formation of thermal NO_X is affected by four furnace zone factors: (1) nitrogen concentration, (2) oxygen concentration, (3) peak temperature, and (4) time of exposure at peak temperature.

The oilfield steam generators are equipped with ultra-low NO_X burners that reduce NO_X and CO emissions. In addition to ultra-low NO_X burners, Permit Units S-3088-7 and -20 are currently equipped with flue gas recirculation (FGR). As explained above, the applicant has proposed to

install new programmable logic controllers (PLCs), modify the steam generators' fuel trains, upgrade the existing FGR systems for Permit Units S-3088-7 and -20, and install an FGR system on Permit Unit S-3088-24 to reduce the NO_X emissions from the units to 5 ppmv @ 3% O_2 to comply with the Tier 2 NO_X emission limits of District Rules 4306 and 4320.

Ultra-low NO_X burners reduce NO_X formation by producing lower flame temperatures and longer flames than conventional burners. Conventional burners thoroughly mix all the fuel and air in a single stage just prior to combustion, whereas ultra-low NO_X burners delay the mixing of fuel and air by introducing the fuel (or sometimes the air) in multiple stages. Generally, in the first combustion stage, the air-fuel mixture is fuel rich. In a fuel rich environment, all the oxygen will be consumed in reactions with the fuel, leaving no excess oxygen available to react with nitrogen to produce thermal NO_X. In the secondary and tertiary stages, the combustion zone is maintained in a fuel-lean environment. The excess air in these stages helps to reduce the flame temperature so that the reaction between the excess oxygen with nitrogen is minimized.

After completion of the project all of the steam generators will be equipped with FGR systems, which will be used as needed to reduce NO_X emissions. FGR reduces NO_X emissions by recirculating a portion of the exhaust gas back into the windbox. This reduces the oxygen concentration in the air-fuel mixture and regulates the combustion process, lowering the combustion temperature. The lowered availability of oxygen in conjunction with lowered combustion temperature reduces the formation of NO_X.

SO_X emissions from the steam generators are controlled through the use of California Public Utility Commission (PUC) regulated natural gas as the primary fuel and oilfield produced gas that has been scrubbed to remove sulfur compounds as a secondary fuel. Dry media hydrogen sulfide (H_2S) scrubbers are used to remove sulfur from the produced gas used to fuel the steam generators. The current permits for the steam generators require that the sulfur content of the gas used to fuel the steam generators be no more than one grain per 100 standard cubic feet (scf), unless a scrubber is used to reduce SO_X emissions by 95% or the concentration of SO_X in the exhaust of the steam generators is no more than 9 ppmv @ 3% O_2. Meeting the permitted requirements to reduce SO_X ensures compliance with the SO_X and PM control requirements of District Rule 4320.

As discussed above, TRC Cypress Group LLC has proposed to limit the total SO_X emissions from the stationary source (Facilities S-2622 and S-3088) to no more than 139,999 lb/year so that emissions from the stationary source will be below the major source threshold for SO_X. All of the permitted equipment at Facility S-2622 is currently dormant and the total actual SO_X emissions from the stationary source have not exceeded 139,999 lb/year for at least 20 years.

VII. General Calculations

A. Assumptions

- Facility S-3088 (TRC Cypress Group LLC) and Facility S-2622 (TRC Operation Company, Inc.) are considered the same stationary source for purposes of District Rule 2201 pursuant to District Rule 2201, Section 3.39 because the facilities are under the same or common ownership, belong to the same industrial grouping with the same two-digit

standard industrial classification (SIC) code (13 - Oil and Gas Extraction), and are both located on properties wholly within the Western Kern County Oil Fields and are both involved in the production of heavy oil (District Rule 2201 and District records)

- Although Facility S-3088 and Facility S-2622 are located over 20 miles apart in different oil fields and could potentially be considered different stationary sources for SB 288 Major Modification and Federal Major Modification purposes, they will be treated as the same stationary source for purposes of this evaluation based on the definition of stationary source given in District Rule 2201

- The three existing 62.5 MMBtu/hr oilfield steam generators are fired only with natural gas and oilfield produced gas (current PTOs and information from the applicant)

- Maximum operating schedule of each of the existing 62.5 MMBtu/hr oilfield steam generators: 24 hour/day and 365 day/year (No limit in current PTOs)

- The typical higher heating value (HHV) of natural gas is 1,000 Btu/scf (District Practice)

- F Factor (ratio of combustion exhaust volume to higher heating value of fuel) for natural gas, corrected to 60 °F (15.6 °C) (District standard temperature): 8,578 dscf/MMBtu (corrected from natural gas F Factor of 8,710 dscf/MMBtu at 20 °C (68 °F) given in 40 CFR 60, Appendix A)

- For Baseline Emission calculations, the HHV of the oilfield produced gas used as fuel in the steam generators is assumed to be approximately 475 Btu/scf, which the applicant proposed and stated was based on the average of the 2021 field tests for the oilfield produced gas. This value is similar to the HHV of 518 Btu/scf from the fuel analysis from the April 16, 2013 source test for Permit Unit S-3088-24 (See Appendix C)

- Based on the fuel analysis from the April 16, 2013 source test for Permit Unit S-3088-24, the oilfield produced gas used as fuel in the steam generators is assumed to be approximately 9,419 dscf/MMBtu at 60°F

- The applicant indicates that the primary fuel of the oilfield steam generators is PUC regulated natural gas and that oilfield produced gas is never used as the primary fuel in the steam generators; when produced gas is used to fuel the steam generators it is always mixed with PUC regulated natural gas so that the fuel used has a minimum methane content of approximately 80% by volume and minimum HHV of approximately 800 Btu/scf (information from applicant)

- Based on the information from the applicant that the mixture of natural gas and produced gas used to fuel the steam generators has minimum HHV of approximately 800 Btu/scf, it is assumed that the mixture contains a maximum of 40% produced gas by volume with an F Factor of approximately 8,914 dscf/MMBtu at 60°F (0.6 x 1,000 Btu/scf + 0.4 x 475 Btu/scf = 790 Btu/scf; 0.6 x 8,578 dscf/MMBtu + 0.4 x 9,419 dscf/MMBtu = 8,914 dscf/MMBtu)

- The total combined SO_X emissions from the steam generators permitted as Units S-3088-7, -20, and -24 are limited to no more than exceed 328.5 lb/day (current PTOs)

- PTO S-3088-24-7 includes conditions that allow for higher NO_X and CO emissions during start-up and shutdown and limits total NO_X and CO emission rates to no more than the following: 54.0 lb-NO_X/day, 9,855 lb-NO_X/year, and 52.5 lb-CO/day; these emission rates will be used to calculate pre-project NO_X and CO emissions from Unit S-3088-24

- The post-project potential to emit for CO from Permit Unit S-3088-24 will continue to be limited to 52.5 lb-CO/day so that this project will not result in any increases in potential emissions (proposed by the applicant)

- Although PTO S-3088-24-7 currently includes conditions that allow for higher NO_X and CO emissions during start-up and shutdown, manufacturers of ultra-low NO_X burners have indicated that ultra-low NO_X burners achieve their guaranteed emission rates within one to two minutes of initial start-up and do not require a special shutdown procedure. In addition, Permit Units S-3088-7 and -20 are equipped with FGR but do not include start-up and shutdown provisions and the applicant has not requested that the units be allowed higher emission rates during start-up and shutdown; therefore, for calculations of post-project emissions, the emission factors for the steam generators during start-up and shutdown will be assumed to be the same as steady operation

- As explained in District projects S-980241, S-1054794, S-1084361, and S-1094664, the permit for Unit S-3088-8 for the TEOR operation includes a condition that only allows the standby flare that is permitted with the TEOR operation to incinerate vapors from the operation when the steam generators that are permitted as Units S-3088-7, -20, and -24 are not operational. The applicant has also confirmed that the standby flare for Unit S-3088-8 only operates when the steam generators are not operating. Therefore, for calculations of the stationary source potential to emit (SSPE), only the total combined emissions of the steam generator or standby flare will be included, whichever is greater

- Total post-project potential SO_X emissions from the stationary source will be limited to 139,999 lb/year (proposed by applicant); Limiting the stationary source SO_X emissions to 139,999 lb/year will not require any physical changes or changes in operation of equipment at the stationary source since the potential SO_X emissions from the stationary source cannot exceed this limit without the SO_X emissions from Facility S-2622 and all permit units at Facility S-2622 have been dormant since 2016 and actual stationary source SO_X emissions have not exceeded 139,999 lb/year for at least 20 years

<u>General Assumptions</u>

- lb-Molar Specific Volume = 379.5 scf/lb-mol (at 60°F)

- Molecular weights:
  NO_X (as NO_2) = 46 lb/lb-mol CO = 28 lb/lb-mol
  VOC (as CH_4) = 16 lb/lb-mol SO_X (as SO_2) = 64 lb/lb-mol

- $PM_{2.5}$ emissions from fuel combustion are assumed to be equal to PM_{10} emissions (District practice)

B. Emission Factors

Pre-Project Emission Factors

For the existing natural gas-fired/oilfield produced gas-fired steam generators, the pre-project emission factors for NO_X, CO, and VOC are based on the current permits. The maximum potential to emit (PE) for SO_X from each unit is based on the current total combined emission limit of 328.5 lb-SO_X/day, equivalent to an emission factor of 0.219 lb-SO_X/MMBtu assuming maximum firing rate. The pre-project PM_{10} emission factor for Permit Unit S-3088-20 is taken from the current permit and was based on AP-42, Table 1.4-2 (July 1998). The PM_{10} emission factors for Permit Units S-3088-7 and -24 are discussed below.

Current PTO S-3088-7-11 includes a PM_{10} emission factor of 0.037 lb-PM_{10}/MMBtu. Permit Unit S-3088-7 was previously permitted as Permit Unit S-1128-37 and before that under Kern County Air Pollution Control District (KCAPCD) Permit 4008-093. The current limit of 0.037 lb-PM_{10}/MMBtu was first included on PTO S-1128-37-12 in 1997. This PM_{10} emission limit was established when the previous specific limiting condition (SLC) for emissions from several units at the source, including this unit, was converted to emission limits for each unit, and appears to have been based on the multiplying the maximum PM_{10} emission factor and the SLC use factor that were included in the previous PTO S-1128-37-11. PTO S-1128-37-11 included emission factors of 0.058 lb-PM_{10}/MMBtu when fired on oil and 0.005 lb-PM_{10}/MMBtu when fired on natural gas, and an overall throttle and use factor of 64% for use in the SLC. Multiplying the PM_{10} emission factor for firing on oil of 0.058 lb-PM_{10}/MMBtu by the SLC use factor of 64% results in the emission factor of 0.037 lb-PM_{10}/MMBtu. As discussed below, the PM_{10} emission factor of 0.058 lb-PM_{10}/MMBtu for firing on oil appears to have been based on an emission factor of 0.096 lb-PM_{10}/MMBtu for combustion of residual oil based on a previous version of AP-42, Section 1.3 – Fuel Oil Combustion (possibly August 1982) with 40% PM control applied to this emission factor for use of a scrubber. PM_{10} emission factors for steam generators fired on oil were often confirmed by source testing. However, the authorization for this unit to use oil as fuel was removed from the permit in 1997 and since that time, the unit has only been authorized to use natural gas and produced gas from a vapor recovery system as fuel.

Current PTO S-3088-24-7 includes a PM_{10} emission factor of 0.058 lb-PM_{10}/MMBtu. Permit Unit S-3088-24 was previously permitted as Permit Unit S-1547-81 and before that under KCAPCD Permit 4012-105. An emission limit of 0.0576 lb-PM_{10}/MMBtu was previously included on the PTO for Unit S-1547-81 and an equivalent limit of 3.60 lb-PM_{10}/hr (0.0576 lb-PM_{10}/MMBtu x 62.5 MMBtu/hr = 3.6 lb-PM_{10}/hr) was included in previous District and KCAPCD Permit 4012-105. The start-up plan that Shell California Production Inc. submitted to the Kern County APCD for several oil-fired steam generators, including this unit, which was dated March 9, 1984, explains that the PM_{10} emission factor of 0.0576 lb-PM_{10}/MMBtu was calculated from an uncontrolled emission factor of 0.096 lb-PM_{10}/MMBtu based on a previous version of AP-42, Section 1.3 – Fuel Oil Combustion (August 1982) for combustion of residual oil with a maximum sulfur content of 1.12% by weight and a heating value of

approximately 6.2 MMBtu/BBL (147,619 Btu/gal) with 40% PM control applied to this emission factor for use of a scrubber. As mentioned above, PM_{10} emission factors for steam generators fired on oil were often confirmed by source testing. Approval for this unit to use oil as fuel was removed from the permit in 1997 and since that time, the unit has only been authorized to use natural gas and produced gas from a vapor recovery system as fuel.

As discussed above the PM_{10} emission factors in current PTOs S-3088-7-11 and -24-7 were based on the use of oil as fuel, which the steam generators have not been permitted to use as fuel in over 20 years. The PM_{10} emissions from the use of gaseous fuels, such as natural gas and oilfield produced gas, are expected to be much lower; therefore, pursuant to District Policy APR 1110 - *Use of Revised Generally Accepted Emission Factors*, the pre-project and post-project PM_{10} emission factor used for these units will be updated to 0.0076 lb-PM_{10}/MMBtu based on AP-42, Table 1.4-2 (July 1998) because this value is expected to better reflect the current PM_{10} emissions from these units.

The pre-project emission factors for the steam generators are given in the tables below.

Pre-Project Emission Factors for S-3088-7

Pre-Project Emission Factors for S-3088-7-11: 62.5 MMBtu/hr Steam Generator				
Pollutant	**ppmvd (@ 3%O_2)**	**Natural Gas lb/MMBtu**	**Mixed Fuel lb/MMBtu**	**Source**
NO_X	14 ppmvd	0.017	0.018	Concentration Limit from Current Permit See Equations Below
SO_X	--	0.219	0.219	Daily Limit from Current Permit
PM_{10}	--	0.0076	0.0076	AP-42, Table 1.4-2 (July 1998)
CO	104 ppmvd	0.077	0.080	Concentration Limit from Current Permit See Equations Below
VOC	--	0.0055	0.0055	Current Permit/AP-42, Table 1.4-2 (July 1998)

NO_X – 14 ppmvd @ 3% O_2 in Exhaust, Natural Gas Fuel

$$\frac{14\ \text{ppmv}\ \text{NO}_\text{X}\ @\ 3\%\ \text{O}_2}{10^6} \times \frac{46\ \text{lb}\ \text{NO}_\text{X}}{\text{lb}-\text{mole}} \times \frac{\text{lb}-\text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}578\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95-3)\%\ \text{O}_2} = 0.017\ \frac{\text{lb}\ \text{NO}_\text{X}}{\text{MMBtu}}$$

NO_X – 14 ppmvd @ 3% O_2 in Exhaust, Mixed Natural Gas/Produced Gas Fuel

$$\frac{14\ \text{ppmv}\ \text{NO}_\text{X}\ @\ 3\%\ \text{O}_2}{10^6} \times \frac{46\ \text{lb}\ \text{NO}_\text{X}}{\text{lb}-\text{mole}} \times \frac{\text{lb}-\text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}914\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95-3)\%\ \text{O}_2} = 0.018\ \frac{\text{lb}\ \text{NO}_\text{X}}{\text{MMBtu}}$$

CO – 104 ppmvd @ 3% O_2 in Exhaust, Natural Gas Fuel

$$\frac{104\ \text{ppmv}\ \text{CO}\ @\ 3\%\ \text{O}_2}{10^6} \times \frac{28\ \text{lb}\ \text{CO}}{\text{lb}-\text{mole}} \times \frac{\text{lb}-\text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}578\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95-3)\%\ \text{O}_2} = 0.077\ \frac{\text{lb}\ \text{CO}}{\text{MMBtu}}$$

CO – 104 ppmvd @ 3% O_2 in Exhaust, Mixed Natural Gas/Produced Gas Fuel

$$\frac{104\ \text{ppmv CO @ 3\% O}_2}{10^6} \times \frac{28\ \text{lb CO}}{\text{lb} - \text{mole}} \times \frac{\text{lb} - \text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}914\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95 - 3)\%\ \text{O}_2} = 0.080\ \frac{\text{lb CO}}{\text{MMBtu}}$$

Pre-Project Emission Factors for S-3088-20

Pre-Project Emission Factors for S-3088-20-9: 62.5 MMBtu/hr Steam Generator				
Pollutant	**ppmvd (@ 3%O_2)**	**Natural Gas lb/MMBtu**	**Mixed Fuel lb/MMBtu**	**Source**
NO_X	14 ppmvd	0.017	0.018	Concentration Limit from Current Permit See Equations Above
SO_X	--	0.219	0.219	Daily Limit from Current Permit
PM_{10}	--	0.0076	0.0076	Current Permit AP-42, Table 1.4-2 (July 1998)
CO	47.5 ppmvd	0.035	0.036	Concentration Limit from Current Permit See Equations Below
VOC	--	0.0055	0.0055	Current Permit/AP-42, Table 1.4-2 (July 1998)

CO – 47.5 ppmvd @ 3% O_2 in Exhaust, Natural Gas Fuel

$$\frac{47.5\ \text{ppmv CO @ 3\% O}_2}{10^6} \times \frac{28\ \text{lb CO}}{\text{lb} - \text{mole}} \times \frac{\text{lb} - \text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}578\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95 - 3)\%\ \text{O}_2} = 0.035\ \frac{\text{lb CO}}{\text{MMBtu}}$$

CO – 47.5 ppmvd @ 3% O_2 in Exhaust, Mixed Natural Gas/Produced Gas Fuel

$$\frac{47.5\ \text{ppmv CO @ 3\% O}_2}{10^6} \times \frac{28\ \text{lb CO}}{\text{lb} - \text{mole}} \times \frac{\text{lb} - \text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}914\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95 - 3)\%\ \text{O}_2} = 0.036\ \frac{\text{lb CO}}{\text{MMBtu}}$$

Pre-Project Emission Factors for S-3088-24, Excluding Start-up and Shutdown Conditions

Pre-Project Emission Factors for S-3088-24-7: 62.5 MMBtu/hr Steam Generator				
Pollutant	**ppmvd (@ 3%O_2)**	**Natural Gas lb/MMBtu**	**Mixed Fuel lb/MMBtu**	**Source**
NO_X	14 ppmvd	0.017	0.018	Concentration Limit from Current Permit See Equations Above
SO_X	--	0.219	0.219	Daily Limit from Current Permit
PM_{10}	--	0.0076	0.0076	AP-42, Table 1.4-2 (July 1998)
CO	47 ppmvd	0.035	0.036	Concentration Limit from Current Permit See Equations Below
VOC	--	0.0055	0.0055	Current Permit/AP-42, Table 1.4-2 (July 1998)

CO – 47 ppmvd @ 3% O_2 in Exhaust, Natural Gas Fuel

$$\frac{47\ \text{ppmv CO @ 3\% O}_2}{10^6} \times \frac{28\ \text{lb CO}}{\text{lb} - \text{mole}} \times \frac{\text{lb} - \text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}578\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95 - 3)\%\ \text{O}_2} = 0.035\ \frac{\text{lb CO}}{\text{MMBtu}}$$

CO – 47 ppmvd @ 3% O_2 in Exhaust, Mixed Natural Gas/Produced Gas Fuel

$$\frac{47\ \text{ppmv CO @ 3\% O}_2}{10^6} \times \frac{28\ \text{lb CO}}{\text{lb} - \text{mole}} \times \frac{\text{lb} - \text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}914\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95 - 3)\%\ \text{O}_2} = 0.036\ \frac{\text{lb CO}}{\text{MMBtu}}$$

Pre-Project Start-up and Shutdown NO_X and CO Emission Rates for S-3088-24

As discussed above, PTO S-3088-24-7 includes conditions that allow for higher NO_X and CO emissions during start-up and shutdown and limits total NO_X and CO emission rates to the following: 54.0 lb-NO_X/day, 9,855 lb-NO_X/year, and 52.5 lb-CO/day. These emission rates will be used to calculate pre-project NO_X and CO emissions from Unit S-3088-24.

Post-Project Emission Factors

As discussed above, the permitted post-project NO_X emission concentrations for the existing natural gas-fired/oilfield produced gas-fired steam generators will be reduced to 5 ppmv @ 3% O_2 to comply with the Tier 2 NO_X limit of District Rule 4320. In addition, the VOC emission limit for each steam generator will be reduced to 0.0027 lb-VOC/MMBtu to satisfy BACT. Previous source testing of oilfield steam generators has shown that compliance with this VOC limit. There will be no changes to any other emission factors, except for Unit S-3088-24. Because ultra-low NO_X burners do not require provisions for higher emissions during start-up or shutdown and the applicant has not requested to include start-up or shutdown provisions in the permit, they will not be included on the ATC for Unit S-3088-24. As also discussed above, the potential CO emissions from Unit S-3088-24 will continue to be limited to 52.5 lb-CO/day.

The post-project emission factors for the steam generators are given in the tables below.

Post-Project Emission Factors for S-3088-7

Post-Project Emission Factors for S-3088-7-12: 62.5 MMBtu/hr Steam Generator					
Pollutant	Natural Gas		Mixed Gas Fuel		Source
	ppmvd @ 3%O_2	lb/MMBtu	ppmvd @ 3%O_2	lb/MMBtu	
NO_X	5 ppmvd	0.0061	5 ppmvd	0.0063	Rule 4330 Limit/Applicant's Proposal See Equations Below
SO_X	--	0.219	--	0.219	Daily Limit from Current Permit
PM_{10}	--	0.0076	--	0.0076	AP-42, Table 1.4-2 (July 1998)
CO	104 ppmvd	0.077	104 ppmvd	0.080	Concentration Limit from Current Permit See Equations Above
VOC	--	0.0027	--	0.0027	BACT Requirement

NO_X – 5 ppmvd @ 3% O_2 in Exhaust, Natural Gas Fuel

$$\frac{5\ \text{ppmv NO}_\text{X}\ @\ 3\%\ \text{O}_2}{10^6} \times \frac{46\ \text{lb NO}_\text{X}}{\text{lb} - \text{mole}} \times \frac{\text{lb} - \text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}578\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95 - 3)\%\ \text{O}_2} = 0.0061\ \frac{\text{lb NO}_\text{X}}{\text{MMBtu}}$$

NO_X – 5 ppmvd @ 3% O_2 in Exhaust, Mixed Natural Gas/Produced Gas Fuel

$$\frac{5\ \text{ppmv}\ NO_X\ @\ 3\%\ O_2}{10^6} \times \frac{46\ \text{lb}\ NO_X}{\text{lb}-\text{mole}} \times \frac{\text{lb}-\text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}914\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ O_2}{(20.95-3)\%\ O_2} = 0.0063\ \frac{\text{lb}\ NO_X}{\text{MMBtu}}$$

Post-Project Emission Factors for S-3088-20

Post-Project Emission Factors for S-3088-20-10: 62.5 MMBtu/hr Steam Generator					
Pollutant	Natural Gas		Mixed Gas Fuel		Source
	ppmvd @ 3%O_2	lb/MMBtu	ppmvd @ 3%O_2	lb/MMBtu	
NO_X	5 ppmvd	0.0061	5 ppmvd	0.0063	Rule 4330 Limit/Applicant's Proposal See Equations Above
SO_X	--	0.219	--	0.219	Daily Limit from Current Permit
PM_{10}	--	0.0076	--	0.0076	Current Permit AP-42, Table 1.4-2 (July 1998)
CO	47.5 ppmvd	0.035	47.5 ppmvd	0.036	Concentration Limit from Current Permit See Equations Above
VOC	--	0.0027	--	0.0027	BACT Requirement

Post-Project Emission Factors for S-3088-24

As discussed above the CO emissions from this unit will continue to be limited to 52.5 lb-CO/day, equivalent to 0.035 lb-CO/MMBtu (52.5 lb-CO/day ÷ 62.5 MMBtu/hr ÷ 24 hr/day = 0.035 lb-CO/MMBtu)

Post-Project Emission Factors for S-3088-24-8: 62.5 MMBtu/hr Steam Generator					
Pollutant	Natural Gas		Mixed Gas Fuel		Source
	ppmvd @ 3%O_2	lb/MMBtu	ppmvd @ 3%O_2	lb/MMBtu	
NO_X	5 ppmvd	0.0061	5 ppmvd	0.0063	Rule 4330 Limit/Applicant's Proposal See Equations Above
SO_X	--	0.219	--	0.219	Daily Limit from Current Permit
PM_{10}	--	0.0076	--	0.0076	AP-42, Table 1.4-2 (July 1998)
CO	47 ppmvd	0.035	46 ppmvd	0.035	Based on Daily Limit from Current Permit See Equations Below
VOC	--	0.0027	--	0.0027	BACT Requirement

CO – 0.035 lb-CO/MMBtu, Natural Gas Fuel

$$0.035\ \frac{\text{lb CO}}{\text{MMBtu}} \times \frac{(20.95-3)\%\ O_2}{20.95\%\ O_2} \times \frac{1\ \text{MMBtu}}{8{,}578\ \text{ft}^3} \times \frac{379.5\ \text{ft}^3}{\text{lb}-\text{mole}} \times \frac{\text{lb}-\text{mole}}{28\ \text{lb CO}} \times \frac{10^6\ \text{ppmv}}{1} = 47\ \text{ppmv CO @ 3\% } O_2$$

CO – 0.035 lb-CO/MMBtu, Mixed Natural Gas/Produced Gas Fuel

$$0.035\ \frac{\text{lb CO}}{\text{MMBtu}} \times \frac{(20.95-3)\%\ \text{O}_2}{20.95\%\ \text{O}_2} \times \frac{1\ \text{MMBtu}}{8{,}914\ \text{ft}^3} \times \frac{379.5\ \text{ft}^3}{\text{lb}-\text{mole}} \times \frac{\text{lb}-\text{mole}}{28\ \text{lb CO}} \times \frac{10^6\ \text{ppmv}}{1} = 46\ \text{ppmv CO @ 3\% O}_2$$

C. Calculations

1. Pre-Project Potential to Emit (PE1)

The PE1 for NO_X and CO will be calculated using the higher lb/MMBtu emission factors for the mixed natural gas/produced gas fuel. In addition, the PE1 for SO_X from each unit will be the current total combined emission limit of 328.5 lb-SO_X/day.

PE1 for PTO S-3088-7-11

Daily PE1 for PTO S-3088-7-11 (62.5 MMBtu/hr Steam Generator)							
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input of Unit (MMBtu/hr)	x	Daily Hours of Operation (hr/day)	=	PE (lb/day)
NO_X	0.018	x	62.5	x	24	=	**27.0**
SO_X	Max Daily Limit from Current Permit					=	**328.5**
PM_{10}	0.0076	x	62.5	x	24	=	**11.4**
CO	0.080	x	62.5	x	24	=	**120.0**
VOC	0.0055	x	62.5	x	24	=	**8.3**

Annual PE1 for PTO S-3088-7-11 (62.5 MMBtu/hr Steam Generator)									
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input of Unit (MMBtu/hr)	x	Daily Hours of Operation (hr/day)	x	Days/Year Operated (day/yr)	=	PE (lb/year)
NO_X	0.018	x	62.5	x	24	x	365	=	**9,855**
SO_X	328.5				lb-SO_X/day	x	365	=	**119,903**
PM_{10}	0.0076	x	62.5	x	24	x	365	=	**4,161**
CO	0.080	x	62.5	x	24	x	365	=	**43,800**
VOC	0.0055	x	62.5	x	24	x	365	=	**3,011**

PE1 for PTO S-3088-20-9

Daily PE1 for PTO S-3088-20-9 (62.5 MMBtu/hr Steam Generator)							
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input of Unit (MMBtu/hr)	x	Daily Hours of Operation (hr/day)	=	PE (lb/day)
NO_X	0.018	x	62.5	x	24	=	**27.0**
SO_X	Max Daily Limit from Current Permit					=	**328.5**
PM_{10}	0.0076	x	62.5	x	24	=	**11.4**
CO	0.036	x	62.5	x	24	=	**54.0**
VOC	0.0055	x	62.5	x	24	=	**8.3**

Annual PE1 for PTO S-3088-20-9 (62.5 MMBtu/hr Steam Generator)									
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input of Unit (MMBtu/hr)	x	Daily Hours of Operation (hr/day)	x	Days/Year Operated (day/yr)	=	PE (lb/year)
NO_X	0.018	x	62.5	x	24	x	365	=	**9,855**
SO_X	328.5				lb-SO_X/day	x	365	=	**119,903**
PM_{10}	0.0076	x	62.5	x	24	x	365	=	**4,161**
CO	0.036	x	62.5	x	24	x	365	=	**19,710**
VOC	0.0055	x	62.5	x	24	x	365	=	**3,011**

PE1 for PTO S-3088-24-7

The pre-project potential to emit for NO_X and CO from PTO S-3088-24-7 are based on the maximum daily emission limits for NO_X (54.0 lb-NO_X/day) and CO (52.5 lb-CO/day) and the maximum annual emission limit for NO_X (9,855 lb-NO_X/year), which includes higher emission rates allowed during start-up and shutdown. The pre-project potential to emit for NO_X and CO from PTO S-3088-24-7 are shown in the tables below.

Daily PE1 for PTO S-3088-24-7 (62.5 MMBtu/hr Steam Generator)							
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input of Unit (MMBtu/hr)	x	Daily Hours of Operation (hr/day)	=	PE (lb/day)
NO_X	Max Daily Limit from Current Permit					=	**54.0**
SO_X	Max Daily Limit from Current Permit					=	**328.5**
PM_{10}	0.0076	x	62.5	x	24	=	**11.4**
CO	Max Daily Limit from Current Permit					=	**52.5**
VOC	0.0055	x	62.5	x	24	=	**8.3**

Annual PE1 for PTO S-3088-24-7 (62.5 MMBtu/hr Steam Generator)									
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input of Unit (MMBtu/hr)	x	Daily Hours of Operation (hr/day)	x	Days/Year Operated (day/yr)	=	PE (lb/year)
NO_X	Max Annual Limit from Current Permit							=	**9,855**
SO_X	328.5				lb-SO_X/day	x	365	=	**119,903**
PM_{10}	0.0076	x	62.5	x	24	x	365	=	**4,161**
CO	52.5				lb-CO/day	x	365	=	**19,163**
VOC	0.0055	x	62.5	x	24	x	365	=	**3,011**

2. Post-Project Potential to Emit (PE2)

As mentioned above, the PE2 for NO_X and CO will be calculated using the higher lb/MMBtu emission factors for the mixed natural gas/produced gas fuel and the PE2 for SO_X from each unit will be the current total combined emission limit of 328.5 lb-SO_X/day.

PE2 for ATC S-3088-7-12

Daily PE2 for ATC S-3088-7-12 (62.5 MMBtu/hr Steam Generator)							
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input of Unit (MMBtu/hr)	x	Daily Hours of Operation (hr/day)	=	PE (lb/day)
NO_X	0.0063	x	62.5	x	24	=	**9.5**
SO_X	Max Daily Limit from Current Permit					=	**328.5**
PM_{10}	0.0076	x	62.5	x	24	=	**11.4**
CO	0.080	x	62.5	x	24	=	**120.0**
VOC	0.0027	x	62.5	x	24	=	**4.1**

Annual PE2 for ATC S-3088-7-12 (62.5 MMBtu/hr Steam Generator)									
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input of Unit (MMBtu/hr)	x	Daily Hours of Operation (hr/day)	x	Days/Year Operated (day/yr)	=	PE (lb/year)
NO_X	0.0063	x	62.5	x	24	x	365	=	**3,449**
SO_X	328.5				lb-SO_X/day	x	365	=	**119,903**
PM_{10}	0.0076	x	62.5	x	24	x	365	=	**4,161**
CO	0.080	x	62.5	x	24	x	365	=	**43,800**
VOC	0.0027	x	62.5	x	24	x	365	=	**1,478**

PE2 for ATC S-3088-20-10

Daily PE2 for ATC S-3088-20-10 (62.5 MMBtu/hr Steam Generator)							
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input of Unit (MMBtu/hr)	x	Daily Hours of Operation (hr/day)	=	PE (lb/day)
NO_X	0.0063	x	62.5	x	24	=	**9.5**
SO_X	Max Daily Limit from Current Permit					=	**328.5**
PM_{10}	0.0076	x	62.5	x	24	=	**11.4**
CO	0.036	x	62.5	x	24	=	**54.0**
VOC	0.0027	x	62.5	x	24	=	**4.1**

Annual PE2 for ATC S-3088-20-10 (62.5 MMBtu/hr Steam Generator)									
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input of Unit (MMBtu/hr)	x	Daily Hours of Operation (hr/day)	x	Days/Year Operated (day/yr)	=	PE (lb/year)
NO_X	0.0063	x	62.5	x	24	x	365	=	**3,449**
SO_X	328.5				lb-SO_X/day	x	365	=	**119,903**
PM_{10}	0.0076	x	62.5	x	24	x	365	=	**4,161**
CO	0.036	x	62.5	x	24	x	365	=	**19,710**
VOC	0.0027	x	62.5	x	24	x	365	=	**1,478**

PE2 for ATC S-3088-24-8

As discussed above, conditions allowing higher emissions during start-up and shutdown will not be included on the ATC for this unit because ultra-low NO_X burners do not require special shutdown procedures and the applicant has not requested higher emission rates for the units during start-up or shutdown. Therefore, the post-project emission factors during start-up and shutdown are the same as during normal operation.

Daily PE2 for ATC S-3088-24-8 (62.5 MMBtu/hr Steam Generator)							
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input of Unit (MMBtu/hr)	x	Daily Hours of Operation (hr/day)	=	PE (lb/day)
NO_X	0.0063	x	62.5	x	24	=	**9.5**
SO_X	Max Daily Limit from Current Permit					=	**328.5**
PM_{10}	0.0076	x	62.5	x	24	=	**11.4**
CO	0.035	x	62.5	x	24	=	**52.5**
VOC	0.0027	x	62.5	x	24	=	**4.1**

Annual PE2 for ATC S-3088-24-8 (62.5 MMBtu/hr Steam Generator)									
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input of Unit (MMBtu/hr)	x	Daily Hours of Operation (hr/day)	x	Days/Year Operated (day/yr)	=	PE (lb/year)
NO_X	0.0063	x	62.5	x	24	x	365	=	**3,449**
SO_X	328.5				lb-SO_X/day	x	365	=	**119,903**
PM_{10}	0.0076	x	62.5	x	24	x	365	=	**4,161**
CO	0.035	x	62.5	x	24	x	365	=	**19,163**
VOC	0.0027	x	62.5	x	24	x	365	=	**1,478**

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.

As discussed above, Facility S-3088 (TRC Cypress Group LLC) and Facility S-2622 (TRC Operation Company, Inc.) are considered the same stationary source for purposes of District Rule 2201 because the facilities are under the same or common ownership, belong to the same industrial grouping with the same two-digit SIC code, and are both located on one or more properties wholly within the Western Kern County Oil Fields and are both involved in the production of heavy oil.

The PE calculations for existing units at the facility are included Appendix D.

SSPE1 (lb/year)					
Facility S-2622: TRC Operation Company, Inc.					
Permit Unit	**NO_X**	**SO_X**	**PM_{10}**	**CO**	**VOC**
S-2622-1-11 (25.2 MMBtu/hr Gas-Fired Steam Generator)	4,194	662	1,766	33,996	1,325
S-2622-5-5 (TEOR Operation with 12 Uncontrolled Cyclic Wells)	0	0	0	0	15,768
S-2622-11-12 (14.5 MMBtu/hr Gas-Fired Steam Generator)	2,413	381	1,016	4,700	762
S-2622-17-6 (62.5 MMBtu/hr Natural Gas-Fired Steam Generator)	10,403	1,560	4,161	19,710	1,643
S-2622-18-3 (Dormant 62.5 MMBtu/hr Natural Gas/Vapor Recovery Gas-Fired Steam Generator)	10,403	8,213	8,213	19,710	1,643
S-2622-19-3 (Dormant 62.5 MMBtu/hr Natural Gas/Vapor Recovery Gas-Fired Steam Generator)	10,403	8,213	8,213	20,805	1,643
S-2622-20-3 (Dormant 62.5 MMBtu/hr Natural Gas/Vapor Recovery Gas-Fired Steam Generator)	10,403	8,213	8,213	20,805	1,643
$SSPE1_{Facility\_S-2622}$	**48,219**	**27,242**	**31,582**	**119,726**	**24,427**
Facility S-3088: TRC Cypress Group LLC					
Permit Unit	**NO_X**	**SO_X**	**PM_{10}**	**CO**	**VOC**
S-3088-7-11 (62.5 MMBtu/hr Natural Gas/Produced gas-Fired Steam Generator)[a b]	9,855	119,903	4,161	43,800	3,011
S-3088-8-17 (TEOR Operation with 150 Crude Oil Wells and Standby Flare)[b c]	12,317	75,774	1,449	67,018	11,411
S-3088-9-5 (1,500 bbl Crude Oil Wash Tank Controlled by Vapor Control System)	0	0	0	0	0
S-3088-10-5 (1,000 bbl Crude Oil Shipping/Reject Tank Controlled by Vapor Control System)	0	0	0	0	0
S-3088-11-5 (1,000 bbl Crude Oil Shipping/Reject Tank Controlled by Vapor Control System)	0	0	0	0	0
S-3088-12-5 (1,000 bbl Crude Oil Shipping/Reject Tank Controlled by Vapor Control System)	0	0	0	0	0
S-3088-13-5 (1,000 bbl Crude Oil Shipping/Reject Tank Controlled by Vapor Control System)	0	0	0	0	0
S-3088-14-6 (200 bbl Crude Oil Slop Tank Controlled by Vapor Control System)	0	0	0	0	0
S-3088-15-6 (250 bbl Crude Oil Slop Tank Controlled by Vapor Control System)	0	0	0	0	0

SSPE1 (lb/year)					
S-3088-16-6 (1,000 bbl Crude Oil Slop Tank Controlled by Vapor Control System)	0	0	0	0	0
S-3088-20-9 (62.5 MMBtu/hr Natural Gas/Produced gas-Fired Steam Generator)[a b]	9,855	119,903	4,161	19,710	3,011
S-3088-21-5 (1,500 bbl Crude Oil Wash Tank Controlled by Vapor Control System)	0	0	0	0	0
S-3088-24-7 (62.5 MMBtu/hr Natural Gas/Produced gas-Fired Steam Generator)[a b]	9,855	119,903	4,161	19,163	3,011
S-3088-30-1 (1,400 bbl Free Water Knock Out Vessel Controlled by Vapor Control System)	0	0	0	0	0
$SSPE1_{Facility\_S-3088}$	**29,565**	**119,903**	**12,483**	**82,673**	**11,411**
Total SSPE1	**77,784**	**147,145**	**44,065**	**202,399**	**35,838**

a. Total combined SO_X emissions from steam generators authorized under PTOs S-3088-7-11, -20-9, and -24-7 are limited to no more than 328.5 lb-SO_X/day (119,903 lb-SO_X/year); therefore, only the PE for SO_X for one of these units is included in the SSPE1.
b. Steam Generators S-3088-7-11, -20-9, and -24-7 and the TEOR operation backup flare authorized under PTO S-3088-8-17 are not allowed to operate at the same time; therefore, only the total combined emissions from the steam generators or the emissions from the standby flare, whichever are greater, are included in the SSPE1.
c. The PE for PTO S-3088-8-16 (TEOR operation with backup flare) was calculated assuming a HHV of 518 Btu/scf for the oilfield produced gas based on gas analysis from the April 2013 source test.

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

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

SSPE2 (lb/year)					
Facility S-2622: TRC Operation Company, Inc.					
Permit Unit	**NO_X**	**SO_X**	**PM_{10}**	**CO**	**VOC**
S-2622-1-11 (25.2 MMBtu/hr Gas-Fired Steam Generator)	4,194	662	1,766	33,996	1,325
S-2622-5-5 (TEOR Operation with 12 Uncontrolled Cyclic Wells)	0	0	0	0	15,768
S-2622-11-12 (14.5 MMBtu/hr Gas-Fired Steam Generator)	2,413	381	1,016	4,700	762
S-2622-17-6 (62.5 MMBtu/hr Natural Gas-Fired Steam Generator)	10,403	1,560	4,161	19,710	1,643
S-2622-18-3 (Dormant 62.5 MMBtu/hr Natural Gas/Vapor Recovery Gas-Fired Steam Generator)	10,403	8,213	8,213	19,710	1,643

SSPE2 (lb/year)					
S-2622-19-3 (Dormant 62.5 MMBtu/hr Natural Gas/Vapor Recovery Gas-Fired Steam Generator)	10,403	8,213	8,213	20,805	1,643
S-2622-20-3 (Dormant 62.5 MMBtu/hr Natural Gas/Vapor Recovery Gas-Fired Steam Generator)	10,403	8,213	8,213	20,805	1,643
$SSPE2_{Facility\_S-2622}$	**48,219**	**27,242**	**31,582**	**119,726**	**24,427**
Facility S-3088: TRC Cypress Group LLC					
Permit Unit	**NO_X**	**SO_X**	**PM_{10}**	**CO**	**VOC**
ATC S-3088-7-12 (62.5 MMBtu/hr Natural Gas/Produced gas-Fired Steam Generator)[a b]	3,449	119,903	4,161	43,800	1,478
S-3088-8-17 (TEOR Operation with 150 Crude Oil Wells and Standby Flare)[b]	12,317	75,774	1,449	67,018	11,411
S-3088-9-5 (1,500 bbl Crude Oil Wash Tank Controlled by Vapor Control System)	0	0	0	0	0
S-3088-10-5 (1,000 bbl Crude Oil Shipping/Reject Tank Controlled by Vapor Control System)	0	0	0	0	0
S-3088-11-5 (1,000 bbl Crude Oil Shipping/Reject Tank Controlled by Vapor Control System)	0	0	0	0	0
S-3088-12-5 (1,000 bbl Crude Oil Shipping/Reject Tank Controlled by Vapor Control System)	0	0	0	0	0
S-3088-13-5 (1,000 bbl Crude Oil Shipping/Reject Tank Controlled by Vapor Control System)	0	0	0	0	0
S-3088-14-6 (200 bbl Crude Oil Slop Tank Controlled by Vapor Control System)	0	0	0	0	0
S-3088-15-6 (250 bbl Crude Oil Slop Tank Controlled by Vapor Control System)	0	0	0	0	0
S-3088-16-6 (1,000 bbl Crude Oil Slop Tank Controlled by Vapor Control System)	0	0	0	0	0
ATC S-3088-20-10 (62.5 MMBtu/hr Natural Gas/Produced gas-Fired Steam Generator)[a b]	3,449	119,903	4,161	19,710	1,478
S-3088-21-5 (1,500 bbl Crude Oil Wash Tank Controlled by Vapor Control System)	0	0	0	0	0
ATC S-3088-24-8 (62.5 MMBtu/hr Natural Gas/Produced gas-Fired Steam Generator)[a b]	3,449	119,903	4,161	19,163	1,478
S-3088-30-1 (1,400 bbl Free Water Knock Out Vessel Controlled by Vapor Control System)	0	0	0	0	0

SSPE2 (lb/year)					
$SSPE2_{Facility\_S-3088}$	12,317	119,903	12,483	82,673	11,411
Total SSPE2	60,536	139,999[c]	44,065	202,399	35,838

a. Total combined SO_X emissions from steam generators authorized as Units S-3088-7, -20, and -24 are limited to no more than 328.5 lb-SO_X/day (119,903 lb-SO_X/year); therefore, only the PE for SO_X for one of these units is included in the SSPE2.
b. Steam Generators S-3088-7, -20, and -24 and the TEOR operation backup flare authorized under PTO S-3088-8-17 are not allowed to operate at the same time; therefore, only the total combined emissions from the steam generators or the emissions from the standby flare, whichever are greater, are included in the SSPE2.
c. Total post-project SO_X emissions from the stationary source will be limited to no more than 139,999 lb-SO_X/year.

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), pursuant to the Clean Air Act, Title 3, Section 302, US Codes 7602(j) and (z)
- Fugitive emissions, except for the specific source categories specified in 40 CFR 70.2

Rule 2201 Major Source Determination (lb/year)						
	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO	VOC
SSPE1	77,784	147,145	44,065	44,065	202,399	35,838
SSPE2	60,536	139,999	44,065	44,065	202,399	35,838
Major Source Threshold	20,000	140,000	140,000	140,000	200,000	20,000
Major Source?	Yes	No	No	No	Yes	Yes

Note: $PM_{2.5}$ assumed to be equal to PM_{10}

As seen in the table above, the facility is an existing major source for NO_X, SO_X, CO, and VOC and will remain a major source for NO_X, CO, and VOC after this project, but will no longer be a major source for SO_X.

Rule 2410 Major Source Determination:

Rule 2410 incorporates the provisions of 40 CFR Part 52.21 that were in effect on June 16, 2011. Pursuant to 40 CFR Part 52.21(b), a stationary source is defined as "*all of the pollutant-emitting activities which belong to the same industrial grouping, are located on*

one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control) except the activities of any vessel." In addition, 40 CFR Part 52.21(b) defines stationary source for onshore oil and gas production as follows: "*for onshore activities under Standard Industrial Classification (SIC) Major Group 13: Oil and Gas Extraction, all of the pollutant-emitting activities included in Major Group 13 that are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control). Pollutant emitting activities shall be considered adjacent if they are located on the same surface site; or if they are located on surface sites that are located within ¼ mile of one another (measured from the center of the equipment on the surface site) and they share equipment. Shared equipment includes, but is not limited to, produced fluids storage tanks, phase separators, natural gas dehydrators or emissions control devices.*"

Because Facility S-3088 and Facility S-2622 are not located on one or more contiguous or adjacent properties and are located over 20 miles apart in different oil fields, these two facilities are not considered the same stationary source according to the definition in 40 CFR 52.21(b). Therefore, pursuant to 40 CFR 52.21, District Rule 2410 and District Policy APR 1010 – Application Review Format, they are considered separate stationary source for purposes of Prevention of Significant Deterioration (PSD).

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

PSD Major Source Determination (tons/year)						
	NO_2	**VOC**	**SO_2**	**CO**	**PM**	**PM_{10}**
Estimated Facility PE before Project Increase	14.8	5.7	60.0	41.3	6.2	6.2
PSD Major Source Thresholds	250	250	250	250	250	250
PSD Major Source?	No	No	No	No	No	No

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

6. Baseline Emissions (BE)

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

Pursuant to District Rule 2201, BE = PE1 for:

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

- Any Clean Emissions Unit, located at a Major Source.

otherwise,

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

a. BE NO_X

As shown in Section VII.C.5 above, the facility is a major source for NO_X emissions.

In order to determine the Historical Actual Emissions (HAEs), the applicant has provided the annual fuel usage for these units for 2020 and 2021 (i.e. the two years prior to the submittal of this application). The HHV of the oilfield produced gas is assumed to be 475 MMBtu/MMscf, as proposed by the applicant based on the average of monthly field tests from 2021. The NO_X measurement results from recent source tests for the units will be used to establish the HAEs.

HAE for NO_X for ATC S-3088-7-12

Throughput
2020 (Natural Gas): 382.95 MMscf x 1,000 MMBtu/MMscf = 382,950 MMBtu
2020 (Oilfield Produced gas): 77.83 MMscf x 475 MMBtu/MMscf = 36,969 MMBtu
2020 Total: 382,950 MMBtu + 36,969 MMBtu = 419,919 MMBtu

2021 (Natural Gas): 229.08 MMscf x 1,000 MMBtu/MMscf = 229,080 MMBtu
2021 (Oilfield Produced gas): 37.89 MMscf x 475 MMBtu/MMscf = 17,998 MMBtu
2021 Total: 229,080 MMBtu + 17,998 MMBtu = 247,078 MMBtu

2020-2021 Average = (419,919 MMBtu + 247,078 MMBtu)/2 = 333,499 MMBtu/year

Source Test Results
May 7, 2021 (Natural Gas Fuel): 13.66 ppmv NO_X @ 3% O_2 = 0.0166 lb-NO_X/MMBtu

HAE = 333,499 MMBtu/year x 0.0166 lb-NO_X/MMBtu = 5,536 lb-NO_X/year

HAE for NO_X for ATC S-3088-20-10

Throughput
2020 (Natural Gas): 86.02 MMscf x 1,000 MMBtu/MMscf = 86,020 MMBtu
2020 (Oilfield Produced gas): 17.48 MMscf x 475 MMBtu/MMscf = 8,303 MMBtu
2020 Total: 86,020 MMBtu + 8,303 MMBtu = 94,323 MMBtu

2021 (Natural Gas): 99.94 MMscf x 1,000 MMBtu/MMscf = 99,940 MMBtu
2021 (Oilfield Produced gas): 16.53 MMscf x 475 MMBtu/MMscf = 7,852 MMBtu
2021 Total: 99,940 MMBtu + 7,852 MMBtu = 107,792 MMBtu

2020-2021 Average = (94,323 MMBtu + 107,792 MMBtu)/2 = 101,058 MMBtu/year

Source Test Results
January 22, 2021 (Natural Gas Fuel): 13.83 ppmv NO_X @ 3% O_2 = 0.0168 lb-NO_X/MMBtu

HAE = 101,058 MMBtu/year x 0.0168 lb-NO_X/MMBtu = 1,698 lb-NO_X/year

HAE for NO_X for ATC S-3088-24-8

Throughput
2020 (Natural Gas): 20.81 MMscf x 1,000 MMBtu/MMscf = 20,810 MMBtu
2020 (Oilfield Produced gas): 4.23 MMscf x 475 MMBtu/MMscf = 2,009 MMBtu
2020 Total: 20,810 MMBtu + 2,009 MMBtu = 22,819 MMBtu

2021 (Natural Gas): 134.51 MMscf x 1,000 MMBtu/MMscf = 134,510 MMBtu
2021 (Oilfield Produced gas): 22.25 MMscf x 475 MMBtu/MMscf = 10,569 MMBtu
2021 Total: 134,510 MMBtu + 10,569 MMBtu = 145,079 MMBtu

2020-2021 Average = (22,819 MMBtu + 145,079 MMBtu)/2 = 83,949 MMBtu/year

Source Test Results
May 10, 2019 (Natural Gas Fuel): 12.19 ppmv NO_X @ 3% O_2 = 0.0148 lb-NO_X/MMBtu

HAE = 83,949 MMBtu/year x 0.0148 lb-NO_X/MMBtu = 1,242 lb-NO_X/year

b. BE SO_X

As shown in Section VII.C.5 above, the facility will not be a major source for SO_X emissions after this project. Therefore BE=PE1.

As discussed above, the total combined SO_X emissions Permit Units S-3088-7, -20, and -24 are limited to no more than exceed 328.5 lb/day by the conditions of the current permits; therefore, the total combined BE for SO_X from these units is 119,903 lb-SO_X/year

Total Combined BE for SO_X for ATCs S-3088-7-12, -20-10, & -24-8

119,903 lb-SO_X/year

c. BE PM_{10}

As shown in Section VII.C.5 above, the facility is not a major source for PM_{10} emissions. Therefore BE=PE1.

BE for PM_{10} for ATCs S-3088-7-12, -20-10, & -24-8

4,161 lb-PM_{10}/year

d. BE CO

As shown in Section VII.C.5 above, the facility is a major source for CO emissions.

In order to determine the Historical Actual Emissions (HAEs), the applicant has provided the annual fuel usage for these units for 2020 and 2021 (i.e. the two years prior to the submittal of this application). The HHV of the oilfield produced gas is assumed to be 475 MMBtu/MMscf, as proposed by the applicant based on the average of monthly field tests from 2021. The CO measurement results from recent source tests for the units will be used to establish the HAEs.

HAE for CO for ATC S-3088-7-12

Throughput
2020-2021 Average = 333,499 MMBtu/year (See calculations of BE for NO_X above)

Source Test Results
May 7, 2021 (Natural Gas Fuel): 0.0 ppmv CO @ 3% O_2 = 0.0 lb-CO/MMBtu

HAE = 333,499 MMBtu/year x 0.0 lb-CO/MMBtu = 0 lb-CO/year

HAE for CO for ATC S-3088-20-10

Throughput
2020-2021 Average = 101,058 MMBtu/year (See calculations of BE for NO_X above)

Source Test Results
January 22, 2021 (Natural Gas Fuel): 0.0 ppmv CO @ 3% O_2 = 0.0 lb-CO/MMBtu

HAE = 101,058 MMBtu/year x 0.0 lb-CO/MMBtu = 0 lb-CO/year

HAE for CO for ATC S-3088-24-8

Throughput
2020-2021 Average = 83,949 MMBtu/year (See calculations of BE for NO_X above)

Source Test Results
May 10, 2019 (Natural Gas Fuel): 0.22 ppmv CO @ 3% O_2 = 0.0002 lb-NO_X/MMBtu

HAE = 83,949 MMBtu/year x 0.0002 lb-NO_X/MMBtu = 17 lb-CO/year

e. BE VOC

As shown in Section VII.C.5 above, the facility is a major source for VOC emissions.

Pursuant to Rule 2201, a Clean Emissions Unit is defined as an emissions unit that is "equipped with an emissions control technology with a minimum control efficiency of at

least 95% or is equipped with emission control technology that meets the requirements for achieved-in-practice BACT as accepted by the APCO during the five years immediately prior to the submission of the complete application.

Each of the existing steam generators is only permitted to be fueled with natural gas or oilfield produced gas, which satisfies the requirements for achieved-in-practice BACT for VOC as listed in previous District BACT Guideline 1.2.1 - Oilfield Steam Generator, which was rescinded on April 11, 2023 (see Appendix E). Because the steam generators meet the requirements for achieved-in-practice BACT for VOC as accepted by the APCO during the five years immediately prior to the submission of the complete application for this project, they qualify as Clean Emissions Units and BE=PE1 for VOC.

BE for VOC for ATCs S-3088-7-12, -20-10, & -24-8

3,011 lb-VOC/year

BE for ATCs S-3088-7-12, -20-10, & -24-8:

The BE for ATCs S-3088-7-12, -20-10, and -24-8 is summarized in the following table:

BE (lb/year)						
	NO_X	**SO_X**	**PM_{10}**	**$PM_{2.5}$**	**CO**	**VOC**
ATC S-3088-7-12	5,536	119,903*	4,161	4,161	0	3,011
ATC S-3088-20-10	1,698		4,161	4,161	0	3,011
ATC S-3088-24-8	1,242		4,161	4,161	17	3,011

* Total Combined BE for SO_X for ATCs S-3088-7-12, -20-10, & -24-8

7. SB 288 Major Modification

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

As discussed in Section VII.A above, Facility S-3088 and Facility S-2622 will be considered the same stationary source for SB 288 major modification purposes.

Since this facility is a major source for NO_X and VOC, the project's PE2 for NO_X and VOC are compared to the SB 288 Major Modification Thresholds in the following table in order to determine if further SB 288 Major Modification calculation is required.

As calculated in the Calculation section above:

SB 288 Major Modification Thresholds			
Pollutant	**Project PE2 (lb/year)**	**Threshold (lb/year)**	**SB 288 Major Modification Calculation Required?**
NO_x	10,347	50,000	No
VOC	4,434	50,000	No

Since none of the SB 288 Major Modification Thresholds are surpassed with this project, this project does not constitute an SB 288 Major Modification and no further discussion is required.

8. Federal Major Modification / New Major Source

Federal Major Modification

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

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

As discussed in Section VII.A above, Facility S-3088 and Facility S-2622 will be considered the same stationary source for federal major modification purposes.

A Federal Major Modification for a given pollutant can only occur at a stationary source that is a major source for that specific pollutant. The only pollutants for which this facility is a major source are NO_X and VOC; therefore, this project is not a Federal Major Modification for any other pollutant.

The determination of Federal Major Modification is based on a two-step test. For the first step, only the emission *increases* are counted. In step 1, emission decreases cannot cancel out the increases. Step 2 allows consideration of the project's net emissions increase as described in 40 CFR 51.165 and the Federal Clean Air Act Section 182 (e), as applicable.

Step 1: Project Emissions Increase

The three existing 62.5 MMBtu/hr natural gas/produced gas-fired oilfield steam generators (Permit Units S-3088-7, -20, and -24) will be modified to reduce the NO_X emissions from the units to 5 ppmv @ 3% O_2 to comply with the Tier 2 NO_X emission limits of District Rules 4306 and District Rule 4320.

For modified existing emissions units, according to 40 CFR 51.165(a)(2)(ii)(C), the project's emission increase for each pollutant is equal to the sum of the differences

between the projected actual emissions (PAE) and the baseline actual emissions (BAE). Please note that in step 1, since the District is classified as extreme non-attainment for ozone, no NO_X and VOC emission decreases associated with the proposed project shall be accounted for.

Project Emissions Increase = ∑(PAE – BAE)

As described in 40 CFR 51.165(a)(1)(xxviii)(B), when using historical data and company's expected business activity to determine PAE, the portion of the emissions after the project that the existing unit could have accommodated (Unused Baseline Capacity, UBC) before the project (during the same 24-month baseline period used to determine BAE) and that are unrelated to the particular project (including emissions increases due to product demand growth) are to be excluded.

Otherwise, according to 40 CFR 51.165(a)(1)(xxvii)(B)(4), when determining PAE, in lieu of using the method described in 40 CFR 51.165 (a)(1)(xxviii)(B)(1)-(3), *Projected Actual Emissions*, the owner/operator may elect to use emissions unit's Potential to Emit. If appropriate projected actual emissions are not provided by the applicant, then the emissions unit's Potential to Emit is used to calculate the emissions increase.

Since the project proponent has not provided information required to calculate PAE, the District will use the PE2 to calculate the emissions increases:

Project Emissions Increase = ∑(PE2 – BAE)

Baseline Actual Emissions (BAE)

For emission units (other than electric utility steam generating units), according to according to 40 CFR 51.165(a)(1)(xxxv)(B), the BAE are calculated as the average, in tons/year, at which the emissions unit actually emitted during any 24-month period selected by the operator within the previous 10-year period.

The calendar years of 2020 and 2021 will be used as the baseline period. The Baseline Actual Emissions (BAE) from each of the steam generators is calculated below using the annual fuel usage for these units for 2020 and 2021. The HHV of the oilfield produced gas is assumed to be 475 MMBtu/MMscf, as proposed by the applicant based on the average of monthly field tests from 2021.

NO_X BAE

The NO_X emission factors (lb-NO_X/MMBtu) from recent source test reports for the steam generators will be used to establish the BAE for NO_X.

The BAE for NOx from the steam generators during the 2020-2021 baseline period are calculated in the tables below.

2020-2021 BAE for NO_X for S-3088-7-12								
Dates	Quantity of Fuel Used (MMscf)	x	Fuel HHV (MMBtu/MMscf)	x	Emission Factor (lb/MMBtu)	=	AE (lb)	AE (ton)
2020 Natural Gas Use	382.95	x	1,000	x	0.0166	=	6,357.0	3.18
2020 Produced Gas Use	77.83	x	475	x	0.0166	=	613.7	0.31
2021 Natural Gas Use	229.08		1,000		0.0166		3,802.7	1.90
2021 Produced Gas Use	37.89	x	475	x	0.0166	=	298.8	0.15
Total 2020-2021 Actual NO_X Emissions						=	11,072	5.54
2020-2021 BAE for NO_X for S-3088-7-12						=	**lb/yr**	**ton/yr**
							5,536	**2.77**

2020-2021 BAE for NO_X for S-3088-20-10								
Dates	Quantity of Fuel Used (MMscf)	x	Fuel HHV (MMBtu/MMscf)	x	Emission Factor (lb/MMBtu)	=	AE (lb)	AE (ton)
2020 Natural Gas Use	86.02	x	1,000	x	0.0168	=	1,445.1	0.72
2020 Produced Gas Use	17.48	x	475	x	0.0168	=	139.5	0.07
2021 Natural Gas Use	99.94		1,000		0.0168		1,679.0	0.84
2021 Produced Gas Use	16.53	x	475	x	0.0168	=	131.9	0.07
Total 2020-2021 Actual NO_X Emissions						=	3,396	1.70
2020-2021 BAE for NO_X for S-3088-20-10						=	**lb/yr**	**ton/yr**
							1,698	**0.85**

2020-2021 BAE for NO_X for S-3088-24-8								
Dates	Quantity of Fuel Used (MMscf)	x	Fuel HHV (MMBtu/MMscf)	x	Emission Factor (lb/MMBtu)	=	AE (lb)	AE (ton)
2020 Natural Gas Use	20.81	x	1,000	x	0.0148	=	308.0	0.15
2020 Produced Gas Use	4.23	x	475	x	0.0148	=	29.7	0.01
2021 Natural Gas Use	134.51		1,000		0.0148		1,990.7	1.00
2021 Produced Gas Use	22.25	x	475	x	0.0148	=	156.4	0.08
Total 2020-2021 Actual NO_X Emissions						=	2,485	1.24
2020-2021 BAE for NO_X for S-3088-24-8						=	**lb/yr**	**ton/yr**
							1,242	**0.62**

Project NO_X Emissions Increase

As discussed above, the total NO_X emissions increase is calculated as PE2 – BAE. The total NO_X emissions increase for each steam generator is summarized in the following table:

NO_X Emissions Increase for ATCs S-3088-7-12, -20-10, & -24-8				
ATC	PE2 (lb-NO_X/yr)	BAE (lb-NO_X/yr)	Emissions Increase (lb-NO_X/yr)	Emissions Increase (ton-NO_X/yr)
S-3088-7-12	3,449	5,536	-2,087 → 0	0
S-3088-20-10	3,449	1,698	1,751	0.88
S-3088-24-8	3,449	1,242	2,207	1.10

As shown above, the modification of the steam generators to reduce the NO_X emission limit will result in actual decreases in NO_X emissions for ATC S-3088-7-12. As discussed above, since the District is classified as extreme non-attainment for ozone, no NO_X emission decreases associated with the proposed project shall be accounted when determining if this project is a major modification. Therefore, the NO_X emissions decrease for ATC S-3088-7-12 has been set to zero.

VOC BAE

There are no VOC source test results available for the steam generators; therefore, BAE for VOC will be conservatively calculated using an emission factor of 0.003 lb-VOC/MMBtu since steam generators typically comply with this limit and there are many District permits for steam generators that require compliance with this limit, including other steam generators permitted at the stationary source under Facility S-2622.

The BAE for VOC from the steam generators during the 2020-2021 baseline period are calculated in the tables below.

2020-2021 BAE for VOC for S-3088-7-12								
Dates	Quantity of Fuel Used (MMscf)	x	Fuel HHV (MMBtu/MMscf)	x	Emission Factor (lb/MMBtu)	=	AE (lb)	AE (ton)
2020 Natural Gas Use	382.95	x	1,000	x	0.003	=	1,148.9	0.57
2020 Produced Gas Use	77.83	x	475	x	0.003	=	110.9	0.06
2021 Natural Gas Use	229.08		1,000		0.003		687.2	0.34
2021 Produced Gas Use	37.89	x	475	x	0.003	=	54.0	0.03
Total 2020-2021 Actual VOC Emissions						=	2,001	1.00
2020-2021 BAE for VOC for S-3088-7-12						=	**lb/yr**	**ton/yr**
							1,001	**0.50**

2020-2021 BAE for VOC for S-3088-20-10								
Dates	Quantity of Fuel Used (MMscf)	x	Fuel HHV (MMBtu/MMscf)	x	Emission Factor (lb/MMBtu)	=	AE (lb)	AE (ton)
2020 Natural Gas Use	86.02	x	1,000	x	0.003	=	258.1	0.13
2020 Produced Gas Use	17.48	x	475	x	0.003	=	24.9	0.01
2021 Natural Gas Use	99.94		1,000		0.003		299.8	0.15
2021 Produced Gas Use	16.53	x	475	x	0.003	=	23.6	0.01
Total 2020-2021 Actual VOC Emissions						=	606	0.30
2020-2021 BAE for VOC for S-3088-20-10						=	**lb/yr**	**ton/yr**
							303	**0.15**

2020-2021 BAE for VOC for S-3088-24-8								
Dates	Quantity of Fuel Used (MMscf)	x	Fuel HHV (MMBtu/MMscf)	x	Emission Factor (lb/MMBtu)	=	AE (lb)	AE (ton)
2020 Natural Gas Use	20.81	x	1,000	x	0.003	=	62.4	0.03
2020 Produced Gas Use	4.23	x	475	x	0.003	=	6.0	0.00
2021 Natural Gas Use	134.51		1,000		0.003		403.5	0.20
2021 Produced Gas Use	22.25	x	475	x	0.003	=	31.7	0.02
Total 2020-2021 Actual VOC Emissions						=	504	0.25
2020-2021 BAE for VOC for S-3088-24-8						=	**lb/yr**	**ton/yr**
							252	**0.13**

Project VOC Emissions Increase

As discussed above, the total VOC emissions increase is calculated as PE2 – BAE. The total VOC emissions increase for each steam generator is summarized in the following table:

VOC Emissions Increase for ATCs S-3088-7-12, -20-10, & -24-8				
ATC	PE2 (lb-VOC/yr)	BAE (lb-VOC/yr)	Emissions Increase (lb-VOC/yr)	Emissions Increase (ton-VOC/yr)
S-3088-7-12	1,478	1,001	477	0.24
S-3088-20-10	3,449	303	3,146	1.57
S-3088-24-8	3,449	252	3,197	1.60

Total Project Emissions Increase for ATCs S-3088-7-12, -20-10, & -24-8

The total project emissions increases for NO_X and VOC from ATCs S-3088-7-12, -20-10, and -24-8 are shown in the table below.

Total Project Increases for NO_X and VOC from ATCs S-3088-7-12, -20-10, and -24-8		
ATC	**NO_X Increase (lb/yr)**	**VOC Increase (lb/yr)**
ATC S-3088-7-12	0	477
ATC S-3088-20-10	1,751	3,146
ATC S-3088-24-8	2,207	3,197
Total Project Increase	3,958	6,820

The project's total emissions increases for NO_X and VOC are summarized and are compared to the Federal Major Modification Thresholds in the following table.

Federal Major Modification Thresholds for Emission Increases			
Pollutant	**Total Emissions Increases (lb/yr)**	**Thresholds (lb/yr)**	**Federal Major Modification?**
NO_X*	3,958	0	Yes
VOC*	6,820	0	Yes

*If there are any emission increases in NO_x or VOC, this project is a Federal Major Modification and no further analysis is required.

Since there is an increase in NO_x and VOC emissions, this project constitutes a Federal Major Modification. The Federal Offset Quantity is discussed below.

Federal Offset Quantity Calculation

In accordance with the Clean Air Act, Section 182(e)(2), the offset requirements of this part shall not be applicable in areas designated as Extreme non-attainment to a modification of an existing source if such modification consists of installation of equipment required to comply with an applicable attainment implementation plan or permit.

The District is designated as Extreme non-attainment for ozone (NO_X and VOC emissions). As discussed above, the proposed project is to modify three existing steam generators to reduce NO_X emissions to comply with District Rules 4306 and 4320. District Rules 4306 and 4320 were adopted as a part of the District's Ozone and $PM_{2.5}$ attainment plans. Since this project involves the modification of existing sources to comply with District Rules 4306 and 4320 and the District's air quality attainment plans, this project is not subject to federal offset requirements.

Therefore,
FOQ_{NOx} = 0 lb-NO_X/year, and
FOQ_{VOC} = 0 lb-VOC/year

New Major Source

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

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

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

- NO_2 (as a primary pollutant)
- SO_2 (as a primary pollutant)
- CO
- PM
- PM_{10}
- Hydrogen sulfide (H_2S)
- Total reduced sulfur (including H_2S)
- Reduced sulfur compounds

Additionally, when evaluating if a facility is a PSD major source all regulated NSR pollutants, including VOC, must be considered regardless of attainment status.

I. Project Emissions Increase - New Major Source Determination

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

The facility or the equipment evaluated under this project is not listed as one of the categories specified in 40 CFR 52.21 (b)(1)(i). The PSD Major Source threshold is 250 tons per year (tpy) for any regulated NSR pollutant and fugitive emissions are not considered when determining if the operation is a PSD Major Source.

Estimation of Maximum H_2S and Total Reduced Sulfur (TRS) for PSD Applicability

Sulfur, primarily in the form of H_2S, is contained in the natural gas and oilfield produced gas that will fuel the steam generators. However, any sulfur compounds contained in the fuel are expected to be converted entirely to SO_X during combustion. A previous EPA study indicated very high destruction efficiencies of 99.7% to greater than 99.9% for H_2S that was flared when the heating values of the gas flared exceeded the flame stability

limit.[1] The steam generators are expected to have H_2S destruction efficiencies that are at least equal to that of a properly operated flare. Therefore, for purposes of the PSD applicability the maximum non-fugitive H_2S and total reduced sulfur (TRS) emissions from the proposed equipment will be conservatively estimated as follows:

Maximum H_2S/TRS Emissions

(119,903 lb-SO_X/yr) x (1 mol-H_2S/mol-SO_X) x (34 lb-H_2S/mol-H_2S)/(64 lb-SO_X/mol-SO_X) x 0.003 = 191 lb-H_2S/yr (0.1 ton-H_2S/yr)

PSD Major Source Determination: Potential to Emit (tons/year)							
	NO_2	**VOC**	**SO_2**	**CO**	**PM**	**PM_{10}**	**H_2S/TRS**
Total PE from New and Modified Units	5.5	4.5	60.0	41.3	6.2	6.2	0.1
PSD Major Source threshold	250	250	250	250	250	250	250
New PSD Major Source?	No	No	No	No	No	No	No

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

10. Quarterly Net Emissions Change (QNEC)

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

VIII. Compliance Determination

Rule 1070 Inspections

The purpose of Rule 1070 is to explain the District's authority in determining compliance with the requirements of District rules and regulations. This rule applies to any source operation, which emits or may emit air contaminants. This rule allows the District to perform inspections for the purpose of obtaining information necessary to determine whether air pollution sources are in compliance with applicable rules and regulations. The rule also allows the District to require record keeping, to make inspections, and to conduct tests of air pollution sources.

The conditions below will be included on the ATC permits to ensure compliance.

[1] Pohl, J. H. and Soelberg, N. R. (September 1986) Evaluation of the Efficiency of Industrial Flares: H2S Gas Mixtures and Pilot Assisted Flares. Prepared for US EPA Office of Air Quality Planning and Standards. EPA/600/2-86/080.

ATCs S-3088-7-12, -20-10, & -24-8: 62.5 MMBtu/hr Oilfield Steam Generators

- Records shall be maintained of the dates that each specific option is used to comply with the SOx and PM control requirements of this permit. [District Rules 1070, 2201, and 4320]

- On a monthly basis, the permittee shall calculate and record the total SOx emissions in pounds from this unit each day for the prior calendar month. [District Rules 1070 and 2201]

- On a monthly basis, the permittee shall calculate and record the total combined SOx emissions from the stationary source in pounds for the prior 12 calendar month period. The total combined SOx emissions shall be calculated by summing the SOx emissions from the previous 12 calendar months from every permitted unit at the stationary source. [District Rules 1070 and 2201]

- For gas used to fuel this unit that is not regulated by the PUC or FERC, the permittee shall maintain records of the higher heating value (HHV), in Btu per standard cubic foot (scf), for each calendar quarter in which the unit operates. For PUC or FERC-regulated gas used to fuel this unit, the permittee shall maintain records of the HHV, in Btu per standard cubic foot (scf), for each calendar year in which the unit operates. The records shall include the method(s) used to determine the HHV of the fuel and the dates the HHV was determined. For PUC or FERC-regulated natural gas, documentation from the utility may be used to establish the HHV of the gas. [District Rule 1070]

- Records of the fuel sulfur content of the natural gas and produced gas combusted in this unit; the daily amounts of each fuel used in this unit, in standard cubic feet (scf) and MMBtu; and calculations to verify compliance with the total combined SOx emission limit(s) for the steam generators permitted as Units S-3088-7, -20, and -24 for each day the units are operated shall be maintained and made readily available for District inspection upon request. [District Rules 1070, 4001, 2201, and 4320, and 40 CFR Part 60, Subpart Dc]

- All records shall be maintained for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rules 1070, 2201, 4305, 4306, and 4320, and 40 CFR Part 60, Subpart Dc]

Rule 2201 New and Modified Stationary Source Review Rule

A. Best Available Control Technology (BACT)

1. BACT Applicability

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

a. Any new emissions unit with a potential to emit exceeding two pounds per day,
b. The relocation from one Stationary Source to another of an existing emissions unit with a potential to emit exceeding two pounds per day,

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

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

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

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

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 the relocation of an emissions unit.

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

As discussed above, the applicant has proposed to modify three existing 62.5 MMBtu/hr natural gas/produced gas-fired oilfield steam generators (Permit Units S-3088-7-, -20, and -24) to reduce the NO_X emissions to 5 ppmv @ 3% O_2 to comply with the Tier 2 NO_X emission limits of District Rules 4306 and 4320. The proposed modifications to these units will not result in any increases in emissions.

AIPE = PE2 – HAPE

Where,
AIPE = Adjusted Increase in Permitted Emissions, (lb/day)
PE2 = Post-Project Potential to Emit, (lb/day)
HAPE = Historically Adjusted Potential to Emit, (lb/day)

HAPE = PE1 x (EF2/EF1)

Where,
PE1 = The emissions unit's PE prior to modification or relocation, (lb/day)
EF2 = The emissions unit's permitted emission factor for the pollutant after modification or relocation. If EF2 is greater than EF1 then EF2/EF1 shall be set to 1
EF1 = The emissions unit's permitted emission factor for the pollutant before the modification or relocation

AIPE = PE2 – (PE1 x (EF2/EF1))

AIPE for ATC S-3088-7-12 (62.5 MMBtu/hr Steam Generator)

AIPE for ATC S-3088-7-12 (62.5 MMBtu/hr Steam Generator)										
Pollutant	Daily PE2 (lb/day)	-	Daily PE1 (lb/day)	x (	EF2 (lb/MMBtu)	÷	EF1 (lb/MMBtu)	) =	EF2/EF1	AIPE (lb/day)
NO_X	9.5	-	27.0	x (	0.0063	÷	0.018	) =	0.35	**0.1**
SO_X	328.5	-	328.5	x (	0.219	÷	0.219	) =	1	**0.0**
PM_{10}	11.4	-	11.4	x (	0.0076	÷	0.0076	) =	1	**0.0**
CO	120.0	-	120.0	x (	0.080	÷	0.080	) =	1	**0.0**
VOC	4.1	-	8.3	x (	0.0027	÷	0.0055	) =	0.49091	**0.0**

As shown above, the AIPE is not greater than 2.0 lb/day for emissions of any affected pollutants from Permit Unit S-3088-7. Therefore, BACT is not triggered for the modification of the existing steam generator.

AIPE for ATC S-3088-20-10 (62.5 MMBtu/hr Steam Generator)

AIPE for ATC S-3088-20-10 (62.5 MMBtu/hr Steam Generator)										
Pollutant	Daily PE2 (lb/day)	-	Daily PE1 (lb/day)	x (	EF2 (lb/MMBtu)	÷	EF1 (lb/MMBtu)	) =	EF2/EF1	AIPE (lb/day)
NO_X	9.5	-	27.0	x (	0.0063	÷	0.018	) =	0.35	**0.1**
SO_X	328.5	-	328.5	x (	0.219	÷	0.219	) =	1	**0.0**
PM_{10}	11.4	-	11.4	x (	0.0076	÷	0.0076	) =	1	**0.0**
CO	54.0	-	54.0	x (	0.036	÷	0.036	) =	1	**0.0**
VOC	4.1	-	8.3	x (	0.0027	÷	0.0055	) =	0.49091	**0.0**

As shown above, the AIPE is not greater than 2.0 lb/day for emissions of any affected pollutants from Permit Unit S-3088-20. Therefore, BACT is not triggered for the modification of the existing steam generator.

AIPE for ATC S-3088-24-8 (62.5 MMBtu/hr Steam Generator)

AIPE for ATC S-3088-24-10 (62.5 MMBtu/hr Steam Generator)										
Pollutant	Daily PE2 (lb/day)	-	Daily PE1 (lb/day)	x (	EF2 (lb/MMBtu)	÷	EF1 (lb/MMBtu)	) =	EF2/EF1	AIPE (lb/day)
NO_X	9.5	-	54.0	x (	0.0063	÷	0.036*	) =	0.175	**0.1**
SO_X	328.5	-	328.5	x (	0.219	÷	0.219	) =	1	**0.0**
PM_{10}	11.4	-	11.4	x (	0.0076	÷	0.0076	) =	1	**0.0**
CO	52.5	-	52.5	x (	0.035	÷	0.035	) =	1	**0.0**
VOC	4.1	-	8.3	x (	0.0027	÷	0.0055	) =	0.49091	**0.0**

* The Daily PE1 for NO_X from Unit S-3088-24 is limited to 54.0 lb-NO_X/day, including start-up and shutdown. The average EF1 for NO_X for the unit is calculated as follows: $EF1_{NOX}$ = 54.0 lb-NO_X/day ÷ (62.5 MMBtu/hr x 24 hr/day) = 0.036 lb-NO_X/MMBtu

As shown above, the AIPE is not greater than 2.0 lb/day for emissions of any affected pollutants from Permit Unit S-3088-20. Therefore, BACT is not triggered for the modification of the existing steam generator.

d. SB 288/Federal Major Modification

As discussed in Sections VII.C.7 and VII.C.8 above, this project does constitute a Federal Major Modification for NO_X and VOC emissions. Therefore, BACT is triggered for NO_X and VOC for all emissions units in the project for which there is a NO_X or VOC emission increase.

As shown VII.C.8, NO_X emissions increases were calculated for ATCs S-3088-20-10 and -24-8 and VOC emissions increases were calculated for ATCs S-3088-7-12, -20-10, and -24-8; therefore, BACT is triggered for NO_X for ATCs S-3088-20-10 and -24-8 and BACT is triggered for VOC for ATCs S-3088-7-12, -20-10, and -24-8.

2. BACT Guideline

As discussed above, the applicant has proposed to modify three existing 62.5 MMBtu/hr natural gas/produced gas-fired oilfield steam generators to comply with the Tier 2 NO_X emission limits of District Rules 4306 and 4320

The District does not currently have an approved BACT Guideline oilfield steam generators. Therefore, a project-specific BACT analysis was performed for the proposed modification of the steam generators based on the District's review of information that was available when the application for this project was deemed complete. (See Appendix G)

3. Top-Down BACT Analysis

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

Pursuant to the Top-Down BACT Analysis (See Appendix G), BACT for the oilfield steam generators is satisfied with the following:

<u>ATCs S-3088-20-10 and -24-8</u>
NO_X: 5 ppmvd NO_X @ 3% O_2

<u>ATCs S-3088-7-12, -20-10, and -24-8</u>
VOC: ≤ 0.0027 lb-VOC/MMBtu

B. Offsets

1. Offset Applicability

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

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

Offset Determination (lb/year)					
	NO_X	SO_X	PM_{10}	CO	VOC
SSPE2	60,536	139,999	44,065	202,399	35,838
Offset Thresholds	20,000	54,750	29,200	200,000	20,000
Offsets Triggered?	Yes	Yes	Yes	Yes	Yes

2. Quantity of District Offsets Required

As seen above, the facility has an SSPE2 for NO_X, SO_X, PM_{10}, CO, and VOC that are greater than the offset thresholds for these pollutants. However, this project only involves the installation or modification of an emission control technique performed solely for the purpose of compliance with the District air pollution control laws.

Pursuant to District Rule 2201, Section 4.6.8, emission offsets shall not be required for the following:

> 4.6.8 For existing facilities, the installation or modification of an emission control technique performed solely for the purpose of compliance with the requirements of District, State or Federal air pollution control laws, regulations, or orders, as approved by the APCO, shall be exempt from offset requirements for all air pollutants provided all of the following conditions are met:
>
> 4.6.8.1 There shall be no increase in the physical or operational design of the existing facility, except for those changes to the design needed for the installation or modification of the emission control technique itself;
>
> 4.6.8.2 There shall be no increase in the permitted rating or permitted operating schedule of the permitted unit;
>
> 4.6.8.3 There shall be no increase in emissions from the stationary source that will cause or contribute to any violation of a National Ambient Air Quality Standard, Prevention of Significant Deterioration increment, or Air Quality Related Value in Class I areas; and
>
> 4.6.8.4 The project shall not result in an increase in permitted emissions or potential to emit of more than 25 tons per year of NO_X, or 25 tons per year of VOC, or 15 tons per year of SO_X, or 15 tons per year of PM_{10}, or 50 tons per year of CO.

The proposed modifications to the steam generators are being performed solely to comply with District Rules 4306 and 4320 and satisfy all of the criteria of District Rule 2201, Section 4.6.8. Therefore, the offset exemption from Section 4.6.8 is applicable to this project and District offsets are not required for this project and District offset calculations are not necessary.

As discussed above, District offsets are triggered but not required for any pollutant. In addition, as discussed above, no federal offset are required for this project. Therefore, offsets will not be required for this project and no further discussion is required.

C. Public Notification

1. Applicability

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

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

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

As demonstrated in Section VII.C.7 of this evaluation, this project is a Federal Major Modification. Therefore, public noticing is required for this project for Federal Major Modification 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. There are no new emissions units associated with this project. Therefore, public noticing is not required for a new emissions unit with PE > 100 lb/day.

c. Offset Threshold

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

Offset Thresholds				
Pollutant	**SSPE1 (lb/year)**	**SSPE2 (lb/year)**	**Offset Threshold**	**Public Notice Required?**
NO_X	77,784	60,536	20,000 lb/year	No
SO_X	147,145	139,999	54,750 lb/year	No
PM_{10}	44,065	44,065	29,200 lb/year	No
CO	202,399	202,399	200,000 lb/year	No
VOC	35,838	35,838	20,000 lb/year	No

As demonstrated 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	60,536	77,784	-17,248	20,000 lb/year	No
SO_x	139,999	147,145	-7,146	20,000 lb/year	No
PM_{10}	44,065	44,065	0	20,000 lb/year	No
CO	202,399	202,399	0	20,000 lb/year	No
VOC	35,838	35,838	0	20,000 lb/year	No

As demonstrated above, the SSIPEs for all pollutants were no more than 20,000 lb/year; therefore, public noticing for SSIPE purposes is not required.

e. Title V Significant Permit Modification

As shown in the discussion of Rule 2520 below, this project constitutes a Title V significant modification. Therefore, public noticing for Title V significant modification purposes is required for this project.

2. Public Notice Action

As discussed above, public noticing is required for this project for a Federal Major Modification and a Title V significant modification. Therefore, public notice documents will be submitted to the California Air Resources Board (CARB) and a public notice will be electronically published on the District's website prior to the issuance of the ATC for this equipment.

D. Daily Emission Limits (DELs)

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

For the natural gas/oilfield produced gas-fired steam generators, the DELs for NO_X, SO_X, PM_{10}, CO, and VOC are stated in the form of emission factors (lb/MMBtu), the maximum heat input rating of the steam generators (62.5 MMBtu/hr), and the maximum operational time of 24 hours per day. The following conditions will be included on the ATC permits.

ATCs S-3088-7-12, -20-10, & -24-8: 62.5 MMBtu/hr Steam Generators

- 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]

- This unit shall only be fired on natural gas, oilfield produced gas, or a blend of natural gas and oilfield produced gas. [District Rule 2201]

- This unit shall comply with one of the following options for control of SOx and particulate matter (PM) emissions: 1) The total sulfur content of the fuel gas used this steam generator shall not exceed 1 grain S per 100 standard cubic feet (1 gr-S/100 scf); or 2) A scrubber that reduces SOx emissions by at least 95% by weight shall be installed and properly operated; or 3) The SO2 concentration in the exhaust of this unit shall not exceed 9 ppmv SO2 corrected to 3.0% O2. [District Rules 2201 and 4320]

ATC S-3088-7-12

- Emissions from this steam generator shall not exceed any of the following limits: 5 ppmvd NOx @ 3% O2 and 0.0063 lb-NOx/MMBtu, 0.219 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu, 104 ppmvd CO @ 3% O2 and 0.080 lb-CO/MMBtu, or 0.0027 lb-VOC/MMBtu (as CH4). [District Rules 2201, 4305, 4306, 4320, 4405, 4406, and 4801]

ATC S-3088-20-10

- Emissions from this steam generator shall not exceed any of the following limits: 5 ppmvd NOx @ 3% O2 and 0.0063 lb-NOx/MMBtu, 0.219 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu, 47.5 ppmvd CO @ 3% O2 and 0.036 lb-CO/MMBtu, or 0.0027 lb-VOC/MMBtu (as CH4). [District Rules 2201, 4305, 4306, 4320, 4405, and 4801]

ATC S-3088-24-8

- Emissions from this steam generator shall not exceed any of the following limits: 5 ppmvd NOx @ 3% O2 and 0.0063 lb-NOx/MMBtu, 0.219 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu, 46 ppmvd CO @ 3% O2 and 0.035 lb-CO/MMBtu, or 0.0027 lb-VOC/MMBtu (as CH4). [District Rules 2201, 4305, 4306, 4320, 4405, and 4801]

In addition, the following conditions will be included on the ATCs that state that the steam generators shall not operate at the same time as the standby flare that is authorized as part of Permit Unit S-3088-8, specify the total combined daily SO_X limit for the units, and limit the total potential to emit for SO_X from the stationary source.

- This unit shall not operate at the same time as the standby flare authorized as part of Permit Unit S-3088-8, except as required during start-up and shutdown periods to continue to incinerate produced gas and such periods shall be minimized. [District Rule 2201]

- The total combined SOx emissions from the steam generators permitted as Units S-3088-7, -20, and -24 shall not exceed 328.5 lb-SOx/day. [District Rule 2201]

- Total combined SOx emissions from all permitted units at the stationary source (District Facilities S-2622 and S-3088) shall not exceed 139,999 pounds in any 12-consecutive month rolling period. [District Rule 2201]

E. Compliance Assurance

1. Source Testing

These units are subject to District Rule 4305 - *Boilers, Steam Generators and Process Heaters, Phase 2,* District Rule 4306 - *Boilers, Steam Generators and Process Heaters, Phase 3,* and District Rule 4320 - *Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr*. Source testing requirements, in accordance with District Rules 2201, 4305, 4306, and 4320 are summarized below and will be discussed further in the sections of this evaluation about District Rules 4306 and 4320. In addition, in accordance with District Policy APR 1705 – Source Testing Frequency, initial source testing of VOC emissions will be required to confirm compliance with the reduced VOC emission limit.

The following conditions will be included on the ATC permits:

- Source testing to measure NOx, CO, and VOC emissions from this unit shall be conducted within 60 days of initial operation of the unit under this Authority to Construct (ATC) permit. [District Rules 2201, 4306, and 4320]

- Source testing to measure NOx and CO emissions from this unit shall be conducted at least once every twelve (12) months. After demonstrating compliance on two (2) consecutive annual source tests, the unit shall be tested not less than once every thirty-six (36) months. If the result of the 36-month source test demonstrates that the unit does not meet the applicable emission limits, the source testing frequency shall revert to at least once every twelve (12) months. [District Rules 2201, 4305, 4306, and 4320]

- The source test plan shall identify which basis (ppmv or lb/MMBtu) will be used to demonstrate compliance. [District Rules 2201, 4305, 4306, and 4320]

- All emissions measurements shall be made with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. No determination of compliance shall be established within two hours after a continuous period in which fuel flow to the unit is shut off for 30 minutes or longer, or within 30 minutes after a re-ignition as defined in Section 3.0 of District Rule 4306. [District Rules 2201, 4305, 4306, and 4320]

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

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

- NOx emissions for source test purposes shall be determined using EPA Method 7E or ARB Method 100 on a ppmv basis, or EPA Method 19 on a heat input basis. [District Rules 4305, 4306, and 4320]

- CO emissions for source test purposes shall be determined using EPA Method 10 or ARB Method 100. [District Rules 4305, 4306, and 4320]

- VOC emissions for source test purposes shall be determined using EPA Method 25A or 25B, or ARB Method 100. EPA Method 18, ARB Method 422 "Determination of Volatile Organic Compounds in Emission from Stationary Sources", or alternative method(s) approved by the District shall be used for the measurement and subtraction of exempt compounds (e.g. methane and ethane). [District Rule 2201]

- Stack gas oxygen (O2) shall be determined using EPA Method 3 or 3A or ARB Method 100. [District Rules 4305, 4306, and 4320]

- SOx emissions for source test purposes shall be determined using EPA Method 6C, EPA Method 8, or ARB Method 100. [District Rule 4320]

- For emissions source testing, the arithmetic average of three 30-consecutive-minute test runs shall apply. If two of three runs are above an applicable limit the test cannot be used to demonstrate compliance with an applicable limit. [District Rules 1081, 4305, 4306, and 4320]

- 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 and the District and EPA. [District Rules 2201, 4306, and 4320]

- When complying with the SOx and PM control requirements of this permit by limiting the total sulfur content of the fuel gas or by reducing SOx emissions by at least 95% using a scrubber that removes sulfur compounds from the gas prior to combustion, laboratory analysis to determine the sulfur content of the fuel gas or the control efficiency of the scrubber shall be performed at least annually using EPA Method 11 or EPA Method 15, as appropriate; ASTM Method D1072, D1945, D3246, D4084, D4468, or D5504; grab sample analysis by GC-FPD/TCD performed in the laboratory; or other methods approved by the District and EPA. Records of the fuel sulfur analyses shall be maintained and provided to the District upon request. [District Rules 2201 and 4320]

- For natural gas that is regulated by the California Public Utilities Commission (PUC) or Federal Energy Regulatory Commission (FERC), valid purchase contracts, supplier certifications, tariff sheets, transportation contracts, or other documentation may be

used to satisfy the fuel sulfur content analysis, provided they establish the fuel sulfur content as required by this permit. [District Rules 2201 and 4320]

- When complying with the SOx and PM control requirements of this permit by using a post-combustion scrubber that reduces SOx emissions by at least 95% by weight or limiting the exhaust SO2 concentration to 9 ppmv corrected to 3.0% O2, source testing of SOx emissions from this unit to demonstrate compliance with the required SOx emission reduction percentage or SO2 exhaust concentration limit shall be performed at least annually. [District Rules 1081, 2201, and 4320]

2. Monitoring

As mentioned above, the steam generators are subject to District Rules 4305, 4306, and 4320. Rules 4305, 4306, and 4320 require that the operator of any unit subject to the emission limits included in the rules shall either install and maintain continuous emissions monitoring equipment for NO_X, CO, and oxygen, as identified in Rule 1080 (Stack Monitoring), or install and maintain APCO-approved alternate monitoring plan. As discussed in Section Vlll, Rules 4306 and 4320 of this evaluation, the steam generators are subject to the emission limits of these rules; therefore, this requirement applies.

The applicant has proposed to continue to utilize pre-approve alternate monitoring plan "A" (Periodic Monitoring NO_X, CO, and O_2 Emissions Concentrations) to meet the requirements of District Rules 4306 and 4320. Monitoring for Rules 4306 and 4320 also satisfies the NO_X and CO monitoring requirements for Rules 2201.

Periodic monitoring of the sulfur content of the fuel used will also be required to enforce the SO_X emission limit of the permit. In addition, if a scrubber is used to comply with the SO_X and PM control requirements of the permit, the operator will be required to periodically monitor key system operating parameters that indicate proper operation of the scrubber as required by District Rule 4320. 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. 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 month. [District Rules 2201, 4305, 4306, and 4320]

- If either the NOx or CO concentrations corrected to 3% O2, as measured by the portable analyzer, exceed the allowable emissions concentration, the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 1 hour of operation after detection. If the portable analyzer readings continue to exceed the allowable emissions concentration after 1 hour of operation after detection, the permittee shall notify the District within the following 1 hour and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test,

the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100. [District Rules 2201, 4305, 4306, and 4320]

- All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rules 2201, 4305, 4306, and 4320]

- The sulfur content of the produced gas and any gas not regulated by the PUC or FERC combusted in this unit shall be monitored and recorded at least once every quarter in which the unit operates. If it is determined that the total combined SOx emissions limit for Units S-3088-7, -20, and -24 was exceeded, the sulfur content of the non-PUC and non-FERC-regulated gas combusted in the unit shall be monitored and recorded at least once every week until compliance with the SOx emission limit is demonstrated for each day the unit operates for eight consecutive weeks. After demonstrating compliance with the SOx emission limit for eight consecutive weeks, the gas sulfur content monitoring frequency may revert to quarterly. Records of the results of monitoring of the sulfur content of the gas combusted in this unit shall be maintained. [District Rule 2201]

- Monitoring of the sulfur content of the gas combusted in this unit shall be performed using gas detection tubes calibrated for H2S; EPA Method 11 or EPA Method 15, as appropriate, ASTM Method D1072, D1945, D3246, D4084, D4468, D4810 or D5504; grab sample analysis by GC-FPD/TCD performed in the laboratory; a continuous analyzer employing gas chromatography; a continuous fuel gas monitor that meets the requirements specified in SCAQMD Rule 431.1, Attachment A; or an alternative method approved by EPA and the District. The permittee shall maintain records of any monitors used to demonstrate compliance with the SOx limit of this permit, including the make, model, and detection limits of the monitor(s). The required quarterly analysis of the sulfur content of the gas and the first of the weekly analyses required to reestablish compliance shall only be performed using methods that use laboratory analysis. The remainder of the weekly analyses required to demonstrate compliance may be performed using approved methods that do not use laboratory analysis. [District Rule 2201]

- Compliance with the SOx emission limit(s) of this permit may be demonstrated either by monitoring sulfur content at location(s) after all fuel sources are combined prior to incineration, or by monitoring the sulfur content and volume of each fuel source and performing mass balance calculations. Records of monitoring locations, detected sulfur concentrations, and mass balance calculations, if necessary, shall be

maintained and kept onsite and made readily available for District inspection upon request. [District Rule 2201]

- When complying with the SOx and PM control requirements of this permit by using a scrubber that reduces SOx emissions by at least 95% by weight, the operator shall monitor key system operating parameters that indicate proper operation of the scrubber (e.g. inlet and outlet H2S concentrations for scrubbers that remove H2S prior to combustion) at least once every week. Records of monitoring of the key system operating parameters of the scrubber shall be maintained. [District Rules 2201 and 4320]

3. Recordkeeping

Recordkeeping is required to demonstrate compliance with the offset, public notification and daily emission limit requirements of Rule 2201.

The following conditions will be included on the ATC permits:

- The permittee shall maintain records of: (1) the date and time of NOx, CO, and O2 measurements, (2) the O2 concentration in percent and the measured NOx and CO concentrations corrected to 3% O2, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, and (5) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 2201, 4305, 4306, and 4320]

- Records shall be maintained of the dates that each specific option is used to comply with the SOx and PM control requirements of this permit. [District Rules 1070, 2201, and 4320]

- On a monthly basis, the permittee shall calculate and record the total SOx emissions in pounds from this unit each day for the prior calendar month. [District Rules 1070 and 2201]

- The SOx emissions from this unit shall be calculated using the following equation: lb-SOx emitted/day = (total volume of gas incinerated per day, in scf) x (ppm sulfur as H2S prior to incineration) x 0.00000017. [District Rule 2201]

- On a monthly basis, the permittee shall calculate and record the total combined SOx emissions, in pounds, for each day from the steam generators permitted as Units S-3088-7, -20, and -24 for the prior calendar month. [District Rules 1070 and 2201]

- On a monthly basis, the permittee shall calculate and record the total combined SOx emissions from the stationary source in pounds for the prior 12 calendar month period. The total combined SOx emissions shall be calculated by summing the SOx emissions from the previous 12 calendar months from every permitted unit at the stationary source. [District Rules 1070 and 2201]

- Records of the fuel sulfur content of the natural gas and produced gas combusted in this unit; the daily amounts of each fuel used in this unit, in standard cubic feet (scf) and MMBtu; and calculations to verify compliance with the total combined SOx emission limit(s) for the steam generators permitted as Units S-3088-7, -20, and -24 for each day the units are operated shall be maintained and made readily available for District inspection upon request. [District Rules 1070, 4001, 2201, and 4320, and 40 CFR Part 60, Subpart Dc]

- All records shall be maintained for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rules 1070, 2201, 4305, 4306, and 4320, and 40 CFR Part 60, Subpart Dc]

4. Reporting

No reporting is required to demonstrate compliance with Rule 2201.

Rule 2410 Prevention of Significant Deterioration

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

Rule 2520 Federally Mandated Operating Permits

This facility is subject to this Rule, and has received their Title V Operating Permit. A significant permit modification is defined as a "permit amendment that does not qualify as a minor permit modification or administrative amendment."

Minor permit modifications are permit modifications that are not Title I modifications as defined in Rule 2520, are not modifications as defined in section 111 or 112 of the Federal Clean Air Act, and are not major modifications under the prevention of significant deterioration (PSD) provisions of Title I of the CAA or under EPA PSD regulations. Since this project is a Federal Major Modification (i.e. Title I modification), the proposed project constitutes a Significant Modification to the Title V Permit.

As discussed above, the facility has applied for a Certificate of Conformity (COC); therefore, the facility must apply to modify their Title V permit with an administrative amendment, prior to operating with the proposed modifications. Continued compliance with this rule is expected. The facility shall not implement the changes requested until EPA has reviewed the project and the final ATC permit is issued.

The following conditions will be included on the ATC permits:

- {1830} This Authority to Construct serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District Rule 2201]

- {1831} Prior to operating with modifications authorized by this Authority to Construct, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4]

Rule 4001 New Source Performance Standards (NSPS)

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

40 CFR Part 60, Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units applies to steam generating units for which construction, modification, or reconstruction commenced after June 9, 1989 and that have a maximum design heat input capacity greater than or equal to 2.9 megawatts (MW) (10 MMBtu/hr) but less than 29 MW (100 MMBtu/hr).

40 CFR Section 60.14(a), states that except as provided under 40 CFR Section 60.14 paragraphs (e) and (f), any physical or operational change to an existing facility (i.e. affected unit) which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies shall be considered a modification within the meaning of section 111 of the Act. Upon modification, an existing facility shall become an affected facility for each pollutant to which a standard applies and for which there is an increase in the emission rate to the atmosphere. Pursuant to 40 CFR Section 60.14(a) the emission rate shall be expressed as kg/hr of any pollutant discharged into the atmosphere for which a standard is applicable.

The existing 62.5 MMBtu/hr steam generators being modified in this project (Permit Units S-3088-7, -20, and -24) were not constructed after June 9, 1989. However, modifications to the units under District Projects S-1064654 and S-1121363 allowed an increase in hourly SO_X emissions from the units. Therefore, the steam generators will be treated as modified units for purposes of 40 CFR Part 60, Subpart Dc

40 CFR 60, Subpart Dc contains SO_2 and Particulate Matter (PM) emissions limits and opacity standards for affected units that combust coal, coal refuse, oil, wood, a mixture of these fuels, or a mixture of these fuels with any other fuels.

The existing 62.5 MMBtu/hr steam generators will only be permitted to combust natural gas or oilfield produced gas; therefore, the SO_2 and PM emissions limits of Subpart Dc do not apply to the steam generators.

40 CFR 60, Section 60.48c - Reporting and Recordkeeping Requirements includes the following requirements of 60.48c(g) that are potentially applicable to the existing 62.5 MMBtu/hr steam generators:

(g)(1) Except as provided under paragraphs (g)(2) and (g)(3) of this section, the owner or operator of each affected facility shall record and maintain records of the amount of each fuel combusted during each operating day.

(g)(2) As an alternative to meeting the requirements of paragraph (g)(1) of this section, the owner or operator of an affected facility that combusts only natural gas, wood, fuels using fuel certification in § 60.48c(f) to demonstrate compliance with the SO_2 standard, fuels not subject to an emissions standard (excluding opacity), or a mixture of these fuels may elect to record and maintain records of the amount of each fuel combusted during each calendar month.

(g)(3) As an alternative to meeting the requirements of paragraph (g)(1) of this section, the owner or operator of an affected facility or multiple affected facilities located on a contiguous property unit where the only fuels combusted in any steam generating unit (including steam generating units not subject to this subpart) at that property are natural gas, wood, distillate oil meeting the most current requirements in Section 60.42c to use fuel certification to demonstrate compliance with the SO_2 standard, and/or fuels, excluding coal and residual oil, not subject to an emissions standard (excluding opacity) may elect to record and maintain records of the total amount of each steam generating unit fuel delivered to that property during each calendar month.

The following condition will be included on the ATC permits:

- Records of the fuel sulfur content of the natural gas and produced gas combusted in this unit; the daily amounts of each fuel used in this unit, in standard cubic feet (scf) and MMBtu; and calculations to verify compliance with the total combined SOx emission limit(s) for the steam generators permitted as Units S-3088-7, -20, and -24 for each day the units are operated shall be maintained and made readily available for District inspection upon request. [District Rules 1070, 4001, 2201, and 4320, and 40 CFR Part 60, Subpart Dc]

40 CFR Section 60.48c(i) requires that all records required under this section shall be maintained by the owner or operator of the affected facility for a period of two years.

Current District practice and District Rules 4305, 4306, and 4320 require that all records be maintained for a period of five years; therefore, the following condition will be included on the ATC permits:

- All records shall be maintained for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rules 1070, 2201, 4305, 4306, and 4320, and 40 CFR Part 60, Subpart Dc]

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

This rule incorporates NESHAPs from Part 61, Chapter I, Subchapter C, Title 40, CFR and the NESHAPs from Part 63, Chapter I, Subchapter C, Title 40, CFR; and applies to all sources of hazardous air pollution listed in 40 CFR Part 61 or 40 CFR Part 63.

40 CFR Part 63, Subpart JJJJJJ - National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources applies to industrial, commercial, or institutional boilers that are located at an area source of hazardous air pollutant (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 HAP emissions is a facility is not a major source of HAPs.

Pursuant to Section 63.11195, the types of boilers listed below are not subject to any requirements 40 CFR 63, Subpart JJJJJJ:

(a) Any boiler specifically listed as, or included in the definition of, an affected source in another standard(s) under this part.
(b) Any boiler specifically listed as an affected source in another standard(s) established under section 129 of the Clean Air Act.
(c) A boiler required to have a permit under section 3005 of the Solid Waste Disposal Act or covered by subpart EEE of this part (*e.g.,* hazardous waste boilers).
(d) A boiler that is used specifically for research and development. This exemption does not include boilers that solely or primarily provide steam (or heat) to a process or for heating at a research and development facility. This exemption does not prohibit the use of the steam (or heat) generated from the boiler during research and development, however, the boiler must be concurrently and primarily engaged in research and development for the exemption to apply.
(e) A gas-fired boiler as defined in this subpart.
(f) A hot water heater as defined in this subpart.
(g) Any boiler that is used as a control device to comply with another subpart of this part, or part 60, part 61, or part 65 of this chapter provided that at least 50 percent of the average annual heat input during any 3 consecutive calendar years to the boiler is provided by regulated gas streams that are subject to another standard.
(h) Temporary boilers as defined in this subpart.
(i) Residential boilers as defined in this subpart.
(j) Electric boilers as defined in this subpart.
(k) An electric utility steam generating unit (EGU) as defined in this subpart.

Section 63.11237 provides the following definitions for gaseous fuels, gas-fired boilers, and temporary boilers:

> *Gaseous fuels includes, but is not limited to, natural gas, process gas, landfill gas, coal derived gas, refinery gas, hydrogen, and biogas.*
>
> *Gas-fired boiler includes any boiler that burns gaseous fuels not combined with any solid fuels and burns liquid fuel only during periods of gas curtailment, gas supply interruption, startups, or for periodic testing, maintenance, or operator training on liquid fuel. Periodic testing, maintenance, or operator training on liquid fuel shall not exceed a combined total of 48 hours during any calendar year.*

The existing 62.5 MMBtu/hr steam generators will only be permitted to be fueled with natural gas and oilfield produced gas; therefore, they are gas-fired boilers as defined in 40 CFR 63, Subpart JJJJJJ and are not subject to any requirements of 40 CFR 63, Subpart JJJJJJ.

Rule 4101 Visible Emissions

Rule 4101 states that no person shall discharge into the atmosphere emissions of any air contaminant aggregating more than 3 minutes in any hour which is as dark as or darker than Ringelmann 1 (or 20% opacity). As the steam generators will only be fueled with natural gas and oilfield produced gas, visible emissions are not expected to exceed Ringelmann 1 or 20% opacity.

The following condition will be included the proposed ATC permits:

- {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.

The following condition will be included on the ATC permits:

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

California Health & Safety Code 41700 (Health Risk Assessment)

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

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

As demonstrated above, there are no increases in emissions associated with this project; therefore, a health risk assessment is not necessary and no further risk analysis is required.

Rule 4201 Particulate Matter Concentration

Section 3.1 prohibits discharge of dust, fumes, or total particulate matter into the atmosphere from any single source operation in excess of 0.1 grain per dry standard cubic foot.

The maximum PM concentration emitted from the steam generators when fueled with natural gas and oilfield produced gas are calculated below.

Natural Gas Fuel

$$0.0076\ \frac{lb-PM}{MMBtu} \times \frac{1\ MMBtu}{8{,}578\ dscf} \times \frac{7{,}000\ grain}{1\ lb} = 0.006 \frac{grain}{dscf}$$

Mixed Natural Gas/Oilfield Produced Gas Fuel

$$0.0076\ \frac{lb-PM}{MMBtu} \times \frac{1\ MMBtu}{8{,}914\ dscf} \times \frac{7{,}000\ grain}{1\ lb} = 0.006 \frac{grain}{dscf}$$

Because 0.006 grain/dscf does not exceed 0.1 grain/dscf, compliance with this rule is expected.

The following condition will be included on the proposed ATC permits:

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

Rule 4301 Fuel Burning Equipment

The purpose of this rule is to limit the emission of air contaminants from fuel burning equipment. This rule limits the concentration of combustion contaminants and specifies maximum emission rates for sulfur dioxide, nitrogen oxide, and combustion contaminant emissions.

The provisions of District Rule 4301 apply to any fuel burning equipment except air pollution control equipment which is exempted according to Section 4.0.

Section 3.1 provides the following definition of fuel burning equipment:

> *Fuel Burning Equipment: any furnace, boiler, apparatus, stack, and all appurtenances thereto, used in the process of burning fuel for the primary purpose of producing heat or power by indirect heat transfer.*

Section 5.1 requires that a person shall not discharge into the atmosphere combustion contaminants exceeding in concentration at the point of discharge, 0.1 grain per cubic foot of gas calculated to 12% of carbon dioxide at dry standard conditions.

Section 5.2 stipulates that a person shall not build, erect, install or expand any non-mobile fuel burning equipment unit unless the discharge into the atmosphere of contaminants will not and does not exceed any one or more of the following rates:

5.2.1 200 pounds per hour of sulfur compounds, calculated as sulfur dioxide (SO_2);
5.2.2 140 pounds per hour of nitrogen oxides, calculated as nitrogen dioxide (NO_2);
5.2.3 Ten pounds per hour of combustion contaminants as defined in Rule 1020 (Definitions) (defined as total PM) and derived from the fuel.

The maximum concentration hourly emission rates for NO_X, SO_X, and PM from the existing 62.5 MMBtu/hr natural gas/oilfield produced gas-fired steam generators are shown in the table below.

District Rule 4301 Limits (lb/hr)			
Pollutant	**NO_X**	**SO_X**	**Total PM**
Rule Limit (lb/hr)	**140**	**200**	**10**
ATC S-3088-7-12 Hourly PE	0.39	13.7	0.475
ATC S-3088-20-10 Hourly PE	0.39	13.7	0.475
ATC S-3088-24-8 Hourly PE	0.39	13.7	0.475

As shown above, the natural gas/oilfield produced gas-fired steam generators are expected to comply with the maximum emission rates allowed by Rule 4301.

Rule 4305 Boilers, Steam Generators, and Process Heaters – Phase 2

The purpose of this rule is to limit emissions of oxides of nitrogen (NO_X) and carbon monoxide (CO) from boilers, steam generators, and process heaters. This rule applies to any gaseous fuel or liquid fuel fired boiler, steam generator, or process heater with a total rated heat input greater than 5 million Btu per hour.

Pursuant to Section 2.0 of District Rule 4305, the existing 62.5 MMBtu/hr natural gas/oilfield produced gas-fired steam generators addressed in this project are subject to District Rule 4305. In addition, the units are also subject to District Rule 4306 - *Boilers, Steam Generators and Process Heaters – Phase 3* and District Rule 4320 - *Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater Than 5.0 MMBtu/hr.* Because the emissions limits of District Rules 4306 and 4320 and all other requirements of these rules are equivalent or more stringent than the requirements of District Rule 4305, compliance with the requirements of District Rules 4306 and 4320 will satisfy the requirements of District Rule 4305. Therefore, compliance with Rule 4305 is expected and no further discussion is required.

Rule 4306 Boilers, Steam Generators, and Process Heaters – Phase 3

The purpose of this rule is to limit emissions of oxides of nitrogen (NO_X) and carbon monoxide (CO) from boilers, steam generators, and process heaters. This rule applies to any gaseous fuel or liquid fuel fired boiler, steam generator, or process heater with a total rated heat input greater than 5 million Btu per hour.

The existing 62.5 MMBtu/hr natural gas/oilfield produced gas-fired steam generators addressed in this project (ATCs S-3088-7-12, -20-10, and -24-8) are subject to District Rule 4306. These units are also subject to District Rule 4320 - *Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters greater than 5.0 MMBtu/hr*, which is discussed below.

Section 5.0 - Requirements

All ppmv emission limits specified in Section 5.0 are referenced at dry stack gas conditions and 3.00 percent by volume stack gas oxygen (O_2). Emission concentrations shall be corrected to 3.00 percent oxygen in accordance with Section 8.1.

Section 5.1 - NO_X and CO Emissions Limits

Section 5.1.1 requires that, except for units subject to Section 5.2, on and after the compliance deadline specified in Section 7, units subject to Section 5.0 shall not be operated in a manner which exceeds the applicable NO_X and CO emissions limit specified in Table 1 - Tier 1 NO_X and CO Limits (until December 31, 2023) and Table 2 - Tier 2 NO_X and CO Limits (on and after December 31, 2023).

The existing 62.5 MMBtu/hr natural gas/oilfield produced gas-fired steam generators addressed in this project are oilfield steam generators with a total rated heat input greater than 20.0 MMBtu/hr but no more than 75.0 MMBtu/hr; therefore, they are subject to the applicable NO_X and CO emission limits listed in District Rule 4306, Section 5.1, Table 1, Category C and Table 2, Category C.2, as summarized in the tables below.

Rule 4306, Table 1: Tier 1 NO_X and CO Limits					
Category	Operated on Gaseous Fuel			Operated on Liquid Fuel	
	NO_X Limit		CO Limit	NO_X Limit	CO Limit
	Standard Option	Enhanced Option			
C. Oilfield Steam Generators	15 ppmv or 0.018 lb/MMBtu	No option	400 ppmv	40 ppmv or 0.052 lb/MMBtu	400 ppmv

Rule 4306, Table 2: Tier 2 NO_X and CO Limits				
Category	Operated on Gaseous Fuel		Operated on Liquid Fuel	
	NO_X Limit	CO Limit (ppmv)	NO_X Limit	CO Limit (ppmv)
C. Oilfield Steam Generators				
1. Units with a total rated heat input > 5.0 MMBtu/hr and ≤ 20.0 MMBtu/hr	9 ppmv or 0.011 lb/MMBtu	400 ppmv	40 ppmv or 0.052 lb/MMBtu	400 ppmv
2. Units with a total rated heat input > 20.0 MMBtu/hr and ≤ 75.0 MMBtu/hr	9 ppmv or 0.011 lb/MMBtu	400 ppmv	40 ppmv or 0.052 lb/MMBtu	400 ppmv
3. Units with a total rated heat input > 75.0 MMBtu/hr	7 ppmv or 0.0085 lb/MMBtu	400 ppmv	40 ppmv or 0.052 lb/MMBtu	400 ppmv
4. Units firing on less than 50%, by volume, PUC quality gas	15 ppmv or 0.018 lb/MMBtu	400 ppmv	40 ppmv or 0.052 lb/MMBtu	400 ppmv

The following conditions that require compliance with the applicable Tier 1 and Tier 2 NO_X and CO emission limits will be included on the ATC permits:

ATC S-3088-7-12

- Emissions from this steam generator shall not exceed any of the following limits: 5 ppmvd NOx @ 3% O2 and 0.0063 lb-NOx/MMBtu, 0.219 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu,

104 ppmvd CO @ 3% O2 and 0.080 lb-CO/MMBtu, or 0.0027 lb-VOC/MMBtu (as CH4). [District Rules 2201, 4305, 4306, 4320, 4405, 4406, and 4801]

ATC S-3088-20-10

- Emissions from this steam generator shall not exceed any of the following limits: 5 ppmvd NOx @ 3% O2 and 0.0063 lb-NOx/MMBtu, 0.219 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu, 47.5 ppmvd CO @ 3% O2 and 0.036 lb-CO/MMBtu, or 0.0027 lb-VOC/MMBtu (as CH4). [District Rules 2201, 4305, 4306, 4320, 4405, and 4801]

ATC S-3088-24-8

- Emissions from this steam generator shall not exceed any of the following limits: 5 ppmvd NOx @ 3% O2 and 0.0063 lb-NOx/MMBtu, 0.219 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu, 46 ppmvd CO @ 3% O2 and 0.035 lb-CO/MMBtu, or 0.0027 lb-VOC/MMBtu (as CH4). [District Rules 2201, 4305, 4306, 4320, 4405, and 4801]

Therefore, the steam generators are expected to comply with the applicable Tier 1 and Tier 2 emission limits in Section 5.1 of Rule 4306.

Section 5.2 - Units Limited to Less than 9 Billion Btu/year Heat Input

Section 5.2 specifies requirements for units that are limited to less than 9 billion Btu per calendar year heat input pursuant to a Permit to Operate.

The units addressed in this project will not be limited to annual heat input of less than 9 billion Btu per year. Therefore, this section is not applicable.

Section 5.3 – Start-up and Shutdown Provisions

Section 5.3 states that on and after the full compliance deadline in Section 7.1, the applicable emission limits of Sections 5.1, 5.2.2, and 5.2.3 shall not apply during start-up or shutdown provided an operator complies with the requirements specified in Sections 5.3.1 through 5.3.4. The duration of each start-up or each shutdown shall not exceed two hours unless the APCO has approved an application for a Permit to Operate condition submitted by the operator to allow more than two hours for each start-up or each shutdown. The emission control system shall be in operation and emissions shall be minimized insofar as technologically feasible during start-up and shutdown.

The existing steam generators utilize ultra-low NO_X burners and FGR to comply with the emission limits of this rule. Ultra-low NO_X burners will generally achieve their rated emissions within a few minutes of initial start-up and do not require a special shutdown procedure and the applicant has not requested to include startup and shutdown provisions in the ATC permits; therefore, during start-up and shutdown the existing steam generators will be required to comply with same emission limits as during steady state operation. Therefore, specific provisions allowing higher emission rates during start-up and shutdown are not necessary and the requirements of this section are not applicable to these units.

Section 5.4 - Monitoring Provisions

Section 5.4.1 specifies requirements for units that simultaneously fire gaseous and liquid fuels.

The units addressed in this project will only be fueled with gaseous fuel. Therefore, the requirements of this section are not applicable.

Section 5.4.2 requires that for permit units subject to District Rule 4306, Section 5.1 emissions limits the operator shall either install and maintain an APCO-approved Continuous Emissions Monitoring System (CEMS) for NO_X, CO and O_2, or shall implement an APCO-approved Alternate Monitoring System.

In order to satisfy the monitoring requirements of District Rule 4306 the applicant has proposed to use pre-approved alternate monitoring scheme A (pursuant to District Policy SSP-1105), which requires that monitoring of NO_X, CO, and O_2 exhaust concentrations shall be conducted at least once per month (in which a source test is not performed) using a portable analyzer.

The following conditions will be included in the ATC permits to incorporate the requirements of the proposed alternate monitoring plan.

- 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. 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 month. [District Rules 2201, 4305, 4306, and 4320]

- If either the NOx or CO concentrations corrected to 3% O2, as measured by the portable analyzer, exceed the allowable emissions concentration, the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 1 hour of operation after detection. If the portable analyzer readings continue to exceed the allowable emissions concentration after 1 hour of operation after detection, the permittee shall notify the District within the following 1 hour and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100. [District Rules 2201, 4305, 4306, and 4320]

- All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rules 2201, 4305, 4306, and 4320]

- The permittee shall maintain records of: (1) the date and time of NOx, CO, and O2 measurements, (2) the O2 concentration in percent and the measured NOx and CO concentrations corrected to 3% O2, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, and (5) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 2201, 4305, 4306, and 4320]

Section 5.4.3 specifies monitoring requirements for units that are limited to less than 9 billion Btu per calendar year heat input.

As discussed above, the units addressed in this project will not be limited to less than 9 billion Btu per calendar year heat input. Therefore, the requirements of Section 5.4.3 are not applicable to these units.

Section 5.4.4 requires that the operator of any Section 5.1, Table 1 Category H units and Section 5.1, Table 2 Category E units that are limited to heat inputs of 9 billion Btu to 30 billion Btu/year, and any units that are limited to less than 9 billion Btu per calendar year heat input and subject to the requirements of Section 5.2 shall install and maintain an operational non-resettable, totalizing mass or volumetric flow meter in each fuel line to each unit or, if approved by the APCO in writing, install and maintain a master meter, which measures fuel to all units in a group of similar units to satisfy these requirements. Volumetric flow measurements shall be periodically compensated for temperature and pressure.

As discussed above, the annual heat input of the units addressed in this project will not be limited. Therefore, the requirements of Section 5.4.4 are not applicable.

Section 5.4.5 stipulates 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. The operator shall source test over the proposed range of surrogate operating parameters to demonstrate compliance with the applicable emission standards.

Section 5.5 - Compliance Determination

Section 5.5.1 requires that the operator of any unit shall have the option of complying with either the applicable heat input (lb/MMBtu) emission limits or the concentration (ppmv) emission limits specified in Section 5.1. The emission limits selected to demonstrate compliance shall be specified in the source test proposal pursuant to Rule 1081 (Source Sampling).

Therefore, the following condition will be included on the ATC permits for the steam generators:

- The source test plan shall identify which basis (ppmv or lb/MMBtu) will be used to demonstrate compliance. [District Rules 2201, 4305, 4306, and 4320]

Section 5.5.2 requires that all emissions measurements shall be made with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to

Operate. No determination of compliance shall be established within two hours after a continuous period in which fuel flow to the unit is shut off for 30 minutes or longer, or within 30 minutes after a re-ignition as defined in Section 3.0.

Therefore, the following condition will be included on the ATC permits:

- All emissions measurements shall be made with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. No determination of compliance shall be established within two hours after a continuous period in which fuel flow to the unit is shut off for 30 minutes or longer, or within 30 minutes after a re-ignition as defined in Section 3.0 of District Rule 4306. [District Rules 2201, 4305, 4306, and 4320]

Section 5.5.3 requires that Continuous Emissions Monitoring System (CEMS) emissions measurements shall be averaged over a period of 15 consecutive minutes to demonstrate compliance with the applicable emission limits and stipulates that any 15-consecutive-minute block average CEMS measurement exceeding the applicable emission limits shall constitute a violation. The units addressed in this project will not be equipped with a CEMS; therefore, this section is not applicable.

Section 5.5.4 requires that for emissions monitoring pursuant to Sections 5.4.2, 5.4.2.1, and 6.3.1 using a portable NO_X analyzer as part of an APCO approved Alternate Emissions Monitoring System, emission readings 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 condition will be included on the ATC permits:

- All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rules 2201, 4305, 4306, and 4320]

Section 5.5.5 requires that for emissions source testing performed pursuant to Section 6.3.1 for the purpose of determining compliance with an applicable standard or numerical limitation of this rule, 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.

Therefore, the following condition will be included on the ATC permits:

- For emissions source testing, the arithmetic average of three 30-consecutive-minute test runs shall apply. If two of three runs are above an applicable limit the test cannot be used to demonstrate compliance with an applicable limit. [District Rules 1081, 4305, 4306, and 4320]

Section 6.1 - Recordkeeping

Section 6.1 stipulates that the records required by Sections 6.1.1 through 6.1.4 shall be maintained for five calendar years and shall be made available to the APCO upon request. Failure to maintain records or information contained in the records that demonstrate noncompliance with the applicable requirements of this rule shall constitute a violation of Rule 4306.

The following condition will be included on the ATC permits for the steam generators:

- All records shall be maintained for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rules 1070, 2201, 4305, 4306, and 4320, and 40 CFR Part 60, Subpart Dc]

Section 6.1.1 requires that the operator of any unit operated under the exemption of Section 4.2 for firing of fuels other than California PUC quality natural gas during California PUC quality natural gas curtailment shall monitor and record, for each unit, the cumulative annual hours of operation on each fuel other than natural gas during periods of natural gas curtailment and equipment testing and shall record the NO_X emission concentration, expressed in ppmv or lb/MMBtu, for each unit that is operated during periods of natural gas curtailment.

The units addressed in this project are not restricted to using only PUC quality natural gas and the applicant has not requested to utilize the exemption in Section 4.2; therefore, conditions for compliance with this section will not be included on the permits.

Section 6.1.2 requires that the operator of any Section 5.1, Table 1 Category H units and Section 5.1, Table 2 Category E units that are limited to heat inputs of 9 billion Btu to 30 billion Btu/year, and any units that are limited to less than 9 billion Btu per calendar year heat input and subject to the requirements of Section 5.2 shall record the amount of fuel use at least on a monthly basis for each unit, or for a group of units as specified in Section 5.4.4.

As discussed above, the annual heat input of the units addressed in this project will not be limited. Therefore, the requirements of this section are not applicable.

Section 6.1.3 requires that the operator of a unit subject to Sections 5.5.1 or 6.3.1 shall maintain records to verify that the required tune-up and the required monitoring of the operational characteristics have been performed. The units are not subject to Sections 5.5.1 or 6.3.1; therefore, the requirements of this section are not applicable.

Section 6.1.4 requires that the operator of a unit with start-up or shutdown provisions keep records of the duration of the start-up or shutdowns. As discussed above, the steam generators

addressed in this project will utilize start-up or shutdown provisions; therefore, this section is not applicable.

Section 6.2 - Test Methods

Section 6.2 requires the test methods listed in the following table to be used for source testing measurements of the pollutants and parameters listed unless otherwise approved by the APCO and EPA.

Rule 4306 Test Methods	
Compound or Parameter Measured	**Approved Test Methods**
HHV for liquid hydrocarbon fuels	American Society for Testing and Materials (ASTM) D 240 or D 4809
HHV for gaseous fuels	ASTM D 1826 or D 1945 in conjunction with ASTM D 3588
NO_X (in ppmv)	EPA Method 7E or ARB Method 100
CO (in ppmv)	EPA Method 10 or ARB Method 100
Stack Gas O_2	EPA Method 3 or 3A, or ARB Method 100
NO_X Emission Rate (Heat Input Basis)	EPA Method 19
Stack Gas Velocities	EPA Method 2
Stack Gas Moisture Content	EPA Method 4

The following condition will be included on the ATC permits to ensure compliance with the requirements of Section 6.2 of District Rule 4306.

- NOx emissions for source test purposes shall be determined using EPA Method 7E or ARB Method 100 on a ppmv basis, or EPA Method 19 on a heat input basis. [District Rules 4305, 4306, and 4320]

- CO emissions for source test purposes shall be determined using EPA Method 10 or ARB Method 100. [District Rules 4305, 4306, and 4320]

- Stack gas oxygen (O2) shall be determined using EPA Method 3 or 3A or ARB Method 100. [District Rules 4305, 4306, and 4320]

- 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 and the District and EPA. [District Rules 2201, 4306, and 4320]

Section 6.3 - Compliance Testing

Section 6.3.1 requires that these units be tested to determine compliance with the applicable requirements of section 5.1 not less than once every 12 months (no more than 30 days before or after the required annual source test date). Units that demonstrate compliance on two consecutive 12-month source tests may defer the following 12-month source test for up to 36

months (no more than 30 days before or after the required 36-month source test date). During the 36-month source testing interval, the operator shall tune the unit in accordance with the provisions of Section 5.2.1, and shall monitor, on a monthly basis, the unit's operational characteristics recommended by the manufacturer to ensure compliance with the applicable emission limits specified in Sections 5.1 or 5.2.3. Tune-ups required by Sections 5.2.1 and 6.3.1 do not need to be performed for units that operate and maintain an APCO approved CEMS or an APCO approved Alternate Monitoring System where the applicable emission limits are periodically monitored. If the result of the 36-month source test demonstrates that the unit does not meet the applicable emission limits specified in Sections 5.1 or 5.2.3, the source testing frequency shall revert to at least once every 12 months. Failure to comply with the requirements Section 6.3.1, or any source test results that exceed the applicable emission limits in Sections 5.1 or 5.2.3 shall constitute a violation of Rule 4306.

Initial source testing will be required for each of the steam generators within 60 days of initial operation under the ATC permits and at least once every 12 months until compliance has been demonstrated on two consecutive 12-month source tests, after which source testing may be performed at least once every 36-months. The following conditions will be included on the ATC permits.

ATCs S-3088-7-12, -20-10, & -24-8: 62.5 MMBtu/hr Steam Generators

- Source testing to measure NOx, CO, and VOC emissions from this unit shall be conducted within 60 days of initial operation of the unit under this Authority to Construct (ATC) permit. [District Rules 2201, 4306, and 4320]

- Source testing to measure NOx and CO emissions from this unit shall be conducted at least once every twelve (12) months. After demonstrating compliance on two (2) consecutive annual source tests, the unit shall be tested not less than once every thirty-six (36) months. If the result of the 36-month source test demonstrates that the unit does not meet the applicable emission limits, the source testing frequency shall revert to at least once every twelve (12) months. [District Rules 2201, 4305, 4306, and 4320]

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

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

Section 6.3.2 specifies the requirements for representative source testing of a group of units. Representative source testing of a group of units has not been proposed for the units addressed in this project. Therefore, the requirements of this section are not applicable.

Section 6.4 - Emission Control Plan (ECP)

Section 6.4.1 requires that the operator of any unit shall submit to the APCO for approval an Emissions Control Plan according to the compliance schedule in Section 7.0 of Rule 4306.

The existing units currently comply with the applicable Tier 1 NO_X and CO emissions limits listed in Table 1 of Section 5.1 and the periodic monitoring and source testing requirements required by this rule. The applicant has submitted this ATC application to modify the existing units to comply with the applicable Tier 2 emission limits of Rule 4306. Therefore, this section is satisfied.

Section 7.0 - Compliance Schedule

Section 7.0 requires that an operator of a unit subject to Rule 4306 must comply with the applicable deadlines for submittal of an Emission Control Plan and ATC application and the applicable deadlines for demonstration of compliance with the rule requirements.

The existing units currently comply with the applicable Tier 1 NO_X and CO emissions limits of Rule 4306 and the proposed ATC permits require compliance with the applicable Tier 2 emission limits of Rule 4306. Therefore, compliance with the requirements of this section is expected.

Conclusion

Conditions will be incorporated into the ATC permits to address compliance with the applicable sections of this rule (see draft ATCs in Appendix B). Therefore, compliance with the requirements of District Rule 4306 is expected.

Rule 4320 Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters greater than 5.0 MMBtu/hr

The purpose of this rule is to limit emissions of oxides of nitrogen (NO_X), carbon monoxide (CO), oxides of sulfur (SO_2), and particulate matter 10 microns or less (PM_{10}) from boilers, steam generators, and process heaters. This rule applies to any gaseous fuel or liquid fuel fired boiler, steam generator, or process heater with a total rated heat input greater than 5 million Btu per hour.

The existing 62.5 MMBtu/hr natural gas/oilfield produced gas-fired steam generators addressed in this project (ATCs S-3088-7-12, -20-10, and -24-8) are subject to District Rule 4320.

Section 5.0 - Requirements

Section 5.1 requires that units that are subject to District Rule 4320 must:

1) Operate the unit to comply with the emission limits specified in Sections 5.2 and 5.4;
2) Pay an annual emissions fee to the District as specified in Section 5.3 and comply with the control requirements specified in Section 5.4; or
3) Comply with the applicable Low-use Unit requirements of Section 5.5

The applicant has chosen to comply with the emission limits specified in Sections 5.2 and 5.4.

Section 5.2 - NO_X and CO Emissions Limits

Section 5.2 requires that units subject to this section shall not be operated in a manner which exceeds the applicable NO_X emissions limit specified in Table 1 - Tier 1 NO_X Emissions Limits (until December 31, 2023) and Table 2 - Tier 2 NO_X Emissions Limits (on and after December 31, 2023). Section 5.2 also requires that units subject to this section shall not be operated in a manner to which exceeds a CO emissions limit of 400 ppmv. All ppmv emission limits specified in Section 5.2 are referenced at dry stack gas conditions and 3.00 percent by volume stack gas oxygen (O_2). Emission concentrations shall be corrected to 3.00 percent oxygen in accordance with Section 8.1.

The existing 62.5 MMBtu/hr natural gas/oilfield produced gas-fired steam generators addressed in this project are oilfield steam generators with a total rated heat input greater than 20.0 MMBtu/hr but no more than 75.0 MMBtu/hr; therefore, they are subject to the applicable NO_X limits listed in District Rule 4320, Section 5.2, Table 1, Category C.2 and Table 2, Category C.2, as shown in the tables below.

Rule 4320, Table 1: Tier 1 NOx Emission Limits			
Category	**NO_X Limit**	**Authority to Construct**	**Compliance Deadline**
C. Oilfield Steam Generators			
1. Units with a total rated heat input > 5.0 MMBtu/hr and ≤ 20.0 MMBtu/hr	a) Standard Schedule 9 ppmv or 0.011 lb/MMBtu; or	July 1, 2011	July 1, 2012
	b) Enhanced Schedule 6 ppmv or 0.007 lb/MMBtu	January 1, 2013	January 1, 2014
2. Units with a total rated heat input > 20.0 MMBtu/hr	a) Standard Schedule 7 ppmv or 0.008 lb/MMBtu; or	July 1, 2009	July 1, 2010
	b) Staged Enhanced Schedule Initial Limit 9 ppmv or 0.011 lb/MMBtu; and	July 1, 2011	July 1, 2012
	Final Limit 5 ppmv or 0.0062 lb/MMBtu	January 1, 2013	January 1, 2014
3. Units firing on less than 50%, by volume, PUC quality gas	Staged Enhanced Schedule Initial Limit 12 ppmv or 0.0145 lb/MMBtu; and	July 1, 2010	July 1, 2011
	Final Limit 9 ppmv or 0.0011 lb/MMBtu	January 1, 2013	January 1, 2014

Rule 4320, Table 2: Tier 2 NO_X Limits				
Category	**NO_X Limit**	**Emission Control Plan**	**Authority to Construct**	**Compliance Deadline**
C. Oilfield Steam Generators				
1. Units with a total rated heat input > 5.0 MMBtu/hr and ≤ 20.0 MMBtu/hr	6 ppmv or 0.0073 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023
2. Units with a total rated heat input > 20.0 MMBtu/hr and ≤ 75.0 MMBtu/hr	5 ppmv or 0.0061 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023
3. Units with a total rated heat input > 75.0 MMBtu/hr	5 ppmv or 0.0061 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023
4. Units firing on less than 50%, by volume, PUC quality gas	5 ppmv or 0.0061 lb/MMBtu	May 1, 2022	May 1, 2022	December 31, 2023

The following conditions that require compliance with the applicable Tier 1 and Tier 2 NO_X and CO emission limits will be included on the ATC permits:

ATC S-3088-7-12

- Emissions from this steam generator shall not exceed any of the following limits: 5 ppmvd NOx @ 3% O2 and 0.0063 lb-NOx/MMBtu, 0.219 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu, 104 ppmvd CO @ 3% O2 and 0.080 lb-CO/MMBtu, or 0.0027 lb-VOC/MMBtu (as CH4). [District Rules 2201, 4305, 4306, 4320, 4405, 4406, and 4801]

ATC S-3088-20-10

- Emissions from this steam generator shall not exceed any of the following limits: 5 ppmvd NOx @ 3% O2 and 0.0063 lb-NOx/MMBtu, 0.219 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu, 47.5 ppmvd CO @ 3% O2 and 0.036 lb-CO/MMBtu, or 0.0027 lb-VOC/MMBtu (as CH4). [District Rules 2201, 4305, 4306, 4320, 4405, and 4801]

ATC S-3088-24-8

- Emissions from this steam generator shall not exceed any of the following limits: 5 ppmvd NOx @ 3% O2 and 0.0063 lb-NOx/MMBtu, 0.219 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu, 46 ppmvd CO @ 3% O2 and 0.035 lb-CO/MMBtu, or 0.0027 lb-VOC/MMBtu (as CH4). [District Rules 2201, 4305, 4306, 4320, 4405, and 4801]

Therefore, the steam generators are expected to comply with the applicable Tier 1 and Tier 2 emission limits in Section 5.2 of Rule 4320.

Section 5.3 - Annual Fee Calculation

Section 5.3 specifies requirements for the payment of annual emission fees for units that do not comply with the emission limits in Section 5.2 of Rule 4320.

The ATC permits for the steam generators will require compliance with the applicable Tier 1 and Tier 2 NO_X emission limits in Section 5.2; therefore, this section is not applicable to these units.

Section 5.4 - Particulate Matter Control Requirements

Section 5.4.1 of this rule requires the operator of a unit to comply with one of the following requirements for control of particulate matter (PM):

1) Operators shall fire units exclusively on PUC-quality natural gas, commercial propane, butane, or liquefied petroleum gas, or a combination of such gases;
2) Operators shall limit fuel sulfur content to no more than five (5) grains of total sulfur per one hundred (100) standard cubic feet; or
3) operators shall install and properly operate an emission control system that reduces SO_2 emissions by at least 95% by weight; or limit exhaust SO2 to less than or equal to 9 ppmv corrected to 3.0% O_2

The following condition will be included on the ATC permits for the steam generators:

- This unit shall comply with one of the following options for control of SOx and particulate matter (PM) emissions: 1) The total sulfur content of the fuel gas used this steam generator shall not exceed 1 grain S per 100 standard cubic feet (1 gr-S/100 scf); or 2) A scrubber that reduces SOx emissions by at least 95% by weight shall be installed and properly operated; or 3) The SO2 concentration in the exhaust of this unit shall not exceed 9 ppmv SO2 corrected to 3.0% O2. [District Rules 2201 and 4320]

- Records shall be maintained of the dates that each specific option is used to comply with the SOx and PM control requirements of this permit. [District Rules 1070, 2201, and 4320]

Section 5.4.2 requires that liquid fuel shall be used only during PUC quality natural gas curtailment periods, provided the requirements of Sections 4.2 and 6.1.5 are met and the fuel contains no more than 15 ppm sulfur, as determined by the test method specified in Section 6.2.

The units addressed in this project are only permitted to use gaseous fuels; therefore, this section is not applicable.

Section 5.5 - Low Use

Section 5.5 specifies requirements for units with maximum annual heat input limits of less than 1.8 billion Btus per calendar year. As discussed above, the annual heat input of the units addressed in this project will not be limited. Therefore, the requirements of this section are not applicable.

Section 5.6 - Startup and Shutdown Provisions

Section 5.6 states that on and after the full compliance deadline in Section 5.0, the applicable emission limits of Sections 5.2, Table 1 and Table 2, and 5.5.2 shall not apply during start-up or shutdown provided an operator complies with the requirements specified in Sections 5.6.1 through 5.6.5. The duration of each start-up or each shutdown shall not exceed two hours unless the APCO has approved an application for a Permit to Operate condition submitted by the operator to allow more than two hours for each start-up or each shutdown. The emission control system shall be in operation and emissions shall be minimized insofar as technologically feasible during start-up and shutdown.

The existing steam generators utilize ultra-low NO_X burners and FGR to comply with the emission limits of this rule. Ultra-low NO_X burners will generally achieve their rated emissions within a few minutes of initial start-up and do not require a special shutdown procedure and the applicant has not requested to include startup and shutdown provisions in the ATC permits; therefore, during start-up and shutdown the existing steam generators will be required to comply with same emission limits as during steady state operation. Therefore, specific provisions allowing higher emission rates during start-up and shutdown are not required and the requirements of this section are not applicable to these units.

Section 5.7 - Monitoring Provisions

Section 5.7.1 requires that for permit units subject to District Rule 4320, Section 5.2 emissions limits the operator shall either install and maintain an APCO-approved Continuous Emissions Monitoring System (CEMS) for NO_X, CO and O_2, or shall implement an APCO-approved Alternate Monitoring System.

In order to satisfy the monitoring requirements of District Rule 4320 the applicant has proposed to use pre-approved alternate monitoring scheme A (pursuant to District Policy SSP-1105), which requires that monitoring of NO_X, CO, and O_2 exhaust concentrations shall be conducted at least once per month (in which a source test is not performed) using a portable analyzer.

The following conditions will be included in the ATC permits to incorporate the requirements of the proposed alternate monitoring plan.

- 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. 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 month. [District Rules 2201, 4305, 4306, and 4320]

- If either the NOx or CO concentrations corrected to 3% O2, as measured by the portable analyzer, exceed the allowable emissions concentration, the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 1 hour of operation after detection. If the portable analyzer readings continue to exceed the allowable emissions concentration after 1 hour of operation after detection, the permittee shall notify

the District within the following 1 hour and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100. [District Rules 2201, 4305, 4306, and 4320]

- All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rules 2201, 4305, 4306, and 4320]

- The permittee shall maintain records of: (1) the date and time of NOx, CO, and O2 measurements, (2) the O2 concentration in percent and the measured NOx and CO concentrations corrected to 3% O2, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, and (5) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 2201, 4305, 4306, and 4320]

Sections 5.7.2 and 5.7.3 specify monitoring requirements for units that are subject to the low use requirements specified in Section 5.5. As discussed above, the units addressed in this project are not subject to the low use requirements of Section 5.5. Therefore, the requirements of Sections 5.7.2 and 5.7.3 are not applicable to these units.

Section 5.7.4 allows units operated at seasonal sources and subject to 40 CFR 60 Subpart Db to install a parametric monitoring system in lieu of a CEMS. The units addressed in this project are not operated at a seasonal source and are not subject to 40 CFR 60 Subpart Db. Therefore, this section is not applicable to these units.

5.7.6 - Monitoring SO_X Emissions

Section 5.7.6.1 requires that operators complying with Sections 5.4.1.1 or 5.4.1.2 shall provide an annual fuel analysis to the District unless a more frequent sampling and reporting period is included in the Permit to Operate. Sulfur analysis shall be performed in accordance with the test methods in Section 6.2.

Section 5.7.6.2 requires operators complying with Section 5.4.1.3 by installing and operating a control device with 95% SO_X reduction shall propose the key system operating parameters and frequency of the monitoring and recording. The monitoring option proposed shall be submitted for approval by the APCO.

Section 5.7.6.3 requires operators complying with Section 5.4.1.3 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 6.2.

The following conditions will be included on the ATC permits for the steam generators to address the requirements of this section:

- When complying with the SOx and PM control requirements of this permit by limiting the total sulfur content of the fuel gas or by reducing SOx emissions by at least 95% using a scrubber that removes sulfur compounds from the gas prior to combustion, laboratory analysis to determine the sulfur content of the fuel gas or the control efficiency of the scrubber shall be performed at least annually using EPA Method 11 or EPA Method 15, as appropriate; ASTM Method D1072, D1945, D3246, D4084, D4468, or D5504; grab sample analysis by GC-FPD/TCD performed in the laboratory; or other methods approved by the District and EPA. Records of the fuel sulfur analyses shall be maintained and provided to the District upon request. [District Rules 2201 and 4320]

- For natural gas that is regulated by the California Public Utilities Commission (PUC) or Federal Energy Regulatory Commission (FERC), valid purchase contracts, supplier certifications, tariff sheets, transportation contracts, or other documentation may be used to satisfy the fuel sulfur content analysis, provided they establish the fuel sulfur content as required by this permit. [District Rules 2201 and 4320]

- When complying with the SOx and PM control requirements of this permit by using a post-combustion scrubber that reduces SOx emissions by at least 95% by weight or limiting the exhaust SO2 concentration to 9 ppmv corrected to 3.0% O2, source testing of SOx emissions from this unit to demonstrate compliance with the required SOx emission reduction percentage or SO2 exhaust concentration limit shall be performed at least annually. [District Rules 1081, 2201, and 4320]

- When complying with the SOx and PM control requirements of this permit by using a scrubber that reduces SOx emissions by at least 95% by weight, the operator shall monitor key system operating parameters that indicate proper operation of the scrubber (e.g. inlet and outlet H2S concentrations for scrubbers that remove H2S prior to combustion) at least once every week. Records of monitoring of the key system operating parameters of the scrubber shall be maintained. [District Rules 2201 and 4320]

Section 5.8 - Compliance Determination

Section 5.8.1 requires that the operator of any unit shall have the option of complying with either the applicable heat input (lb/MMBtu) emission limits or the concentration (ppmv) emission limits specified in Section 5.2.

Therefore, the following condition will be included on the ATC permits for the steam generators:

- The source test plan shall identify which basis (ppmv or lb/MMBtu) will be used to demonstrate compliance. [District Rules 2201, 4305, 4306, and 4320]

Section 5.8.2 requires that all emissions measurements shall be made with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate.

Therefore, the following condition will be included on the ATC permits:

- All emissions measurements shall be made with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. No determination of compliance shall be established within two hours after a continuous period in which fuel flow to the unit is shut off for 30 minutes or longer, or within 30 minutes after a re-ignition as defined in Section 3.0 of District Rule 4306. [District Rules 2201, 4305, 4306, and 4320]

Section 5.8.3 requires that Continuous Emissions Monitoring System (CEMS) emissions measurements shall be averaged over a period of 15 consecutive minutes to demonstrate compliance with the applicable emission limits and stipulates that any 15-consecutive-minute block average CEMS measurement exceeding the applicable emission limits shall constitute a violation.

The units addressed in this project are not subject to the emission limits in Section 5.2 and will not be equipped with CEMS; therefore, this section is not applicable.

Section 5.8.4 requires that for emissions monitoring pursuant to Sections 5.7.1 and 6.3.1 using a portable NO_X analyzer as part of an APCO approved Alternate Emissions Monitoring System, emission readings 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 condition will be included on the ATC permits:

- All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rules 2201, 4305, 4306, and 4320]

Section 5.8.5 requires that for emissions source testing performed pursuant to Section 6.3.1 for the purpose of determining compliance with an applicable standard or numerical limitation of this rule, 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.

Therefore, the following condition will be included on the ATC permits:

- For emissions source testing, the arithmetic average of three 30-consecutive-minute test runs shall apply. If two of three runs are above an applicable limit the test cannot be used to demonstrate compliance with an applicable limit. [District Rules 1081, 4305, 4306, and 4320]

Section 6.1 - Recordkeeping

Section 6.1 stipulates that the records required by Sections 6.1.1 through 6.1.5 shall be maintained for five calendar years and shall be made available to the APCO upon request. Failure to maintain records or information contained in the records that demonstrate noncompliance with the applicable requirements of this rule shall constitute a violation of Rule 4320.

The following condition will be included on the ATC permits:

- All records shall be maintained for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rules 1070, 2201, 4305, 4306, and 4320, and 40 CFR Part 60, Subpart Dc]

Section 6.1.1 requires that the operator of any unit operated under the exemption of Section 4.2 for firing of fuels other than California PUC quality natural gas during California PUC quality natural gas curtailment shall monitor and record, for each unit, the cumulative annual hours of operation on each fuel other than natural gas during periods of natural gas curtailment and equipment testing and shall record the NO_X emission concentration, expressed in ppmv or lb/MMBtu, for each unit that is operated during periods of natural gas curtailment.

The units addressed in this project are not restricted to using only PUC quality natural gas and the applicant has not requested to utilize the exemption of Section 4.2; therefore, conditions for compliance with this section will not be included on the permits.

Section 6.1.2 requires that the operator of a unit subject to Section 5.5 shall record the amount of fuel use at least on a monthly basis. The units are not subject to Section 5.5; therefore, Section 6.1.2 is not applicable.

Section 6.1.3 requires that the operator of a unit subject to Sections 5.5.1 or 6.3.1 shall maintain records to verify that the required tune-up and the required monitoring of the operational characteristics have been performed. The units are not subject to Sections 5.5.1 or 6.3.1; therefore, the requirements of this section are not applicable.

Section 6.1.4 requires that the operator of a unit with start-up or shutdown provisions keep records of the duration of the start-up or shutdowns.

As discussed above, the units addressed in this project will not utilize start-up or shutdown provisions; therefore, this section is not applicable.

Section 6.1.5 requires that the operator of a unit fired on liquid fuel during PUC quality natural gas curtailment periods record the sulfur content of the fuel, the amount of fuel used, and the duration of the natural gas curtailment period.

The units addressed in this project will only be permitted to use gaseous fuels; therefore, the requirements of this section are not applicable.

Section 6.2 - Test Methods

Section 6.2 requires the test methods listed in the following table shall be used for source testing measurements of the pollutants and parameters listed unless otherwise approved by the APCO and EPA.

Rule 4320 Test Methods	
Compound or Parameter Measured	**Approved Test Methods**
HHV for liquid hydrocarbon fuels	American Society for Testing and Materials (ASTM) D 240 or D 4809
HHV for gaseous fuels	ASTM D 1826 or D 1945 in conjunction with ASTM D 3588
NO_X (in ppmv)	EPA Method 7E or ARB Method 100
CO (in ppmv)	EPA Method 10 or ARB Method 100
Stack Gas O_2	EPA Method 3 or 3A, or ARB Method 100
NO_X Emission Rate (Heat Input Basis)	EPA Method 19
Stack Gas Velocities	EPA Method 2
Stack Gas Moisture Content	EPA Method 4
SO_X	EPA Method 6C, EPA Method 8, or ARB Method 100
Determination of total sulfur as hydrogen sulfide (H_2S) content	EPA Method 11 or EPA Method 15, as appropriate
Sulfur content of liquid fuel	ASTM D 5453

The following conditions will be included on the ATC permits to ensure compliance with the requirements of Section 6.2 of District Rule 4320.

- NOx emissions for source test purposes shall be determined using EPA Method 7E or ARB Method 100 on a ppmv basis, or EPA Method 19 on a heat input basis. [District Rules 4305, 4306, and 4320]

- CO emissions for source test purposes shall be determined using EPA Method 10 or ARB Method 100. [District Rules 4305, 4306, and 4320]

- Stack gas oxygen (O2) shall be determined using EPA Method 3 or 3A or ARB Method 100. [District Rules 4305, 4306, and 4320]

- SOx emissions for source test purposes shall be determined using EPA Method 6C, EPA Method 8, or ARB Method 100. [District Rule 4320]

- 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 EPA and the District. [District Rules 2201, 4306, and 4320]

Section 6.3 - Compliance Testing

Section 6.3.1 requires that this unit be tested to determine compliance with the applicable requirements of section 5.2 not less than once every 12 months (no more than 30 days before or after the required annual source test date).

Pursuant to Section 6.3.1.1, units that demonstrate compliance on two consecutive 12-month source tests may defer the following 12-month source test for up to 36 months (no more than 30 days before or after the required 36-month source test date). During the 36-month source testing interval, the operator shall tune the unit in accordance with the provisions of Section 5.5.1, and shall monitor, on a monthly basis, the unit's operational characteristics recommended by the manufacturer to ensure compliance with the applicable emission limits specified in Section 5.2.

Pursuant to Section 6.3.1.2, tune-ups required by Sections 5.5.1 and 6.3.1 do not need to be performed for units that operate and maintain an APCO approved CEMS or an APCO approved Alternate Monitoring System where the applicable emission limits are periodically monitored.

Pursuant to Section 6.3.1.3, if the result of the 36-month source test demonstrates that the unit does not meet the applicable emission limits specified in Section 5.2, the source testing frequency shall revert to at least once every 12 months.

Initial source testing will be required for each of the steam generators within 60 days of initial operation under the ATC permits and at least once every 12 months until compliance has been demonstrated on two consecutive 12-month source tests, after which source testing may be performed at least once every 36-months. The following conditions will be included on the ATC permits.

ATCs S-3088-7-12, -20-10, & -24-8: 62.5 MMBtu/hr Steam Generators

- Source testing to measure NOx, CO, and VOC emissions from this unit shall be conducted within 60 days of initial operation of the unit under this Authority to Construct (ATC) permit. [District Rules 2201, 4306, and 4320]

- Source testing to measure NOx and CO emissions from this unit shall be conducted at least once every twelve (12) months. After demonstrating compliance on two (2) consecutive annual source tests, the unit shall be tested not less than once every thirty-six (36) months. If the result of the 36-month source test demonstrates that the unit does not meet the applicable emission limits, the source testing frequency shall revert to at least once every twelve (12) months. [District Rules 2201, 4305, 4306, and 4320]

- Source testing shall be conducted using the methods and procedures approved by the District. The District must be notified at least 30 days prior to any compliance source test,

and a source test plan must be submitted for approval at least 15 days prior to testing. [District Rule 1081]

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

Section 6.4 - Emission Control Plan (ECP)

Section 6.4.1 requires that the operator of any unit shall submit to the APCO for approval an Emissions Control Plan according to the compliance schedule in Section 7.0 of Rule 4320.

The existing units currently comply with the applicable Tier 1 NO_X and CO emissions limits listed in Table 1 of Section 5.2 and the periodic monitoring and source testing requirements required by this rule. The applicant has submitted this ATC application to modify the existing units to comply with the applicable Tier 2 emission limits of Rule 4320. Therefore, this section is satisfied.

Section 7.0 - Compliance Schedule

Section 7.0 requires that an operator of a unit subject to Rule 4320 must comply with the applicable deadlines for submittal of an Emission Control Plan and ATC application and the applicable deadlines for demonstration of compliance with the rule requirements.

The existing units currently comply with Rule 4320 through payment annual emissions fees for NO_X emissions. The proposed ATC permits will require compliance with the applicable Tier 2 emission limits of Rule 4320. Therefore, compliance with the requirements of this section is expected.

Conclusion

Conditions will be incorporated into the ATC permits to address compliance with the applicable sections of this rule (see draft ATCs in Appendix B). Therefore, compliance with the requirements of District Rule 4320 is expected.

Rule 4351 Boilers, Steam Generators and Process Heaters – Phase 1

The purpose of this rule is to limit emissions of oxides of nitrogen (NO_X) from boilers, steam generators, and process heaters to levels consistent with Reasonably Available Control Technology (RACT).

This rule applies to any boiler, steam generator or process heater, with a rated heat input greater than 5 million Btu per hour that is fired with gaseous and/or liquid fuels, and is included in a major NO_X source. This rule does not apply to any unit located west of Interstate Highway 5 located in Fresno County, Kern County, or Kings County.

The units addressed in this project are located west of Interstate Highway 5 in Kern County. Therefore, this rule does not apply.

Rule 4405 Oxides of Nitrogen Emissions from Existing Steam Generators Used in Thermally Enhanced Oil Recovery – Central and Western Kern County Fields

This rule incorporates the requirements of previous Kern County Air Pollution Control District (KCAPCD) Rule 425 into District regulations. The purpose of this rule is to limit NO_X emissions from oilfield steam generators. This rule also specifies an implementation schedule. The provisions of this rule apply to existing steam generators that have been operated within Kern County prior to August 22, 1986 and are used in thermally enhanced oil recovery in the Central and Western Kern County Fields.

Section 3.0 – Definitions defines the following terms:

3.1 Existing Steam Generator: a steam generator which has been operated within Kern County prior to August 22, 1986 and has a current Permit to Operate.

3.2 Large Steam Generator: a steam generator which has a heat input capacity of thirty-five million BTUs per hour or greater.

3.3 Small Producer: a person, including any business entity which on March 6, 1980 had petroleum business interests solely in drilling and producing crude oil and gas and has a total maximum steam generator heat input of less than or equal to 500 million BTU/hour.

3.4 Small Steam Generator: a steam generator which has a heat input capacity greater than fifteen million but less than thirty-five million BTUs per hour.

3.5 Stationary Source: a stationary source as defined in Rule 2201 (New and Modified Stationary Source Review Rule).

3.6 Steam Generator: a combustion device which has a heat input capacity greater than 15 million BTUs per hour and which converts water to dry steam or to a mixture of water vapor and steam, with an absolute pressure of more than thirty pounds per square inch, and which is used in thermally enhanced oil recovery.

The information located in District files indicates that the 62.5 MMBtu/hr steam generators being modified in this project, Permit Units S-3088-7, -20, and -24 (previously KCAPCD Permits 4008-093, 4012-139-D, and 4012-105-K, respectively) are existing large steam generators, as defined in this rule, that have been operated within Kern County prior to August 22, 1986.

Section 4.2 requires that for natural gas fired units, after September 30, 1988, unless another date is prescribed by the provisions of Section 42301.5 California Health and Safety Code, the owner or operator of an existing steam generator shall limit the NO_X emissions from the unit to the following:

4.2.1 For large steam generators operated by small producers, no more than 0.14 pounds of NO_X per million BTU of heat input.

4.2.2 For large steam generators operated by producers other than small producers, no more than 0.14 pounds of NO_X per million BTU of heat input.

4.2.3 For all small steam generators, no more than 0.18 pounds of NO_X per million BTU of heat input.

Section 5.0 - Alternate Emission Limit specifies provisions of provisions for alternative NO_X emission limits for existing steam generator equipped with a "Coen" Low NO_X Burner, installed on or before August 22, 1986 with approved staged combustion NO_X control equipment.

As discussed above, the existing 62.5 MMBtu/hr natural gas/oilfield produced gas-fired steam generators addressed in this project are subject to District Rules 4305, 4306, and 4320. Because the NO_X emission limits and all other applicable requirements of District Rules 4305, 4306, and 4320 are more stringent than the requirements of District Rule 4405, compliance with the requirements of District Rules 4305, 4306, and 4320 will satisfy the requirements of District Rule 4405. Therefore, compliance with Rule 4405 is expected and no further discussion is required.

Rule 4406 Sulfur Compounds from Oil-field Steam Generators-Kern County

This rule incorporates the requirements of previous Kern County Air Pollution Control District (KCAPCD) Rule 424 into District regulations. The purpose of this rule is to limit the emissions of sulfur from oilfield steam generators in Kern County. This rule applies to steam generators used in oilfield operations in Kern County. This rule does not apply to cogeneration facilities.

Section 3.0 – Definitions defines the following terms:

3.1 Cogeneration Facility: a facility which employs technology defined in Sections 25134 of the Public Resources Code, and from which the electricity generated is no less than ten (10) percent and no greater than 90 percent of the useful energy output of the facility.

3.2 Cogeneration technology: according to Public Resources Code, Section 25134 means the use for the generation of electricity of exhaust steam, waste steam, heat, or resultant energy from an industrial, commercial, or manufacturing plant or process, or the use of exhaust steam, waste steam, or heat from a thermal powerplant for an industrial, commercial, or manufacturing plant or process. For purposes of this division, the industrial, commercial, or manufacturing plant or process shall not be considered a thermal powerplant or portion thereof. Cogeneration technology shall not include steam or heat developed solely for electrical power generation.

3.3 Existing Steam Generator: a steam generator for which an authority to construct or a permit to operate was issued prior to September 12, 1979.

3.4 Small Producer: a person, including any business entity, which, on March 6, 1980 had petroleum business interests solely in drilling and producing crude oil and gas.

3.5 Stationary Source: a stationary source as defined in Rule 2092 (Standards for Permits to Operate).

3.6 Steam Generator: a fossil-fuel-fired combustion device which has a rated heat input capacity greater than fifteen million BTUs per hour and which evaporates water to dry steam, or to a mixture of water vapor and steam that has an absolute pressure of more than thirty pounds per square inch.

Based on the information located in District files, Permit Unit S-3088-7 (previously KCAPCD Permit 4008-093) is an existing large steam generator for which an ATC or a PTO was issued prior to September 12, 1979, while Permit Units S-3088-20 and -24 (previously KCAPCD Permits 4012-139-D and 4012-105-K) were first not issued ATCs or PTOs prior to September 12, 1979. Therefore, only Permit Unit S-3088-7 is subject to this rule.

Section 4.0 - Emission Standards requires that the owner or operator of an existing steam generator shall limit the emissions of sulfur compounds from such steam generator in accordance with the following schedule:

4.1 After July 1, 1982, except as provided in Section 8.0, such emissions shall not exceed 0.25 pound of sulfur per million BTU of heat input.

4.2 After July 1, 1984, except as provided in Section 8.0, such emissions shall not exceed 0.11 pound of sulfur per million BTU of heat input.

The sulfur compound emission limits above expressed in terms of SO_X (as SO_2) are calculated as follows:

0.25 lb-S/MMBtu x (64 lb mol-SO_X)/(32 lb mol-S) = 0.50 lb-SO_X/MMBtu

0.11 lb-S/MMBtu x (64 lb mol-SO_X)/(32 lb mol-S) = 0.22 lb-SO_X/MMBtu

Section 5.0 – Increments of Progress specifies the dates by which compliance with the emission limits in Section 4.0 is required.

Section 6.0 – Averaging states that the owner or operator of two or more existing steam generators subject to this rule may satisfy the requirements of Section 4.0 by demonstrating that the total emissions of sulfur compounds from all of its existing steam generators which are located within the same stationary source do not exceed the total emissions of sulfur compounds from its existing steam generators which would result if each of its existing steam generators within the same stationary source which are subject to this rule were operating in compliance with this rule. Emission reductions required on permits issued prior to September 12, 1979 shall be used for averaging purposes under this rule.

The applicant will not use averaging to demonstrate compliance with this rule; therefore, this section is not applicable.

Section 7.0 – Cogeneration Exemptions specifies the requirements for exemption from the rule for existing steam generators that were replaced with a cogeneration facility.

The existing steam generator that is subject to this rule was not replaced with a cogeneration facility by the required date; therefore, this section is not applicable.

Section 8.0 – Small Producer Exemption specifies the requirements for exemption from the rule for existing steam generators that have a heat input rating less than 35 MMBtu/hr and are operated by small producers. The exemption is limited to up to a total heat input of 165 MMBtu/hr for any one small producer.

This facility is a small producer; however, existing steam generator that is subject to this rule does not have a heat input rating less than 35 MMBtu/hr; therefore, this section is not applicable.

As mentioned above, based on the information located in District files, only Permit Unit S-3088-7 (previously KCAPCD Permit 4008-093) is subject to this rule. The following conditions that require compliance with this rule will be included on the ATC permit.

ATC S-3088-7-12

- Emissions from this steam generator shall not exceed any of the following limits: 5 ppmvd NOx @ 3% O2 and 0.0063 lb-NOx/MMBtu, 0.219 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu, 104 ppmvd CO @ 3% O2 and 0.080 lb-CO/MMBtu, or 0.0027 lb-VOC/MMBtu (as CH4). [District Rules 2201, 4305, 4306, 4320, 4405, 4406, and 4801]

Rule 4801 Sulfur Compounds

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

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

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

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

Where:

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

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

The maximum concentration of sulfur compounds emitted from the steam generators when fueled with natural gas and oilfield produced gas are calculated below.

Natural Gas Fuel

$$\frac{0.219\ lb-SOx}{MMBtu}\times\frac{1\ MMBtu}{8{,}578\ dscf}\times\frac{1\ lb\cdot mol}{64\ lb-SOx}\times\frac{10.73\ psi\cdot ft^3}{lb\cdot mol\cdot{}^\circ R}\times\frac{520\ {}^\circ R}{14.7\ psi}\times\frac{1{,}000{,}000\ parts}{million}=151\ ppmv$$

Mixed Natural Gas/Oilfield Produced Gas Fuel

$$\frac{0.219\ lb-SOx}{MMBtu}\times\frac{1\ MMBtu}{8{,}914\ dscf}\times\frac{1\ lb\cdot mol}{64\ lb-SOx}\times\frac{10.73\ psi\cdot ft^3}{lb\cdot mol\cdot{}^\circ R}\times\frac{520\ {}^\circ R}{14.7\ psi}\times\frac{1{,}000{,}000\ parts}{million}=146\ ppmv$$

Because 151 ppmv and 146 ppmv are both ≤ 2000 ppmv, the steam generators are expected to comply with Rule 4801. The following conditions will be included on the ATC permits:

ATC S-3088-7-12

- Emissions from this steam generator shall not exceed any of the following limits: 5 ppmvd NOx @ 3% O2 and 0.0063 lb-NOx/MMBtu, 0.219 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu, 104 ppmvd CO @ 3% O2 and 0.080 lb-CO/MMBtu, or 0.0027 lb-VOC/MMBtu (as CH4). [District Rules 2201, 4305, 4306, 4320, 4405, 4406, and 4801]

ATC S-3088-20-10

- Emissions from this steam generator shall not exceed any of the following limits: 5 ppmvd NOx @ 3% O2 and 0.0063 lb-NOx/MMBtu, 0.219 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu, 47.5 ppmvd CO @ 3% O2 and 0.036 lb-CO/MMBtu, or 0.0027 lb-VOC/MMBtu (as CH4). [District Rules 2201, 4305, 4306, 4320, 4405, and 4801]

ATC S-3088-24-8

- Emissions from this steam generator shall not exceed any of the following limits: 5 ppmvd NOx @ 3% O2 and 0.0063 lb-NOx/MMBtu, 0.219 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu, 46 ppmvd CO @ 3% O2 and 0.035 lb-CO/MMBtu, or 0.0027 lb-VOC/MMBtu (as CH4). [District Rules 2201, 4305, 4306, 4320, 4405, and 4801]

California Health & Safety Code 42301.6 (School Notice)

The District has verified that this site is not located within 1,000 feet of a school. In addition, this project does not result in any increases in emissions. 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 compliance with air quality regulations and will not result in any increases in fuel usage or 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 for each emissions unit affected by the project the potential project emission increase is equal to or less than 2 lbs per day per pollutant. Therefore, the potential project emission increase is considerably below all annual criteria emissions CEQA significant thresholds. The activity will occur at an existing facility and involves negligible expansion of the existing or former use. Furthermore, the District determined that the activity will not have a significant effect on the environment. Therefore, the District finds that the activity is categorically exempt from the provisions of CEQA pursuant to CEQA Guideline § 15301 (Existing Facilities), and finds that the project is exempt per the common sense exemption that CEQA applies only to projects which have the potential for causing a significant effect on the environment (CEQA Guidelines §15061(b)(3)).

Indemnification Agreement/Letter of Credit Determination

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

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

IX. Recommendation

Compliance with all applicable rules and regulations is expected. Pending a successful NSR Public Noticing period and EPA review, issue ATCs S-3088-7-12, -20-10, and -24-8 subject to the permit conditions on the attached draft ATCs in Appendix B.

X. Billing Information

Annual Permit Fees			
Permit Number	**Fee Schedule**	**Fee Description**	**Annual Fee**
S-3088-7-12	3020-02-H	62.5 MMBtu/hr	$1,238
S-3088-20-10	3020-02-H	62.5 MMBtu/hr	$1,238
S-3088-24-8	3020-02-H	62.5 MMBtu/hr	$1,238

Appendixes

A: Current PTOs S-3088-7-11, -20-9, & -24-7
B: Draft ATCs S-3088-7-12, -20-10, & -24-8
C: Oilfield Produced Gas Analysis from April 16, 2013 Source Test at Facility
D: PE Calculations for Existing Units
E: Previous District BACT Guideline 1.2.1 - Oilfield Steam Generator (Rescinded 4/11/2023)
F: Quarterly Net Emissions Change
G: BACT Analysis for Oilfield Steam Generators
H: TRC Cypress Group Compliance Certification

APPENDIX A

Current PTOs S-3088-7-11, -20-9, & -24-7

San Joaquin Valley
Air Pollution Control District

PERMIT UNIT: S-3088-7-11 **EXPIRATION DATE:** 05/31/2027

SECTION: SW22 **TOWNSHIP:** 32S **RANGE:** 23E

EQUIPMENT DESCRIPTION:
62.5 MMBTU/HR NATURAL GAS/WASTE GAS FIRED STEAM GENERATOR WITH NORTH AMERICAN MAGNA-FLAME G-LE ULTRA LOW NOX BURNER AND FLUE GAS RECIRCULATION (CYPRESS LEASE)

PERMIT UNIT REQUIREMENTS

1. 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] Federally Enforceable Through Title V Permit
2. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201] Federally Enforceable Through Title V Permit
3. Emissions rates from the unit shall not exceed any of the following limits: 14 ppmv NOx @ 3% O2 or 0.017 lb-NOx/MMBtu, 0.037 lb-PM10/MMBtu, 104 ppmv CO @ 3% O2 or 0.0757 lb-CO/MMBtu, or 0.0055 lb-VOC/MMBtu. [District Rules 2201, 4305, and 4306] Federally Enforceable Through Title V Permit
4. Combined SOx emissions from steam generators S-3088-7, '-20, and '-24 shall not exceed 328.5 lb/day. [District Rule 2201] Federally Enforceable Through Title V Permit
5. Fuel gas sulfur content shall not exceed 1 gr S/100 scf unless SOx is reduced by 95% or to 9 ppmv SOx @ 3% O2 in exhaust with scrubber. [District Rules 2201 and 4320] Federally Enforceable Through Title V Permit
6. Source testing to measure NOx and CO emissions from this unit while fired on natural gas shall be conducted at least once every twelve (12) months. After demonstrating compliance on two (2) consecutive annual source tests, the unit shall be tested not less than once every thirty-six (36) months. If the result of the 36-month source test demonstrates that the unit does not meet the applicable emission limits, the source testing frequency shall revert to at least once every twelve (12) months. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit
7. All emissions measurements shall be made with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. No determination of compliance shall be established within two hours after a continuous period in which fuel flow to the unit is shut off for 30 minutes or longer, or within 30 minutes after a re-ignition as defined in Section 3.0 of District Rule 4306. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit
8. The source test plan shall identify which basis (ppmv or lb/MMBtu) will be used to demonstrate compliance. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit
9. 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] Federally Enforceable Through Title V Permit
10. NOx emissions for source test purposes shall be determined using EPA Method 7E or ARB Method 100 on a ppmv basis, or EPA Method 19 on a heat input basis. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit
11. CO emissions for source test purposes shall be determined using EPA Method 10 or ARB Method 100. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

12. Stack gas oxygen (O2) shall be determined using EPA Method 3 or 3A or ARB Method 100. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit

13. For emissions source testing, the arithmetic average of three 30-consecutive-minute test runs shall apply. If two of three runs are above an applicable limit the test cannot be used to demonstrate compliance with an applicable limit. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit

14. The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081] Federally Enforceable Through Title V Permit

15. 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. 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 month. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit

16. If either the NOx or CO concentrations corrected to 3% O2, as measured by the portable analyzer, exceed the allowable emissions concentration, the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 1 hour of operation after detection. If the portable analyzer readings continue to exceed the allowable emissions concentration after 1 hour of operation after detection, the permittee shall notify the District within the following 1 hour and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100 in lieu of performing the notification and testing required by this condition. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit

17. All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit

18. The permittee shall maintain records of: (1) the date and time of NOx, CO, and O2 measurements, (2) the O2 concentration in percent and the measured NOx and CO concentrations corrected to 3% O2, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, and (5) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit

19. Permittee shall determine sulfur content of combusted gas weekly for eight consecutive weeks. After demonstrating compliance for eight consecutive weeks testing may be conducted on a quarterly basis. Weekly sulfur testing shall resume if quarterly testing does not indicate compliance. Weekly gas analysis shall be performed using Draeger tubes and quarterly analysis using ASTM method D3246 or double GC for H2S and mercaptans. First of the weekly gas analyses shall be done using laboratory analysis. [District Rules 1081, 2201, and 4320] Federally Enforceable Through Title V Permit

20. Compliance with fuel sulfur limit(s) can be demonstrated either by monitoring sulfur content at location(s) after all fuel sources are combined prior to incineration, or by monitoring the sulfur content and volume of each fuel source and performing mass balance calculations. Records of monitoring locations, detected sulfur concentrations, and mass balance calculations, if necessary, shall be maintained and kept onsite and made readily available for District inspection upon request. [District Rules 1081, 2201, and 4320] Federally Enforceable Through Title V Permit

21. The following calculation shall be used to show compliance with the SOx daily emissions limit: lb SOx emitted/day = (volume of gas incinerated per day, in scf) x (ppm H2S prior to incineration) x 0.00000017. [District Rule 2201] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

22. Records of weekly and quarterly test results for sulfur content, amounts of natural gas and waste gas combusted (in scf), higher heating values of natural gas and waste gas, and calculations to verify compliance with the sulfur SLC limit shared by units '-7, '-20, and '-24 shall be retained on-site for a period of at least five years and made readily available for District inspection upon request. [District Rules 1070, 2201, and 4320] Federally Enforceable Through Title V Permit

23. Pursuant to Rule 4320, the operator shall pay an annual emission fee to the District for NOx emissions from this unit for the previous calendar year. Payments are due by July 1 of each year. Payments shall continue annually until either the unit is permanently removed from service in the District or the operator demonstrates compliance with the applicable NOx emission limit listed in Rule 4320. [District Rule 4320] Federally Enforceable Through Title V Permit

24. The permittee shall submit an analysis showing the fuel's sulfur content at least once every year. Valid purchase contracts, supplier certifications, tariff sheets, or transportation contacts may be used to satisfy this requirement, provided they establish the fuel parameters mentioned above. [District Rule 4320] Federally Enforceable Through Title V Permit

25. Permittee shall maintain records of annual heat input (MMBtu) for this unit on a calendar year basis. [District Rules 1070 and Rule 4320] Federally Enforceable Through Title V Permit

26. All records shall be maintained and retained on-site for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rules 1070, 4305, and 4306] Federally Enforceable Through Title V Permit

San Joaquin Valley
Air Pollution Control District

PERMIT UNIT: S-3088-20-9 **EXPIRATION DATE:** 05/31/2027

SECTION: SW22 **TOWNSHIP:** 32S **RANGE:** 23E

EQUIPMENT DESCRIPTION:
62.5 MMBTU/HR C.E. NATCO NATURAL GAS/WASTE GAS-FIRED STEAM GENERATOR WITH A NORTH AMERICAN MODEL MAGNA-FLAME G-LE, ULTRA LOW NOX BURNER AND FLUE GAS RECIRCULATION - CYPRESS LEASE

PERMIT UNIT REQUIREMENTS

1. 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] Federally Enforceable Through Title V Permit
2. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201] Federally Enforceable Through Title V Permit
3. Combined SOx emissions from steam generators S-3088-7, '-20, and '-24 shall not exceed 328.5 lb/day. [District Rule 2201] Federally Enforceable Through Title V Permit
4. Fuel gas sulfur content shall not exceed 1 gr S/100 scf unless SOx is reduced by 95% or to 9 ppmv SOx @ 3% O2 in exhaust with scrubber. [District Rules 2201 and 4320] Federally Enforceable Through Title V Permit
5. Emissions from the natural gas-fired unit shall not exceed any of the following limits: 14 ppmvd NOx @ 3% O2 or 0.017 lb-NOx/MMBtu, 0.0076 lb-PM10/MMBtu, 47.5 ppmvd CO @ 3% O2 or 0.035 lb-CO/MMBtu, or 0.0055 lb-VOC/MMBtu. [District Rules 2201, 4305, and 4306] Federally Enforceable Through Title V Permit
6. 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. 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 month. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit
7. If either the NOx or CO concentrations corrected to 3% O2, as measured by the portable analyzer, exceed the allowable emissions concentration, the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 1 hour of operation after detection. If the portable analyzer readings continue to exceed the allowable emissions concentration after 1 hour of operation after detection, the permittee shall notify the District within the following 1 hour and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100 in lieu of performing the notification and testing required by this condition. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit
8. All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

9. The permittee shall maintain records of: (1) the date and time of NOx, CO, and O2 measurements, (2) the O2 concentration in percent and the measured NOx and CO concentrations corrected to 3% O2, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, and (5) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit

10. All emissions measurements shall be made with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. No determination of compliance shall be established within two hours after a continuous period in which fuel flow to the unit is shut off for 30 minutes or longer, or within 30 minutes after a re-ignition as defined in Section 3.0 of District Rule 4306. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit

11. Source testing to measure NOx and CO emissions from this unit while fired on natural gas shall be conducted at least once every twelve (12) months. After demonstrating compliance on two (2) consecutive annual source tests, the unit shall be tested not less than once every thirty-six (36) months. If the result of the 36-month source test demonstrates that the unit does not meet the applicable emission limits, the source testing frequency shall revert to at least once every twelve (12) months. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit

12. The source test plan shall identify which basis (ppmv or lb/MMBtu) will be used to demonstrate compliance. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit

13. 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] Federally Enforceable Through Title V Permit

14. NOx emissions for source test purposes shall be determined using EPA Method 7E or ARB Method 100 on a ppmv basis, or EPA Method 19 on a heat input basis. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit

15. CO emissions for source test purposes shall be determined using EPA Method 10 or ARB Method 100. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit

16. Stack gas oxygen (O2) shall be determined using EPA Method 3 or 3A or ARB Method 100. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit

17. For emissions source testing, the arithmetic average of three 30-consecutive-minute test runs shall apply. If two of three runs are above an applicable limit the test cannot be used to demonstrate compliance with an applicable limit. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit

18. The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081] Federally Enforceable Through Title V Permit

19. Permittee shall determine sulfur content of combusted gas weekly for eight consecutive weeks. After demonstrating compliance for eight consecutive weeks testing may be conducted on a quarterly basis. Weekly sulfur testing shall resume if quarterly testing does not indicate compliance. Weekly gas analysis shall be performed using Draeger tubes and quarterly analysis using ASTM method D3246 or double GC for H2S and mercaptans. First of the weekly gas analyses shall be done using laboratory analysis. [District Rules 1081, 2201, and 4320] Federally Enforceable Through Title V Permit

20. Compliance with fuel sulfur limit(s) can be demonstrated either by monitoring sulfur content at location(s) after all fuel sources are combined prior to incineration, or by monitoring the sulfur content and volume of each fuel source and performing mass balance calculations. Records of monitoring locations, detected sulfur concentrations, and mass balance calculations, if necessary, shall be maintained and kept onsite and made readily available for District inspection upon request. [District Rules 1081, 2201, and 4320] Federally Enforceable Through Title V Permit

21. The following calculation shall be used to show compliance with the SOx daily emissions limit: lb SOx emitted/day = (volume of gas incinerated per day, in scf) x (ppm H2S prior to incineration) x 0.00000017. [District Rule 2201] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

22. Records of weekly and quarterly test results for sulfur content, daily amounts of natural gas and waste gas combusted (in scf), higher heating values of natural gas and waste gas, and calculations to verify compliance with the sulfur SLC limit shared by units '-7, '-20, and '-24 shall be retained on-site for a period of at least five years and made readily available for District inspection upon request. [District Rules 1070, 2201, and 4320] Federally Enforceable Through Title V Permit

23. Pursuant to Rule 4320, the operator shall pay an annual emission fee to the District for NOx emissions from this unit for the previous calendar year. Payments are due by July 1 of each year. Payments shall continue annually until either the unit is permanently removed from service in the District or the operator demonstrates compliance with the applicable NOx emission limit listed in Rule 4320. [District Rule 4320] Federally Enforceable Through Title V Permit

24. The permittee shall submit an analysis showing the fuel's sulfur content at least once every year. Valid purchase contracts, supplier certifications, tariff sheets, or transportation contacts may be used to satisfy this requirement, provided they establish the fuel parameters mentioned above. [District Rule 4320] Federally Enforceable Through Title V Permit

25. Permittee shall maintain records of annual heat input (MMBtu) for this unit on a calendar year basis. [District Rules 1070 and Rule 4320] Federally Enforceable Through Title V Permit

26. All records shall be maintained and retained on-site for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rules 1070, 4305, and 4306] Federally Enforceable Through Title V Permit

San Joaquin Valley
Air Pollution Control District

PERMIT UNIT: S-3088-24-7 **EXPIRATION DATE:** 05/31/2027

SECTION: SW22 **TOWNSHIP:** 32S **RANGE:** 23E

EQUIPMENT DESCRIPTION:
62.5 MMBTU/HR C.E. NATCO NATURAL GAS/WASTE GAS FIRED STEAM GENERATOR (#92 DIS# 27572-80) WITH NORTH AMERICAN MAGNA FLAME GLE ULTRA LOW NOX BURNER

PERMIT UNIT REQUIREMENTS

1. 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] Federally Enforceable Through Title V Permit
2. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201] Federally Enforceable Through Title V Permit
3. Combined SOx emissions from steam generators S-3088-7, '-20, and '-24 shall not exceed 328.5 lb/day. [District Rule 2201] Federally Enforceable Through Title V Permit
4. Fuel gas sulfur content shall not exceed 1 gr S/100 scf unless SOx is reduced by 95% or to 9 ppmv SOx @ 3% O2 in exhaust with scrubber. [District Rules 2201 and 4320] Federally Enforceable Through Title V Permit
5. Emission rates from the unit shall not exceed any of the following limits: 0.058 lb-PM10/MMBtu, or 0.0055 lb-VOC/MMBtu. [District Rule 2201] Federally Enforceable Through Title V Permit
6. Except during startup and shutdown, emission rates from the unit shall not exceed any of the following limits: 14 ppmv NOx @ 3% O2 or 47 ppmv CO @ 3% O2. [District Rules 2201, 4305, and 4306] Federally Enforceable Through Title V Permit
7. Emission rates during startup and shutdown shall not exceed: NO2 - 140 pounds per hour or 0.14 pounds per MMBtu. [District Rules 4301 and 4405] Federally Enforceable Through Title V Permit
8. Emission rates shall not exceed any of the following: NOx (as NO2): 54.0 lb/day or 9855 lb/year, CO: 52.5 lb/day. [District Rule 2201] Federally Enforceable Through Title V Permit
9. Start-up is defined as the period of time during which a unit is brought from a shutdown status to its operating temperature and pressure, including the time required by the unit's emission control system to reach full operation. Shutdown is defined as the period of time during which a unit is taken from an operational to a non-operational status by allowing it to cool down from its operating temperature to ambient temperature as the fuel supply to the unit is completely turned off. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit
10. Duration of start-up or shutdown shall not exceed two hours each per occurrence. During start-up or shutdown, the emissions control system shall be in operation, and emissions shall be minimized insofar as technologically possible. The operator shall maintain daily records of the duration of start-up and shutdown periods. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit
11. Source testing to measure natural gas-combustion NOx and CO emissions from this unit shall be conducted at least once every twelve (12) months. After demonstrating compliance on two (2) consecutive annual source tests, the unit shall be tested not less than once every thirty-six (36) months. If the result of the 36-month source test demonstrates that the unit does not meet the applicable emission limits, the source testing frequency shall revert to at least once every twelve (12) months. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

12. All emissions measurements shall be made with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. No determination of compliance shall be established within two hours after a continuous period in which fuel flow to the unit is shut off for 30 minutes or longer, or within 30 minutes after a re-ignition as defined in Section 3.0 of District Rule 4306. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit
13. The source test plan shall identify which basis (ppmv or lb/MMBtu) will be used to demonstrate compliance. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit
14. 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] Federally Enforceable Through Title V Permit
15. NOx emissions for source test purposes shall be determined using EPA Method 7E or ARB Method 100 on a ppmv basis, or EPA Method 19 on a heat input basis. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit
16. CO emissions for source test purposes shall be determined using EPA Method 10 or ARB Method 100. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit
17. Stack gas oxygen (O2) shall be determined using EPA Method 3 or 3A or ARB Method 100. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit
18. For emissions source testing, the arithmetic average of three 30-consecutive-minute test runs shall apply. If two of three runs are above an applicable limit the test cannot be used to demonstrate compliance with an applicable limit. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit
19. The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081] Federally Enforceable Through Title V Permit
20. 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. 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 month. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit
21. If either the NOx or CO concentrations corrected to 3% O2, as measured by the portable analyzer, exceed the allowable emissions concentration, the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 1 hour of operation after detection. If the portable analyzer readings continue to exceed the allowable emissions concentration after 1 hour of operation after detection, the permittee shall notify the District within the following 1 hour and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100 in lieu of performing the notification and testing required by this condition. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit
22. All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit
23. The permittee shall maintain records of: (1) the date and time of NOx, CO, and O2 measurements, (2) the O2 concentration in percent and the measured NOx and CO concentrations corrected to 3% O2, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, and (5) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 4305 and 4306] Federally Enforceable Through Title V Permit

PERMIT UNIT REQUIREMENTS CONTINUE ON NEXT PAGE

24. Permittee shall determine sulfur content of combusted gas weekly for eight consecutive weeks. After demonstrating compliance for eight consecutive weeks testing may be conducted on a quarterly basis. Weekly sulfur testing shall resume if quarterly testing does not indicate compliance. Weekly gas analysis shall be performed using Draeger tubes and quarterly analysis using ASTM method D3246 or double GC for H2S and mercaptans. First of the weekly gas analyses shall be done using laboratory analysis. [District Rules 1081, 2201, and 4320] Federally Enforceable Through Title V Permit

25. Compliance with fuel sulfur limit(s) can be demonstrated either by monitoring sulfur content at location(s) after all fuel sources are combined prior to incineration, or by monitoring the sulfur content and volume of each fuel source and performing mass balance calculations. Records of monitoring locations, detected sulfur concentrations, and mass balance calculations, if necessary, shall be maintained and kept onsite and made readily available for District inspection upon request. [District Rules 1081, 2201, and 4320] Federally Enforceable Through Title V Permit

26. The following calculation shall be used to show compliance with the SOx daily emissions limit: lb SOx emitted/day = (volume of gas incinerated per day, in scf) x (ppm H2S prior to incineration) x 0.00000017. [District Rule 2201] Federally Enforceable Through Title V Permit

27. Records of weekly and quarterly test results for sulfur content, daily amounts of natural gas and waste gas combusted (in scf), higher heating values of natural gas and waste gas, and calculations to verify compliance with the sulfur SLC limit shared by units '-7, '-20, and '-24 shall be retained on-site for a period of at least five years and made readily available for District inspection upon request. [District Rules 1070, 2201, and 4320] Federally Enforceable Through Title V Permit

28. Pursuant to Rule 4320, the operator shall pay an annual emission fee to the District for NOx emissions from this unit for the previous calendar year. Payments are due by July 1 of each year. Payments shall continue annually until either the unit is permanently removed from service in the District or the operator demonstrates compliance with the applicable NOx emission limit listed in Rule 4320. [District Rule 4320] Federally Enforceable Through Title V Permit

29. The permittee shall submit an analysis showing the fuel's sulfur content at least once every year. Valid purchase contracts, supplier certifications, tariff sheets, or transportation contacts may be used to satisfy this requirement, provided they establish the fuel parameters mentioned above. [District Rule 4320] Federally Enforceable Through Title V Permit

30. Permittee shall maintain records of annual heat input (MMBtu) for this unit on a calendar year basis. [District Rules 1070 and Rule 4320] Federally Enforceable Through Title V Permit

31. All records shall be maintained and retained on-site for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rules 1070, 4305, and 4306] Federally Enforceable Through Title V Permit

APPENDIX B

Draft ATCs S-3088-7-12, -20-10, & -24-8

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: S-3088-7-12 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: TRC CYPRESS GROUP LLC
MAILING ADDRESS: PO BOX 227
TAFT, CA 93268

LOCATION: HEAVY OIL WESTERN STATIONARY SOURCE
CA

SECTION: SW22 **TOWNSHIP:** 32S **RANGE:** 23E

EQUIPMENT DESCRIPTION:
MODIFICATION OF 62.5 MMBTU/HR NATURAL GAS/PRODUCED GAS FIRED STEAM GENERATOR WITH A NORTH AMERICAN MODEL MAGNA-FLAME G-LE ULTRA-LOW NOX BURNER AND FLUE GAS RECIRCULATION (FGR) (CYPRESS LEASE): INSTALL NEW PROGRAMMABLE LOGIC CONTROLLER (PLC), MODIFY FUEL TRAIN, AND UPGRADE EXISTING FGR SYSTEM TO REDUCE NOX EMISSIONS TO 5 PPMV @ 3% O2 TO COMPLY WITH DISTRICT RULES 4306 AND 4320; AND LIMIT TOTAL STATIONARY SOURCE SOX EMISSIONS TO 139,999 LB/YEAR

CONDITIONS

1. {1830} This Authority to Construct serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District Rule 2201] Federally Enforceable Through Title V Permit
2. {1831} Prior to operating with modifications authorized by this Authority to Construct, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4] Federally Enforceable Through Title V Permit
3. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. 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] Federally Enforceable Through Title V Permit
5. 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] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

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

Samir Sheikh, Executive Director / APCO

Brian Clements, Director of Permit Services
S-3088-7-12 : Jun 5 2023 9:41AM -- NORMANR : Joint Inspection NOT Required

6. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201] Federally Enforceable Through Title V Permit

7. This unit shall not operate at the same time as the standby flare authorized as part of Permit Unit S-3088-8, except as required during start-up and shutdown periods to continue to incinerate produced gas and such periods shall be minimized. [District Rule 2201] Federally Enforceable Through Title V Permit

8. This unit shall only be fired on natural gas, oilfield produced gas, or a blend of natural gas and oilfield produced gas. [District Rule 2201] Federally Enforceable Through Title V Permit

9. Emissions from this steam generator shall not exceed any of the following limits: 5 ppmvd NOx @ 3% O2 and 0.0063 lb-NOx/MMBtu, 0.219 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu, 104 ppmvd CO @ 3% O2 and 0.080 lb-CO/MMBtu, or 0.0027 lb-VOC/MMBtu (as CH4). [District Rules 2201, 4305, 4306, 4320, 4405, 4406, and 4801] Federally Enforceable Through Title V Permit

10. This unit shall comply with one of the following options for control of SOx and particulate matter (PM) emissions: 1) The total sulfur content of the fuel gas used this steam generator shall not exceed 1 grain S per 100 standard cubic feet (1 gr-S/100 scf); or 2) A scrubber that reduces SOx emissions by at least 95% by weight shall be installed and properly operated; or 3) The SO2 concentration in the exhaust of this unit shall not exceed 9 ppmv SO2 corrected to 3.0% O2. [District Rules 2201 and 4320] Federally Enforceable Through Title V Permit

11. The total combined SOx emissions from the steam generators permitted as Units S-3088-7, -20, and -24 shall not exceed 328.5 lb-SOx/day. [District Rule 2201] Federally Enforceable Through Title V Permit

12. 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. 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 month. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

13. If either the NOx or CO concentrations corrected to 3% O2, as measured by the portable analyzer, exceed the allowable emissions concentration, the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 1 hour of operation after detection. If the portable analyzer readings continue to exceed the allowable emissions concentration after 1 hour of operation after detection, the permittee shall notify the District within the following 1 hour and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

14. All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

15. The permittee shall maintain records of: (1) the date and time of NOx, CO, and O2 measurements, (2) the O2 concentration in percent and the measured NOx and CO concentrations corrected to 3% O2, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, and (5) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

16. Source testing to measure NOx, CO, and VOC emissions from this unit shall be conducted within 60 days of initial operation of the unit under this Authority to Construct (ATC) permit. [District Rules 2201, 4306, and 4320] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

17. Source testing to measure NOx and CO emissions from this unit shall be conducted at least once every twelve (12) months. After demonstrating compliance on two (2) consecutive annual source tests, the unit shall be tested not less than once every thirty-six (36) months. If the result of the 36-month source test demonstrates that the unit does not meet the applicable emission limits, the source testing frequency shall revert to at least once every twelve (12) months. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

18. The source test plan shall identify which basis (ppmv or lb/MMBtu) will be used to demonstrate compliance. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

19. All emissions measurements shall be made with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. No determination of compliance shall be established within two hours after a continuous period in which fuel flow to the unit is shut off for 30 minutes or longer, or within 30 minutes after a re-ignition as defined in Section 3.0 of District Rule 4306. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

20. 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] Federally Enforceable Through Title V Permit

21. The results of each source test shall be submitted to the District within 60 days after completion of the source test. [District Rule 1081] Federally Enforceable Through Title V Permit

22. NOx emissions for source test purposes shall be determined using EPA Method 7E or ARB Method 100 on a ppmv basis, or EPA Method 19 on a heat input basis. [District Rules 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

23. CO emissions for source test purposes shall be determined using EPA Method 10 or ARB Method 100. [District Rules 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

24. VOC emissions for source test purposes shall be determined using EPA Method 25A or 25B, or ARB Method 100. EPA Method 18, ARB Method 422 "Determination of Volatile Organic Compounds in Emission from Stationary Sources", or alternative method(s) approved by the District shall be used for the measurement and subtraction of exempt compounds (e.g. methane and ethane). [District Rule 2201] Federally Enforceable Through Title V Permit

25. Stack gas oxygen (O2) shall be determined using EPA Method 3 or 3A or ARB Method 100. [District Rules 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

26. SOx emissions for source test purposes shall be determined using EPA Method 6C, EPA Method 8, or ARB Method 100. [District Rule 4320] Federally Enforceable Through Title V Permit

27. For emissions source testing, the arithmetic average of three 30-consecutive-minute test runs shall apply. If two of three runs are above an applicable limit the test cannot be used to demonstrate compliance with an applicable limit. [District Rules 1081, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

28. 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 EPA and the District. [District Rules 2201, 4306, and 4320] Federally Enforceable Through Title V Permit

29. When complying with the SOx and PM control requirements of this permit by limiting the total sulfur content of the fuel gas or by reducing SOx emissions by at least 95% using a scrubber that removes sulfur compounds from the gas prior to combustion, laboratory analysis to determine the sulfur content of the fuel gas or the control efficiency of the scrubber shall be performed at least annually using EPA Method 11 or EPA Method 15, as appropriate; ASTM Method D1072, D1945, D3246, D4084, D4468, or D5504; grab sample analysis by GC-FPD/TCD performed in the laboratory; or other methods approved by the District and EPA. Records of the fuel sulfur analyses shall be maintained and provided to the District upon request. [District Rules 2201 and 4320] Federally Enforceable Through Title V Permit

30. For natural gas that is regulated by the California Public Utilities Commission (PUC) or Federal Energy Regulatory Commission (FERC), valid purchase contracts, supplier certifications, tariff sheets, transportation contracts, or other documentation may be used to satisfy the fuel sulfur content analysis, provided they establish the fuel sulfur content as required by this permit. [District Rules 2201 and 4320] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

31. When complying with the SOx and PM control requirements of this permit by using a post-combustion scrubber that reduces SOx emissions by at least 95% by weight or limiting the exhaust SO2 concentration to 9 ppmv corrected to 3.0% O2, source testing of SOx emissions from this unit to demonstrate compliance with the required SOx emission reduction percentage or SO2 exhaust concentration limit shall be performed at least annually. [District Rules 1081, 2201, and 4320] Federally Enforceable Through Title V Permit

32. When complying with the SOx and PM control requirements of this permit by using a scrubber that reduces SOx emissions by at least 95% by weight, the operator shall monitor key system operating parameters that indicate proper operation of the scrubber (e.g. inlet and outlet H2S concentrations for scrubbers that remove H2S prior to combustion) at least once every week. Records of monitoring of the key system operating parameters of the scrubber shall be maintained. [District Rules 2201 and 4320] Federally Enforceable Through Title V Permit

33. The sulfur content of the produced gas and any gas not regulated by the PUC or FERC combusted in this unit shall be monitored and recorded at least once every quarter in which the unit operates. If it is determined that the total combined SOx emissions limit for Units S-3088-7, -20, and -24 was exceeded, the sulfur content of the non-PUC and non-FERC-regulated gas combusted in the unit shall be monitored and recorded at least once every week until compliance with the SOx emission limit is demonstrated for each day the unit operates for eight consecutive weeks. After demonstrating compliance with the SOx emission limit for eight consecutive weeks, the gas sulfur content monitoring frequency may revert to quarterly. Records of the results of monitoring of the sulfur content of the gas combusted in this unit shall be maintained. [District Rule 2201] Federally Enforceable Through Title V Permit

34. Monitoring of the sulfur content of the gas combusted in this unit shall be performed using gas detection tubes calibrated for H2S; EPA Method 11 or EPA Method 15, as appropriate, ASTM Method D1072, D1945, D3246, D4084, D4468, D4810 or D5504; grab sample analysis by GC-FPD/TCD performed in the laboratory; a continuous analyzer employing gas chromatography; a continuous fuel gas monitor that meets the requirements specified in SCAQMD Rule 431.1, Attachment A; or an alternative method approved by EPA and the District. The permittee shall maintain records of any monitors used to demonstrate compliance with the SOx limit of this permit, including the make, model, and detection limits of the monitor(s). The required quarterly analysis of the sulfur content of the gas and the first of the weekly analyses required to reestablish compliance shall only be performed using methods that use laboratory analysis. The remainder of the weekly analyses required to demonstrate compliance may be performed using approved methods that do not use laboratory analysis. [District Rule 2201] Federally Enforceable Through Title V Permit

35. Records shall be maintained of the dates that each specific option is used to comply with the SOx and PM control requirements of this permit. [District Rules 1070, 2201, and 4320] Federally Enforceable Through Title V Permit

36. On a monthly basis, the permittee shall calculate and record the total SOx emissions in pounds from this unit each day for the prior calendar month. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

37. The SOx emissions from this unit shall be calculated using the following equation: lb-SOx emitted/day = (total volume of gas incinerated per day, in scf) x (ppm sulfur as H2S prior to incineration) x 0.00000017. [District Rule 2201] Federally Enforceable Through Title V Permit

38. Compliance with the SOx emission limit(s) of this permit may be demonstrated either by monitoring sulfur content at location(s) after all fuel sources are combined prior to incineration, or by monitoring the sulfur content and volume of each fuel source and performing mass balance calculations. Records of monitoring locations, detected sulfur concentrations, and mass balance calculations, if necessary, shall be maintained and made readily available for District inspection upon request. [District Rule 2201] Federally Enforceable Through Title V Permit

39. On a monthly basis, the permittee shall calculate and record the total combined SOx emissions, in pounds, for each day from the steam generators permitted as Units S-3088-7, -20, and -24 for the prior calendar month. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

40. Total combined SOx emissions from all permitted units at the stationary source (District Facilities S-2622 and S-3088) shall not exceed 139,999 pounds in any 12-consecutive month rolling period. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

41. On a monthly basis, the permittee shall calculate and record the total combined SOx emissions from the stationary source in pounds for the prior 12 calendar month period. The total combined SOx emissions shall be calculated by summing the SOx emissions from the previous 12 calendar months from every permitted unit at the stationary source. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

42. For gas used to fuel this unit that is not regulated by the PUC or FERC, the permittee shall maintain records of the higher heating value (HHV), in Btu per standard cubic foot (scf), for each calendar quarter in which the unit operates. For PUC or FERC-regulated gas used to fuel this unit, the permittee shall maintain records of the HHV, in Btu per standard cubic foot (scf), for each calendar year in which the unit operates. The records shall include the method(s) used to determine the HHV of the fuel and the dates the HHV was determined. For PUC or FERC-regulated natural gas, documentation from the utility may be used to establish the HHV of the gas. [District Rule 1070] Federally Enforceable Through Title V Permit

43. Records of the fuel sulfur content of the natural gas and produced gas combusted in this unit; the daily amounts of each fuel used in this unit, in standard cubic feet (scf) and MMBtu; and calculations to verify compliance with the total combined SOx emission limit(s) for the steam generators permitted as Units S-3088-7, -20, and -24 for each day the units are operated shall be maintained and made readily available for District inspection upon request. [District Rules 1070, 4001, 2201, and 4320, and 40 CFR Part 60, Subpart Dc] Federally Enforceable Through Title V Permit

44. All records shall be maintained for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rules 1070, 2201, 4305, 4306, and 4320, and 40 CFR Part 60, Subpart Dc] Federally Enforceable Through Title V Permit

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: S-3088-20-10 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: TRC CYPRESS GROUP LLC
MAILING ADDRESS: PO BOX 227
TAFT, CA 93268

LOCATION: HEAVY OIL WESTERN STATIONARY SOURCE
CA

SECTION: SW22 **TOWNSHIP:** 32S **RANGE:** 23E

EQUIPMENT DESCRIPTION:
MODIFICATION OF 62.5 MMBTU/HR C.E. NATCO NATURAL GAS/PRODUCED GAS-FIRED STEAM GENERATOR WITH A NORTH AMERICAN MODEL MAGNA-FLAME G-LE ULTRA-LOW NOX BURNER AND FLUE GAS RECIRCULATION (FGR) (CYPRESS LEASE): INSTALL NEW PROGRAMMABLE LOGIC CONTROLLER (PLC), MODIFY FUEL TRAIN, AND UPGRADE EXISTING FGR SYSTEM TO REDUCE NOX EMISSIONS TO 5 PPMV @ 3% O2 TO COMPLY WITH DISTRICT RULES 4306 AND 4320; AND LIMIT TOTAL STATIONARY SOURCE SOX EMISSIONS TO 139,999 LB/YEAR

CONDITIONS

1. {1830} This Authority to Construct serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District Rule 2201] Federally Enforceable Through Title V Permit
2. {1831} Prior to operating with modifications authorized by this Authority to Construct, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4] Federally Enforceable Through Title V Permit
3. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. 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] Federally Enforceable Through Title V Permit
5. 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] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

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

Samir Sheikh, Executive Director / APCO

Brian Clements, Director of Permit Services
S-3088-20-10 : Jun 5 2023 9:42AM -- NORMANR : Joint Inspection NOT Required

6. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201] Federally Enforceable Through Title V Permit

7. This unit shall not operate at the same time as the standby flare authorized as part of Permit Unit S-3088-8, except as required during start-up and shutdown periods to continue to incinerate produced gas and such periods shall be minimized. [District Rule 2201] Federally Enforceable Through Title V Permit

8. This unit shall only be fired on natural gas, oilfield produced gas, or a blend of natural gas and oilfield produced gas. [District Rule 2201] Federally Enforceable Through Title V Permit

9. Emissions from this steam generator shall not exceed any of the following limits: 5 ppmvd NOx @ 3% O2 and 0.0063 lb-NOx/MMBtu, 0.219 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu, 47.5 ppmvd CO @ 3% O2 and 0.036 lb-CO/MMBtu, or 0.0027 lb-VOC/MMBtu (as CH4). [District Rules 2201, 4305, 4306, 4320, 4405, and 4801] Federally Enforceable Through Title V Permit

10. This unit shall comply with one of the following options for control of SOx and particulate matter (PM) emissions: 1) The total sulfur content of the fuel gas used this steam generator shall not exceed 1 grain S per 100 standard cubic feet (1 gr-S/100 scf); or 2) A scrubber that reduces SOx emissions by at least 95% by weight shall be installed and properly operated; or 3) The SO2 concentration in the exhaust of this unit shall not exceed 9 ppmv SO2 corrected to 3.0% O2. [District Rules 2201 and 4320] Federally Enforceable Through Title V Permit

11. The total combined SOx emissions from the steam generators permitted as Units S-3088-7, -20, and -24 shall not exceed 328.5 lb-SOx/day. [District Rule 2201] Federally Enforceable Through Title V Permit

12. 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. 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 month. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

13. If either the NOx or CO concentrations corrected to 3% O2, as measured by the portable analyzer, exceed the allowable emissions concentration, the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 1 hour of operation after detection. If the portable analyzer readings continue to exceed the allowable emissions concentration after 1 hour of operation after detection, the permittee shall notify the District within the following 1 hour and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

14. All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

15. The permittee shall maintain records of: (1) the date and time of NOx, CO, and O2 measurements, (2) the O2 concentration in percent and the measured NOx and CO concentrations corrected to 3% O2, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, and (5) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

16. Source testing to measure NOx, CO, and VOC emissions from this unit shall be conducted within 60 days of initial operation of the unit under this Authority to Construct (ATC) permit. [District Rules 2201, 4306, and 4320] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

17. Source testing to measure NOx and CO emissions from this unit shall be conducted at least once every twelve (12) months. After demonstrating compliance on two (2) consecutive annual source tests, the unit shall be tested not less than once every thirty-six (36) months. If the result of the 36-month source test demonstrates that the unit does not meet the applicable emission limits, the source testing frequency shall revert to at least once every twelve (12) months. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

18. The source test plan shall identify which basis (ppmv or lb/MMBtu) will be used to demonstrate compliance. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

19. All emissions measurements shall be made with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. No determination of compliance shall be established within two hours after a continuous period in which fuel flow to the unit is shut off for 30 minutes or longer, or within 30 minutes after a re-ignition as defined in Section 3.0 of District Rule 4306. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

20. 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] Federally Enforceable Through Title V Permit

21. The results of each source test shall be submitted to the District within 60 days after completion of the source test. [District Rule 1081] Federally Enforceable Through Title V Permit

22. NOx emissions for source test purposes shall be determined using EPA Method 7E or ARB Method 100 on a ppmv basis, or EPA Method 19 on a heat input basis. [District Rules 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

23. CO emissions for source test purposes shall be determined using EPA Method 10 or ARB Method 100. [District Rules 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

24. VOC emissions for source test purposes shall be determined using EPA Method 25A or 25B, or ARB Method 100. EPA Method 18, ARB Method 422 "Determination of Volatile Organic Compounds in Emission from Stationary Sources", or alternative method(s) approved by the District shall be used for the measurement and subtraction of exempt compounds (e.g. methane and ethane). [District Rule 2201] Federally Enforceable Through Title V Permit

25. Stack gas oxygen (O2) shall be determined using EPA Method 3 or 3A or ARB Method 100. [District Rules 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

26. SOx emissions for source test purposes shall be determined using EPA Method 6C, EPA Method 8, or ARB Method 100. [District Rule 4320] Federally Enforceable Through Title V Permit

27. For emissions source testing, the arithmetic average of three 30-consecutive-minute test runs shall apply. If two of three runs are above an applicable limit the test cannot be used to demonstrate compliance with an applicable limit. [District Rules 1081, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

28. 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 EPA and the District. [District Rules 2201, 4306, and 4320] Federally Enforceable Through Title V Permit

29. When complying with the SOx and PM control requirements of this permit by limiting the total sulfur content of the fuel gas or by reducing SOx emissions by at least 95% using a scrubber that removes sulfur compounds from the gas prior to combustion, laboratory analysis to determine the sulfur content of the fuel gas or the control efficiency of the scrubber shall be performed at least annually using EPA Method 11 or EPA Method 15, as appropriate; ASTM Method D1072, D1945, D3246, D4084, D4468, or D5504; grab sample analysis by GC-FPD/TCD performed in the laboratory; or other methods approved by the District and EPA. Records of the fuel sulfur analyses shall be maintained and provided to the District upon request. [District Rules 2201 and 4320] Federally Enforceable Through Title V Permit

30. For natural gas that is regulated by the California Public Utilities Commission (PUC) or Federal Energy Regulatory Commission (FERC), valid purchase contracts, supplier certifications, tariff sheets, transportation contracts, or other documentation may be used to satisfy the fuel sulfur content analysis, provided they establish the fuel sulfur content as required by this permit. [District Rules 2201 and 4320] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

31. When complying with the SOx and PM control requirements of this permit by using a post-combustion scrubber that reduces SOx emissions by at least 95% by weight or limiting the exhaust SO2 concentration to 9 ppmv corrected to 3.0% O2, source testing of SOx emissions from this unit to demonstrate compliance with the required SOx emission reduction percentage or SO2 exhaust concentration limit shall be performed at least annually. [District Rules 1081, 2201, and 4320] Federally Enforceable Through Title V Permit

32. When complying with the SOx and PM control requirements of this permit by using a scrubber that reduces SOx emissions by at least 95% by weight, the operator shall monitor key system operating parameters that indicate proper operation of the scrubber (e.g. inlet and outlet H2S concentrations for scrubbers that remove H2S prior to combustion) at least once every week. Records of monitoring of the key system operating parameters of the scrubber shall be maintained. [District Rules 2201 and 4320] Federally Enforceable Through Title V Permit

33. The sulfur content of the produced gas and any gas not regulated by the PUC or FERC combusted in this unit shall be monitored and recorded at least once every quarter in which the unit operates. If it is determined that the total combined SOx emissions limit for Units S-3088-7, -20, and -24 was exceeded, the sulfur content of the non-PUC and non-FERC-regulated gas combusted in the unit shall be monitored and recorded at least once every week until compliance with the SOx emission limit is demonstrated for each day the unit operates for eight consecutive weeks. After demonstrating compliance with the SOx emission limit for eight consecutive weeks, the gas sulfur content monitoring frequency may revert to quarterly. Records of the results of monitoring of the sulfur content of the gas combusted in this unit shall be maintained. [District Rule 2201] Federally Enforceable Through Title V Permit

34. Monitoring of the sulfur content of the gas combusted in this unit shall be performed using gas detection tubes calibrated for H2S; EPA Method 11 or EPA Method 15, as appropriate, ASTM Method D1072, D1945, D3246, D4084, D4468, D4810 or D5504; grab sample analysis by GC-FPD/TCD performed in the laboratory; a continuous analyzer employing gas chromatography; a continuous fuel gas monitor that meets the requirements specified in SCAQMD Rule 431.1, Attachment A; or an alternative method approved by EPA and the District. The permittee shall maintain records of any monitors used to demonstrate compliance with the SOx limit of this permit, including the make, model, and detection limits of the monitor(s). The required quarterly analysis of the sulfur content of the gas and the first of the weekly analyses required to reestablish compliance shall only be performed using methods that use laboratory analysis. The remainder of the weekly analyses required to demonstrate compliance may be performed using approved methods that do not use laboratory analysis. [District Rule 2201] Federally Enforceable Through Title V Permit

35. Records shall be maintained of the dates that each specific option is used to comply with the SOx and PM control requirements of this permit. [District Rules 1070, 2201, and 4320] Federally Enforceable Through Title V Permit

36. On a monthly basis, the permittee shall calculate and record the total SOx emissions in pounds from this unit each day for the prior calendar month. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

37. The SOx emissions from this unit shall be calculated using the following equation: lb-SOx emitted/day = (total volume of gas incinerated per day, in scf) x (ppm sulfur as H2S prior to incineration) x 0.00000017. [District Rule 2201] Federally Enforceable Through Title V Permit

38. Compliance with the SOx emission limit(s) of this permit may be demonstrated either by monitoring sulfur content at location(s) after all fuel sources are combined prior to incineration, or by monitoring the sulfur content and volume of each fuel source and performing mass balance calculations. Records of monitoring locations, detected sulfur concentrations, and mass balance calculations, if necessary, shall be maintained and made readily available for District inspection upon request. [District Rule 2201] Federally Enforceable Through Title V Permit

39. On a monthly basis, the permittee shall calculate and record the total combined SOx emissions, in pounds, for each day from the steam generators permitted as Units S-3088-7, -20, and -24 for the prior calendar month. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

40. Total combined SOx emissions from all permitted units at the stationary source (District Facilities S-2622 and S-3088) shall not exceed 139,999 pounds in any 12-consecutive month rolling period. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

41. On a monthly basis, the permittee shall calculate and record the total combined SOx emissions from the stationary source in pounds for the prior 12 calendar month period. The total combined SOx emissions shall be calculated by summing the SOx emissions from the previous 12 calendar months from every permitted unit at the stationary source. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

42. For gas used to fuel this unit that is not regulated by the PUC or FERC, the permittee shall maintain records of the higher heating value (HHV), in Btu per standard cubic foot (scf), for each calendar quarter in which the unit operates. For PUC or FERC-regulated gas used to fuel this unit, the permittee shall maintain records of the HHV, in Btu per standard cubic foot (scf), for each calendar year in which the unit operates. The records shall include the method(s) used to determine the HHV of the fuel and the dates the HHV was determined. For PUC or FERC-regulated natural gas, documentation from the utility may be used to establish the HHV of the gas. [District Rule 1070] Federally Enforceable Through Title V Permit

43. Records of the fuel sulfur content of the natural gas and produced gas combusted in this unit; the daily amounts of each fuel used in this unit, in standard cubic feet (scf) and MMBtu; and calculations to verify compliance with the total combined SOx emission limit(s) for the steam generators permitted as Units S-3088-7, -20, and -24 for each day the units are operated shall be maintained and made readily available for District inspection upon request. [District Rules 1070, 4001, 2201, and 4320, and 40 CFR Part 60, Subpart Dc] Federally Enforceable Through Title V Permit

44. All records shall be maintained for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rules 1070, 2201, 4305, 4306, and 4320, and 40 CFR Part 60, Subpart Dc] Federally Enforceable Through Title V Permit

San Joaquin Valley
Air Pollution Control District

AUTHORITY TO CONSTRUCT

PERMIT NO: S-3088-24-8 **ISSUANCE DATE:** DRAFT

LEGAL OWNER OR OPERATOR: TRC CYPRESS GROUP LLC
MAILING ADDRESS: PO BOX 227
TAFT, CA 93268

LOCATION: HEAVY OIL WESTERN STATIONARY SOURCE
CA

SECTION: SW22 **TOWNSHIP:** 32S **RANGE:** 23E

EQUIPMENT DESCRIPTION:
MODIFICATION OF 62.5 MMBTU/HR C.E. NATCO NATURAL GAS/PRODUCED GAS FIRED STEAM GENERATOR (#92 DIS# 27572-80) WITH A NORTH AMERICAN MAGNA FLAME GLE ULTRA-LOW NOX BURNER: INSTALL NEW PROGRAMMABLE LOGIC CONTROLLER (PLC), MODIFY FUEL TRAIN, AND INSTALL FLUE GAS RECIRCULATION (FGR) SYSTEM TO REDUCE NOX EMISSIONS TO 5 PPMV @ 3% O2 TO COMPLY WITH DISTRICT RULES 4306 AND 4320; AND LIMIT TOTAL STATIONARY SOURCE SOX EMISSIONS TO 139,999 LB/YEAR

CONDITIONS

1. {1830} This Authority to Construct serves as a written certificate of conformity with the procedural requirements of 40 CFR 70.7 and 70.8 and with the compliance requirements of 40 CFR 70.6(c). [District Rule 2201] Federally Enforceable Through Title V Permit
2. {1831} Prior to operating with modifications authorized by this Authority to Construct, the facility shall submit an application to modify the Title V permit with an administrative amendment in accordance with District Rule 2520 Section 5.3.4. [District Rule 2520, 5.3.4] Federally Enforceable Through Title V Permit
3. {98} No air contaminant shall be released into the atmosphere which causes a public nuisance. [District Rule 4102]
4. 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] Federally Enforceable Through Title V Permit
5. 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] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

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

Samir Sheikh, Executive Director / APCO

Brian Clements, Director of Permit Services

S-3088-24-8 : Jun 5 2023 9:42AM -- NORMANR : Joint Inspection NOT Required

6. Particulate matter emissions shall not exceed 0.1 grains/dscf in concentration. [District Rule 4201] Federally Enforceable Through Title V Permit

7. This unit shall not operate at the same time as the standby flare authorized as part of Permit Unit S-3088-8, except as required during start-up and shutdown periods to continue to incinerate produced gas and such periods shall be minimized. [District Rule 2201] Federally Enforceable Through Title V Permit

8. This unit shall only be fired on natural gas, oilfield produced gas, or a blend of natural gas and oilfield produced gas. [District Rule 2201] Federally Enforceable Through Title V Permit

9. Emissions from this steam generator shall not exceed any of the following limits: 5 ppmvd NOx @ 3% O2 and 0.0063 lb-NOx/MMBtu, 0.219 lb-SOx/MMBtu, 0.0076 lb-PM10/MMBtu, 46 ppmvd CO @ 3% O2 and 0.035 lb-CO/MMBtu, or 0.0027 lb-VOC/MMBtu (as CH4). [District Rules 2201, 4305, 4306, 4320, 4405, and 4801] Federally Enforceable Through Title V Permit

10. This unit shall comply with one of the following options for control of SOx and particulate matter (PM) emissions: 1) The total sulfur content of the fuel gas used this steam generator shall not exceed 1 grain S per 100 standard cubic feet (1 gr-S/100 scf); or 2) A scrubber that reduces SOx emissions by at least 95% by weight shall be installed and properly operated; or 3) The SO2 concentration in the exhaust of this unit shall not exceed 9 ppmv SO2 corrected to 3.0% O2. [District Rules 2201 and 4320] Federally Enforceable Through Title V Permit

11. The total combined SOx emissions from the steam generators permitted as Units S-3088-7, -20, and -24 shall not exceed 328.5 lb-SOx/day. [District Rule 2201] Federally Enforceable Through Title V Permit

12. 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. 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 month. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

13. If either the NOx or CO concentrations corrected to 3% O2, as measured by the portable analyzer, exceed the allowable emissions concentration, the permittee shall return the emissions to within the acceptable range as soon as possible, but no longer than 1 hour of operation after detection. If the portable analyzer readings continue to exceed the allowable emissions concentration after 1 hour of operation after detection, the permittee shall notify the District within the following 1 hour and conduct a certified source test within 60 days of the first exceedance. In lieu of conducting a source test, the permittee may stipulate a violation has occurred, subject to enforcement action. The permittee must then correct the violation, show compliance has been re-established, and resume monitoring procedures. If the deviations are the result of a qualifying breakdown condition pursuant to Rule 1100, the permittee may fully comply with Rule 1100. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

14. All alternate monitoring parameter emission readings shall be taken with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. The analyzer shall be calibrated, maintained, and operated in accordance with the manufacturer's specifications and recommendations or a protocol approved by the APCO. Emission readings taken shall be averaged over a 15 consecutive-minute period by either taking a cumulative 15 consecutive-minute sample reading or by taking at least five (5) readings, evenly spaced out over the 15 consecutive-minute period. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

15. The permittee shall maintain records of: (1) the date and time of NOx, CO, and O2 measurements, (2) the O2 concentration in percent and the measured NOx and CO concentrations corrected to 3% O2, (3) make and model of exhaust gas analyzer, (4) exhaust gas analyzer calibration records, and (5) a description of any corrective action taken to maintain the emissions within the acceptable range. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

16. Source testing to measure NOx, CO, and VOC emissions from this unit shall be conducted within 60 days of initial operation of the unit under this Authority to Construct (ATC) permit. [District Rules 2201, 4306, and 4320] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

17. Source testing to measure NOx and CO emissions from this unit shall be conducted at least once every twelve (12) months. After demonstrating compliance on two (2) consecutive annual source tests, the unit shall be tested not less than once every thirty-six (36) months. If the result of the 36-month source test demonstrates that the unit does not meet the applicable emission limits, the source testing frequency shall revert to at least once every twelve (12) months. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

18. The source test plan shall identify which basis (ppmv or lb/MMBtu) will be used to demonstrate compliance. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

19. All emissions measurements shall be made with the unit operating either at conditions representative of normal operations or conditions specified in the Permit to Operate. No determination of compliance shall be established within two hours after a continuous period in which fuel flow to the unit is shut off for 30 minutes or longer, or within 30 minutes after a re-ignition as defined in Section 3.0 of District Rule 4306. [District Rules 2201, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

20. 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] Federally Enforceable Through Title V Permit

21. The results of each source test shall be submitted to the District within 60 days after completion of the source test. [District Rule 1081] Federally Enforceable Through Title V Permit

22. NOx emissions for source test purposes shall be determined using EPA Method 7E or ARB Method 100 on a ppmv basis, or EPA Method 19 on a heat input basis. [District Rules 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

23. CO emissions for source test purposes shall be determined using EPA Method 10 or ARB Method 100. [District Rules 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

24. VOC emissions for source test purposes shall be determined using EPA Method 25A or 25B, or ARB Method 100. EPA Method 18, ARB Method 422 "Determination of Volatile Organic Compounds in Emission from Stationary Sources", or alternative method(s) approved by the District shall be used for the measurement and subtraction of exempt compounds (e.g. methane and ethane). [District Rule 2201] Federally Enforceable Through Title V Permit

25. Stack gas oxygen (O2) shall be determined using EPA Method 3 or 3A or ARB Method 100. [District Rules 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

26. SOx emissions for source test purposes shall be determined using EPA Method 6C, EPA Method 8, or ARB Method 100. [District Rule 4320] Federally Enforceable Through Title V Permit

27. For emissions source testing, the arithmetic average of three 30-consecutive-minute test runs shall apply. If two of three runs are above an applicable limit the test cannot be used to demonstrate compliance with an applicable limit. [District Rules 1081, 4305, 4306, and 4320] Federally Enforceable Through Title V Permit

28. 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 EPA and the District. [District Rules 2201, 4306, and 4320] Federally Enforceable Through Title V Permit

29. When complying with the SOx and PM control requirements of this permit by limiting the total sulfur content of the fuel gas or by reducing SOx emissions by at least 95% using a scrubber that removes sulfur compounds from the gas prior to combustion, laboratory analysis to determine the sulfur content of the fuel gas or the control efficiency of the scrubber shall be performed at least annually using EPA Method 11 or EPA Method 15, as appropriate; ASTM Method D1072, D1945, D3246, D4084, D4468, or D5504; grab sample analysis by GC-FPD/TCD performed in the laboratory; or other methods approved by the District and EPA. Records of the fuel sulfur analyses shall be maintained and provided to the District upon request. [District Rules 2201 and 4320] Federally Enforceable Through Title V Permit

30. For natural gas that is regulated by the California Public Utilities Commission (PUC) or Federal Energy Regulatory Commission (FERC), valid purchase contracts, supplier certifications, tariff sheets, transportation contracts, or other documentation may be used to satisfy the fuel sulfur content analysis, provided they establish the fuel sulfur content as required by this permit. [District Rules 2201 and 4320] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

31. When complying with the SOx and PM control requirements of this permit by using a post-combustion scrubber that reduces SOx emissions by at least 95% by weight or limiting the exhaust SO2 concentration to 9 ppmv corrected to 3.0% O2, source testing of SOx emissions from this unit to demonstrate compliance with the required SOx emission reduction percentage or SO2 exhaust concentration limit shall be performed at least annually. [District Rules 1081, 2201, and 4320] Federally Enforceable Through Title V Permit

32. When complying with the SOx and PM control requirements of this permit by using a scrubber that reduces SOx emissions by at least 95% by weight, the operator shall monitor key system operating parameters that indicate proper operation of the scrubber (e.g. inlet and outlet H2S concentrations for scrubbers that remove H2S prior to combustion) at least once every week. Records of monitoring of the key system operating parameters of the scrubber shall be maintained. [District Rules 2201 and 4320] Federally Enforceable Through Title V Permit

33. The sulfur content of the produced gas and any gas not regulated by the PUC or FERC combusted in this unit shall be monitored and recorded at least once every quarter in which the unit operates. If it is determined that the total combined SOx emissions limit for Units S-3088-7, -20, and -24 was exceeded, the sulfur content of the non-PUC and non-FERC-regulated gas combusted in the unit shall be monitored and recorded at least once every week until compliance with the SOx emission limit is demonstrated for each day the unit operates for eight consecutive weeks. After demonstrating compliance with the SOx emission limit for eight consecutive weeks, the gas sulfur content monitoring frequency may revert to quarterly. Records of the results of monitoring of the sulfur content of the gas combusted in this unit shall be maintained. [District Rule 2201] Federally Enforceable Through Title V Permit

34. Monitoring of the sulfur content of the gas combusted in this unit shall be performed using gas detection tubes calibrated for H2S; EPA Method 11 or EPA Method 15, as appropriate, ASTM Method D1072, D1945, D3246, D4084, D4468, D4810 or D5504; grab sample analysis by GC-FPD/TCD performed in the laboratory; a continuous analyzer employing gas chromatography; a continuous fuel gas monitor that meets the requirements specified in SCAQMD Rule 431.1, Attachment A; or an alternative method approved by EPA and the District. The permittee shall maintain records of any monitors used to demonstrate compliance with the SOx limit of this permit, including the make, model, and detection limits of the monitor(s). The required quarterly analysis of the sulfur content of the gas and the first of the weekly analyses required to reestablish compliance shall only be performed using methods that use laboratory analysis. The remainder of the weekly analyses required to demonstrate compliance may be performed using approved methods that do not use laboratory analysis. [District Rule 2201] Federally Enforceable Through Title V Permit

35. Records shall be maintained of the dates that each specific option is used to comply with the SOx and PM control requirements of this permit. [District Rules 1070, 2201, and 4320] Federally Enforceable Through Title V Permit

36. On a monthly basis, the permittee shall calculate and record the total SOx emissions in pounds from this unit each day for the prior calendar month. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

37. The SOx emissions from this unit shall be calculated using the following equation: lb-SOx emitted/day = (total volume of gas incinerated per day, in scf) x (ppm sulfur as H2S prior to incineration) x 0.00000017. [District Rule 2201] Federally Enforceable Through Title V Permit

38. Compliance with the SOx emission limit(s) of this permit may be demonstrated either by monitoring sulfur content at location(s) after all fuel sources are combined prior to incineration, or by monitoring the sulfur content and volume of each fuel source and performing mass balance calculations. Records of monitoring locations, detected sulfur concentrations, and mass balance calculations, if necessary, shall be maintained and made readily available for District inspection upon request. [District Rule 2201] Federally Enforceable Through Title V Permit

39. On a monthly basis, the permittee shall calculate and record the total combined SOx emissions, in pounds, for each day from the steam generators permitted as Units S-3088-7, -20, and -24 for the prior calendar month. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

40. Total combined SOx emissions from all permitted units at the stationary source (District Facilities S-2622 and S-3088) shall not exceed 139,999 pounds in any 12-consecutive month rolling period. [District Rule 2201] Federally Enforceable Through Title V Permit

CONDITIONS CONTINUE ON NEXT PAGE

41. On a monthly basis, the permittee shall calculate and record the total combined SOx emissions from the stationary source in pounds for the prior 12 calendar month period. The total combined SOx emissions shall be calculated by summing the SOx emissions from the previous 12 calendar months from every permitted unit at the stationary source. [District Rules 1070 and 2201] Federally Enforceable Through Title V Permit

42. For gas used to fuel this unit that is not regulated by the PUC or FERC, the permittee shall maintain records of the higher heating value (HHV), in Btu per standard cubic foot (scf), for each calendar quarter in which the unit operates. For PUC or FERC-regulated gas used to fuel this unit, the permittee shall maintain records of the HHV, in Btu per standard cubic foot (scf), for each calendar year in which the unit operates. The records shall include the method(s) used to determine the HHV of the fuel and the dates the HHV was determined. For PUC or FERC-regulated natural gas, documentation from the utility may be used to establish the HHV of the gas. [District Rule 1070] Federally Enforceable Through Title V Permit

43. Records of the fuel sulfur content of the natural gas and produced gas combusted in this unit; the daily amounts of each fuel used in this unit, in standard cubic feet (scf) and MMBtu; and calculations to verify compliance with the total combined SOx emission limit(s) for the steam generators permitted as Units S-3088-7, -20, and -24 for each day the units are operated shall be maintained and made readily available for District inspection upon request. [District Rules 1070, 4001, 2201, and 4320, and 40 CFR Part 60, Subpart Dc] Federally Enforceable Through Title V Permit

44. All records shall be maintained for a minimum of five (5) years, and shall be made available for District inspection upon request. [District Rules 1070, 2201, 4305, 4306, and 4320, and 40 CFR Part 60, Subpart Dc] Federally Enforceable Through Title V Permit

APPENDIX C

Oilfield Produced Gas Analysis from April 16, 2013 Source Test at Facility

AEROS Environmental Inc.

TRC Cypress Group LLC
Steam Generator 92
TEOR Gas

Project 395-8250
Laboratory ID 13-127-05

Sampled by: Jesus Garcia

Date Sampled: April 16, 2013
Date Received: April 16, 2013
Date Analyzed: April 17, 2013

Fuel Gas Analysis Results

CONSTITUENT	MOLE %	Wt. %
Oxygen	0.139	0.144
Nitrogen	2.337	2.128
Carbon Dioxide	49.538	70.854
Carbon Monoxide	0.000	0.000
Hydrogen	1.046	0.069
Hydrogen Sulfide	0.001	0.001
Methane	44.839	23.378
Ethane	0.646	0.631
Propane	0.541	0.775
Isobutane	0.390	0.737
N-Butane	0.132	0.249
Isopentane	0.127	0.298
N-Pentane	0.013	0.030
Hexanes	0.252	0.707
Total(s)	**100.000**	**100.000**

CHONS	Wt.%
Carbon	39.66
Hydrogen	6.56
Oxygen	51.66
Nitrogen	2.13
Sulfur	0.03
H/C	0.165

SULFUR	ppm	gr/100 SCF*
H_2S	6.14	0.358
TRS	274	16.0

* Reported as Sulfur

Specific Gravity (Air = 1)	1.0624
Specific Volume (cf/lb)	12.33
Gross Calorific Value, Dry (Btu/cf)	518.01
Gross Calorific Value, Wet (Btu/cf)	507.07
Gross Calorific Value, Dry (Btu/lb)	6388.60
Net Calorific Value, Dry (Btu/cf)	467.31
Net Calorific Value, Wet (Btu/cf)	457.44
Compressibility Factor "Z" @ 60° F, 1 atm	0.9963
EPA F-Factor @ 68° F (DSCF/MMBtu)	**9562**
EPA F-Factor @ 60° F (DSCF/MMBtu)	**9419**

References:
ASTM Methods D1945, D3588 & D6228
EPA Method 19
GC-TCD & GC-FPD
TRS = Total Reduced Sulfur

Reviewed By: Tim Brennan, Laboratory Manager

APPENDIX D

PE Calculations for Existing Units

PE Calculations for S-2622-1-11: 25.2 MMBtu/hr Steam Generator

Assumptions

- The existing steam generator is fired only with natural gas and vapor recovery produced gas (current permit)
- Maximum operating schedule: 24 hour/day and 365 day/year
- F Factor for natural gas, corrected to 60 °F (15.6 °C) (District standard temperature): 8,578 dscf/MMBtu (corrected from natural gas F Factor of 8,710 dscf/MMBtu at 20 °C (68 °F) given in 40 CFR 60, Appendix A)
- Based on the fuel analysis from the April 16, 2013 source test for Permit Unit S-3088-24, the F Factor for the vapor recovery produced gas used as fuel in the steam generator is assumed to be approximately 9,419 dscf/MMBtu at 60°F
- Based on the information from the applicant that the mixture of natural gas and produced gas used to fuel the steam generators has minimum HHV of approximately 800 Btu/scf, it is assumed that the mixture contains a maximum of 40% produced gas by volume with an F Factor of approximately 8,914 dscf/MMBtu at 60°F (0.6 x 1,000 Btu/scf + 0.4 x 475 Btu/scf = 790 Btu/scf; 0.6 x 8,578 dscf/MMBtu + 0.4 x 9,419 dscf/MMBtu = 8,914 dscf/MMBtu)

Emission Factors for S-2622-1-11

Emission Factors for S-2622-1-11				
Pollutant	**ppmvd (@ 3%O_2)**	**Natural Gas lb/MMBtu**	**Mixed Gas lb/MMBtu**	**Source**
NO_X	15 ppmvd	0.018	0.019	Rule 4306 Limit/Current Permit See Equations Below
SO_X	--	0.003	0.003	Current Permit
PM_{10}	--	0.008	0.008	Current Permit
CO	200 ppmvd	0.148	0.154	Concentration limit from Current Permit See Equations Below
VOC	--	0.006	0.006	Current Permit

NO_X – 15 ppmvd @ 3% O_2 in Exhaust, Natural Gas Fuel

$$\frac{15\ \text{ppmv}\ \text{NO}_\text{X}\ @\ 3\%\ \text{O}_2}{10^6} \times \frac{46\ \text{lb}\ \text{NO}_\text{X}}{\text{lb}-\text{mole}} \times \frac{\text{lb}-\text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}578\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95-3)\%\ \text{O}_2} = 0.018 \frac{\text{lb}\ \text{NO}_\text{X}}{\text{MMBtu}}$$

NO_X – 15 ppmvd @ 3% O_2 in Exhaust, Mixed Natural Gas/Produced Gas Fuel

$$\frac{15\ \text{ppmv}\ \text{NO}_\text{X}\ @\ 3\%\ \text{O}_2}{10^6} \times \frac{46\ \text{lb}\ \text{NO}_\text{X}}{\text{lb}-\text{mole}} \times \frac{\text{lb}-\text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}914\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95-3)\%\ \text{O}_2} = 0.019 \frac{\text{lb}\ \text{NO}_\text{X}}{\text{MMBtu}}$$

CO – 200 ppmvd @ 3% O_2 in Exhaust, Natural Gas Fuel

$$\frac{200\ \text{ppmv CO @ 3\% O}_2}{10^6} \times \frac{28\ \text{lb CO}}{\text{lb} - \text{mole}} \times \frac{\text{lb} - \text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}578\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95 - 3)\%\ \text{O}_2} = 0.148\ \frac{\text{lb CO}}{\text{MMBtu}}$$

CO – 200 ppmvd @ 3% O_2 in Exhaust, Mixed Natural Gas/Produced Gas Fuel

$$\frac{200\ \text{ppmv CO @ 3\% O}_2}{10^6} \times \frac{28\ \text{lb CO}}{\text{lb} - \text{mole}} \times \frac{\text{lb} - \text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}914\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95 - 3)\%\ \text{O}_2} = 0.154\ \frac{\text{lb CO}}{\text{MMBtu}}$$

PE for S-2622-1-11

Annual PE for S-2622-1-11									
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input of Unit (MMBtu/hr)	x	Daily Hours of Operation (hr/day)	x	Days/Year Operated (day/yr)	=	PE (lb/year)
NO_X	0.019	x	25.2	x	24	x	365	=	**4,194**
SO_X	0.003	x	25.2	x	24	x	365	=	**662**
PM_{10}	0.008	x	25.2	x	24	x	365	=	**1,766**
CO	0.154	x	25.2	x	24	x	365	=	**33,996**
VOC	0.006	x	25.2	x	24	x	365	=	**1,325**

PE Calculations for S-2622-5-5: TEOR Operation with 12 Uncontrolled Cyclic Wells

Assumptions

- VOC is the only pollutant emitted by the uncontrolled cyclic wells

Emission Factors for S-2622-5-5

VOC emissions from the uncontrolled cyclic wells will be calculated an emission factor of 3.6 lb-VOC/well-day from the California Air Resources Board (ARB) emission inventory methodology Section 4.5 – Oil & Gas Production, Steam Drive and Cyclic Wells (updated June 1990)[2]

PE for S-2622-5-5

3.6 lb-VOC/well-day x 12 wells x 365 day/year = 15,768 lb-VOC/year

[2] California Air Resources Board Petroleum Production and Marketing Methodologies - Oil and Gas Production, Section 4.5 – Oil & Gas Production, Steam Drive and Cyclic Wells (updated June 1990). https://ww3.arb.ca.gov/ei/areasrc/fullpdf/full4-5.pdf

PE Calculations for S-2622-11-12: 14.5 MMBtu/hr Steam Generator

Assumptions

- The existing steam generator is fired only with natural gas and vapor recovery produced gas (current permit)
- Maximum operating schedule: 24 hour/day and 365 day/year
- F Factor for natural gas, corrected to 60 °F (15.6 °C): 8,578 dscf/MMBtu
- F Factor for the vapor recovery produced gas: approximately 9,419 dscf/MMBtu at 60°F
- The mixture of natural gas and produced gas used to fuel the steam generators has minimum HHV of approximately 800 Btu/scf and an F Factor of approximately 8,914 dscf/MMBtu at 60°F (Based on information from applicant)

Emission Factors for S-2622-11-12

Emission Factors for S-2622-11-12				
Pollutant	**ppmvd (@ 3%O_2)**	**Natural Gas lb/MMBtu**	**Mixed Gas lb/MMBtu**	**Source**
NO_X	15 ppmvd	0.018	0.019	Rule 4306 Limit/Current Permit See Equations Above
SO_X	--	0.003	0.003	Current Permit
PM_{10}	--	0.008	0.008	Current Permit
CO	48 ppmvd	0.036	0.037	Concentration limit from Current Permit See Equations Below
VOC	--	0.006	0.006	Current Permit

CO – 48 ppmvd @ 3% O_2 in Exhaust, Natural Gas Fuel

$$\frac{48\ \text{ppmv CO @ 3\% O}_2}{10^6} \times \frac{28\ \text{lb CO}}{\text{lb} - \text{mole}} \times \frac{\text{lb} - \text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}578\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95 - 3)\%\ \text{O}_2} = 0.036\ \frac{\text{lb CO}}{\text{MMBtu}}$$

CO – 48 ppmvd @ 3% O_2 in Exhaust, Mixed Natural Gas/Produced Gas Fuel

$$\frac{48\ \text{ppmv CO @ 3\% O}_2}{10^6} \times \frac{28\ \text{lb CO}}{\text{lb} - \text{mole}} \times \frac{\text{lb} - \text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}914\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95 - 3)\%\ \text{O}_2} = 0.037\ \frac{\text{lb CO}}{\text{MMBtu}}$$

PE for S-2622-11-12

Annual PE for S-2622-11-12									
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input of Unit (MMBtu/hr)	x	Daily Hours of Operation (hr/day)	x	Days/Year Operated (day/yr)	=	PE (lb/year)
NO_X	0.019	x	14.5	x	24	x	365	=	**2,413**
SO_X	0.003	x	14.5	x	24	x	365	=	**381**
PM_{10}	0.008	x	14.5	x	24	x	365	=	**1,016**
CO	0.037	x	14.5	x	24	x	365	=	**4,700**
VOC	0.006	x	14.5	x	24	x	365	=	**762**

PE Calculations for S-2622-17-6: 62.5 MMBtu/hr Steam Generator

Assumptions

- The existing steam generator is fired only with natural gas and vapor recovery produced gas (current permit)
- Maximum operating schedule: 24 hour/day and 365 day/year
- F Factor for natural gas, corrected to 60 °F (15.6 °C): 8,578 dscf/MMBtu
- F Factor for the vapor recovery produced gas: approximately 9,419 dscf/MMBtu at 60°F
- The mixture of natural gas and produced gas used to fuel the steam generators has minimum HHV of approximately 800 Btu/scf and an F Factor of approximately 8,914 dscf/MMBtu at 60°F (Based on information from applicant)

Emission Factors for S-2622-17-6

Emission Factors for S-2622-17-6				
Pollutant	**ppmvd (@ 3%O_2)**	**Natural Gas lb/MMBtu**	**Mixed Gas lb/MMBtu**	**Source**
NO_X	15 ppmvd	0.018	0.019	Rule 4306 Limit/Current Permit See Equations Above
SO_X	--	0.00285	0.00285	Current Permit
PM_{10}	--	0.0076	0.0076	Current Permit AP-42, Table 1.4-2 (July 1998)
CO	47.5 ppmvd	0.035	0.036	Concentration limit from Current Permit See Equations Below
VOC	--	0.003	0.003	Current Permit

CO – 47.5 ppmvd @ 3% O_2 in Exhaust, Natural Gas Fuel

$$\frac{47.5\ \text{ppmv CO @ 3\% O}_2}{10^6} \times \frac{28\ \text{lb CO}}{\text{lb} - \text{mole}} \times \frac{\text{lb} - \text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}578\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95 - 3)\%\ \text{O}_2} = 0.035\ \frac{\text{lb CO}}{\text{MMBtu}}$$

CO – 47.5 ppmvd @ 3% O_2 in Exhaust, Mixed Natural Gas/Produced Gas Fuel

$$\frac{47.5\ \text{ppmv CO @ 3\% O}_2}{10^6} \times \frac{28\ \text{lb CO}}{\text{lb} - \text{mole}} \times \frac{\text{lb} - \text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}914\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95 - 3)\%\ \text{O}_2} = 0.036\ \frac{\text{lb CO}}{\text{MMBtu}}$$

PE for S-2622-17-6

Annual PE for S-2622-17-6									
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input of Unit (MMBtu/hr)	x	Daily Hours of Operation (hr/day)	x	Days/Year Operated (day/yr)	=	PE (lb/year)
NO_X	0.019	x	62.5	x	24	x	365	=	**10,403**
SO_X	0.00285	x	62.5	x	24	x	365	=	**1,560**
PM_{10}	0.0076	x	62.5	x	24	x	365	=	**4,161**
CO	0.036	x	62.5	x	24	x	365	=	**19,710**
VOC	0.003	x	62.5	x	24	x	365	=	**1,643**

PE Calculations for S-2622-18-3: Dormant 62.5 MMBtu/hr Steam Generator

Assumptions

- The existing steam generator is dormant because the NO_X emission factor in the permit does not comply with District Rule 4306
- Because the steam generator is not allowed to operate until it complies with District Rule 4306, the PE for this unit will be based on compliance with District Rule 4306
- The existing steam generator is only allowed to use natural gas and vapor recovery produced gas (non-condensable gas) as fuel (current permit)
- Maximum operating schedule: 24 hour/day and 365 day/year
- F Factor for natural gas, corrected to 60 °F (15.6 °C): 8,578 dscf/MMBtu
- F Factor for the vapor recovery produced gas: approximately 9,419 dscf/MMBtu at 60°F
- The mixture of natural gas and produced gas used to fuel the steam generators has minimum HHV of approximately 800 Btu/scf and an F Factor of approximately 8,914 dscf/MMBtu at 60°F (Based on information from applicant)

Emission Factors for S-2622-18-3

Emission Factors for S-2622-18-3				
Pollutant	**ppmvd (@ 3%O_2)**	**Natural Gas lb/MMBtu**	**Mixed Gas lb/MMBtu**	**Source**
NO_X	15 ppmvd	0.018	0.019	Rule 4306 Limit See Equations Above
SO_X	--	0.002	0.015	Current Permit
PM_{10}	--	0.014	0.015	Current Permit
CO	47.5 ppmvd	0.035	0.036	Concentration limit from Current Permit See Equations Above
VOC	--	0.003	0.003	Current Permit

PE for S-2622-18-3

Annual PE for S-2622-18-3									
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input of Unit (MMBtu/hr)	x	Daily Hours of Operation (hr/day)	x	Days/Year Operated (day/yr)	=	PE (lb/year)
NO_X	0.019	x	62.5	x	24	x	365	=	**10,403**
SO_X	0.015	x	62.5	x	24	x	365	=	**8,213**
PM_{10}	0.015	x	62.5	x	24	x	365	=	**8,213**
CO	0.036	x	62.5	x	24	x	365	=	**19,710**
VOC	0.003	x	62.5	x	24	x	365	=	**1,643**

PE Calculations for S-2622-19-3 and -20-3: Dormant 62.5 MMBtu/hr Steam Generators

Assumptions

- The existing steam generator are dormant because the NO_X emission factor in the permits does not comply with District Rule 4306
- Because the steam generators are not allowed to operate until they comply with District Rule 4306, the PE for these units will be based on compliance with District Rule 4306
- The existing steam generators are only allowed to use natural gas and vapor recovery produced gas (non-condensable gas) as fuel (current permits)
- Maximum operating schedule: 24 hour/day and 365 day/year
- F Factor for natural gas, corrected to 60 °F (15.6 °C): 8,578 dscf/MMBtu
- F Factor for the vapor recovery produced gas: approximately 9,419 dscf/MMBtu at 60°F
- The mixture of natural gas and produced gas used to fuel the steam generators has minimum HHV of approximately 800 Btu/scf and an F Factor of approximately 8,914 dscf/MMBtu at 60°F (Based on information from applicant)

Emission Factors for S-2622-19-3 & -20-3

Emission Factors for S-2622-19-3 & -20-3				
Pollutant	**ppmvd (@ 3%O_2)**	**Natural Gas lb/MMBtu**	**Mixed Gas lb/MMBtu**	**Source**
NO_X	15 ppmvd	0.018	0.019	Rule 4306 Limit See Equations Above
SO_X	--	0.015	0.015	Current Permit
PM_{10}	--	0.015	0.015	Current Permit
CO	50 ppmvd	0.037	0.038	Concentration limit from Current Permit See Equations Below
VOC	--	0.003	0.003	Current Permit

CO – 50 ppmvd @ 3% O_2 in Exhaust, Natural Gas Fuel

$$\frac{50\ \text{ppmv CO @ 3\% O}_2}{10^6} \times \frac{28\ \text{lb CO}}{\text{lb} - \text{mole}} \times \frac{\text{lb} - \text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}578\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95 - 3)\%\ \text{O}_2} = 0.037\ \frac{\text{lb CO}}{\text{MMBtu}}$$

CO – 50 ppmvd @ 3% O_2 in Exhaust, Mixed Natural Gas/Produced Gas Fuel

$$\frac{50\ \text{ppmv CO @ 3\% O}_2}{10^6} \times \frac{28\ \text{lb CO}}{\text{lb} - \text{mole}} \times \frac{\text{lb} - \text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}914\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95 - 3)\%\ \text{O}_2} = 0.038\ \frac{\text{lb CO}}{\text{MMBtu}}$$

PE for S-2622-19-3 & -20-3

Annual PE for S-2622-19-3 & -20-3									
Pollutant	Emission Factor (lb/MMBtu)	x	Max Heat Input of Unit (MMBtu/hr)	x	Daily Hours of Operation (hr/day)	x	Days/Year Operated (day/yr)	=	PE (lb/year)
NO_X	0.019	x	62.5	x	24	x	365	=	**10,403**
SO_X	0.015	x	62.5	x	24	x	365	=	**8,213**
PM_{10}	0.015	x	62.5	x	24	x	365	=	**8,213**
CO	0.038	x	62.5	x	24	x	365	=	**20,805**
VOC	0.003	x	62.5	x	24	x	365	=	**1,643**

PE Calculations for S-3088-8-17: Thermally Enhanced Oil Recovery (TEOR) 150 Steam-Enhanced Crude Oil Production Wells and a 665 SCFM Standby Flare

Assumptions

- The piping and components for the TEOR operation only handle fluid streams with a VOC content of 10% or less by weight (District Project S-1160260)

- Pursuant to District Policy SSP 2015 - Procedures for Quantifying Fugitive VOC Emissions at Petroleum and SOCMI Facilities (September 15, 2005), VOC emissions are not assessed to piping and components handling fluid streams with a VOC content of 10% or less by

weight; therefore, the only emissions assessed to the TEOR operation are from the standby flare

- Maximum operating schedule: 365 day/year
- Maximum amount of gas combusted in standby flare: 0.958 scf/day (current permit)
- The HHV of the produced gas combusted in flare: 518 Btu/scf (this value is from the produced gas analysis from the April 16, 2013 source test at the facility and a little more conservative than the HHV of 475 Btu/scf proposed by applicant based on the average of the 2021 field tests for the oilfield produced gas)
- SO_X emissions from the standby flare are limited to 207.6 lb/day (current permit)

Emission Factors for S-3088-8-17

Emission Factors for S-3088-8-17		
Pollutant	**lb/MMBtu**	**Source**
NO_X	0.068	Current Permit
SO_X	--	Limit of 207.6 lb-SO_X/day from Current Permit
PM_{10}	0.008	Current Permit
CO	0.370	Current Permit
VOC	0.063	Current Permit

PE for S-3088-8-17

Annual PE for S-3088-8-17									
Pollutant	Emission Factor (lb/MMBtu)	x	Max Amount Flared Daily (MMscf/day)	x	HHV of Gas Flared (MMBtu/MMscf)	x	Days/Year Operated (day/yr)	=	PE (lb/year)
NO_X	0.068	x	0.958	x	518	x	365	=	**12,317**
SO_X	207.6				lb-SO_X/day	x	365	=	**75,774**
PM_{10}	0.008	x	0.958	x	518	x	365	=	**1,449**
CO	0.370	x	0.958	x	518	x	365	=	**67,018**
VOC	0.063	x	0.958	x	518	x	365	=	**11,411**

PE Calculations for S-3088-9-5, -10-5, -11-5, -12-5, -13-5, -14-6, -15-6, -16-6, & -30-1: Crude Oil Tanks Connected to Vapor Control System Listed on S-3088-8

Assumptions

- The piping and components for the tanks only handle fluid streams with a maximum VOC content of 10% by weight (current permits)

- Pursuant to District Policy SSP 2015, VOC emissions are not assessed to piping and components handling fluid streams with a VOC content of 10% or less by weight; therefore, no VOC emissions are assessed to the crude oil tanks; any VOCs are collected by the vapor control system and sent to the standby flare or steam generators to be incinerated

PE for S-3088-9-4, -10-4, -11-4, -12-4, -13-4, -14-5, -15-5, -16-5, & -30-1

As discussed above, no VOC emissions are assessed to the crude oil tanks; therefore annual PE for VOC from each tank = 0 lb-VOC/year

APPENDIX E

Previous District BACT Guideline 1.2.1 - Oilfield Steam Generator (Rescinded 4/11/2023)

San Joaquin Valley
Unified Air Pollution Control District

Best Available Control Technology (BACT) Guideline 1.2.1*

Last Update: 3/24/2014

Oilfield Steam Generator (> or =20 MMBtu/hr)

Pollutant	Achieved in Practice or contained in the SIP	Technologically Feasible	Alternate Basic Equipment
VOC	Gaseous fuel		
SOx	Fired on PUC quality natural gas, commercial propane, and/or commercial LPG; or gaseous fuel treated to remove 95% by weight of sulfur compounds; or treated such that the sulfur content of all fuel streams combined does not exceed 1 gr of sulfur compounds (as S) per 100 dscf; or use of a continuously operating SO2 scrubber and either achieve 95% by weight control of sulfur compounds or achieve an emission rate of 9 ppmvd SO2 @ 3% O2		
PM10	Fired on PUC quality natural gas, commercial propane, and/or commercial LPG; or gaseous fuel treated to remove 95% by weight of sulfur compounds; or treated such that the sulfur content of all fuel streams combined does not exceed 1 gr of sulfur compounds (as S) per 100 dscf; or use of a continuously operating SO2 scrubber and either achieve 95% by weight control of sulfur compounds or achieve an emission rate of 9 ppmvd SO2 @ 3% O2		
NOx	•Units rated 85 MMBtu/hr and fired solely on PUC quality natural gas: 6 ppmvd @ 3% O2; or •Units firing on > or = 50% PUC quality natural gas; commercial propane; and/or LPG: 7 ppmvd @ 3% O2, except units rated 85 MMBtu/hr and fired solely on PUC quality natural gas; or •Units firing on <50% PUC quality natural gas; commercial propane; and/or LPG: 9 ppmvd @ 3% O2	5 ppmvd @ 3% O2	
CO	25 ppmvd @ 3% O2		

CO2e	FEDERAL BACT	FEDERAL BACT	FEDERAL BACT
	==========	==========	==========
		Federal BACT (40CFR52.21 (b)(23)) for Sources Subject to District Rule 2410 (Prevention of Significant Deterioration) Variable frequency drive high efficiency electrical motors driving the blower; and •When firing on ≥50% PUC quality natural gas, commercial propane, and/or LPG: a convection section with at least 235 square feet of heat transfer surface area per MMBtu/hr (HHV) of maximum rated heat input (verified by manufacturer or independent engineering/construction firm) or an overall thermal efficiency rating of 88% (verified by manufacturer or independent engineering/construction firm); or, •When firing on <50% PUC quality natural gas, commercial propane, and/or LPG: split flow dual pass water feed configuration, a convection section having at least 128 square feet of heat transfer surface area per MMBtu/hr (HHV) of maximum rated heat input (verified by the manufacturer or independent engineering/construction firm) and at least six inches of castable refractory or an overall thermal efficiency rating of at least 85% (verified by manufacturer or independent engineering/construction firm); Variable frequency drive high efficiency electrical motors driving the blower; and, •When firing on ≥50% PUC quality natural gas, commercial propane, and/or LPG: a convection section with at least 235 square feet of heat transfer surface area per MMBtu/hr (HHV) of maximum rated heat input (verified by manufacturer or independent engineering/construction firm) or an overall thermal efficiency rating of 88% (verified by manufacturer or independent engineering/construction firm); or, •When firing on <50% PUC quality natural gas, commercial propane, and/or LPG: split flow dual pass water feed configuration, a convection section having at least 128 square feet of heat transfer surface area per MMBtu/hr (HHV) of maximum rated heat input (verified by the manufacturer or independent engineering/construction firm) and at least six inches of castable refractory or an overall thermal efficiency rating of at least 85% (verified by manufacturer or independent engineering/construction firm); Or other emission reduction technique determined on a case by case basis that meets the requirements of 40 CFR52.21(b)(23)	

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 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**

APPENDIX F

Quarterly Net Emissions Change (QNEC)

Quarterly Net Emissions Change (QNEC)

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

QNEC = PE2 - PE1, where:

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

Because the total combined SO_X emissions from the steam generators permitted as Units S-3088-7, -20, and -24 are limited to no more than exceed 328.5 lb/day (current permits), equivalent to 119,903 lb-SO_X/year. Units S-3088-7, -20, and -24 will each be assessed approximately 1/3 of the total combined annual SO_X limit for these units (39,967.7 lb-SO_X/year).

In addition, although the total combined SO_X emission limit for Permit Units S-3088-7, -20, and -24 is not changing, the total potential SO_X emissions from the stationary source will decrease from 147,145 lb-SO_X/year to 139,999 lb-SO_X/year as a result of this project; therefore the decrease in potential stationary source SO_X emissions for the project of 7,146 lb-SO_X/year (147,145 lb-SO_X/year - 139,999 lb-SO_X/year) will be equally divided between the three steam generators, resulting in an annual decrease of 2,382 lb-SO_X/year and a quarterly decrease of 595.5 lb-SO_X/qtr for each steam generator.

Using the values in Sections VII.C.2 and VII.C.1 of this evaluation, QNEC values are calculated below.

ATC S-3088-7-12 (62.5 MMBtu/hr Natural Gas/Oilfield Produced gas-Fired Steam Generator)

PE1 (lb/qtr) S-3088-7-11					
	PE1 (lb/year)	÷	4 qtr/year	=	PE1 (lb/qtr)
NO_X	9,855	÷	4 qtr/year	=	2,463.75
SO_X	39,967.7	÷	4 qtr/year	=	9,991.93
PM_{10}	4,161	÷	4 qtr/year	=	1,040.25
CO	43,800	÷	4 qtr/year	=	10,950.00
VOC	3,011	÷	4 qtr/year	=	752.75

PE2 (lb/qtr) S-3088-7-12					
	PE2 (lb/year)	÷	4 qtr/year	=	PE2 (lb/qtr)
NO_X	3,449	÷	4 qtr/year	=	862.25
SO_X	39,967.7	÷	4 qtr/year	=	9,991.93
PM_{10}	4,161	÷	4 qtr/year	=	1,040.25
CO	43,800	÷	4 qtr/year	=	10,950.00
VOC	1,478	÷	4 qtr/year	=	369.50

Quarterly NEC [QNEC] S-3088-7-12					
	PE2 (lb/qtr)	-	PE1 (lb/qtr)	=	QNEC (lb/qtr)
NO_X	862.25	-	2,463.75	=	-1,601.50
SO_X	-			=	-595.5
PM_{10}	1,040.25	-	1,040.25	=	0.00
CO	10,950.00	-	10,950.00	=	0.00
VOC	369.50	-	752.75	=	-383.25

ATC S-3088-20-10 (62.5 MMBtu/hr Natural Gas/Oilfield Produced gas-Fired Steam Generator)

PE1 (lb/qtr) S-3088-20-9					
	PE1 (lb/year)	÷	4 qtr/year	=	PE1 (lb/qtr)
NO_X	9,855	÷	4 qtr/year	=	2,463.75
SO_X	39,967.7	÷	4 qtr/year	=	9,991.93
PM_{10}	4,161	÷	4 qtr/year	=	1,040.25
CO	19,710	÷	4 qtr/year	=	4,927.50
VOC	3,011	÷	4 qtr/year	=	752.75

PE2 (lb/qtr) S-3088-20-10					
	PE2 (lb/year)	÷	4 qtr/year	=	PE2 (lb/qtr)
NO_X	3,449	÷	4 qtr/year	=	862.25
SO_X	39,967.7	÷	4 qtr/year	=	9,991.93
PM_{10}	4,161	÷	4 qtr/year	=	1,040.25
CO	19,710	÷	4 qtr/year	=	4,927.50
VOC	1,478	÷	4 qtr/year	=	369.50

Quarterly NEC [QNEC] S-3088-20-10					
	PE2 (lb/qtr)	-	PE1 (lb/qtr)	=	QNEC (lb/qtr)
NO_X	862.25	-	2,463.75	=	-1,601.50
SO_X	-			=	-595.5
PM_{10}	1,040.25	-	1,040.25	=	0.00
CO	4,927.50	-	4,927.50	=	0.00
VOC	369.50	-	752.75	=	-383.25

ATC S-3088-24-8 (62.5 MMBtu/hr Natural Gas/Oilfield Produced gas-Fired Steam Generator)

PE1 (lb/qtr) S-3088-24-7					
	PE1 (lb/year)	÷	4 qtr/year	=	PE1 (lb/qtr)
NO_X	9,855	÷	4 qtr/year	=	2,463.75
SO_X	39,967.7	÷	4 qtr/year	=	9,991.93
PM_{10}	4,161	÷	4 qtr/year	=	1,040.25
CO	19,163	÷	4 qtr/year	=	4,790.75
VOC	3,011	÷	4 qtr/year	=	752.75

PE2 (lb/qtr) S-3088-24-8					
	PE2 (lb/year)	÷	4 qtr/year	=	PE2 (lb/qtr)
NO_X	3,449	÷	4 qtr/year	=	862.25
SO_X	39,967.7	÷	4 qtr/year	=	9,991.93
PM_{10}	4,161	÷	4 qtr/year	=	1,040.25
CO	19,163	÷	4 qtr/year	=	4,790.75
VOC	1,478	÷	4 qtr/year	=	369.50

Quarterly NEC [QNEC] S-3088-24-8					
	PE2 (lb/qtr)	-	PE1 (lb/qtr)	=	QNEC (lb/qtr)
NO_X	862.25	-	2,463.75	=	-1,601.50
SO_X	-			=	-595.5
PM_{10}	1,040.25	-	1,040.25	=	0.00
CO	4,790.75	-	4,790.75	=	0.00
VOC	369.50	-	752.75	=	-383.25

APPENDIX G

BACT Analysis for Existing Natural Gas/Produced Gas-Fired Oilfield Steam Generators

Top-Down BACT Analysis for Project S-1221387
62.5 MMBtu/hr Natural Gas/Produced Gas-Fired Oilfield Steam Generators

Previous District BACT Guideline 1.2.1 – Oilfield Steam Generator (≥ 20 MMBtu/hr), which was rescinded on April 11, 2023, listed the BACT requirements for oilfield steam generators rated 20.0 MMBtu/hr or greater. Because District BACT Guideline 1.2.1 was last updated in March 2014, more than none years ago, and there is no existing District BACT Guideline that applies to the existing 62.5 MMBtu/hr natural gas/oilfield produced gas-fired steam generators, a project-specific BACT analysis will be performed in accordance the District BACT policy to determine the BACT requirements for the existing steam generators.

I. Proposal

TRC Cypress Group LLC has requested Authority to Construct (ATC) permits to modify three existing 62.5 MMBtu/hr natural gas/produced gas-fired oilfield steam generators, currently operating under Permits to Operate (PTOs) S-3088-7-11, -20-9, and -24-7, by installing new programmable logic controllers (PLCs), modifying their fuel trains, upgrading the existing flue gas recirculation (FGR) systems for two of the steam generators (Permit Units S-3088-7 and 20), and installing an FGR system on the other steam generator (Permit Unit S-3088-24) to reduce the NO_X emissions from the units to 5 ppmv @ 3% O_2 to comply with the Tier 2 NO_X emission limits of District Rules 4306 and 4320. Because the modification to the steam generators is considered a physical change and change in the method of operation of the units, the modification is subject to the requirements of New and Modified Source Review (NSR). As discussed in this evaluation, the project is considered a federal major modification for NO_X emissions and therefore triggered federal BACT for NO_X.

II. Top-Down BACT Analyses for the Existing 62.5 MMBtu/hr Natural Gas/Oilfield Produced gas-Fired Steam Generators

As stated above, a project-specific BACT analysis will be performed for the modification of the 62.5 MMBtu/hr natural gas/oilfield produced gas-fired steam generators evaluated under this project.

1. BACT Analysis for NO_X Emissions:

a. Step 1 - Identify control technologies

As mentioned above, District BACT Guideline 1.2.1 – Oilfield Steam Generator (≥ 20 MMBtu/hr) has been rescinded. District BACT Guideline 1.2.1 listed the following BACT requirements for NO_X for oilfield steam generators rated 20 MMBtu/hr or greater.

Previous SJVAPCD BACT Guideline 1.2.1 – Oilfield Steam Generator (≥ 20 MMBtu/hr) NO_X Emission Requirements		
Achieved in Practice	Technologically Feasible	Alternate Basic Equipment
• Units rated 85 MMBtu/hr and fired solely on PUC quality natural gas: 6 ppmvd @ 3% O_2; or, • Units firing on ≥ 50% PUC quality natural gas; commercial propane; and/or LPG: 7 ppmvd @ 3% O_2. except units rated 85 MMBtu/hr and fired solely on PUC quality natural gas; or, • Units firing on < 50% PUC quality natural gas; commercial propane; and/or LPG: 9 ppmvd @ 3% O_2	5 ppmvd @ 3% O_2	--

In addition, the US Environmental Protection Agency (USEPA) RACT/BACT/LAER Clearinghouse, the California Air Resources Board (CARB) BACT Clearinghouse, and the South Coast Air Quality Management District (SCAQMD), the Ventura County Air Pollution Control District (VCAPCD), the Bay Area Air Quality Management District (BAAQMD), the Sacramento Metropolitan Air Quality Management District (SMAQMD), the Monterey Bay Air Resources District, the Santa Barbara County Air Pollution Control District (SBAPCD), and the San Diego County Air Pollution Control District (SDAPCD) BACT Guidelines were reviewed to determine potential control technologies for NO_X for this class and category of operation. The District also reviewed the applicable rules from the District and other air districts.

The following table summarizes the results of the review of BACT guidelines and applicable rules for oilfield steam generators:

BACT Guideline/Applicable Rule Emission Limit Source	Equipment Rating	NO_X Control Technology/Requirement
SJVAPCD Rule 4306 – Boilers, Steam Generators and Process Heaters – Phase 3 (12-17-2020)	> 5.0 MMBtu/hr	**Tier 1 Limits** Tier 1 Standard NO_X Limit: 15 ppmv NO_X @ 3% O_2 or 0.018 lb-NO_X/MMBtu
		Tier 2 Limits Tier 2 NO_X Limit for Units Rated > 5.0 MMBtu/hr to ≤ 75.0 MMBtu/hr: 9 ppmv NO_X @ 3% O_2 or 0.011 lb-NO_X/MMBtu Tier 2 NO_X Limit for Units Rated > 75.0 MMBtu/hr 7 ppmv NO_X @ 3% O_2 or 0.0085 lb-NO_X/MMBtu Tier 2 NO_X Limit for Units Firing on Less Than 50%, by volume, PUC Quality Gas 15 ppmv NO_X @ 3% O_2 or 0.018 lb-NO_X/MMBtu

BACT Guideline/Applicable Rule Emission Limit Source	Equipment Rating	NO_X Control Technology/Requirement
SJVAPCD Rule 4320 – Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr (12-17-2020)	> 5.0 MMBtu/hr	**Tier 1 Limits** Tier 1 Standard Schedule NO_X Limit for Units Rated > 5.0 MMBtu/hr to ≤ 20.0 MMBtu/hr: 9 ppmv NO_X @ 3% O_2 or 0.011 lb-NO_X/MMBtu Tier 1 Enhanced Schedule NO_X Limit for Units Rated > 5.0 MMBtu/hr to ≤ 20.0 MMBtu/hr: 6 ppmv NO_X @ 3% O_2 or 0.007 lb-NO_X/MMBtu Tier 1 Standard Schedule NO_X Limit for Units Rated > 20.0 MMBtu/hr: 7 ppmv NO_X @ 3% O_2 or 0.008 lb-NO_X/MMBtu Tier 1 Enhanced Schedule Final NO_X Limit for Units Rated > 20.0 MMBtu/hr: 5 ppmv NO_X @ 3% O_2 or 0.0062 lb-NO_X/MMBtu Tier 1 Enhanced Schedule Final NO_X Limit for Units Firing on Less Than 50%, by volume, PUC Quality Gas 9 ppmv NO_X @ 3% O_2 or 0.011 lb-NO_X/MMBtu
		Tier 2 Limits Tier 2 NO_X Limit for Units Rated > 5.0 MMBtu/hr to ≤ 20.0 MMBtu/hr: 6 ppmv NO_X @ 3% O_2 or 0.0073 lb-NO_X/MMBtu Tier 2 NO_X Limit for Units Rated > 20.0 MMBtu/hr: 5 ppmv NO_X @ 3% O_2 or 0.0061 lb-NO_X/MMBtu Tier 2 NO_X Limit for Units Firing on Less Than 50%, by volume, PUC Quality Gas 5 ppmv NO_X @ 3% O_2 or 0.0061 lb-NO_X/MMBtu
SCAQMD Rule 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional and Commercial Boilers, Steam Generators, and Process Heaters (12-4-2020)	Units ≥ 20 MMBtu/hr	Group I Units (≥ 75 MMBtu/hr) 5 ppmvd NO_X @ 3% O_2 or 0.0062 lb-NO_X/MMBtu
		New Group II Units (≥ 20 to < 75 MMBtu/hr) 5 ppmvd NO_X @ 3% O_2 or 0.0062 lb-NO_X/MMBtu
Bay Area AQMD BACT Workbook Document 162.1.1: Steam Generator – Oil Field, ≥ 5 MMBtu/hr to < 33.5 MMBtu/hr heat input (8-12-1994)	≥ 5 MMBtu/hr to < 33.5 MMBtu/hr	Achieved in Practice 25 ppmvd NO_X @ 3%O_2 AIP Typical Technology Low NO_X Burners (LNB) + Flue Gas Recirculation (FGR)

BACT Guideline/Applicable Rule Emission Limit Source	Equipment Rating	NO_X Control Technology/Requirement
Bay Area AQMD BACT Workbook Document 162.2.1: Steam Generator – Oil Field, ≥ 33.5 MMBtu/hr to < 50 MMBtu/hr heat input (8-12-1994)	≥ 33.5 MMBtu/hr to < 50 MMBtu/hr	1. Technologically Feasible 20 ppmvd NO_X @ 3%O_2 1. TF Typical Technology Low NO_X Burners (LNB) + FGR 2. Achieved in Practice 25 ppmvd NO_X @ 3%O_2 2. AIP Typical Technology Low NO_X Burners (LNB) + FGR
Bay Area AQMD BACT Workbook Document 162.3.1: Steam Generator – Oil Field, ≥ 50 MMBtu/hr heat input (12-16-1991)	≥ 50 MMBtu/hr	1. Technologically Feasible 9 ppmvd NO_X @ 3%O_2 1. TF Typical Technology Selective Catalytic Reduction (SCR) + Low NO_X Burners (LNB) + FGR 2. Achieved in Practice 25 ppmvd NO_X @ 3%O_2 2. AIP Typical Technology Low NO_X Burners (LNB) + FGR
Bay Area AQMD Regulation 9, Rule 7 - Nitrogen Oxides And Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, And Process Heaters (5-4-2011)	≥ 20 MMBtu/hr (except landfill or digester gas)	20 MMBtu/hr to < 75 MMBtu/hr (except landfill or digester gas) 9 ppmvd NO_X at 3% O_2
		≥ 75 MMBtu/hr (except landfill or digester gas) 5 ppmvd NO_X at 3% O_2
Sacramento Metropolitan AQMD Rule 411 - NO_X from Boilers, Process Heaters and Steam Generators (8-23-2007)	> 20 MMBtu/hr	9 ppmvd NO_X at 3% O_2
Monterey Bay Air Resources District Rule 441 – Boilers, Steam Generators, and Process Heaters (2-19-2020)	Oilfield Steam Generators ≥ 2 MMBtu/hr	15 ppmvd NO_X at 3% O_2
Santa Barbara County APCD BACT Guideline 1.4.1 - Oilfield Steam Generator Rated ≥5.000 MMBtu/hr to ≤20.000 MMBtu/hr (12-9-2019)	Oilfield Steam Generator Rated ≥5.000 MMBtu/hr to ≤20.000 MMBtu/hr	BACT Technology Low-NOx burner, flue gas recirculation (FGR), selective catalytic reduction (SCR) with ammonia slip of 5 ppmvd @ 3% O_2 Achieved in Practice Performance Standard 9 ppmvd NO_X at 3% O_2

BACT Guideline/Applicable Rule Emission Limit Source	Equipment Rating	NO_X Control Technology/Requirement
Santa Barbara County APCD BACT Guideline 1.4.2 - Oilfield Steam Generator Rated >20.000 MMBtu/hr (12-9-2019)	Oilfield Steam Generator Rated >20.000 MMBtu/hr	BACT Technology Low-NOx burner, flue gas recirculation (FGR), selective catalytic reduction (SCR) with ammonia slip of 5 ppmvd @ 3% O_2 Achieved in Practice Performance Standard 7 ppmvd NO_X at 3% O_2 Technologically Feasible Performance Standard 5 ppmvd NO_X at 3% O_2
Santa Barbara County APCD Rule 342 – Boilers, Steam Generators and Process Heaters (5 MMBtu/hr anf greater) (6-20-2019)	≥ 5.0 MMBtu/hr	5 - 20 MMBtu/hr (except landfill or digester gas) 9 ppmvd NO_X at 3% O_2
		> 20 MMBtu/hr (except landfill or digester gas) 7 ppmvd NO_X at 3% O_2
Santa Barbara County APCD Default Boiler/Process Heater/Large Water Heater and Steam Generator Emission Standards (3-14-2017) (https://www.ourair.org/wp-content/uploads/extcombstds-1.pdf)	≥ 5.0 MMBtu/hr	BACT Oilfield Steam Generators 5 to 20 MMBtu/hr 9 ppmvd NO_X at 3% O_2
		BACT Oilfield Steam Generators ≥ 20 MMBtu/hr 7 ppmvd NO_X at 3% O_2
Santa Barbara County APCD Default Boiler/Process Heater/Large Water Heater and Steam Generator Emission Factors (Rev. 2.0, 8-28-2018) (https://www.ourair.org/wp-content/uploads/SBCAPCD-External-Combustion-Emission-Factors-Revision-2-.pdf)	≥ 5.0 MMBtu/hr	BACT Oilfield Steam Generators 5,000,000 – 19,999,999 Btu/hr 0.0110 lb-NO_X/MMBtu
		BACT Oilfield Steam Generators ≥ 20,000,000 Btu/hr 0.0085 lb-NO_X/MMBtu
San Diego County APCD Rule 69.2 – Industrial and Commercial Boilers, Process heaters and Steam Generators (9-27-1994)	≥ 5.0 MMBtu/hr	Operated on Gaseous Fuel 30 ppmv @ 3% O_2
Ventura County APCD Rule 74.15 - Boilers, Steam Generators and Process Heaters (1110-2020)	≥ 5.0 MMBtu/hr	Modified, New, and Replacement Units on or after January 1, 2021 Operating on Gaseous Fuel Except Landfill or Digester Gas 9 ppmvd @ 3% O_2
EPA RBLC ID CA-1239 – Steam Generator; Facility Name: ERG Resources; Agency: Santa Barbara APCD (6-14-2013)	85 MMBtu/hr	7 ppmvd @ 3% O_2 Description: Ultra Low NO_X burner and FGR
EPA RBLC ID CA-1188 – Oilfield Steam Generator; Facility Name: Petrorock – Tunnel Lease; Agency: Santa Barbara APCD (1-24-2012)	25 MMBtu/hr	9 ppmvd @ 3% O_2 Primary Fuel: propane, field gas, PUC natural gas
EPA RBLC ID CA-1165 – Steam Generator: Oilfield ≥ 50 MMBtu/hr; Facility Name: Breitburn Energy – Newlove Lease, Orcutt Hill Field; Agency: Santa Barbara APCD (ATC 12084, 6-5-2007)	62.5 MMBtu/hr	9 ppmvd @ 3% O_2 Equipment: Ultra-Low NO_X design and flue gas recirculation (FGR)

BACT Guideline/Applicable Rule Emission Limit Source	Equipment Rating	NO_X Control Technology/Requirement
EPA RBLC ID CA-1163 – Steam Generator: Oilfield 5 to < 33.5 MMBtu/hr; Facility Name: Breitburn Energy – Dome and Newlove Lease, Orcutt Hill Field; Agency: Santa Barbara APCD (ATC 11405-02, 12-8-2006)	23.0 MMBtu/hr	9 ppmvd @ 3% O_2 Equipment: Ultra-Low NO_X design and flue gas recirculation (FGR)
EPA RBLC ID CA-1123 – Steam Generator: Oilfield 5 to < 33.5 MMBtu/hr; Facility Name: Santa Maria – Casmalia Field; Agency: Santa Barbara APCD (ATC 11062, 1-13-2006)	26.5 MMBtu/hr	14 ppmvd @ 3% O_2 Equipment: Enhanced Oil Recovery Steam Generator Notes: Per manufacturer, 8 ppmv at 3% O_2 NO_X is achievable with FGR for units rated between 10 and 250 MMBtu/hr
EPA RBLC ID CA-0545 – Generator Steam (Natural and Waste Gas); Facility Name: Mobil Exploration & Producing U.S. Inc.; Agency: Monterey Bay Unified APCD (ATCs 4509-4527, 12-28-1992)	62.5 MMBtu/hr	30 ppmvd @ 3% O_2 Description: Low NO_X burner, oxygen controller, flue gas recirculation (FGR)
EPA New Source Performance Standards (NSPS) - 40 CFR Part 60, Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units	> 10 MMBtu/hr and ≤ 100 MMBtu/hr	No NO_X Standards

As seen in the table above, based on the District's review of air district rules and applicable BACT guidelines for oilfield steam generators and the District search of the USEPA RACT/BACT/LAER Clearinghouse, the lowest NO_X emission limit identified for oilfield steam generators is the 5 ppmv NO_X @ 3% O_2 or 0.0061 lb-NO_X/MMBtu. This limit is equivalent to the District Rule 4320 Tier 2 NO_X limit for oilfield steam generators rated greater than 20.0 MMBtu/hr, is required by SCAQMD Rule 1146 for new units rated 20 MMBtu to less than 75 MMBtu/hr and all units rated 75 MMBtu/hr or greater, and also required by BAAQMD Regulation 9, Rule 7 for units rated 75 MMBtu/hr or greater. The District also searched the District's permitting database to determine the lowest NO_X emission limit at which steam oilfield steam generators had been permitted in the District. Based on the search of the District's permitting database, the lowest NO_X emission limit at which oilfield steam generators have been permitted in the District is 5 ppmv NO_X @ 3% O_2. Based on the number of steam generators that are subject to this limit and the inclusion of this limit in District Rule 4320, SCAQMD Rule 1146, and BAAQMD Regulation 9, Rule 7, a limit of 5 ppmv NO_X @ 3% O_2 or 0.0061 lb-NO_X/MMBtu is determined to be achieved in practice BACT for NO_X from oilfield steam generators.

Additionally, because oilfield steam generators and boilers both heat water to produce steam, the District considered BACT guidelines and rules that are applicable to boilers for the potential transfer of control technologies or emission limits used for boilers to

oilfield steam generators. The controls and emission limits located that were applicable these sources are shown in the table below.

BACT Guideline/Applicable Rule Emission Limit Source	Equipment Rating	NO_X Control Technology/Requirement
SJVAPCD BACT Guideline 1.1.1 - Natural Gas or Propane Fired Boilers/Steam Generators* with Heat Input Rate Greater than 5 MMBtu/hr and Less than or Equal to 20 MMBtu/hr (11-30-2022)	> 5.0 to ≤ 20.0 MMBtu/hr	Achieved in Practice 5 ppmv NO_X @ 3% O_2 (0.0061 lb-NO_X/MMBtu)
*This guideline is applicable to units fired solely on natural gas from a PUC or FERC regulated source or propane/LPG. This guideline is not applicable to Oilfield Steam Generators or Electric Utility Steam Generating Units.		
SJVAPCD BACT Guideline 1.1.2 - Natural Gas or Propane Fired Boilers/Steam Generators* with Heat Input Rate Greater than 20 MMBtu/hr (11-30-2022)	> 20.0 MMBtu/hr	Achieved in Practice 2.5 ppmv NO_X @ 3% O_2 (0.003 lb-NO_X/MMBtu)
*This guideline is applicable to units fired solely on natural gas from a PUC or FERC regulated source or propane/LPG. This guideline is not applicable to Oilfield Steam Generators or Electric Utility Steam Generating Units.		
SJVAPCD Rule 4306 – Boilers, Steam Generators and Process Heaters – Phase 3 (12-17-2020)	> 5.0 MMBtu/hr	**Tier 1 Boiler Limits** Tier 1 Standard NO_X Limit for Boilers Rated > 5.0 MMBtu/hr to ≤ 20.0.0 MMBtu/hr: 15 ppmv NO_X @ 3% O_2 or 0.018 lb-NO_X/MMBtu Tier 1 Enhanced NO_X Limit for Boilers Rated > 5.0 MMBtu/hr to ≤ 20.0.0 MMBtu/hr: 9 ppmv NO_X @ 3% O_2 or 0.011 lb-NO_X/MMBtu Tier 1 Standard NO_X Limit for Boilers Rated > 20.0.0 MMBtu/hr: 9 ppmv NO_X @ 3% O_2 or 0.011 lb-NO_X/MMBtu Tier 1 Enhanced NO_X Limit for Boilers Rated > 20.0.0 MMBtu/hr: 6 ppmv NO_X @ 3% O_2 or 0.007 lb-NO_X/MMBtu **Tier 2 Boiler Limits** Tier 2 NO_X Limit for Fire Tube Boilers Rated > 5.0 MMBtu/hr to ≤ 20.0 MMBtu/hr: 7 ppmv NO_X @ 3% O_2 or 0.0085 lb-NO_X/MMBtu Tier 2 NO_X Limit for All Other Boilers Rated > 5.0 MMBtu/hr to ≤ 20.0 MMBtu/hr: 9 ppmv NO_X @ 3% O_2 or 0.011 lb-NO_X/MMBtu Tier 2 NO_X Limit for Boilers Rated > 20.0 MMBtu/hr to ≤ 75.0 MMBtu/hr 7 ppmv NO_X @ 3% O_2 or 0.0085 lb-NO_X/MMBtu Tier 2 NO_X Limit for Boilers Rated > 75.0 MMBtu/hr 5 ppmv NO_X @ 3% O_2 or 0.0061 lb-NO_X/MMBtu

BACT Guideline/Applicable Rule Emission Limit Source	Equipment Rating	NO_X Control Technology/Requirement
SJVAPCD Rule 4320 – Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr (12-17-2020)	> 5.0 MMBtu/hr	**Tier 1 Boiler Limits** Tier 1 Standard Schedule NO_X Limit for Boilers Rated > 5.0 MMBtu/hr to ≤ 20.0 MMBtu/hr: 9 ppmv NO_X @ 3% O_2 or 0.011 lb-NO_X/MMBtu Tier 1 Enhanced Schedule NO_X Limit for Boilers Rated > 5.0 MMBtu/hr to ≤ 20.0 MMBtu/hr: 6 ppmv NO_X @ 3% O_2 or 0.007 lb-NO_X/MMBtu Tier 1 Standard Schedule NO_X Limit for Boilers Rated > 20.0 MMBtu/hr: 7 ppmv NO_X @ 3% O_2 or 0.008 lb-NO_X/MMBtu Tier 1 Enhanced Schedule NO_X Limit for Boilers Rated > 20.0 MMBtu/hr: 5 ppmv NO_X @ 3% O_2 or 0.0062 lb-NO_X/MMBtu **Tier 2 Boiler Limits** Tier 2 NO_X Limit for Fire Tube Boilers Rated > 5.0 MMBtu/hr to ≤ 20.0 MMBtu/hr: 5 ppmv NO_X @ 3% O_2 or 0.0061 lb-NO_X/MMBtu Tier 2 NO_X Limit for Boilers at Schools, Fired on Digester Gas, and Thermal Fluid Heaters Rated > 5.0 MMBtu/hr to ≤ 20.0 MMBtu/hr: 9 ppmv NO_X @ 3% O_2 or 0.011 lb-NO_X/MMBtu Tier 2 NO_X Limit for All Other Boilers Rated > 5.0 MMBtu/hr to ≤ 20.0 MMBtu/hr: 5 ppmv NO_X @ 3% O_2 or 0.0061 lb-NO_X/MMBtu Tier 2 NO_X Limit for Boilers Rated > 20.0 MMBtu/hr: 2.5 ppmv NO_X @ 3% O_2 or 0.003 lb-NO_X/MMBtu
SCAQMD BACT Guidelines Part B - Boiler, Fire-tube, A/N 615085, Mizkan America, 8.4 MMBtu/hr (9-2-2022)	8.4 MMBtu/hr	Achieved in Practice Description: Boiler, Fire-tube Type, with a Low NO_X Burner 7 ppmvd NO_X @ 3% O_2
SCAQMD BACT Guidelines Part B - Boiler, A/N 562449, VA Med Center, 39.9 MMBtu/hr (3-22-2016)	39.9 MMBtu/hr	Achieved in Practice Description: 39.9 MMBtu watertube boiler with low NO_X burner and SCR 5 ppmvd NO_X @ 3% O_2 Other BACT Requirements: When firing on standby fuel: 40 ppmvd NO_X @ 3% O_2, 15 min average; 400 ppmvd CO @ 3% O_2 Start-ups not to exceed 120 min for cold start and 30 min for warm start.

BACT Guideline/Applicable Rule Emission Limit Source	Equipment Rating	NO_X Control Technology/Requirement
SCAQMD BACT Guidelines Part D – Boiler, Natural Gas or Propane Fired, ≥ 20 and < 75 MMBtu/hr (2-1-2019 Rev. 3)	≥ 20 MMBtu/hr and < 75 MMBtu/hr	Achieved in Practice Compliance with SCAQMD Rule 1146 (2-1-2019)
SCAQMD BACT Guidelines Part D – Boiler, Natural Gas or Propane Fired, ≥ 75 MMBtu/hr (2-1-2019 Rev. 3)	≥ 75 MMBtu/hr	Achieved in Practice Compliance with SCAQMD Rule 1146 (12-2-2016)
SCAQMD Rule 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional and Commercial Boilers, Steam Generators, and Process Heaters (12-4-2020)	Units ≥ 20 MMBtu/hr	Group I Units (≥ 75 MMBtu/hr) 5 ppmvd NO_X @ 3% O_2 or 0.0062 lb-NO_X/MMBtu
		New Group II Units (≥ 20 to < 75 MMBtu/hr) 5 ppmvd NO_X @ 3% O_2 or 0.0062 lb-NO_X/MMBtu
Bay Area AQMD BACT Workbook Document 17.1.1 – Boiler: ≥ 5 MMBtu/hr to < 33.5 MMBtu/hr heat input (8-4-2010)	≥ 5 MMBtu/hr to < 33.5 MMBtu/hr	1. Technologically Feasible Typical Technology Low NOx Burners + Flue Gas Recirculation (FGR) + Selective Catalytic Reduction (SCR) 2. Achieved in Practice Typical Technology Low NO_X Burners + FGR
Bay Area AQMD BACT Workbook – Document 17.2.1 – Boiler: ≥ 33.5 MMBtu/hr to < 50 MMBtu/hr heat input (8-4-2010)	≥ 33.5 MMBtu/hr to < 50 MMBtu/hr	1. Technologically Feasible Typical Technology Low NOx Burners + Flue Gas Recirculation (FGR) + Selective Catalytic Reduction (SCR) 2. Achieved in Practice Typical Technology Low NO_X Burners + FGR
Bay Area AQMD BACT Workbook Document 17.3.1 – Boiler: ≥ 50 MMBtu/hr heat input (8-4-2010)	≥ 50 MMBtu/hr	1. Technologically Feasible Typical Technology Selective Catalytic Reduction (SCR) + Low NOx Burners (LNB) + Flue Gas Recirculation (FGR) 2. Achieved in Practice Typical Technology Ultra Low NO_X Burners (ULNB) + FGR
Bay Area AQMD Regulation 9, Rule 7 - Nitrogen Oxides And Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, And Process Heaters (5-4-2011)	≥ 20 MMBtu/hr (except landfill or digester gas)	20 MMBtu/hr to < 75 MMBtu/hr (except landfill or digester gas) 9 ppmvd NO_X at 3% O_2
		≥ 75 MMBtu/hr (except landfill or digester gas) 5 ppmvd NO_X at 3% O_2
Sacramento Metropolitan AQMD BACT Determination 283 – Boiler/Heater 5 MMBtu/hr to 20 MMBtu/hr (9/7/2021)	5 MMBtu/hr to 20 MMBtu/hr	Achieved in Practice For firetube boilers: 7 ppm NO_X at 3% O_2 or 0.0085 lb/MMBtu, Non-atmospheric units: 9 ppmvd NO_X at 3% O_2 or 0.011 lb/MMBtu,[3] Atmospheric units and thermal fluid heaters: 12 ppmvd NO_X at 3% O_2 or 0.015 lb/MMBtu

[3] Sacramento Metropolitan AQMD BACT Determination 283 lists 9 ppmvd NO_X at 3% O_2 or 0.0085 lb/MMBtu; however, based on the SJVAPCD and SCAQMD requirements referenced in the SMAQMD BACT determination, the correct value appears to be 9 ppmvd NO_X at 3% O_2 or 0.011 lb/MMBtu. Sacramento Metropolitan AQMD BACT Determination 283 is available at the following web link: http://www.airquality.org/StationarySources/Documents/Boilers%205%20to%2020%20MMBtu%20per%20hr%20BACT%20283.pdf

BACT Guideline/Applicable Rule Emission Limit Source	Equipment Rating	NO_X Control Technology/Requirement
Expired Sacramento Metropolitan AQMD BACT Determination 142 – Boiler 100 MMBtu/hr with a 4.9 MMBtu/hr pilot, fired on Natural Gas (10-3-2016)	100 MMBtu/hr	Achieved in Practice 5 ppmvd NO_X at 3% O_2
Sacramento Metropolitan AQMD Rule 411 - NO_X from Boilers, Process Heaters and Steam Generators (8-23-2007)	> 20 MMBtu/hr	9 ppmvd NO_X at 3% O_2
Monterey Bay Air Resources District Permit Requirements for Gaseous Fired Boilers (5-8-2019)	> 2 MMBtu/hr	BACT – Natural Gas, > 2 and < 75 MMBtu/hr 9 ppmvd NO_X at 3% O_2
		BACT – Propane, > 2 and < 20 MMBtu/hr 12 ppmvd NO_X at 3% O_2
		BACT – Propane, ≥ 20 and < 75 MMBtu/hr 12 ppmvd NO_X at 3% O_2
		BACT – Natural Gas or Propane ≥ 75 MMBtu/hr 5 ppmvd NO_X at 3% O_2
Monterey Bay Air Resources District Rule 441 – Boilers, Steam Generators, and Process Heaters (2-19-2020)	Boilers ≥ 2 MMBtu/hr	Boilers Rated ≥ 5 to < 20 MMBtu/hr 15 ppmvd NO_X at 3% O_2
		Boilers Rated ≥ 20 MMBtu/hr 9 ppmvd NO_X at 3% O_2
Santa Barbara County APCD BACT Guideline 2.3 – External Combustion Rated ≥5.000 MMBtu/hr (12-9-2019)	External Combustion Units Rated ≥ 5.000 MMBtu/hr	BACT Technology Low-NOx burner, flue gas recirculation (FGR), selective catalytic reduction (SCR) with ammonia slip of 5 ppmvd @ 3% O2
		Achieved in Practice Performance Standard For Units Rated ≥ 5.000 MMBtu/hr to ≤ 20.000 MMBtu/hr 9 ppmvd NO_X at 3% O_2
		Achieved in Practice Performance Standard For Units Rated > 20.000 MMBtu/hr to < 26.000 MMBtu/hr 7 ppmvd NO_X at 3% O_2
		Achieved in Practice Performance Standard For Units Rated ≥ 26.000 MMBtu/hr 5 ppmvd NO_X at 3% O_2
Santa Barbara County APCD Rule 342 – Boilers, Steam Generators and Process Heaters (5 MMBtu/hr anf greater) (6-20-2019)	≥ 5.0 MMBtu/hr	5 - 20 MMBtu/hr (except landfill or digester gas) 9 ppmvd NO_X at 3% O_2
		> 20 MMBtu/hr (except landfill or digester gas) 7 ppmvd NO_X at 3% O_2
Santa Barbara County APCD Default Boiler/Process Heater/Large Water Heater and Steam Generator Emission Standards (3-14-2017) (https://www.ourair.org/wp-content/uploads/extcombstds-1.pdf)	≥ 5.0 MMBtu/hr	BACT (5 to < 20 MMBtu/hr) 9 ppmvd NO_X at 3% O_2
		BACT (20 to < 26 MMBtu/hr) 7 ppmvd NO_X at 3% O_2
		BACT (26 + MMBtu/hr) 5 ppmvd NO_X at 3% O_2

BACT Guideline/Applicable Rule Emission Limit Source	Equipment Rating	NO_X Control Technology/Requirement
Santa Barbara County APCD Default Boiler/Process Heater/Large Water Heater and Steam Generator Emission Factors (Rev. 2.0, 8-28-2018) (https://www.ourair.org/wp-content/uploads/SBCAPCD-External-Combustion-Emission-Factors-Revision-2-.pdf)	≥ 5.0 MMBtu/hr	Boilers 5,000,000 – 19,999,999 Btu/hr 0.0110 lb-NO_X/MMBtu
		Boilers ≥ 20,000,000 Btu/hr - 25,999,999 0.0085 lb-NO_X/MMBtu
		Boilers ≥ 26,000,000 Btu/hr 0.0061 lb-NO_X/MMBtu
San Diego County APCD New Source Review Requirements For Best Available Control Technology (BACT) Guidance Document (June 2011) Boilers (<50 MM BTU/HR) -- Fee Schedule 13A	< 50 MMBtu/hr	Achieved in Practice BACT Emission Rate Limit: 9 ppmv @ 3% O_2, Natural Gas (NG) or LPG BACT Control Option: Low NO_X burner, FGR, and oxygen controller. NG or LPG
San Diego County APCD New Source Review Requirements For Best Available Control Technology (BACT) Guidance Document (June 2011) Boilers (50 to <250 MM BTU/HR) -- Fee Schedule 13B	50 MMBtu/hr to < 250 MMBtu/hr	Technologically Feasible BACT Emission Rate Limit: 5 ppmv @ 3% O_2/ Natural Gas (NG) or LPG BACT Control Option: SCR on NG or LPG fuel (duct burner may be required) Achieved in Practice BACT Emission Rate Limit: 9 ppmv @ 3% O_2/ Natural Gas (NG) or LPG BACT Control Option: Low NO_X burner, FGR, and oxygen controller. NG or LPG
San Diego County APCD Rule 69.2 – Industrial and Commercial Boilers, Process heaters and Steam Generators (9-27-1994)	≥ 5.0 MMBtu/hr	Operated on Gaseous Fuel 30 ppmv @ 3% O_2
Ventura County APCD Rule 74.15 - Boilers, Steam Generators and Process Heaters (1110-2020)	≥ 5.0 MMBtu/hr	Modified, New, and Replacement Units on or after January 1, 2021 Operating on Gaseous Fuel Except Landfill or Digester Gas 9 ppmvd @ 3% O_2

The only NO_X emission limit identified in the District's review of the applicable BACT guidelines and rules for boilers that was more stringent than the most stringent NO_X emission limit identified above for oilfield steam generators of 5 ppmv NO_X @ 3% O_2 or 0.0061 lb-NO_X/MMBtu was 2.5 ppmv NO_X @ 3% O_2. This limit is required by District BACT Guideline 1.1.2 for natural gas or propane fired boilers rated greater than 20 MMBtu/hr and is the District Rule 4320 Tier 2 NO_X limit for boilers rated greater than 20 MMBtu/hr and process heaters rated greater than 110 MMBtu/hr. The most stringent NO_X limit identified for boilers and process heaters of 2.5 ppmv NO_X @ 3% O_2 will be considered below for the potential applicability of this limit to the existing oilfield steam generators.

Based on an extensive review of applicable BACT guidelines and rules for oilfield steam generators and a review of BACT guidelines and rules for boilers for emission limits and control technologies that could potentially be applied to oilfield steam generators, the following emission limits were identified as the most stringent NO_X emission limits that may be applicable to oilfield steam generators:

NO_X Control Option #1: 5 ppmv NO_X @ 3% O_2 or 0.0061 lb-NO_X/MMBtu

This limit is the District Rule 4320 Tier 2 NO_X limit of for oilfield steam generators rated greater than 20.0 MMBtu/hr, is required by SCAQMD Rule 1146 for new units rated 20 MMBtu to less than 75 MMBtu/hr and all units rated 75 MMBtu/hr or greater, and also required by BAAQMD Regulation 9, Rule 7 for units rated 75 MMBtu/hr or greater. A search of the District's permitting database also identified a number of oilfield steam generators that have been permitted at 5 ppmv NO_X @ 3% O_2 and have source tests that demonstrated compliance with this limit. Therefore, this emission limit has been determined to be achieved in practice.

NO_X Control Option #2: 2.5 ppmv NO_X @ 3% O_2 or 0.003 lb-NO_X/MMBtu

This limit is required by District BACT Guideline 1.1.2 for natural gas or propane fired boilers rated greater than 20 MMBtu/hr and is also the District Rule 4320 Tier 2 NO_X limit for boilers rated greater than 20 MMBtu/hr and process heaters rated greater 110 MMBtu/hr. No permits for oilfield steam generators were located that currently comply with this limit; however, the potential to transfer the control technology required by boilers and process heaters to achieve this limit to oilfield steam generators will be considered.

b. Step 2 - Eliminate technologically infeasible options

The following option will be eliminated from further consideration:

2.5 ppmv NO_X @ 3% O_2 or 0.003 lb-NO_X/MMBtu (most stringent NO_X limit identified for boilers and process heaters)

Boilers and process heaters typically must use Selective Catalytic Reduction (SCR) to achieve a NO_X emission limit of 2.5 ppmv @ 3% O_2 or 0.003 lb-NO_X/MMBtu. The District is not aware of any oilfield steam generators that are currently equipped with SCR systems and the feasibility of the use of SCR on oilfield steam generators needs additional assessment. SCR may not be an effective control for steam generators that must produce steam with varying steam pressure or volume. The exhaust temperature of steam generators is typically below the operating temperature of SCR systems. It may not be feasible to place an SCR system into the convection section to achieve the required operating temperature. If oilfield steam generators are fueled with produced gas with high sulfur content, there is a potential for sulfur in the gas to poison the SCR catalyst. In addition, for existing steam generators, there may not be adequate space for an SCR system. Because of the questions regarding the feasibility of the use of SCR systems on oilfield steam generators and the ability of oilfield steam generators to consistently achieve a NO_X emission limit of 2.5 ppmv @ 3% O_2 or 0.003 lb-NO_X/MMBtu, this limit will be eliminated from further consideration.

c. Step 3 - Rank remaining options by control effectiveness

Option 1: 5 ppmv NO_X @ 3% O_2 or 0.0061 lb-NO_X/MMBtu

d. Step 4 - Cost Effectiveness Analysis

The applicant has proposed the highest ranked control option identified above and this option has been determined to be achieved in practice. Therefore, a cost effectiveness analysis is not required.

e. Step 5 - Select BACT

Pursuant to the above BACT Analysis, BACT for NO_X emissions from the existing oilfield steam generators is 5 ppmv NO_X @ 3% O_2 or 0.0061 lb-NO_X/MMBtu. The applicant has proposed to comply with this requirement. Therefore, the BACT requirements for NO_X will be satisfied.

2. BACT Analysis for VOC Emissions:

a. Step 1 - Identify control technologies

As mentioned above, District BACT Guideline 1.2.1 – Oilfield Steam Generator (≥ 20 MMBtu/hr) has been rescinded. District BACT Guideline 1.2.1 listed the following BACT requirements for VOC for oilfield steam generators rated 20 MMBtu/hr or greater.

Previous SJVAPCD BACT Guideline 1.2.1 – Oilfield Steam Generator (≥ 20 MMBtu/hr) VOC Emission Requirements		
Achieved in Practice	Technologically Feasible	Alternate Basic Equipment
Gaseous Fuel	--	--

In addition, the US Environmental Protection Agency (USEPA) RACT/BACT/LAER Clearinghouse, the California Air Resources Board (CARB) BACT Clearinghouse, and the South Coast Air Quality Management District (SCAQMD), the Ventura County Air Pollution Control District (VCAPCD), the Bay Area Air Quality Management District (BAAQMD), the Sacramento Metropolitan Air Quality Management District (SMAQMD), the Monterey Bay Air Resources District, the Santa Barbara County Air Pollution Control District (SBAPCD), and the San Diego County Air Pollution Control District (SDAPCD) BACT Guidelines were reviewed to determine potential control technologies for VOC from this class and category of operation. The District also reviewed the applicable rules from the District and other air districts.

The following table summarizes the results of the review of BACT guidelines and applicable rules for oilfield steam generators:

BACT Guideline/Applicable Rule Emission Limit Source	**Equipment Rating**	**VOC Control Technology/Requirement**
SJVAPCD Rule 4306 – Boilers, Steam Generators and Process Heaters – Phase 3 (12-17-2020)	> 5.0 MMBtu/hr	No VOC limits or controls, Rule only limits NO_X and CO

BACT Guideline/Applicable Rule Emission Limit Source	Equipment Rating	VOC Control Technology/Requirement
SJVAPCD Rule 4320 – Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr (12-17-2020)	> 5.0 MMBtu/hr	No VOC limits or controls, Rule only limits NO_X, SO_X, PM_{10}, and CO
SCAQMD Rule 1146 – Emissions of Oxides of Nitrogen from Industrial, Institutional and Commercial Boilers, Steam Generators, and Process Heaters (12-4-2020)	Units ≥ 5 MMBtu/hr	No VOC limits or controls, Rule only limits NO_X and CO
Bay Area AQMD BACT Workbook Document 162.1.1: Steam Generator – Oil Field, ≥ 5 MMBtu/hr to < 33.5 MMBtu/hr heat input (8-12-1994)	≥ 5 MMBtu/hr to < 33.5 MMBtu/hr	Achieved in Practice Typical Technology Good Combustion Practice
Bay Area AQMD BACT Workbook Document 162.2.1: Steam Generator – Oil Field, ≥ 33.5 MMBtu/hr to < 50 MMBtu/hr heat input (8-12-1994)	≥ 33.5 MMBtu/hr to < 50 MMBtu/hr	Achieved in Practice Typical Technology Good Combustion Practice
Bay Area AQMD BACT Workbook Document 162.3.1: Steam Generator – Oil Field, ≥ 50 MMBtu/hr heat input (12-16-1991)	≥ 50 MMBtu/hr	Achieved in Practice Typical Technology Good Combustion Practice
Bay Area AQMD Regulation 9, Rule 7 - Nitrogen Oxides And Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, And Process Heaters (5-4-2011)	≥ 1 MMBtu/hr	No VOC limits or controls, Rule only limits NO_X and CO
Sacramento Metropolitan AQMD Rule 411 - NO_X from Boilers, Process Heaters and Steam Generators (8-23-2007)	≥ 1 MMBtu/hr	No VOC limits or controls, Rule only limits NO_X and CO
Monterey Bay Air Resources District Rule 441 – Boilers, Steam Generators, and Process Heaters (2-19-2020)	Oilfield Steam Generators ≥ 2 MMBtu/hr	No VOC limits or controls, Rule only limits NO_X and CO
Santa Barbara County APCD BACT Guideline 1.4.1 - Oilfield Steam Generator Rated ≥5.000 MMBtu/hr to ≤20.000 MMBtu/hr (12-9-2019)	Oilfield Steam Generator Rated ≥5.000 MMBtu/hr to ≤20.000 MMBtu/hr	BACT Technology Good combustion practices Achieved in Practice Performance Standard --

BACT Guideline/Applicable Rule Emission Limit Source	Equipment Rating	VOC Control Technology/Requirement
Santa Barbara County APCD BACT Guideline 1.4.2 - Oilfield Steam Generator Rated >20.000 MMBtu/hr (12-9-2019)	Oilfield Steam Generator Rated >20.000 MMBtu/hr	BACT Technology Low-NOx burner, flue gas recirculation (FGR) >20.000 MMBtu/hr to <50.000 MMBtu/hr Achieved in Practice Performance Standard 7 ppmvd @ 3% O_2 (as methane) ≥ 50.000 MMBtu/hr to <85.000 MMBtu/hr Achieved in Practice Performance Standard 8.5 ppmvd @ 3% O_2 (as methane) ≥85.000 MMBtu/hr Technologically Feasible Performance Standard 4 ppmvd NO_X at 3% O_2
Santa Barbara County APCD Rule 342 – Boilers, Steam Generators and Process Heaters (5 MMBtu/hr anf greater) (6-20-2019)	≥ 5.0 MMBtu/hr	No VOC limits or controls, Rule only limits NO_X and CO
Santa Barbara County APCD Default Boiler/Process Heater/Large Water Heater and Steam Generator Emission Factors (Rev. 2.0, 8-28-2018) (https://www.ourair.org/wp-content/uploads/SBCAPCD-External-Combustion-Emission-Factors-Revision-2-.pdf)	≥ 5.0 MMBtu/hr	BACT Oilfield Steam Generators 5,000,000 – 19,999,999 Btu/hr 0.0054 lb-VOC/MMBtu
		BACT Oilfield Steam Generators ≥ 20,000,000 - 49,999,999 Btu/hr 0.0030 lb-VOC/MMBtu
		BACT Oilfield Steam Generators ≥ 50,000,000 - 84,999,999 Btu/hr 0.0036 lb-VOC/MMBtu
		BACT Oilfield Steam Generators ≥ 85,000,000 Btu/hr 0.0017 lb-VOC/MMBtu
San Diego County APCD Rule 69.2 – Industrial and Commercial Boilers, Process heaters and Steam Generators (9-27-1994)	≥ 5.0 MMBtu/hr	No VOC limits or controls, Rule only limits NO_X and CO
Ventura County APCD Rule 74.15 - Boilers, Steam Generators and Process Heaters (1110-2020)	≥ 5.0 MMBtu/hr	No VOC limits or controls, Rule only limits NO_X and CO
EPA RBLC ID CA-1239 – Steam Generator; Facility Name: ERG Resources; Agency: Santa Barbara APCD (6-14-2013)	85 MMBtu/hr	0.0054 lb-VOC/MMBtu Description: Ultra Low NO_X burner and FGR
EPA RBLC ID CA-1165 – Steam Generator: Oilfield ≥ 50 MMBtu/hr; Facility Name: Breitburn Energy – Newlove Lease, Orcutt Hill Field; Agency: Santa Barbara APCD (ATC 12084, 6-5-2007)	62.5 MMBtu/hr	8.5 ppmvd @ 3% O_2 Equipment: Ultra-Low NO_X design and flue gas recirculation (FGR) Description: Low NO_X burner and FGR (VOC as ROC)

BACT Guideline/Applicable Rule Emission Limit Source	Equipment Rating	VOC Control Technology/Requirement
EPA RBLC ID CA-1163 – Steam Generator: Oilfield 5 to < 33.5 MMBtu/hr; Facility Name: Breitburn Energy – Dome and Newlove Lease, Orcutt Hill Field; Agency: Santa Barbara APCD (ATC 11405-02, 12-8-2006)	23.0 MMBtu/hr	8.5 ppmvd @ 3% O_2 Equipment: Ultra-Low NO_X design and flue gas recirculation (FGR) Description: Low NO_X burner and FGR (VOC as ROC)
EPA RBLC ID CA-1123 – Steam Generator: Oilfield 5 to < 33.5 MMBtu/hr; Facility Name: Santa Maria – Casmalia Field; Agency: Santa Barbara APCD (ATC 11062, 1-13-2006)	26.5 MMBtu/hr	7 ppmvd @ 3% O_2 Equipment: Enhanced Oil Recovery Steam Generator Description: Ultra-Low NO_X burner
EPA New Source Performance Standards (NSPS) - 40 CFR Part 60, Subpart Dc - Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units	> 10 MMBtu/hr and ≤ 100 MMBtu/hr	No VOC Standards

The following VOC emission limits were identified for oilfield steam generators based on the District's review of air district rules and applicable BACT guidelines for oilfield steam generators and the District search of the USEPA RACT/BACT/LAER Clearinghouse:

a. 0.0054 lb-VOC/MMBtu – As shown in the table above, the Santa Barbara County APCD document Default Boiler/Process Heater/Large Water Heater and Steam Generator Emission Factors lists this VOC emission limit as achieved in practice BACT for oilfield steam generators rated less than 20.000 MMBtu/hr

b. 7 ppmvd VOC (as methane) @ 3% O_2 or 0.0030 lb-VOC/MMBtu – As shown in the table above, the Santa Barbara County APCD has determined that these VOC limits are achieved in practice BACT for oilfield steam generators rated 20.000 MMBtu/hr to less than 50.000 MMBtu/hr

c. 8.5 ppmvd VOC (as methane) @ 3% O_2 or 0.0036 lb-VOC/MMBtu – As shown in the table above, the Santa Barbara County APCD has determined that these VOC limits are achieved in practice BACT for oilfield steam generators rated 50.000 MMBtu/hr to less than 85.000 MMBtu/hr

d. 4 ppmvd VOC (as methane) @ 3% O_2 or 0.0017 lb-VOC/MMBtu – As shown in the table above, the Santa Barbara County APCD has determined that these VOC limits are technologically feasible BACT for oilfield steam generators rated 85.000 MMBtu/hr or greater

As shown in the calculations below, the VOC ppmv concentration limits and lb/MMBtu limits that the Santa Barbara County APCD determined to be BACT for steam generators

rated 20.000 MMBtu/hr are equivalent for units fueled with natural gas or liquefied petroleum gas (LPG)

- F Factor for natural gas, propane, and butane, corrected to 60 °F (15.6 °C): 8,578 dscf/MMBtu (corrected from F Factor of 8,710 dscf/MMBtu at 20 °C (68 °F) given in 40 CFR 60, Appendix A)

VOC (as CH_4) – 7 ppmvd @ 3% O_2 in exhaust, Natural Gas or LPG Fuel

$$\frac{7\ \text{ppmv VOC @ 3\% O}_2}{10^6} \times \frac{16\ \text{lb VOC}}{\text{lb} - \text{mole}} \times \frac{\text{lb} - \text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}578\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95 - 3)\%\ \text{O}_2} = 0.0030\ \frac{\text{lb VOC}}{\text{MMBtu}}$$

VOC (as CH_4) – 8.5 ppmvd @ 3% O_2 in exhaust, Natural Gas or LPG Fuel

$$\frac{8.5\ \text{ppmv VOC @ 3\% O}_2}{10^6} \times \frac{16\ \text{lb VOC}}{\text{lb} - \text{mole}} \times \frac{\text{lb} - \text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}578\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95 - 3)\%\ \text{O}_2} = 0.0036\ \frac{\text{lb VOC}}{\text{MMBtu}}$$

VOC (as CH_4) – 4 ppmvd @ 3% O_2 in exhaust, Natural Gas or LPG Fuel

$$\frac{4\ \text{ppmv VOC @ 3\% O}_2}{10^6} \times \frac{16\ \text{lb VOC}}{\text{lb} - \text{mole}} \times \frac{\text{lb} - \text{mole}}{379.5\ \text{ft}^3} \times \frac{8{,}578\ \text{ft}^3}{1\ \text{MMBtu}} \times \frac{20.95\%\ \text{O}_2}{(20.95 - 3)\%\ \text{O}_2} = 0.0017\ \frac{\text{lb VOC}}{\text{MMBtu}}$$

The District also searched the District's permitting database to determine the lowest VOC emission limits at which steam oilfield steam generators had been permitted in the District. Based on the search of the District's permitting database, steam generators in the District are typically permitted with a VOC emission limit of 0.0055 lb-VOC/MMBtu based on the value given in AP 42, Section 1.4 – Natural Gas Combustion (July 1998) of 5.5 lb-VOC/MMscf for natural gas fuel. For the purposes of this BACT analysis, the typical District value of 0.0055 lb-VOC/MMBtu and the Santa Barbara County APCD BACT limit of 0.0054 lb-VOC/MMBtu for units rated less than 20.000 MMBtu/hr since the only difference is the assumed heating value of the natural gas fuel (District practice of 1,000 Btu/scf vs 1,020 Btu/scf given in AP 42). In addition, the District's permitting database indicates that there are a number of steam generators that have permit limits of 0.003 lb-VOC/MMBtu. In addition, one oilfield steam generator with a permit limit of 0.0028 lb-VOC/MMBtu and another with a permit limit of 0.0027 lb-VOC/MMBtu, which have been confirmed by a source test, were also located. It is possible that the emission limits of 0.0027 to 0.003 lb-VOC/MMBtu were based on the emission factors from earlier versions of AP 42, Section 1.4 – Natural Gas Combustion (e.g. from 1995 or earlier). Although, the most recent version of AP 42, Section 1.4 (July 1998) lists a higher VOC emission factor for combustion of natural gas, source testing of oilfield steam generators has demonstrated compliance with VOC emission limits of 0.0027 to 0.003 lb/MMBtu.

Additionally, because oilfield steam generators and boilers both heat water to produce steam, the District considered BACT guidelines and rules that are applicable to boilers for the potential transfer of control technologies or emission limits used for boilers to oilfield steam generators. The controls and emission limits located that were applicable these sources are shown in the table below.

BACT Guideline/Applicable Rule Emission Limit Source	Equipment Rating	NO_X Control Technology/Requirement
SJVAPCD BACT Guideline 1.1.1 - Natural Gas or Propane Fired Boilers/Steam Generators* with Heat Input Rate Greater than 5 MMBtu/hr and Less than or Equal to 20 MMBtu/hr (11-30-2022)	> 5.0 to ≤ 20.0 MMBtu/hr	Achieved in Practice PUC quality natural gas or propane with LPG backup
*This guideline is applicable to units fired solely on natural gas from a PUC or FERC regulated source or propane/LPG. This guideline is not applicable to Oilfield Steam Generators or Electric Utility Steam Generating Units.		
SJVAPCD BACT Guideline 1.1.2 - Natural Gas or Propane Fired Boilers/Steam Generators* with Heat Input Rate Greater than 20 MMBtu/hr (11-30-2022)	> 20.0 MMBtu/hr	Achieved in Practice PUC quality natural gas or propane with LPG backup
*This guideline is applicable to units fired solely on natural gas from a PUC or FERC regulated source or propane/LPG. This guideline is not applicable to Oilfield Steam Generators or Electric Utility Steam Generating Units.		
SCAQMD BACT Guidelines Part D – Boiler, Natural Gas or Propane Fired, ≥ 20 and < 75 MMBtu/hr (2-1-2019 Rev. 3)	≥ 20 MMBtu/hr and < 75 MMBtu/hr	--
SCAQMD BACT Guidelines Part D – Boiler, Natural Gas or Propane Fired, ≥ 75 MMBtu/hr (2-1-2019 Rev. 3)	≥ 75 MMBtu/hr	--
Bay Area AQMD BACT Workbook Document 17.1.1 – Boiler: ≥ 5 MMBtu/hr to < 33.5 MMBtu/hr heat input (8-4-2010)	≥ 5 MMBtu/hr to < 33.5 MMBtu/hr	Achieved in Practice Typical Technology Good Combustion Practice
Bay Area AQMD BACT Workbook – Document 17.2.1 – Boiler: ≥ 33.5 MMBtu/hr to < 50 MMBtu/hr heat input (8-4-2010)	≥ 33.5 MMBtu/hr to < 50 MMBtu/hr	Achieved in Practice Typical Technology Good Combustion Practice
Bay Area AQMD BACT Workbook Document 17.3.1 – Boiler: ≥ 50 MMBtu/hr heat input (8-4-2010)	≥ 50 MMBtu/hr	Achieved in Practice Typical Technology Good Combustion Practice
Sacramento Metropolitan AQMD BACT Determination 283 – Boiler/Heater 5 MMBtu/hr to 20 MMBtu/hr (9/7/2021)	5 MMBtu/hr to 20 MMBtu/hr	Achieved in Practice Good combustion practice and natural gas or LPG fuel
Expired Sacramento Metropolitan AQMD BACT Determination 142 – Boiler 100 MMBtu/hr with a 4.9 MMBtu/hr pilot, fired on Natural Gas (10-3-2016)	100 MMBtu/hr	Achieved in Practice 3.77 lb-VOC/MMscf (approximately 0.00377 lb-VOC/MMBtu)
Santa Barbara County APCD BACT Guideline 2.3 – External Combustion Rated ≥5.000 MMBtu/hr (12-9-2019)	External Combustion Units Rated ≥ 5.000 MMBtu/hr	BACT Technology Good Combustion Practices Achieved in Practice Performance Standard --

BACT Guideline/Applicable Rule Emission Limit Source	Equipment Rating	NO_X Control Technology/Requirement
Santa Barbara County APCD Default Boiler/Process Heater/Large Water Heater and Steam Generator Emission Factors (Rev. 2.0, 8-28-2018)	≥ 5.0 MMBtu/hr	Boilers 0.0054 lb-VOC/MMBtu
San Diego County APCD New Source Review Requirements For Best Available Control Technology (BACT) Guidance Document (June 2011) Boilers (<50 MM BTU/HR) -- Fee Schedule 13A	< 50 MMBtu/hr	Achieved in Practice BACT Emission Rate Limit: Not Determined BACT Control Option: NG or LPG fuel
San Diego County APCD New Source Review Requirements For Best Available Control Technology (BACT) Guidance Document (June 2011) Boilers (50 to <250 MM BTU/HR) -- Fee Schedule 13B	50 MMBtu/hr to < 250 MMBtu/hr	Achieved in Practice BACT Control Option: NG or LPG fuel

There were no VOC emission limits identified in the District's review of the applicable BACT guidelines and rules for boilers that were more stringent than the most stringent VOC emission limits identified above for oilfield steam generators, which ranged from 0.0017 lb-VOC/MMBtu to 0.0054 or 0.0055 lb-VOC/MMBtu (considered equivalent for purposes of this BACT analysis, as discussed above).

Based on an extensive review of applicable BACT guidelines and rules for oilfield steam generators and a review of BACT guidelines and rules for boilers for emission limits and control technologies that could potentially be applied to oilfield steam generators, the following emission limits were identified as the most stringent NO_X emission limits that may be applicable to oilfield steam generators:

1. VOC Control Option #1: 0.0054/0.0055 lb-VOC/MMBtu

This VOC emission limit is based on the AP 42, Section 1.4 – Natural Gas Combustion (July 1998). There are several steam generators in the District that have permits that require this VOC emission limit and the Santa Barbara County APCD has determined this limit to be achieved in practice BACT for achieved in practice BACT for oilfield steam generators rated less than 20.000 MMBtu/hr and all boilers and all boilers, process heaters, and large water heaters. This limit has been determined achieved in practice for oilfield steam generators of all ratings.

2. VOC Control Option #2: 0.0030 lb-VOC/MMBtu or 7 ppmvd VOC (as CH_4) @ 3% O_2

There are many steam generators in the District that have permits that require this VOC emission limit and source tests of several steam generators in the District have demonstrated compliance with this limit. In addition, the Santa Barbara County APCD has determined this limit to be achieved in practice BACT for achieved in practice BACT for

oilfield steam generators rated 20.000 MMBtu/hr to less than 50.000 MMBtu/hr. This limit has been determined achieved in practice for oilfield steam generators of all ratings.

3. VOC Control Option #3: 0.0036 lb-VOC/MMBtu or 8.5 ppmvd VOC (as CH_4) @ 3% O_2

The Santa Barbara County APCD has determined this limit to be achieved in practice BACT for achieved in practice BACT for oilfield steam generators rated 20.000 MMBtu/hr to less than 50.000 MMBtu/hr to less than 85.000 MMBtu/hr. Source tests of several steam generators in the District have demonstrated compliance with this limit. This limit has been determined achieved in practice for oilfield steam generators of all ratings.

4. VOC Control Option #4: 0.0017 lb-VOC/MMBtu or 4 ppmvd (as CH_4) @ 3% O_2

The Santa Barbara County APCD has determined this limit to be technologically feasible BACT for oilfield steam generators rated 85.000 MMBtu/hr or more. The Santa Barbara County APCD indicates that this emission limit was proposed by an applicant in an ATC application based on a guarantee from burner supplier for specific oilfield steam generators proposed. The Santa Barbara County APCD indicates that the proposed steam generators were not constructed.

5. VOC Control Option #5: 0.0028 lb-VOC/MMBtu

This VOC emission limit is the permit limit for an existing steam generator in the District. Source testing has demonstrated compliance with this emission limit and the limit has been determined to be achieved in practice.

6. VOC Control Option #6: 0.0027 lb-VOC/MMBtu

This VOC emission limit is the permit limit for an existing steam generator in the District. Source testing has demonstrated compliance with this emission limit and the limit has been determined to be achieved in practice.

b. Step 2 - Eliminate technologically infeasible options

The following option will be eliminated from further consideration:

0.0017 lb-VOC/MMBtu or 4 ppmvd (as CH_4) @ 3% O_2 (most stringent VOC limit identified for oilfield steam generators)

As stated above, the Santa Barbara County APCD has determined this limit to be technologically feasible BACT for oilfield steam generators rated 85.000 MMBtu/hr or more. As explained above, this emission limit was proposed in an ATC application for steam generators based on a supplier's guarantee; however, the Santa Barbara County APCD indicates that the specific steam generators for which this limit was proposed were not constructed. Because the steam generators for which this VOC limit was proposed were not constructed and have not demonstrated continuous compliance with the limit and the Santa Barbara County APCD determined that the limit is only technologically

feasible BACT for oilfield steam generators rated 85.000 MMBtu/hr or more, this limit will be eliminated from further consideration for the 62.5 MMBtu/hr natural gas/produced gas steam generators evaluated in this project.

c. Step 3 - Rank remaining options by control effectiveness

1. 0.0027 lb-VOC/MMBtu (Achieved in Practice)

2. 0.0028 lb-VOC/MMBtu (Achieved in Practice)

3. 0.0030 lb-VOC/MMBtu or 7 ppmvd VOC (as CH_4) @ 3% O_2 (Achieved in Practice)

4. 0.0036 lb-VOC/MMBtu or 8.5 ppmvd VOC (as CH_4) @ 3% O_2 (Achieved in Practice)

5. 0.0054/0.0055 lb-VOC/MMBtu (Achieved in Practice)

d. Step 4 - Cost Effectiveness Analysis

The highest ranked control option identified above has been determined to be achieved in practice. Therefore, a cost effectiveness analysis is not required.

e. Step 5 - Select BACT

Pursuant to the above BACT Analysis, BACT for VOC emissions from the existing oilfield steam generators is 0.0027 lb-VOC/MMBtu. The applicant will be required to comply with this requirement. Therefore, the BACT requirements for VOC will be satisfied.

APPENDIX H

TRC Cypress Group Compliance Certification

San Joaquin Valley Air Pollution Control District

TITLE V MODIFICATION - COMPLIANCE CERTIFICATION FORM

I. TYPE OF PERMIT ACTION (Check appropriate box)

☐ ADMINISTRATIVE AMENDMENT ☒ MINOR MODIFICATION ☐ SIGNIFICANT MODIFICATION

COMPANY NAME: TRC Cypress Group LLC	FACILITY ID: S-3088
1. Type of Organization: ☐ Corporation ☐ Sole Ownership ☐ Government ☒ Partnership ☐ Utility	
2. Owner's Name: TRC Cypress Group LLC	
3. Agent to the Owner: Gary Grillette	

II. COMPLIANCE CERTIFICATION (Read each statement carefully and initial **applicable** circles for confirmation):

GG Based on information and belief formed after reasonable inquiry, the equipment identified in this application will continue to comply with the applicable federal requirement(s).

GG Based on information and belief formed after reasonable inquiry, the equipment identified in this application will comply with applicable federal requirement(s) that will become effective during the permit term, on a timely basis.

GG Corrected information will be provided to the District when I become aware that incorrect or incomplete information has been submitted.

GG Based on information and belief formed after reasonable inquiry, information and statements in the submitted application package, including all accompanying reports, and required certifications are true, accurate, and complete.

GG For minor modifications, this application meets the criteria for use of minor permit modification procedures pursuant to District Rule 2520.

I declare, under penalty of perjury under the laws of the state of California, that the forgoing is correct and true:

Signature of Responsible Official

4/15/2022
Date

Gary Grillette
Name of Responsible Official (please print)

Operations Engineer
Title of Responsible Official (please print)