



OCT 21 2010

Mr. Dennis Champion
Occidental of Elk Hills, Inc
10800 Stockdale Hwy
Bakersfield, CA 93311

**Re: Notice of Preliminary Decision - ATC / Certificate of Conformity
Facility # S-2234
Project # 1103628**

Dear Mr. Champion:

Enclosed for your review and comment is the District's analysis of an application for Authorities to Construct for Occidental of Elk Hills, Inc within the gas plant stationary source, CA. The project authorizes the installation of a new cryogenic gas plant within the existing gas plant stationary source near Tupman, CA.

After addressing all comments made during the 30-day public notice and the 45-day EPA comment periods, the Authorities to Construct will be issued to the facility with Certificates of Conformity. 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.

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

If you have any questions, please contact Mr. Leonard Scandura, Permit Services Manager, at (661) 392-5500.

Thank you for your cooperation in this matter.

Sincerely,

David Warner
Director of Permit Services

DW: RE/cm

Enclosures

Seyed Sadredin
Executive Director/Air Pollution Control Officer

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

Central Region (Main Office)
1990 E. Gettysburg Avenue
Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061

Southern Region
34946 Flyover Court
Bakersfield, CA 93308-9725
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San Joaquin Valley

AIR POLLUTION CONTROL DISTRICT



HEALTHY AIR LIVING™

OCT 21 2010

Gerardo C. Rios, Chief
Permits Office
Air Division
U.S. EPA - Region IX
75 Hawthorne St.
San Francisco, CA 94105

**Re: Notice of Preliminary Decision - ATC / Certificate of Conformity
Facility # S-2234
Project # 1103628**

Dear Mr. Rios:

Enclosed for your review is the District's engineering evaluation of an application for Authorities to Construct for Occidental of Elk Hills, Inc within the gas plant stationary source, CA, which has been issued a Title V permit. Occidental of Elk Hills, Inc is requesting that Certificates of Conformity, with the procedural requirements of 40 CFR Part 70, be issued with this project. The project authorizes the installation of a new cryogenic gas plant within the existing gas plant stationary source near Tupman, CA.

Enclosed is the engineering evaluation of this application and proposed Authorities to Construct # S-2234-216-0 through '-240-0 with Certificates of Conformity. After demonstrating compliance with the Authority to Construct, the conditions will be incorporated into the facility's Title V permit through an administrative amendment.

Please submit your written comments on this project within the 45-day comment period that begins on the date you receive this letter. If you have any questions, please contact Mr. Leonard Scandura, Permit Services Manager, at (661) 392-5500.

Thank you for your cooperation in this matter.

Sincerely,

David Warner
Director of Permit Services

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OCT 21 2010

Mike Tollstrup, Chief
Project Assessment Branch
Air Resources Board
P O Box 2815
Sacramento, CA 95812-2815

Re: **Notice of Preliminary Decision - ATC / Certificate of Conformity**
Facility # S-2234
Project # 1103628

Dear Mr. Tollstrup:

Enclosed for your review and comment is the District's analysis of an application for Authorities to Construct for Occidental of Elk Hills, Inc within the gas plant stationary source, CA. The project authorizes the installation of a new cryogenic gas plant within the existing gas plant stationary source near Tupman, CA.

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

Thank you for your cooperation in this matter. If you have any questions, please contact Mr. Leonard Scandura, Permit Services Manager, at (661) 392-5500.

Thank you for your cooperation in this matter.

Sincerely,

David Warner
Director of Permit Services

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

NOTICE IS HEREBY GIVEN that the San Joaquin Valley Air Pollution Control District solicits public comment on the proposed issuance of Authority To Construct to Occidental of Elk Hills, Inc for its cryogenic gas plant within the gas plant stationary source, California. The project authorizes the installation of a new cryogenic gas plant within the existing gas plant stationary source near Tupman, CA.

The analysis of the regulatory basis for these proposed actions, Project #1103628, is available for public inspection at http://www.valleyair.org/notices/public_notices_idx.htm and the District office at the address below. Written comments on the proposed initial permit must be submitted within 30 days of the publication date of this notice to **DAVID WARNER, DIRECTOR OF PERMIT SERVICES, SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT, 1990 E. GETTYSBURG AVE, FRESNO, CA 93726-0244.**

San Joaquin Valley Air Pollution Control District
Authority to Construct Application Review
Cryogenic Gas Plant

Facility Name: Occidental of Elk Hills Inc (OEHI) Date: October 18, 2010
Mailing Address: 10800 Stockdale Hwy Engineer: Richard Edgehill
Bakersfield, CA 93311 Lead Engineer: Richard Karrs
Contact Person: Dennis Champion (OEHI) and Mike Kelly (Vector Environmental)
Telephone: (661) 412-5214 (DC) (661) 323-1477 #205 (MK)
Fax: (661) 412-5270
E-Mail: Dennis_Champion@oxy.com
Application #(s): S-2234-216-0 through '240-0
Project #: 1103628
Deemed Complete: July 29, 2010

I. Proposal

Occidental of Elk Hills Inc (OEHI) has requested Authority to Construct (ATC) permits for the installation of a new natural gas processing plant to be located at the existing gas plant stationary source S-2234. The new plant will process 200 MMscfd natural gas from crude oil and natural gas production operations. Cryogenic processes involving compression and refrigeration are designed to separate ethane, propane, butane and natural gasoline from the produced gas stream. The remaining residue gas, containing primarily methane will be used as fuel or sold to offsite users.

Emissions from the new equipment will consist of combustion emissions (NO_x, SO_x, PM₁₀, CO, and VOCs) from two heaters, an emergency IC engine and emergency flare, uncontrolled VOC emissions from tanks, and fugitive emissions from process equipment.

BACT is triggered for the IC engine, flare, and the two heaters. Offsets and public notice are also required. Additionally the project is a Federal Major Modification.

OEHI received their Title V Permit on April 30, 1999. The project is a Federal Major Modification and therefore it is classified as a Title V Significant Modification pursuant to Rule 2520, Section 3.20, 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. OEHI must apply to administratively amend their Title V Operating Permit to include the requirements of the ATC(s) issued with this project.

II. Applicable Rules

| | |
|---|--|
| Rule 2020 | Exemptions (12/20/07) |
| Rule 2201 | New and Modified Stationary Source Review Rule (12/18/08) |
| Rule 2520 | Federally Mandated Operating Permits (6/21/01) |
| Rule 4001 | New Source Performance Standards (4/14/99) – Subpart KKK |
| Rule 4002 | National Emissions Standards for Hazardous Air Pollutants (5/20/04) – exempt – facility is not a major HAPs source |
| 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 II (8/21/03) |
| Rule 4306 | Boilers, Steam Generators and Process Heaters – Phase III (3/17/05) |
| Rule 4320 | Rule 4320 Advanced Emission Reduction Options for Boilers, Steam Generators, and Process Heaters Greater than 5.0 MMBtu/hr (10/16/08) |
| Rule 4408 | Glycol Dehydration Systems (12/19/02) |
| Rule 4409 | Components at Light Crude Oil Production Facilities, Natural Gas Production Facilities, and Natural Gas Processing Facilities (4/30/05) |
| Rule 4623 | Storage of Organic Liquids (5/19/05) |
| Rule 4801 | Sulfur Compounds (12/17/92) |
| Rule 8011 | General Requirements (8/19/04) |
| Rule 8021 | Construction, Demolition, Excavation, Extraction And Other Earthmoving Activities (8/19/04) |
| Rule 8041 | Carryout and Trackout (8/19/04) |
| Rule 8051 | Open Areas (8/19/04) |
| Rule 8071 | Unpaved Vehicle/Equipment Traffic Areas (9/16/04) |
| Rule 8061 | Paved and Unpaved Roads (8/19/04) |
| 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 new natural gas processing plant will be located at the 35R Gas Processing Stationary Source NW Section 35, T30S, R23E. The facility will not be located near residential areas, sensitive receptors or within 1000 feet of any school. Project location maps are included in **Attachment I**.

IV. Process Description

The new cryogenic gas plant will include a variety of equipment required for compressing, treating and dehydrating rich wet field gas; equipment required for processing and extracting natural gas liquids (NGL) and recovering liquefied petroleum gas products (propane, butane); and utility systems required for supporting the various process units that comprise the gas plant.

Dry, sweet residue gas from the facility will be delivered to existing pipelines for use as fuel or for custody transfer. Natural gas liquids recovered by the cryogenic process will be separated into four streams: ethane (C₂H₆); propane (C₃H₈), butane (C₄H₁₀) and natural gasoline (pentane+). Ethane will be combined with overhead gas from the treating systems and will be compressed, dehydrated and reinjected. The propane, butane and natural gasoline will proceed to custody transfer via product pipeline systems.

Although the plant includes a large amount of equipment, operation of most equipment only results in fugitive emissions of volatile organic compounds (VOC) from piping components. All process vents are enclosed and liquids and "drips" from process gas scrubbers (gas liquid separators) are returned to the gas production system or to a closed drain system with overhead gas routed to the field gas collection system.

The cryogenic gas plant will include two gas fired process heaters; an emergency use only flare; and an emergency use only diesel fueled engine for a fire-pump. For the most part, the heat required for process equipment will be provided using a "hot-oil-system". The heat required for the system will be provided using a gas fired process heater ("hot oil heater") having a maximum heat input rating of 206.7 MMBtu/Hr. The gas treating system will also include an oxygen (O₂) removal system. Heat required for the O₂ removal system will be provided using a gas fired process heater having a maximum heat input rating of 19.5 MMBtu/Hr. Both heaters will be equipped with state of the art low NO_x burners meeting Best Available Control Technology (BACT) requirements. Several small tanks will also be used at the facility.

Process flow diagrams are included in **Attachment II**.

V. Equipment Listing

S-2234-216-0: INLET GAS SYSTEM WITH ELECTRIC MOTOR DRIVEN INLET GAS COMPRESSOR(S)

S-2234-217-0: MERCURY REMOVAL SYSTEM WITH INLET GAS FILTER SEPARATOR, MERCURY GUARD BED

- S-2234-218-0: O2 REMOVAL SYSTEM WITH 19.5 MMBTU/HR O2 HEATER WITH COEN C-RMB RAPID MIX ULTRA LOW NOX BURNER (OR EQUIVALENT) , OXYGEN REMOVAL REACTOR, OXYGEN REMOVAL DISCHARGE COOLER AND SCRUBBER AND O2 REMOVAL COOLER
- S-2234-219-0: INLET GAS TREATING WITH INLET GAS AMINE CONTACTOR, TREATED GAS COOLER, LEAN GLYCOL COOLER, TREATED GAS FILTER SEPARATOR
- S-2234-220-0: INLET GAS DEHYDRATION WITH MOLECULAR SIEVE DEHYDRATION, DRY GAS DUST FILTER, REGENERATION GAS HEATER, REGENERATION GAS COOLER AND SCRUBBER, AND REGENERATION GAS COOLER
- S-2234-221-0: NGL RECOVERY WITH EXPANDER/BOOSTER COMPRESSOR, GAS/GAS EXCHANGER, COLD SEPARATOR, DEMETHANIZER REBOILERS, DEMETHANIZER, AND DEETHANIZER FEED PUMPS
- S-2234-222-0: RESIDUE GAS COMPRESSION WITH ELECTRIC MOTOR DRIVEN RESIDUE GAS COMPRESSOR(S), RESIDUE GAS COALESCER(S)
- S-2234-223-0: DEETHANIZER WITH REFLUX CONDENSER
- S-2234-224-0: DEPROPANIZER WITH REFLUX CONDENSERS AND REFLUX DRUMS
- S-2234-225-0: DEBUTANIZER WITH REFLUX CONDENSERS AND REFLUX DRUMS
- S-2234-226-0: REFRIGERATION SYSTEM WITH REFRIGERANT SUCTION SCRUBBER, REFRIGERANT COMPRESSOR(S) AND COMPRESSOR COMPONENTS, REFRIGERANT FLASH DRUM, REFRIGERANT CONDENSERS AND COMPONENTS, AND REFRIGERANT SURGE DRUM
- S-2234-227-0: AMINE SYSTEM WITH AMINE REGENERATION PACKAGE
- S-2234-228-0: GLYCOL SYSTEM WITH GLYCOL REGENERATION PACKAGE
- S-2234-229-0: PROPANE TANK (EXEMPT), BUTANE TANK (EXEMPT), AND 16,250 GALLON NATURAL GAS TANK
- S-2234-230-0: HOT OIL SYSTEM WITH HOT OIL EXPANSION TANK, HOT OIL PUMPS, AND 206.7 MMBTU/HR HOT OIL HEATER WITH COEN C-RMB RAPID MIX ULTRA LOW NOX BURNER (OR EQUIVALENT)
- S-2234-231-0: OVERHEAD GAS SYSTEM WITH GAS SCRUBBER, ETHANE/CO2 GLYCOL CONTACTOR, ETHANE/CO2 COMPRESSOR(S), ETHANE COOLERS AND ETHANE COOLER COMPONENTS
- S-2234-232-0: METHANOL INJECTION SYSTEM WITH PERMIT EXEMPT (<250 GALLON) METHANOL TANK

S-2234-233-0: 2000 GALLON AMINE SUMP TANK
S-2234-234-0: 3000 GALLON GLYCOL SUMP TANK

S-2234-235-0: 250 MMSCF/DAY EMERGENCY USE SMOKELESS SONIC FLARE WITH
FLARE HEADER AND FLARE KNOCK OUT DRUM

S-2234-236-0: 300 BBL AMINE STORAGE TANK SERVED BY VAPOR CONTROL SYSTEM

S-2234-237-0: 300 BBL FRESH WATER TANK SERVED BY VAPOR CONTROL SYSTEM

S-2234-238-0: 500 BBL PRODUCED WATER STORAGE TANK SERVED BY VAPOR
CONTROL SYSTEM

S-2234-239-0: 500 BBL SLOP OIL TANK

S-2234-240-0: 175 HP TIER 3 CERTIFIED DIESEL- FIRED IC ENGINE POWERING AN
EMERGENCY FIREWATER PUMP

Make/Model: Cummins/CFP7E-F10
Model Year: 2010
Emissions: Tier 3 Certified
CARB engine family: ACEXL0409AAB
Maximum Power: 170 hp
Diesel consumption rate: 9 gal/hr

As per District policy 1035 Flexibility in Equipment Descriptions in ATCs, some flexibility in the final specifications of the equipment will be allowed stated in the following ATC conditions for the O2 heater and Hot Oil Heater (S-2234-218 and '-230 respectively).

The permittee shall obtain written District approval for the use of any equivalent equipment not specifically approved by this Authority to Construct. Approval of the equivalent equipment shall be made only after the District's determination that the submitted design and performance of the proposed alternate equipment is equivalent to the specifically authorized equipment. [District Rule 2201] N

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

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

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

VI. Emission Control Technology Evaluation

S-2234-218 and '-230 Hot Oil and O2 Heaters

Emissions from the natural gas-fired O2 heater (S-234-218-0) and hot oil heater (S-2234-230-0) and include NO_x, CO, VOC, PM₁₀, and SO_x.

NO_x is the major pollutant of concern when burning natural 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, nearly all NO_x emissions 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.

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 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.

Units S-2234-218 and '-230 are designed to achieve 6 and 5 ppmv NO_x @3% O₂, respectively. Manufacturer's information on the ultra-low NO_x burner is included in **Attachment III**.

Uncontrolled Amine Sump Tank, and Glycol Sump Tank S-2234-233 and '-234

These sump tanks (horizontal drain tanks) are equipped with a P/V valve.

Emergency Use Sonic Flare S-2234-235-0

The proposed sonic flare tip nozzle channels the gas through a narrow annulus thereby maximizing the gas/air interface consequently entraining more primary combustion air than conventional flare tips. The flare tip on this type of flare has many orifices (prongs) through which gas flows. With pressure build up orifices open. If there is a larger release and the pressure starts to fall orifices close. The flare tip is designed to withstand about 10 to 15 psig on the system even at low flows which results in a highly pre-mixed flame that radiates less, and operates without producing smoke.

Amine, Produced Water and Fresh Water Tanks S-2234-236 through '-238

Tanks S-2234-236 through '-238 will be served by a vapor control system with a control efficiency of at least 95% as required by Rule 4623.

Slop Oil Tank S-2234-239

The tank is uncontrolled (equipped with a P/V valve).

Fire Water Pump Diesel-Fired IC Engine S-2234-240

The engine is equipped with:

- Turbocharger
- Intercooler/aftercooler

- Injection timing retard (or equivalent per District Policy SSP-1805, dated 8/14/1996)
- Positive Crankcase Ventilation (PCV) or 90% efficient control device
- This engine is required to be, and is UL certified
- Catalytic particulate filter
- Very Low (0.0015%) sulfur diesel

The emission control devices/technologies and their effect on diesel engine emissions detailed below are from *Non-catalytic NO_x Control of Stationary Diesel Engines*, by Don Koeberlein, CARB.

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

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

The PCV system reduces crankcase VOC and PM₁₀ emissions by at least 90% over an uncontrolled crankcase vent.

The use of very low-sulfur diesel fuel (0.0015% by weight sulfur maximum) reduces SO_x emissions by over 99% from standard diesel fuel.

Fugitive Emissions (all ATCs except IC engine S-2234-240-0)

Leaks from fugitive emissions components will be controlled by implementation of an I&M program consistent with the requirements of Rule 4409 and NSPS Subpart KKK. Because emissions are calculated using EPA Average Leak Rate equations with a leak threshold of 2000 ppmv leaks exceeding 2000 ppmv are a violation of the permit as stated in the following condition:

A leak-free condition is defined as a condition without a gas leak or a liquid leak. A gas leak is defined as a reading in excess of 2,000 parts per million by volume (ppmv), as methane, above background on a portable hydrocarbon detection instrument that is calibrated to methane in accordance with the procedures specified in EPA Test Method 21. A liquid leak is defined as the dripping of organic liquid at a rate more than 3 drops per minute. A gas or liquid leak is a violation of this permit and shall be reported as a deviation. [District Rule 2201] Y

Fugitive Emissions BACT Requirement

As the project is a Federal Major Modification BACT is triggered for all of the new emissions units. BACT is a leak definition of (3) drops per minute of liquid containing VOC or a reading of methane in excess of 100 ppmv (valves and connectors) and 500 ppmv (compressor and pump seals) and an Inspection and Maintenance Program (I&M) pursuant to District Rule 4409 (BACT Requirement).

VII. General Calculations

A. Assumptions

- Facility operates 24 hr/day 365 days per year.
- Except for the residue gas system (which is essentially 100% methane with no VOCs), the VOC content of fugitive emissions is 100% by weight.
- IC engine operates 24 hr/day and 24 hr/yr
- Emergency flare operates 24 hr/day and 0 hr/yr (emissions from emergency equipment are not included in the SSPE)
- Natural gas heating value: 1062 Btu/scf
- F factor, 8578 dscf @ 0% O₂ (60 deg F)/MMBtu
- Sulfur content of natural gas: 1.0 gr S/scf
- S-2234-233-0 Amine Sump Tank
Methyl/diethanolamine, MW 119, 48,000 gal/yr, 24 turnovers/yr, DEL = annual emissions/365
- S-2234-234-0 Glycol Sump Tank
Triethylene glycol, MW 150, 72,000 gal/yr, 24 turnovers/yr, DEL = annual emissions/365
- S-2234-239-0 Slop Oil Tank
240,773 gal/yr, MW 150, 12 turnovers/yr, RVP = 0.37, DEL = annual emissions/365
- Miscellaneous drain sump is exempt as it stores clean produced water (Rule 2020 Section 6.6.1)

B. Emission Factors

Fugitive Emissions

Fugitive VOC emissions have been quantified for Average Leak Rate (ALR) equations with a 2000 ppmv leak threshold (other equipment) in EPA, "Protocol for Estimating Leak Emissions" (EPA – 453/R-95-017, November 1995) Table 5-7, "Equation Relating Average Leak Rate to Fraction Leaking at Oil and Gas Production Operation Units" (**Attachment IV**). In calculating the DEL associated with fugitive emissions, the "LKFRAC" term in these equations, representing the number of allowable leaks, was assumed to be zero.

O2 Heater S-2234-218-0

| Pollutant | Emission Factors | | Source |
|------------------|------------------------------------|--|-----------------------------------|
| NO _x | 0.007 lb-NO _x /MMBtu | 6 ppmvd NO _x (@ 3%O ₂) | Burner Manufacturer |
| SO _x | 0.00269 lb-SO _x /MMBtu* | | District Standard for Natural Gas |
| PM ₁₀ | 0.0076 lb-PM ₁₀ /MMBtu | 7.6 lb/10 ⁶ scf | AP-42 Table 1.4-2 |
| CO | 0.037 lb-CO/MMBtu | 50 ppmv CO (@ 3%O ₂) | Burner Manufacturer |
| VOC | 0.0055 lb-VOC/MMBtu | 13 ppmv @3% O ₂ | AP-42 Table 1.4-2 |

Hot Oil Heater S-2234-230-0

| Pollutant | Emission Factors | | Source |
|------------------|------------------------------------|--|-----------------------------------|
| NO _x | 0.0062 lb-NO _x /MMBtu | 5 ppmvd NO _x (@ 3%O ₂) | Burner Manufacturer |
| SO _x | 0.00269 lb-SO _x /MMBtu* | | District Standard for Natural Gas |
| PM ₁₀ | 0.0076 lb-PM ₁₀ /MMBtu | 7.6 lb/10 ⁶ scf | AP-42 Table 1.4-2 |
| CO | 0.037 lb-CO/MMBtu | 50 ppmv CO (@ 3%O ₂) | Burner Manufacturer |
| VOC | 0.0055 lb-VOC/MMBtu | 13 ppmv @3% O ₂ | AP-42 Table 1.4-2 |

*1.0 gr/ S100 scf x lb S/7000 gr x scf/1062 Btu x 10⁶ Btu/MMBtu x 2 SO₂/S = 0.00269 lb SO₂/MMBtu

Emergency Use Flare S-2234-235-0

| Pollutant | Emission Factor (lb/MMBtu) | Source |
|------------------|-------------------------------|----------------------------------|
| NO _x | 0.068 | AP-42/FYI-83 |
| SO _x | 0.00269 | 1.0 gr-S/100 scf 1062 Btu/scf |
| PM ₁₀ | 0.008 | AP-42/FYI-83-BACT |
| CO | 0.37 | AP-42/FYI-83 |
| VOC | 0.063 | AP-42/FYI-83 |

*1.0 gr/ S100 scf x lb S/7000 gr x scf/1062 Btu x 10⁶ Btu/MMBtu x 2 SO₂/S = 0.00269 lb SO₂/MMBtu

IC Engine S-2234-240-0

The application includes manufacturer emissions factors for NO_x, VOC, PM₁₀, and CO which reflect certified emissions for CARB engine family ACXLO409AAB. (**Attachment V**). The SO_x emission factor is calculated using the sulfur content in the diesel fuel (0.0015% sulfur). Emissions factors are included in the table below.

| | g/KW·hr | g/hp-hr* | Source |
|-----------------------|---------|----------|--|
| NO _x + VOC | 3.7 | 2.759 | Tier 3 Certification |
| NO _x | 3.6 | 2.685 | Tier 3 Certification (calculated fraction) |
| SO _x | | 0.0051 | |
| PM ₁₀ | 0.17 | 0.127 | Tier 3 Certification |
| CO | 1.6 | 1.193 | Tier 3 Certification |
| VOC | 0.1 | 0.075 | Tier 3 Certification (calculated fraction) |

* 0.74558 KW/hp

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

S-2234-233, '-234, and '-239 Amine, Glycol Sump and Slop Oil Tanks
Uncontrolled tank VOC emissions were calculated using the EPA Tanks 4.0
(Attachment VI).

C. Calculations

1. Pre-Project Potential to Emit (PE1)

Since these are new emissions units, PE1 = 0 for all pollutants.

2. Post Project Potential to Emit (PE2)

Fugitive Emissions

| Permit unit | VOC PE2 (lb/day) | VOC PE2 (lb/yr) |
|--|---------------------|--------------------|
| '-216 Inlet Gas System | 2.638 | 963 |
| '-217 Mercury Removal System | 0.205 | 75 |
| '-218 O2 Removal System | 0.256 | 93 |
| '-219 Inlet Gas Treating | 0.570 | 208 |
| '-220 Inlet Gas Dehydration | 0.360 | 131 |
| '-221 NGL Recovery | 0.462 | 169 |
| '-222 Residue Gas Compression | 0.177 | 65 |
| '-223 Deethanizer | 0.096 | 35 |
| '-224 Depropanizer | 0.724 | 264 |
| '-225 Debutanizer | 0.521 | 190 |
| '-226 Refrigeration System | 1.876 | 685 |
| '-227 Amine System | 0.205 | 75 |
| '-228 Glycol Regeneration | 0.235 | 86 |
| '-229 Propane, Butane, Natural Gas Storage | 0.933 | 341 |
| '-230 Hot Oil System | 0.189 | 69 |
| '-231 Overhead Gas System and Overhead Gas Scrubber | 1.138 | 415 |
| '-232 Methanol Injection System | 0.072 | 26 |
| '-233 Amine Sump | 0.039 | 14 |
| '-234 Glycol Sump | 0.009 | 3 |
| '-235 Flare System | 0.162 | 59 |
| '-236 Amine Tank | 0.036 | 13 |
| '-237 Water Tank | 0.008 | 3 |
| '-238 Produced Water Tank | 0.01 | 4 |
| '-239 Slop Oil Tank | 0.012 | 4 |
| Total | 10.93 | 3990 |

O2 Heater S-2234-218

| Pollutant | Daily PE2 | | | |
|------------------------|-------------------|--------------------------|-----------------------------------|-----------------------|
| | EF2 (lb/MMBtu) | Heat Input (MMBtu/hr) | Operating Schedule (hr/day) | Daily PE2 (lb/day) |
| NO_x | 0.007 | 19.5 | 24 | 3.3 |
| SO_x | 0.00269 | 19.5 | 24 | 1.3 |
| PM₁₀ | 0.0076 | 19.5 | 24 | 3.6 |
| CO | 0.037 | 19.5 | 24 | 17.3 |
| VOC | 0.0055 | 19.5 | 24 | 2.6 |

| Pollutant | Annual PE2 | | | |
|------------------------|-------------------|--------------------------|------------------------------------|----------------------------|
| | EF2 (lb/MMBtu) | Heat Input (MMBtu/hr) | Operating Schedule (hr/year) | Annual PE2 (lb/year) |
| NO_x | 0.007 | 19.5 | 8,760 | 1,196 |
| SO_x | 0.00269 | 19.5 | 8,760 | 460 |
| PM₁₀ | 0.0076 | 19.5 | 8,760 | 1,298 |
| CO | 0.037 | 19.5 | 8,760 | 6,320 |
| VOC | 0.0055 | 19.5 | 8,760 | 940 |

Hot Oil Heater S-2234-230-0

| Pollutant | Daily PE2 | | | |
|------------------|----------------|-----------------------|-----------------------------|--------------------|
| | EF2 (lb/MMBtu) | Heat Input (MMBtu/hr) | Operating Schedule (hr/day) | Daily PE2 (lb/day) |
| NO _x | 0.006 | 206.7 | 24 | 30.8 |
| SO _x | 0.00269 | 206.7 | 24 | 13.3 |
| PM ₁₀ | 0.0076 | 206.7 | 24 | 37.7 |
| CO | 0.037 | 206.7 | 24 | 183.5 |
| VOC | 0.0055 | 206.7 | 24 | 27.3 |

| Pollutant | Annual PE2 | | | |
|------------------|----------------|-----------------------|------------------------------|----------------------|
| | EF2 (lb/MMBtu) | Heat Input (MMBtu/hr) | Operating Schedule (hr/year) | Annual PE2 (lb/year) |
| NO _x | 0.006 | 206.7 | 8,760 | 11,226 |
| SO _x | 0.00269 | 206.7 | 8,760 | 4,871 |
| PM ₁₀ | 0.0076 | 206.7 | 8,760 | 13,761 |
| CO | 0.037 | 206.7 | 8,760 | 66,996 |
| VOC | 0.0055 | 206.7 | 8,760 | 9,959 |

S-2234-235: Emergency Flare – One day/yr operate as emergency

The daily potential to emit for the flare is calculated as follows, and summarized in the table below:

$$\begin{aligned} PE2_{NO_x} &= (0.068 \text{ lb/MMBtu}) * (1,062 \text{ MMBtu/ MMscf}) * (250 \text{ MMscf/day}) \\ &= 18,054.0 \text{ lb-NO}_x/\text{day} \end{aligned}$$

$$\begin{aligned} PE2_{SO_x} &= (0.00269 \text{ lb/MMBtu}) * (1,062 \text{ MMBtu/ MMscf}) * (250 \text{ MMscf/day}) \\ &= 714.2 \text{ lb-SO}_x/\text{day} \end{aligned}$$

$$\begin{aligned} PE2_{PM_{10}} &= (0.008 \text{ lb/MMBtu}) * (1,062 \text{ MMBtu/ MMscf}) * (250 \text{ MMscf/day}) \\ &= 2,124.0 \text{ lb-PM}_{10}/\text{day} \end{aligned}$$

$$\begin{aligned} PE2_{CO} &= (0.37 \text{ lb/MMBtu}) * (1,062 \text{ MMBtu/ MMscf}) * (250 \text{ MMscf/day}) \\ &= 98,235.0 \text{ lb-CO}/\text{day} \end{aligned}$$

$$\begin{aligned} PE2_{VOC} &= (0.063 \text{ lb/MMBtu}) * (1,062 \text{ MMBtu/ MMscf}) * (250 \text{ MMscf/day}) \\ &= 16,726.5 \text{ lb-VOC}/\text{day} (+ 0.2 \text{ fugitives} = 16,726.7 \text{ lb-VOC}/\text{day}) \end{aligned}$$

Uncontrolled and Fugitive Tank emissions

S-2234-233: Amine Sump Tank 80 lb/yr/365 = 0.2 lb/day, (fugitives 0.04 lb/day, 14 lb/yr)

S-2234-234: Glycol Sump Tank 149 lb/yr/365 = 0.4 lb/day (fugitives 0.0 lb/day, 3 lb/yr)

S-2234-239: Slop Oil Tank 143 lb/yr/365 = 0.4 lb/day (fugitives 0.0 lb/day, 4 lb/yr)

S-2234-240 Fire Water ICE

| Daily Post Project Emissions | | | | | |
|-------------------------------|-----------------------------|--------------|------------------------------------|-------------------|--------------------|
| Pollutant | Emissions Factor (g/bhp-hr) | Rating (bhp) | Daily Hours of Operation (hrs/day) | Conversion (g/lb) | PE2 Total (lb/day) |
| NO _x | 2.685 | 175 | 24 | 453.6 | 24.9 |
| SO _x | 0.005 | 175 | 24 | 453.6 | 0.0 |
| PM ₁₀ | 0.127 | 175 | 24 | 453.6 | 1.2 |
| CO | 1.193 | 175 | 24 | 453.6 | 11.0 |
| VOC | 0.075 | 175 | 24 | 453.6 | 0.7 |
| Annual Post Project Emissions | | | | | |
| Pollutant | Emissions Factor (g/bhp-hr) | Rating (bhp) | Annual Hours of Operation (hrs/yr) | Conversion (g/lb) | PE2 Total (lb/yr) |
| NO _x | 2.685 | 175 | 24 | 453.6 | 25 |
| SO _x | 0.005 | 175 | 24 | 453.6 | 0 |
| PM ₁₀ | 0.127 | 175 | 24 | 453.6 | 1 |
| CO | 1.193 | 175 | 24 | 453.6 | 11 |
| VOC | 0.075 | 175 | 24 | 453.6 | 1 |

Daily PE2

| | NOx | SOx | PM10 | CO | VOC |
|------------|---------|-------|--------|---------|---------|
| S-2234-216 | 0 | 0 | 0 | 0 | 2.6 |
| S-2234-217 | 0 | 0 | 0 | 0 | 0.2 |
| S-2234-218 | 3.3 | 1.3 | 3.6 | 17.3 | 2.9 |
| S-2234-219 | 0 | 0 | 0 | 0 | 0.6 |
| S-2234-220 | 0 | 0 | 0 | 0 | 0.4 |
| S-2234-221 | 0 | 0 | 0 | 0 | 0.5 |
| S-2234-222 | 0 | 0 | 0 | 0 | 0.2 |
| S-2234-223 | 0 | 0 | 0 | 0 | 0.1 |
| S-2234-224 | 0 | 0 | 0 | 0 | 0.7 |
| S-2234-225 | 0 | 0 | 0 | 0 | 0.5 |
| S-2234-226 | 0 | 0 | 0 | 0 | 1.9 |
| S-2234-227 | 0 | 0 | 0 | 0 | 0.2 |
| S-2234-228 | 0 | 0 | 0 | 0 | 0.2 |
| S-2234-229 | 0 | 0 | 0 | 0 | 0.9 |
| S-2234-230 | 30.8 | 13.3 | 37.7 | 183.5 | 27.5 |
| S-2234-231 | 0 | 0 | 0 | 0 | 1.1 |
| S-2234-232 | 0 | 0 | 0 | 0 | 0.1 |
| S-2234-233 | 0 | 0 | 0 | 0 | 0.2 |
| S-2234-234 | 0 | 0 | 0 | 0 | 0.4 |
| S-2234-235 | 18054.0 | 714.2 | 2124.0 | 98235.0 | 16726.7 |
| S-2234-236 | 0 | 0 | 0 | 0 | 0.0 |
| S-2234-237 | 0 | 0 | 0 | 0 | 0.0 |
| S-2234-238 | 0 | 0 | 0 | 0 | 0.0 |
| S-2234-239 | 0 | 0 | 0 | 0 | 0.4 |
| S-2234-240 | 24.9 | 0 | 1.2 | 11.0 | 0.7 |

Annual PE2

| | NOx | SOx | PM10 | CO | VOC |
|--------------|---------------|-------------|---------------|---------------|---------------|
| S-2234-216 | 0 | 0 | 0 | 0 | 963 |
| S-2234-217 | 0 | 0 | 0 | 0 | 75 |
| S-2234-218 | 1196 | 460 | 1298 | 6320 | 1033 |
| S-2234-219 | 0 | 0 | 0 | 0 | 208 |
| S-2234-220 | 0 | 0 | 0 | 0 | 131 |
| S-2234-221 | 0 | 0 | 0 | 0 | 169 |
| S-2234-222 | 0 | 0 | 0 | 0 | 65 |
| S-2234-223 | 0 | 0 | 0 | 0 | 35 |
| S-2234-224 | 0 | 0 | 0 | 0 | 264 |
| S-2234-225 | 0 | 0 | 0 | 0 | 190 |
| S-2234-226 | 0 | 0 | 0 | 0 | 685 |
| S-2234-227 | 0 | 0 | 0 | 0 | 75 |
| S-2234-228 | 0 | 0 | 0 | 0 | 86 |
| S-2234-229 | 0 | 0 | 0 | 0 | 341 |
| S-2234-230 | 11,226 | 4871 | 13,761 | 66,996 | 10,028 |
| S-2234-231 | 0 | 0 | 0 | 0 | 415 |
| S-2234-232 | 0 | 0 | 0 | 0 | 26 |
| S-2234-233 | 0 | 0 | 0 | 0 | 94 |
| S-2234-234 | 0 | 0 | 0 | 0 | 152 |
| S-2234-235 | * | * | * | * | 59** |
| S-2234-236 | 0 | 0 | 0 | 0 | 13 |
| S-2234-237 | 0 | 0 | 0 | 0 | 3 |
| S-2234-238 | 0 | 0 | 0 | 0 | 4 |
| S-2234-239 | 0 | 0 | 0 | 0 | 147 |
| S-2234-240 | 25 | 0 | 1 | 11 | 1 |
| Total | 12,447 | 5331 | 15,060 | 73,327 | 15,262 |

* emergency flare annual emissions are not included

** flare fugitive emissions

Emissions Profiles are included in **Attachment VII**.

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

Pursuant to Section 4.9 of District Rule 2201, the Pre-Project Stationary Source Potential to Emit (SSPE1) is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

Facility emissions are already above the Offset and Major Source Thresholds for NOx, SOx, PM10, CO, and VOC emissions; therefore, SSPE1 calculations are not necessary.

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

Pursuant to Section 4.10 of District Rule 2201, the Post Project Stationary Source Potential to Emit (SSPE2) is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

Facility emissions are already above the Offset and Major Source Thresholds for NO_x, SO_x, PM₁₀, CO, and VOC emissions; therefore, SSPE2 calculations are not necessary.

5. Major Source Determination

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

This source is an existing Major Source for NO_x, SO_x, PM₁₀, CO, and VOC emissions and will remain a Major Source for these air contaminants.

6. Baseline Emissions (BE)

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

Pursuant to Section 3.7 of District Rule 2201, BE = Pre-project Potential to Emit for:

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

otherwise,

BE = Historic Actual Emissions (HAE), calculated pursuant to Section 3.22 of District Rule 2201.

Since these are new emissions units, BE = 0 for all pollutants.

7. SB 288 Major Modification

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

As discussed in Section VII.C.5 above, the facility is an existing Major Source for NO_x, SO_x, PM₁₀, CO, and VOC; however, the project by itself would need to be a significant increase in order to trigger a Major Modification. The emissions unit(s) within this project do not have a total potential to emit which is greater than Major Modification thresholds (see table below). Therefore, the project cannot be a significant increase and the project does not constitute a SB 288 Major Modification.

| SB 288 Major Modification Thresholds (Existing Major Source) | | | |
|---|----------------------|---------------------|----------------------------|
| Pollutant | Project PE (lb/year) | Threshold (lb/year) | SB 288 Major Modification? |
| NO _x | 12,447 | 50,000 | No |
| SO _x | 5,331 | 80,000 | No |
| PM ₁₀ | 15,060 | 30,000 | No |
| VOC | 15,262 | 50,000 | No |

8. Federal Major Modification

Recent draft District Policy on Implementation of Rule 2201 (as amended 12/18/08 and approved by EPA 6/10/10) states that if the project's emissions increase is greater than 0.5 lb/day for NO_x or VOCs, such an emissions increase shall constitute a Federal Major Modification. As pre-project emissions are zero, the project emissions increase triggers is a Federal Major Modification for NO_x and VOC.

9. 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. For all units in the project the QNEC is PE2 divided by 4.

VIII. Compliance

Rule 2020 Exemptions

Section 6.6.9 of the rule provides the following exemption:

6.6.9 The storage of liquefied gases in unvented (except for emergency pressure relief valves) pressure vessels.

The propane and butane tanks store liquefied gases and are therefore exempt.

The methanol storage tank is less than 250 gallons in capacity and therefore is exempt by section 6.6.4 which follows:

6.6.4 The storage of organic material with a capacity of 250 gallons or less where the actual storage temperature does not exceed 150°F.

The miscellaneous drain sump stores only clean produced water and therefore is exempt under Section 6.6.1.

Rule 2201 New and Modified Stationary Source Review Rule

A. Best Available Control Technology (BACT)

1. BACT Applicability

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

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

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

No relocations or modifications are proposed (items b and c above). As discussed in Section VII.C.8 above, this project constitutes a Federal Major Modification; BACT is required for all new emissions units in the project pursuant to District Rule 2201 Section 4.1.3.

2. BACT Guideline

The applicable BACT Guidelines are listed below and are included in **Attachment VIII**.

| | NOx | SOx | PM10 | CO | VOC | BACT? | BACT GUIDELINE* |
|------------|---------|-------|--------|---------|---------|-------|---|
| S-2234-216 | 0 | 0 | 0 | 0 | 2.6 | Yes | 7.2.7 |
| S-2234-217 | 0 | 0 | 0 | 0 | 0.2 | Yes | 7.2.7 |
| S-2234-218 | 3.3 | 1.3 | 3.6 | 17.3 | 2.9 | Yes | Rescinded- Rule 4320 Requirements |
| S-2234-219 | 0 | 0 | 0 | 0 | 0.6 | Yes | 7.2.7 |
| S-2234-220 | 0 | 0 | 0 | 0 | 0.4 | Yes | 7.2.7 |
| S-2234-221 | 0 | 0 | 0 | 0 | 0.5 | Yes | 7.2.7 |
| S-2234-222 | 0 | 0 | 0 | 0 | 0.2 | Yes | 7.2.7 |
| S-2234-223 | 0 | 0 | 0 | 0 | 0.1 | Yes | 7.2.7 |
| S-2234-224 | 0 | 0 | 0 | 0 | 0.7 | Yes | 7.2.7 |
| S-2234-225 | 0 | 0 | 0 | 0 | 0.5 | Yes | 7.2.7 |
| S-2234-226 | 0 | 0 | 0 | 0 | 1.9 | Yes | 7.2.7 |
| S-2234-227 | 0 | 0 | 0 | 0 | 0.2 | Yes | 7.2.7 |
| S-2234-228 | 0 | 0 | 0 | 0 | 0.2 | Yes | 7.2.7 |
| S-2234-229 | 0 | 0 | 0 | 0 | 0.9 | Yes | 7.3.1 |
| S-2234-230 | 30.8 | 13.3 | 37.7 | 183.5 | 27.5 | Yes | Rescinded- Rule 4320 Requirements |
| S-2234-231 | 0 | 0 | 0 | 0 | 1.1 | Yes | 7.2.7 |
| S-2234-232 | 0 | 0 | 0 | 0 | 0.1 | Yes | 7.2.7 |
| S-2234-233 | 0 | 0 | 0 | 0 | 0.2 | Yes | 7.3.1 |
| S-2234-234 | 0 | 0 | 0 | 0 | 0.4 | Yes | 7.3.1 |
| S-2234-235 | 18054.0 | 714.2 | 2124.0 | 98235.0 | 16726.7 | Yes | 1.4.2 |
| S-2234-236 | 0 | 0 | 0 | 0 | 0.0 | Yes | 7.3.1 |
| S-2234-237 | 0 | 0 | 0 | 0 | 0.0 | Yes | 7.3.1 |
| S-2234-238 | 0 | 0 | 0 | 0 | 0.0 | Yes | 7.3.1 |
| S-2234-239 | 0 | 0 | 0 | 0 | 0.4 | Yes | 7.3.1 |
| S-2234-240 | 24.9 | 0 | 1.2 | 11.0 | 0.7 | Yes | 3.1.1 |

*BACT Guidelines

1.4.2 Waste Gas Flare Incinerating Produced Gas

3.1.1 Emergency Diesel I.C. Engine

7.2.7 Natural Gas Processing Plant – Valves, Connectors, and Compressor and Pump Seals (Subject to Rule 4409) ≤ 100 MMscf/day

7.3.1 Petroleum and Petrochemical Production – Fixed Roof Organic Liquid Storage or Processing Tank, < 5,000 bbl tank capacity

3. Top-Down BACT Analysis

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

BACT Analyses are included in **Attachment IX**.

B. Offsets

1. Offset Applicability

Pursuant to Section 4.5.3, offset requirements shall be triggered on a pollutant by pollutant basis and shall be required if the Post Project Stationary Source Potential to Emit (SSPE2) equals to or exceeds the offset threshold levels in Table 4-1 of Rule 2201.

The following table compares the post-project facility-wide annual emissions in order to determine if offsets will be required for this project.

| Offset Determination (lb/year) | | | | | |
|---------------------------------------|-----------------|-----------------|------------------|----------|---------|
| | NO _x | SO _x | PM ₁₀ | CO | VOC |
| Post Project SSPE (SSPE2) | >20,000 | >54,750 | >29,200 | >200,000 | >20,000 |
| Offset Threshold | 20,000 | 54,750 | 29,200 | 200,000 | 20,000 |
| Offsets triggered? | Yes | Yes | Yes | Yes | Yes |

2. Quantity of Offsets Required

As seen above, the SSPE2 is greater than the offset thresholds for NO_x, SO_x, PM₁₀, CO, and VOC; therefore offset calculations will be required for this project.

Per Sections 4.7.1 and 4.7.3, the quantity of offsets in pounds per year for NO_x is calculated as follows for sources with an SSPE1 greater than the offset threshold levels before implementing the project being evaluated.

$$\text{Offsets Required (lb/year)} = (\Sigma[\text{PE2} - \text{BE}] + \text{ICCE}) \times \text{DOR, for all new or modified emissions units in the project,}$$

Where,

PE2 = Post Project Potential to Emit, (lb/year)

BE = Baseline Emissions, (lb/year)

ICCE = Increase in Cargo Carrier Emissions, (lb/year)

DOR = Distance Offset Ratio, determined pursuant to Section 4.8

BE = Pre-project Potential to Emit for:

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

otherwise,

BE = Historic Actual Emissions (HAE)

The facility is proposing to install a new emissions units; therefore Baseline Emissions are equal to zero. Also, there are no increases in cargo carrier emissions. Offsets can be determined as follows:

Offsets Required (lb/year) = PE2 x DOR

Non Combustion Units

Offsets Required (lb/year) = PE2

| Permit unit | PE2 (lb/day) | IPE (lb/day)* | IPE (lb/yr) |
|-------------|--------------|---------------|-------------|
| S-2234-216 | 2.6 | 2.6 | 963 |
| S-2234-217 | 0.2 | 0 | 0 |
| S-2234-219 | 0.6 | 0.6 | 208 |
| S-2234-220 | 0.4 | 0 | 0 |
| S-2234-221 | 0.5 | 0 | 0 |
| S-2234-222 | 0.2 | 0 | 0 |
| S-2234-223 | 0.1 | 0 | 0 |
| S-2234-224 | 0.7 | 0.7 | 264 |
| S-2234-225 | 0.5 | 0 | 0 |
| S-2234-226 | 1.9 | 1.9 | 685 |
| S-2234-227 | 0.2 | 0 | 0 |
| S-2234-228 | 0.2 | 0 | 0 |
| S-2234-229 | 0.9 | 0.9 | 341 |
| S-2234-231 | 1.1 | 1.1 | 415 |
| S-2234-232 | 0.1 | 0 | 0 |
| S-2234-233 | 0.2 | 0 | 0 |
| S-2234-234 | 0.4 | 0 | 0 |
| S-2234-236 | 0.0 | 0 | 0 |
| S-2234-237 | 0.0 | 0 | 0 |
| S-2234-238 | 0.0 | 0 | 0 |
| S-2234-239 | 0.4 | 0 | 0 |
| Total | | | 2876 |

*District policy APR 1130 states that IPEs less than or equal to 0.5 lb/day to be set to zero for purposes of providing emission offsets. This change allows an IPE that rounds to 0.5 lb/day, e.g. less than 0.54 lb/day, to be set to zero for purposes of providing emission offsets.

S-2234-218 (O2 heater)

NOx: 1196 lb/yr
 SOx: 460 lb/yr
 PM10: 1298 lb/yr
 CO: 6,320 lb/yr
 VOC: 1033 lb/yr (940 lb/yr combustion + 93 lb/yr fugitives)

S-2234-230 (hot oil heater)

NOx: 11,226 lb/yr
 SOx: 4871 lb/yr
 PM10: 13,761 lb/yr
 CO: 66,996 lb/yr
 VOC: 10,028 (9959 lb/yr combustion + 69 lb/yr fugitives)

S-2234-235 and '-240 (emergency flare and IC engine)

Emergency equipment is exempt from offsets as per Rule 2201 Section 4.6.2.

NOx

Facility has proposed to withdraw ERC S-2824-2 with reductions occurring at source S-2234. However the project is a Federal Major modification, therefore the correct offset ratio is 1.5:1 (Section 4.8.1 Rule 2201), the amount of NOx ERCs that need to be withdrawn is:

$$\begin{aligned} \text{Offsets Required (lb/year)} &= [1,196 ('-218) \\ &+ 11,226 ('230)] \times 1.5 \\ &= \underline{18,633 \text{ lb NOx/year}} \end{aligned}$$

| | | | | |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--|
| DOR 1.0:1 | | | | |
| <u>1st Quarter</u> | <u>2nd Quarter</u> | <u>3rd Quarter</u> | <u>4th Quarter</u> | |
| 3106 | 3106 | 3106 | 3106 | |

| | | | | |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--|
| DOR 1.5:1* | | | | |
| <u>1st Quarter</u> | <u>2nd Quarter</u> | <u>3rd Quarter</u> | <u>4th Quarter</u> | |
| 4658 | 4658 | 4658 | 4658 | |

*quantities of ERCs reserved in PAS

The ERC certificate S-2824-2 has available quarterly NOx credits as follows:

| | | | | |
|--------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| <u>Certificate</u> | <u>1st Quarter</u> | <u>2nd Quarter</u> | <u>3rd Quarter</u> | <u>4th Quarter</u> |
| ERC #S-2824-2 | 29,265 | 29,810 | 30,356 | 30,356 |

SOx

Facility has proposed to withdraw ERC N-771-5 with reductions occurring at another stationary source greater than 15 miles from S-2234. Therefore the correct offset ratio is 1.5:1 (Section 4.8.3 Rule 2201), the amount of SOx ERCs that need to be withdrawn is:

$$\begin{aligned} \text{Offsets Required (lb/year)} &= 460 ('-218) \\ &+ 4871 ('230)] \times 1.5 \\ &= \underline{7,997 \text{ lb SOx/year}} \end{aligned}$$

Calculating the appropriate quarterly emissions to be offset is as follows:

| | | | | |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--|
| DOR 1.0:1 | | | | |
| <u>1st Quarter</u> | <u>2nd Quarter</u> | <u>3rd Quarter</u> | <u>4th Quarter</u> | |
| 1333 | 1333 | 1333 | 1333 | |

| | | | | |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--|
| DOR 1.5:1 | | | | |
| <u>1st Quarter</u> | <u>2nd Quarter</u> | <u>3rd Quarter</u> | <u>4th Quarter</u> | |
| 1999 | 1999 | 1999 | 1999 | |

*quantities of ERCs reserved in PAS

PM10

Facility has proposed to withdraw ERC N-771-5 with reductions occurring at another stationary source greater than 15 miles from S-2234, at an interpollutant offset ratio of 1.0:1 (Draft District Policy APR 14XX).

$$\begin{aligned} \text{Offsets Required (lb/year)} &= 1,298 \text{ ('-218)} \\ &+ 13,761 \text{ ('-230)]} \times 1.5 \times 1.0 \\ &= \underline{22,589 \text{ lb PM10/year}} \end{aligned}$$

Calculating the appropriate quarterly emissions to be offset is as follows:

| | | | |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| DOR 1.0:1 | | | |
| <u>1st Quarter</u> | <u>2nd Quarter</u> | <u>3rd Quarter</u> | <u>4th Quarter</u> |
| 3765 | 3765 | 3765 | 3765 |

| | | | |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| DOR 1.5:1 | | | |
| <u>1st Quarter</u> | <u>2nd Quarter</u> | <u>3rd Quarter</u> | <u>4th Quarter</u> |
| 5647 | 5647 | 5647 | 5647 |

*quantities of ERCs reserved in PAS

The ERC certificate N-771-5 has available quarterly SOx credits as follows:

| | | | | |
|--------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| | | | | |
| <u>Certificate</u> | <u>1st Quarter</u> | <u>2nd Quarter</u> | <u>3rd Quarter</u> | <u>4th Quarter</u> |
| ERC #N-771-5 | 88,068 | 87,945 | 37,822 | 37,822 |

Therefore sufficient offsets have been provided for both SOx and PM10.

CO

Section 4.6.1 of Rule 2201 states that emissions offsets are not required for increases in carbon monoxide in attainment areas provided the applicant demonstrates to the satisfaction of the APCO that the Ambient Air Quality Standards are not violated in the areas to be affected, and such emissions will be consistent with Reasonable Further Progress, and will not cause or contribute to a violation of Ambient Air Quality Standards. The District performed an Ambient Air Quality Analysis (discussed later) and determined that this project will not result in or contribute to a violation of an Ambient Air Quality Standard for CO (see **Attachment X**). Therefore, CO offsets are not required for this project.

VOCs

Facility has proposed to withdraw ERC S-2822-1 with reductions occurring at OXY's gas plant stationary source S-2234. However, the project is a Federal Major modification; therefore the correct offset ratio is 1.5:1 (Section 4.8.1 Rule 2201), the amount of VOC ERCs that need to be withdrawn is:

$$\begin{aligned} \text{Offsets Required (lb/year)} &= [2876 \text{ (fugitive emissions)} \\ &+ 940 \text{ ('-218)} \\ &+ 9959 \text{ ('-230)]} \times 1.5 \\ &= \underline{20,662 \text{ lb VOC/year}} \end{aligned}$$

| | | | | |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--|
| DOR 1.0:1 | | | | |
| <u>1st Quarter</u> | <u>2nd Quarter</u> | <u>3rd Quarter</u> | <u>4th Quarter</u> | |
| 3,444 | 3,444 | 3,444 | 3,444 | |

| | | | | |
|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--|
| DOR 2.629:1* | | | | |
| <u>1st Quarter</u> | <u>2nd Quarter</u> | <u>3rd Quarter</u> | <u>4th Quarter</u> | |
| 5,166 | 5,166 | 5,166 | 5,166 | |

*quantities of ERCs reserved in PAS

The ERC certificate S-2822-1 has available quarterly VOC credits as follows:

| | | | | |
|--------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| <u>Certificate</u> | <u>1st Quarter</u> | <u>2nd Quarter</u> | <u>3rd Quarter</u> | <u>4th Quarter</u> |
| ERC #S-2822-1 | 83,976 | 85,157 | 86,339 | 86,339 |

As seen above, the facility has proposed sufficient credits to fully offset the quarterly emission increases associated with this project.

Proposed Rule 2201 (offset) Conditions:

Noncombustion Units (unit -216 example)

- Prior to operating equipment under this Authority to Construct, permittee shall surrender VOC emission reduction credits for the following quantity of emissions: 1st quarter - 241 lb, 2nd quarter - 241 lb, 3rd quarter - 241 lb, and fourth quarter - 241 lb. Offsets shall be provided at the applicable offset ratio specified in Table 4-2 of Rule 2201 (as amended 12/18/08). [District Rule 2201]
- ERC Certificate Number S-2822-1 (or a certificate split from this certificate) shall be used to supply the required offsets, unless a revised offsetting proposal is received and approved by the District, upon which this Authority to Construct shall be reissued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to reissuance of this Authority to Construct. [District Rule 2201]

S-2234-218 (O2 Heater)

- Prior to operating under this Authority to Construct, permittee shall surrender emission reduction credits for the following quantities of emissions: NOx, 299 lb/quarter; SOx, 115 lb/quarter; PM10, 325 lb/quarter; VOC, 259 lb/quarter. Offset shall be provided at the applicable offset ratio specified in Table 4-2 of Rule 2201 (as amended 12/18/08). Offsets for PM10 shall be provided at a SOx:PM10 interpollutant ratio of 1.0:1. [District Rule 2201] Y
- ERC Certificate Numbers S-2824-2 (NOx), N-771-5 (SOx), N-771-5 (PM10), S-2822-1 (VOC), (or certificates split from these certificates) shall be used to supply the required offsets, unless a revised offsetting proposal is received and approved by the District, upon which this Authority to Construct shall be reissued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to reissuance of this Authority to Construct. [District Rule 2201] Y

S-2234-230 (Hot Oil Heater)

- Prior to operating under this Authority to Construct, permittee shall surrender emission reduction credits for the following quantities of emissions: NOx, 2807 lb/quarter; SOx, 1218 lb/quarter; PM10, 3440 lb/quarter; VOC, 2507 lb/quarter. Offset shall be provided at the applicable offset ratio specified in Table 4-2 of Rule 2201 (as amended 9/21/2006). Offsets for PM10 shall be provided at a SOx:PM10 interpollutant ratio of 1.0:1. [District Rule 2201] Y

- ERC Certificate Numbers S-2824-2 (NOx), S-771-5 (SOx), S-771-5 (PM10), S-2822-1 (VOC), (or certificates split from these certificates) shall be used to supply the required offsets, unless a revised offsetting proposal is received and approved by the District, upon which this Authority to Construct shall be reissued, administratively specifying the new offsetting proposal. Original public noticing requirements, if any, shall be duplicated prior to reissuance of this Authority to Construct. [District Rule 2201] Y

C. Public Notification

1. Applicability

Public noticing is required for:

- a. Any new Major Source, which is a new facility that is also a Major Source,
- b. SB 288/ Federal Major Modifications,
- c. Any new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any one pollutant,
- d. Any project which results in the offset thresholds being surpassed, and/or
- e. Any project with an SSIPE of greater than 20,000 lb/year for any pollutant.

As demonstrated in VII.C.8, this project constitutes a Federal Major Modification. Therefore public noticing is required.

2. Public Notice Action

As discussed above, this project is a Federal Major Modification and therefore public noticing is required. Therefore, public notice documents will be submitted to the California Air Resources Board (CARB) and a public notice will be published in a local newspaper of general circulation prior to the issuance of the ATC for this equipment.

D. Daily Emission Limits (DELs)

Daily Emissions Limitations (DELs) and other enforceable conditions are required by Section 3.15 to restrict a unit's maximum daily emissions, to a level at or below the emissions associated with the maximum design capacity. Per Sections 3.15.1 and 3.15.2, the DEL must be contained in the latest ATC and contained in or enforced by the latest PTO and enforceable, in a practicable manner, on a daily basis. DELs are also required to enforce the applicability of BACT.

Proposed Rule 2201 (DEL) Conditions:

S-2234-217 through '-239 (Fugitive Emissions only)

Permittee shall maintain with the permit accurate fugitive component counts and resulting emissions calculated using (ALR) equations for a 2,000 ppmv leak threshold included in EPA, "Protocol for Estimating Leak Emissions" (EPA - 453/R-95-017, November 1995). [District Rule 2201] Y

A leak-free condition is defined as a condition without a gas leak or a liquid leak. A gas leak is defined as a reading in excess of 2,000 parts per million by volume (ppmv), as methane, above background on a portable hydrocarbon detection instrument that is calibrated to methane in accordance with the procedures specified in

EPA Test Method 21. A liquid leak is defined as the dripping of organic liquid at a rate more than 3 drops per minute. A gas or liquid leak is a violation of this permit and shall be reported as a deviation. [District Rule 2201] Y

BACT Requirement

Any leak greater than 500 ppmv for pump seals, and compressor seals and 100 ppmv for valves and connectors, when measured with a portable hydrocarbon detection instrument calibrated with methane in accordance with EPA Method 21 or leaking at a rate of greater than 3 drops of liquid per minute, shall be repaired in a manner consistent with the procedures specified in Rule 4409 (adopted April 20, 2005). This requirement shall not apply to inaccessible or unsafe-to-access components as identified in the revised Operator Management Plan required by Rule 4409. [District Rule 2201 and Rule 4409] Y

VOC fugitive emissions shall not exceed XX lb/day. [District Rule 2201] Y

S-2234-218 (O₂ Removal Heater)

Sulfur content of natural gas shall not exceed 1.0 gr S/100 scf. [District Rule 2201] Y

Emissions rates from the unit shall not exceed any of the following limits: 6 ppmvd NOx @ 3% O₂ or 0.007 lb/MMBtu, 0.0076 lb-PM10/MMBtu, 50 ppmvd CO @ 3% O₂ or 0.037 lb-CO/MMBtu, or 0.0055 lb-VOC/MMBtu. [District Rules 2201, 4305, 4306, and 4320] Y

S-2234-230 (Hot Oil Heater)

Sulfur content of natural gas shall not exceed 1.0 gr S/100 scf. [District Rule 2201] Y

Emissions rates from the unit shall not exceed any of the following limits: 5 ppmvd NOx @ 3% O₂ or 0.006 lb/MMBtu, 0.0076 lb-PM10/MMBtu, 50 ppmvd CO @ 3% O₂ or 0.037 lb-CO/MMBtu, or 0.0055 lb-VOC/MMBtu. [District Rules 2201, 4305, 4306, and 4320]

S-2234-233 (Amine Sump Tank)

Monthly average daily throughput shall not exceed 132 gallons per day. [District Rule 2201] Y

True Vapor Pressure (TVP) of any organic liquid introduced to or stored in the sump shall not exceed 0.5 psia. [District Rule 2201] Y

S-2234-234 (Glycol Sump)

Monthly average daily throughput shall not exceed 197 gallons per day. [District Rule 2201] Y

True Vapor Pressure (TVP) of any organic liquid introduced to or stored in the sump shall not exceed 0.5 psia. [District Rule 2201] N

S-2234-235 (Emergency Flare)

Flare shall be equipped with waste gas volume flow metering system. [District Rule 2201] N

When combustible gases are vented to the flare, flare shall be equipped with a heat sensing device to detect the presence of a propane or natural gas pilot flame which is burning at all times. [District Rule 4311] N

Maximum amount of waste gas combusted shall not exceed 11,063 MMBtu/hour. [District Rule 2201] N

Measured heating value and quantity of gas flared shall be used to determine compliance with heat input limits. [District Rule 2201] N

Sulfur content of flared gas shall not exceed 1.0 gr/100 scf. [District Rule 2201] N

Flare emissions shall not exceed any of the following: 0.068 lb-NOx/MMBtu, 0.008 lb-PM10/MMBtu, 0.370 lb-CO/MMBtu, or 0.063 lb-VOC/MMBtu. [District Rule 2201] N

S-2234-236 through '238 (Vapor Controlled Amine, Produced Water and Fresh Water Tanks)

There shall be no leaks exceeding 2,000 ppmv from fugitive emissions components associated with organic liquid storage tanks. [District Rule 2201] Y

Permittee shall maintain with the permit accurate fugitive component counts and resulting emissions calculated using (ALR) equations for a 2,000 ppmv leak threshold included in EPA, "Protocol for Estimating Leak Emissions" (EPA - 453/R-95-017, November 1995). [District Rule 2201] Y

VOC fugitive emissions shall not exceed XX lb/day. [District Rule 2201] Y

Gas-leak concentration shall be determined by EPA Method 21. [District Rule 2201] Y

Tank shall be equipped with a vapor recovery system consisting of a closed vent system that collects all VOCs from the storage tank, and a VOC control device. The vapor recovery system shall be APCO-approved and maintained in gas-tight condition. The VOC control device shall be either of the following: a vapor return or condensation system that connects to a gas pipeline distribution system, or an approved VOC destruction device that reduces the inlet VOC emissions by at least 99% by weight as determined by the test method specified in Section 6.4.7. [District Rule 2201 and 4623] Y

The control efficiency of any VOC control device, measured and calculated as carbon, shall be determined by EPA Method 25, except when the outlet concentration must be below 50 ppm in order to meet the standard, in which case EPA Method 25a may be used. EPA Method 18 may be used in lieu of EPA Method 25 or EPA Method 25a provided the identity and approximate concentrations of the analytes/compounds in the sample gas stream are known before analysis with the gas chromatograph and the gas chromatograph is calibrated for each of those known analyte/compound to ensure that the VOC concentrations are neither under- or over-reported. [District Rules 2201 and 4623] Y

All piping, valves, and fittings shall be constructed and maintained in a leak-free condition. [District Rules 2201 and 4623] Y

A leak-free condition is defined as a condition without a gas leak. A gas leak is defined as a reading in excess of 10,000 ppmv, above background, as measured by a portable hydrocarbon detection instrument in accordance with the procedures specified in EPA Test Method 21. A reading in excess of 10,000 ppmv above background is a violation of this permit and Rule 4623 and shall be reported as a deviation. [District Rules 2201 and 4623] Y

Any tank gauging or sampling device on a tank vented to the vapor recovery system shall be equipped with a leak-free cover which shall be closed at all times except during gauging or sampling. [District Rules 2201 and 4623] Y

Operator shall visually inspect tank shell, hatches, seals, seams, cable seals, valves, flanges, connectors, and any other piping components directly affixed to the tank and within five feet of the tank at least once per year for liquid leaks, and with a portable hydrocarbon detection instrument conducted in accordance with EPA Method 21 for gas leaks. Operator shall also visually or ultrasonically inspect as appropriate, the external shell and roof of the uninsulated tank for structural integrity annually. [District Rules 2210 and 4623] Y

Upon detection of a liquid leak, defined as a leak rate of greater than or equal to 30 drops per minute, operator shall repair the leak within 8 hours. For leaks with a liquid leak rate of between 3 and 30 drops per minute, the leaking component shall be repaired within 24 hours after detection. [District Rules 2201 and 4623] Y

Upon detection of a gas leak, defined as a VOC concentration of greater than 10,000 ppmv measured in accordance with EPA Method 21, operator shall take on of the following actions: 1) eliminate the leak within 8

hours after detection; or 2) if the leak cannot be eliminated, then minimize the leak to the lowest possible level within 8 hours after detection by using best maintenance practices, and eliminate the leak within 48 hours after minimization. In no event shall the total time to minimize and eliminate a leak exceed 56 hours after detection [District Rules 2201 and 4623] Y

Components found to be leaking either liquids or gases shall be immediately affixed with a tag showing the component to be leaking. Operator shall maintain records of the liquid or gas leak detection readings, date/time the leak was discovered, and date/time the component was repaired to a leak-free condition. [District Rules 2201 and 4623] Y

Leaking components that have been discovered by the operator that have been immediately tagged and repaired within the timeframes specified in District Rule 4623, Table 3 shall not constitute a violation of this rule. Leaking components as defined by District Rule 4623 discovered by District staff that were not previously identified and/or tagged by the operator, and/or any leaks that were not repaired within the timeframes specified in District Rule 4623, Table 3 shall constitute a violation of this rule. [District Rules 2201 and 4623] Y

If a component type for the tank is found to leak during an annual inspection, operator shall conduct quarterly inspections of that component type on the tank for four consecutive quarters. If no components are found to leak after four consecutive quarters, the operator may revert to annual inspections. [District Rules 2201 and 4623] Y

Any component found to be leaking on two consecutive annual inspections is in violation of the District Rule 4623, even if it is under the voluntary inspection and maintenance program. [District Rule 2201] Y

Operator shall maintain an inspection log containing the following 1) Type of component leaking; 2) Date and time of leak detection, and method of detection; 3) Date and time of leak repair, and emission level of recheck after leak is repaired; 4) Method used to minimize the leak to lowest possible level within 8 hours after detection. [District Rules 2201 and 4623] Y

S-2234-239-0 (Slop Oil Tank)

This tank shall only store, place, or hold organic liquid with a true vapor pressure (TVP) of less than 0.5 psia under all storage conditions. [District Rules 2201 and 4623] Y

Monthly average daily throughput shall not exceed 660 gallons per day. [District Rule 2201] Y

S-2234-240 (Emergency ICE)

Daily Emissions Limits (DELs) are required to enforce the applicability of BACT. For this emergency IC engine, the DELs are stated in the form of emission factors, the maximum engine horsepower rating, and the maximum operational time of 24 hours per day.

- Emissions from this IC engine shall not exceed any of the following limits: 2.685 g-NO_x/bhp-hr, 1.193 g-CO/bhp-hr, or 0.075 g-VOC/bhp-hr. [District Rules 2201, 4701, and 4702 and 13 CCR 2423 and 17 CCR 93115]
- The PM₁₀ emissions rate shall not exceed 0.127 g/bhp-hr based on US EPA certification using ISO 8178 test procedure. [District Rules 2201 and 4102 and 13 CCR 2423]

In addition, the DEL for SO_x is established by the sulfur content of the fuel being combusted in the engine. Therefore, the following condition will be listed on the ATC to ensure compliance:

- {3395} Only CARB certified diesel fuel containing not more than 0.0015% sulfur by weight is to be used. [District Rules 2201 and 4801 and 17 CCR 93115]

E. Compliance Assurance

1. Source Testing

S-2234-218 and '-230 (O₂ Removal and Hot Oil Heaters)

The 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 4305, 4306, and 4320 will be discussed in Section VIII, District Rule 4320 of this evaluation.

2. Monitoring

S-2234-216 through '-239

Permittee shall maintain accurate component count and emissions calculated using the Average Leak Rate (ALR) equations for a 2,000 ppmv leak threshold included in EPA, "Protocol for Estimating Leak Emissions" (EPA - 453/R-95-017, November 1995). [District Rule 2201] Y

S-2234-218 and '-230 (O₂ Removal and Hot Oil Heaters)

As required by *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*, this unit is subject to monitoring requirements. Monitoring requirements, in accordance with District Rules 4305, 4306, and 4320 will be discussed in Section VIII, District Rule 4320 of this evaluation.

Sulfur monitoring conditions are as follows:

Permittee shall measure sulfur content of gas used as fuel in heater within 60 days of startup and at least once every year thereafter. Such data shall be submitted to the District within 60 days of sample collection. [District Rules 2201 and 4801] N

Permittee shall determine sulfur content of gas flared using ASTM method D3246 or double GC for H₂S and mercaptans. [District Rule 2201] N

S-2234-235 (Emergency Flare)

Sulfur monitoring conditions are as follows:

Permittee shall measure sulfur content of gas incinerated in flare within 60 days of startup and at least once every year thereafter. Such data shall be submitted to the District within 60 days of sample collection. [District Rules 2201 and 4801] N

Permittee shall determine sulfur content of gas flared using ASTM method D3246 or double GC for H₂S and mercaptans. [District Rule 2201] N

The higher heating value of the flared gas shall be monitored at least quarterly. [District Rules 1070 and 2201] N

3. Recordkeeping

S-2234-218 and '-230 (O2 Removal and Hot Oil Heaters)

As required by *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*, this unit is subject to recordkeeping requirements. Recordkeeping requirements, in accordance with District Rules 4305, 4306, and 4320 will be discussed in Section VIII, District Rule 4320 of this evaluation.

S-2234-235 (Emergency Flare)

The permittee shall maintain monthly records of emergency and non-emergency operation. Records shall include the number of hours of emergency operation, the date and number of hours of all testing and maintenance operations, and the purpose of the operation. [District Rule 2201] Y

S-2234-216 through '-240

The following permit condition will be listed on permit as follows:

{2983} 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, 4306, and 4320]

4. Reporting

S-2234-216 through '-239

A leak-free condition is defined as a condition without a gas leak or a liquid leak. A gas leak is defined as a reading in excess of 2,000 parts per million by volume (ppmv), as methane, above background on a portable hydrocarbon detection instrument that is calibrated to methane in accordance with the procedures specified in EPA Test Method 21. A liquid leak is defined as the dripping of organic liquid at a rate more than 3 drops per minute. A gas or liquid leak is a violation of this permit and shall be reported as a deviation. [District Rule 2201] Y

F. Ambient Air Quality Analysis

Section 4.14.1 of this Rule requires that an ambient air quality analysis (AAQA) be conducted for the purpose of determining whether a new or modified Stationary Source will cause or make worse a violation of an air quality standard. The Technical Services Division of the SJVAPCD conducted the required analysis.

As shown by the AAQA summary sheet (**Attachment X**) the proposed equipment will not cause a violation of an air quality standard for NO_x, CO, SO_x, or PM₁₀

The results from the Criteria Pollutant Modeling are as follows:

Criteria Pollutant Modeling Results*

| Diesel ICE and Combustion Equipment | 1 Hour | 3 Hours | 8 Hours. | 24 Hours | Annual |
|-------------------------------------|--------|---------|----------|-------------------|-------------------|
| CO | Pass | X | Pass | X | X |
| NO _x | Pass | X | X | X | Pass |
| SO _x | Pass | Pass | X | Pass | Pass |
| PM ₁₀ | X | X | X | Pass ¹ | Pass ¹ |

¹The criteria pollutants are below EPA's level of significance as found in 40 CFR Part 51.165 (b)(2).

G. Compliance Certification

Section 4.15.2 of this Rule requires the owner of a new Major Source or a source undergoing a SB 288/Federal Major Modification to demonstrate to the satisfaction of the District that all other Major Sources owned by such person and operating in California are in compliance or are on a schedule for compliance with all applicable emission limitations and standards. As discussed in Sections VIII-Rule 2201-C.1.a and VIII-Rule 2201-C.1.b, this project does constitute a SB 288/Federal Major Modification, therefore this requirement is applicable. The Statewide Compliance Certification and Title V Compliance Certification forms are included in **Attachment XI**.

H. Alternative Siting Analysis

Alternative siting analysis is required for any project, which constitutes a New Major Source or a Federal Major Modification. The current project is a Federal Major Modification and occurs at an existing gas plant.

During the conceptual phase of the project, pursuant to requirements outlined in the federal Clean Air Act, OEHI reviewed and considered various options in relation to the location and size of the proposed facility. The decision to proceed with the existing plan and location was based on economics, reliability, support facilities, existing infrastructure, as well as several issues related to health, safety, and environmental concerns.

The proposed location is adjacent to existing gas delivery facilities at Elk Hills. The proposed facility will be constructed on previously disturbed land alleviating environmental concerns related to endangered species at Elk Hills. As an adjacent operation to existing facilities, the plant will be capable of utilizing existing infrastructure for the delivery of gas thus further reducing the potential for land disturbance in the area. Furthermore, as this will be a process safety management (PSM) facility, the emergency management systems in place at the existing plants will be carried over to the new plant. This logical nexus of PSM facilities provides a seamless interface of existing programs wherein the overlap of programs lends itself to safer facility overall.

Currently, there is no other location at Elk Hills suitable for siting a new gas plant. As discussed above, any other location would require all new infrastructure resulting in monumental project expenses as well as sizable land disturbance issues associated with the new plant and associated delivery and sales pipeline construction and corridors. The proposed location will alleviate these potential concerns.

Another aspect of the conceptual design was the development of several alternatives. These included a plant with reduced throughput capacity, a plant with two trains, a plant with increased throughput capacity, and a do nothing alternative. The reservoir management team developed and reviewed a 10 and 20 - year horizon at Elk Hills. From this exercise coupled with knowledge of the reservoir characteristics at Elk Hills, it was determined that the do nothing alternative was not an option. Further, a plant with reduced throughput capacity would not provide sufficient gas handling capabilities. The twin-train system was considered. However, due to economic constraints associated with the construction, management, and maintenance of the twin system, this alternative was rejected in lieu of the current design.

Rule 2520 Federally Mandated Operating Permits

This facility is subject to this Rule, and has received their Title V Operating Permit. Section 3.29 defines a significant permit modification as a “permit amendment that does not qualify as a minor permit modification or administrative amendment.”

The project is Federal Major Modification and therefore is also a Title V Significant Modification. 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 may construct/operate under the ATC upon submittal of the Title V administrative amendment/minor modification application.

Rule 4001 New Source Performance Standards (NSPS)

40 CFR Part 60, Subpart Kb: Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984

Pursuant to 40 CFR Part 60 Section 60.110b(a), *Applicability And Designation Of Affected Facility*, except as provided in paragraph (b) of this section, the affected facility to which this subpart applies is each storage vessel with a capacity greater than or equal to 75 cubic meters (m^3) (equivalent to 19,813 gal, 472 bbls) that is used to store volatile organic liquids (VOL) for which construction, reconstruction, or modification is commenced after July 23, 1984.

Pursuant to 40 CFR Part 60 Section 60.110b(b), this subpart does not apply to:

(a) storage vessels with a capacity greater than or equal to $151 m^3$ (equivalent to 39,890 gal, 950 bbls) storing a liquid with a maximum True Vapor Pressure (TVP) less than 3.5 kilopascals (kPa) (equivalent to 0.5 psi) or

(b) with a capacity greater than or equal to $75 m^3$ (equivalent to 19,813 gal, 472 bbls) but less than $151 m^3$ (equivalent to 39,890 gal, 950 bbls) storing a liquid with a maximum true vapor pressure less than 15.0 kPa (equivalent to 2.2 psi).

| Permit Units | Tank Capacity (gal) | TVP (psia) | TVP Thresholds (psia) |
|--------------------------------|---------------------|------------|-----------------------|
| S-2234-229 NGL Tank | 16,250 gallons | Na | Exempt |
| S-2234-233 Amine Sump | 2,000 gallons | Na | Exempt |
| S-2234-234 Glycol Sump | 3,000 gallons | Na | Exempt |
| S-2234-236 Amine Storage Tank | 300 bbls | Na | Exempt |
| S-2234-237 Fresh Water Tank | 300 bbls | Na | Exempt |
| S-2234-238 Produced Water Tank | 500 bbls | <0.5 | 2.2 |
| S-2234-239 Slop Oil Tank | 500 bbls | < 0.5 | 2.2 |

The NGL tank, Amine Sump, Glycol Sump, Amine Storage Tank, and Fresh Water Tank are less than 19,813 gallons (472 bbls) in capacity and are therefore exempt from the requirements of 40 CFR Part 60, Subpart Kb.

The produced water and slop oil tanks exceed 19,813 gallons in capacity and therefore the following permit condition will be applicable (for exemption from the 40 CFR Part 60, Subpart Kb NSPS requirements):

The True Vapor Pressure (TVP) of liquid introduced, placed, processed or stored in the tank shall be less than 0.5 psi. [District Rules 2201 and 4623, and 40 CFR 60.110b(b)]

Subpart KKK—Standards of Performance for Equipment Leaks of VOC From Onshore Natural Gas Processing Plants.

40 CFR Part 60, Subpart KKK (40 CFR 60.630 to 60.636) applies to onshore natural gas processing plants. These general requirements and those of 40 CFR Subpart VV, establish leak standards for each category of component (valves, flanges, pressure relief valves etc.) and specify procedures and timelines for repairing leaks. The following condition is included on the ATCs:

Permittee shall comply with applicable monitoring, inspection, maintenance, and recordkeeping, and reporting requirements of 40 CFR Part 60 Subpart KKK and Rule 4409. [40 CFR Part 60 Subpart KKK and District Rule 4409] N

Note that tanks are not subject to 40 CFR KKK because they are not part of a process unit and not used for the extraction of natural gas liquids. Compliance is expected.

Rule 4101 Visible Emissions

Per Section 5.0, 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 IC engine, O2 removal heater, and hot oil heater are fired solely on natural gas, visible emissions are not expected to exceed Ringelmann 1 or 20% opacity. Compliance is expected.

Rule 4102 Nuisance

Section 4.0 prohibits discharge of air contaminants which could cause injury, detriment, nuisance or annoyance to the public. Public nuisance conditions are not expected as a result of these operations, provided the equipment is well maintained. Therefore, compliance with this rule is expected.

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.

A. An HRA is not required for a project with a total facility prioritization score of less than or equal to one. According to the Technical Services Memo for this project (**Attachment X**), Prioritization Score exceeded 1.0 for the facility. The RMR summary follows.

B. RMR SUMMARY

| RMR Summary | | | | | | | | | | |
|---|---------------------------------------|--|------------------------------------|--------------------------------|---------------------------------|---------------------------|-----------------------------------|--------------------------------|-----------------------|------------------------|
| Categories | Fugitive Emissions³ | O₂ Heater (Unit 218-0) | Hot Oil Heater (Unit 230-0) | Amine Sump (Unit 233-0) | Glycol Sump (Unit 234-0) | Flare (Unit 235-0) | Slop Oil Tank (Unit 239-0) | Diesel ICE (Unit 240-0) | Project Totals | Facility Totals |
| Prioritization Score | 0.00 | 0.01 | 0.02 | 0.00 | 0.00 | 15.00 | 0.00 | N/A ¹ | >1.0 | >1.0 |
| Acute Hazard Index | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | N/A ² | 0.01 | 0.15 |
| Chronic Hazard Index | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | N/A ² | 0.00 | 0.04 |
| Maximum Individual Cancer Risk (10⁻⁶) | 0.00 | 0.33 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.34 | 3.25 |
| T-BACT Required? | No | No | No | No | No | No | No | No | | |
| Special Permit Conditions? | No | No | No | No | No | No | No | Yes | | |

- 1 Prioritization for this unit was not conducted since it has been determined that all diesel-fired IC engines will result in a prioritization score greater than 1.0.
- 2 Acute and Chronic Hazard Indices were not calculated since there is not risk factor or the risk factor is so low that it has been determined to be insignificant for this type of unit.
- 3 These fugitive emissions are from the entire facility, and for this project, they are arbitrarily assigned to unit 216-0.

Proposed Permit Conditions

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

Unit # 240-0

1. The PM10 emissions rate shall not exceed 0.127 g/bhp-hr based on US EPA certification using ISO 8178 test procedure. [District Rules 2201]

2. Only CARB certified diesel fuel containing not more than 0.0015% sulfur by weight is to be used. [District Rules 2201 and 4801 and 17 CCR 93115]
3. The exhaust stack shall vent vertically upward. The vertical exhaust flow shall not be impeded by a rain cap (flapper ok), roof overhang, or any other obstruction. [District Rule 4102]
4. This engine shall be operated only for testing and maintenance of the engine, required regulatory purposes, and during emergency situations. Operation of the engine for maintenance, testing, and required regulatory purposes shall not exceed 24 hours per calendar year. [District Rule 4702 and 17 CCR 93115]

The project is approvable without TBACT.

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.

S-2234-218 and '-230 O2 and Hot Oil Heaters

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.

| | |
|---|---------------------------|
| F-Factor for NG: | 8,578 dscf/MMBtu at 60 °F |
| PM10 Emission Factor: | 0.0076 lb-PM10/MMBtu |
| Percentage of PM as PM10 in Exhaust: | 100% |
| Exhaust Oxygen (O ₂) Concentration: | 3% |

$$\text{Excess Air Correction to F Factor} = \frac{20.9}{(20.9 - 3)} = 1.17$$

$$GL = \left(\frac{0.0076 \text{ lb-PM}}{\text{MMBtu}} \times \frac{7,000 \text{ grain}}{\text{lb-PM}} \right) / \left(\frac{8,578 \text{ ft}^3}{\text{MMBtu}} \times 1.17 \right)$$

$$GL = 0.0053 \text{ grain/dscf} < 0.1 \text{ grain/dscf}$$

Therefore, compliance with District Rule 4201 requirements is expected and a permit condition will be listed on the permit as follows:

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

S-2324-240 Emergency Fire Water Pump IC Engine

$$0.127 \frac{g}{hp \cdot hr} \times \frac{1 hp \cdot hr}{2,542.5 \text{ Btu}} \times \frac{10^6 \text{ Btu}}{8578 \text{ dscf}} \times \frac{0.30 \text{ Btu}_{out}}{1 \text{ Btu}_{in}} \times \frac{15.43 \text{ grain}}{g} = 0.027 \frac{\text{grain}}{\text{dscf}}$$

Since 0.027 grain/dscf is less than 0.1 grain/dscf, compliance with this rule is expected.

Compliance is expected.

Rule 4301 Fuel Burning Equipment

This rule specifies maximum emission rates in lb/hr for SO₂, NO₂, and combustion contaminants

(defined as total PM in Rule 1020). This rule also limits combustion contaminants to ≤ 0.1 gr/scf. According to AP 42 (Table 1.4-2, footnote c), all PM emissions from natural gas combustion are less than $1 \mu\text{m}$ in diameter. The values in the following table are calculated using the hourly heat input of the O2 Removal heater and Hot Oil Heater and the emission factor for the respective pollutant.

| District Rule 4301 Limits | | | |
|----------------------------------|--|--|--|
| Pollutant | NO ₂ | Total PM | SO ₂ |
| ATC S-2324-18 (lb/hr) | 0.007 lb/MMBtu x 19.5 MMBtu/hr = 0.14 | 0.0076/MMBtu x 19.5 MMBtu/hr = 0.15 | 0.00285/MMBtu x 19.5 MMBtu/hr = 0.056 |
| ATC S-2324-30-0 (lb/hr) | 0.0062 lb/MMBtu x 206.7 MMBtu/hr = 1.28 | 0.0076/MMBtu x 206.7 MMBtu/hr = 1.57 | 0.00285/MMBtu x 206.7 MMBtu/hr = 0.59 |
| Rule Limit (lb/hr) | 140 | 10 | 200 |

The above table indicates compliance with the maximum lb/hr emissions in this rule; therefore, compliance is expected.

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

S-2234-218 and -230 O2 and Hot Oil Heaters

Section 5.2 NO_x and CO Emission Limits

The units are subject to the following NO_x limits in Table 2, as shown below.

The applicant has proposed to meet the enhanced schedule NO_x emission limits listed in the Table below:

| Rule 4320 Emissions Limits | | | | |
|--|--|----------|---------------------------|----------|
| Category | Operated on gaseous fuel | | Operated on liquid fuel | |
| | NO _x Limit | CO Limit | NO _x Limit | CO Limit |
| S-2234-218 A. Units with a total rated heat input > 5.0 MMBtu/hr to < 20.0 MMBtu/hr, except for Categories C through G units | a) Standard Schedule 9 ppmv or 0.011 lb/MMBtu; or | 400 ppmv | 40 ppmv or 0.052 lb/MMBtu | 400 ppmv |
| | b) Enhanced Schedule 6 ppmv or 0.007 lb/MMBtu | | | |
| S-2234-230 B. Units with a total rated heat input > 20.0 MMBtu/hr, except for Categories C through G units | a) Standard Schedule 7 ppmv or 0.008 lb/MMBtu; or | 400 ppmv | 40 ppmv or 0.052 lb/MMBtu | 400 ppmv |
| | b) Enhanced Schedule 5 ppmv or 0.0062 lb/MMBtu | | | |

| S-2234-218 | | | |
|-----------------|---------------------------------|---|---------------------|
| Pollutant | Emission Factors | | Source |
| NO _x | 0.007 lb-NO _x /MMBtu | 6 ppmvd NO _x (@ 3%O ₂) | Burner Manufacturer |
| CO | 0.037 lb-CO/MMBtu | 50 ppmv CO (@ 3%O ₂) | Burner Manufacturer |

| S-2234-230 | | | |
|-----------------|----------------------------------|---|---------------------|
| Pollutant | Emission Factors | | Source |
| NO _x | 0.0062 lb-NO _x /MMBtu | 5 ppmvd NO _x (@ 3%O ₂) | Burner Manufacturer |
| CO | 0.037 lb-CO/MMBtu | 50 ppmv CO (@ 3%O ₂) | Burner Manufacturer |

Therefore, compliance with Section 5.2 of District Rule 4320 is expected.

A permit condition listing the emissions limits will be listed on permit as shown in the DEL section above.

Section 5.4 Particulate Matter Control Requirements

Section 5.4 of the rule requires one of four options for control of particulate matter: 1) combustion of PUC-quality natural gas, commercial propane, butane, or liquefied petroleum gas, or a combination of such gases, 2) limit fuel sulfur content to no more than five (5) grains of total sulfur per one hundred (100) standard cubic, 3) install and properly operate an emission control system that reduces SO₂ emissions by at least 95% by weight; or limit exhaust SO₂ to less than or equal to 9 ppmv corrected to 3.0% O₂ or 4) refinery units, which require modification of refinery equipment to reduce sulfur emissions, shall be in compliance with the applicable requirement in Section 5.4.1 no later than July 1, 2013.

The sulfur content of the combusted gas is limited to 1.0 gr S/100scf. Therefore compliance is expected.

Section 5.6, Startup and Shutdown Provisions

Applicable emissions limits are not required during startup and shutdown provided The duration of each start-up or each shutdown shall not exceed two hours, the emission control system shall be in operation and emissions shall be minimized insofar as technologically feasible during start-up or shutdown or operator has submitted an application for a Permit to Operate condition to allow more than two hours for each start-up or each shutdown provided the operator meets all of the conditions specified in Sections 5.6.3.1 through 5.6.3.3.

Applicant has not requested startup and shutdown provisions:

Section 5.7, Monitoring Provisions

Section 5.7 requires either use of a APCO approved Continuous Emissions Monitoring System (CEMS) for NO_x, CO, and oxygen, or implementation of an APCO-approved Alternate Monitoring System.

In order to satisfy the 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 O₂ 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 incorporated into the permit in order to ensure compliance with the requirements of the proposed alternate monitoring plan:

{4063} The permittee shall monitor and record the stack concentration of NO_x, CO, and O₂ at least once every month (in which a source test is not performed) using a portable analyzer 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, 4306, and 4320]

{4064} If either the NO_x 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 the performing the notification and testing required by this condition. [District Rules 4305, 4306, and 4320]

{4065} 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, 4306, and 4320]

{4066} The permittee shall maintain records of: (1) the date and time of NO_x, CO, and O₂ measurements, (2) the O₂ concentration in percent by volume and the measured NO_x 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, 4306, and 4320]

5.7.6 Monitoring SO_x Emissions

Section 5.7.6.1 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 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 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.

Applicant will provide a fuel sulfur analysis at startup and annually thereafter as stated in the following ATC conditions:

Permittee shall measure sulfur content of gas incinerated in flare within 60 days of startup and at least once every year thereafter. Such data shall be submitted to the District within 60 days of sample collection. [District Rules 2201 and 4801] N

Permittee shall determine sulfur content of gas flared using ASTM method D3246 or double GC for H₂S and mercaptans. [District Rule 2201] N

Section 5.8, Compliance Determination

The following conditions reflect the compliance determination requirements of the rule:

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

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] Y

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] Y

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

Section 6.1 Recordkeeping

No proposed changes to recordkeeping requirements are proposed or applicant has proposed the following change to recordkeeping requirements:

Section 6.2 Test Methods

The following test methods are proposed which reflect compliance with this section of the rule:

NO_x 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] Y

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

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

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). Upon demonstrating compliance on two consecutive compliance source tests, the following source test may be deferred for up to thirty-six months.

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. 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. Applicant will implement Monitoring Scheme "A" and therefore this section is not applicable.

The following permit conditions will be listed on the permit as follows:

3467} Source testing to measure NO_x and CO emissions from this unit while fired on natural gas shall be conducted within 60 days of initial start-up. [District Rules 2201, 4305, 4306, and 4320]

{3466} 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, 4306, and 4320]

{110} The results of each source test shall be submitted to the District within 60 days thereafter. [District Rule 1081]

Conclusion

Conditions will be incorporated into the permit in order to ensure compliance with each section of this rule, see attached draft permit(s). Therefore, compliance with District Rule 4320 requirements is expected.

Rule 4311 Flares

Section 5.0 Requirements

Section 5.1 states that flares that are permitted to operate only during an emergency are not subject to the requirements of Sections 5.6 and 5.7.

The proposed flare is an emergency flare.

Section 5.2 requires a flame to be present at all times when combustible gases are vented through the flare.

The flare will be equipped with continuous pilot. The following condition on ATC S-2234-235-0 will ensure compliance with Section 5.2:

The flame shall be present at all times when combustible gases are vented through the flare. [District Rule 4311, 5.2] Y

Section 5.3 requires the flare outlet to be equipped with an automatic ignition system, or, to operate with a pilot flame present at all times when combustible gases are vented through the flare, except during purge periods for automatic-ignition equipped flares.

The flare will be equipped with a continuous pilot.

Except for flares equipped with a flow-sensing ignition system, Section 5.4 requires the flare be equipped with a heat sensing device such as a thermocouple, ultraviolet beam sensor, infrared sensor, or an equivalent device, capable of continuously detecting at least one pilot flame or the flare flame is present to be installed and operated.

The following condition will ensure compliance with this requirement:

A flame or heat sensing device such as a thermocouple, ultraviolet beam sensor, infrared sensor, or an equivalent device, capable of continuously detecting at least one pilot flame or the flare flame is present shall be operational. [District Rule 4311, 5.4]

Section 5.5 requires flares that use flow-sensing automatic ignition systems and which do not use a continuous flame pilot shall use purge gas for purging. This flare is not equipped with a flow-sensing device and uses a continuous flame pilot; therefore, this section is not applicable.

The flare will be equipped with a continuous pilot.

Section 5.6 – not applicable to emergency flares

Section 5.7 – not applicable to emergency flares

Administrative Requirements

Section 6.1.1 requires the operator of flares that are subject to Section 5.6 to make available to the APCO upon request the compliance determination records that demonstrate compliance with the provisions of 40 CFR 60.18, (c)(3) through (c)(5).

The flare is not subject to Section 5.6; therefore, Section 6.1.1 is not applicable.

Section 6.1.2 applies to ground level enclosed flares. The proposed flare is a sonic flare not a ground level enclosed flare; therefore, this section is not applicable.

Recordkeeping

The flare is not subject to Sections 5.6 (40 CFR 60.18), 6.1.1, 6.1.2, nor 6.2.

Compliance is expected.

Rule 4408 Glycol Dehydration Systems

This rule applies to any glycol dehydration system with a glycol dehydration vent that is subject to permitting requirements pursuant to Regulation II (Permits). The proposed system does not have a glycol vent but uses closed circulated hot oil system as the heat source. Therefore the rule is not applicable.

Rule 4409 Component at Light Crude Oil Production Facilities, Natural Gas Production Facilities, and Natural Gas Processing Facilities

The proposed cryogenic gas plant is subject to the rule requirements as listed in the facility wide PTO S-2234-0-2. Compliance is expected.

Rule 4623 Storage of Organic Liquids

Section 5.1 requires that an operator shall not place, hold, or store organic liquid in any tank unless such tank is equipped with a VOC control system. The amine storage tank, produced water tank, and fresh water tank will be connected to vapor control system vented to a gas pipeline. The expected control efficiency is 99%.

The following conditions will be included on the ATCs:

Vapor Controlled Amine, Produced Water and Fresh Water Tanks S-2234-236 through '238

Gas-leak concentration shall be determined by EPA Method 21. [District Rule 2201] Y

Tank shall be equipped with a vapor recovery system consisting of a closed vent system that collects all VOCs from the storage tank, and a VOC control device. The vapor recovery system shall be APCO-approved and maintained in gas-tight condition. The VOC control device shall be either of the following: a vapor return or condensation system that connects to a gas pipeline distribution system, or an approved VOC destruction device that reduces the inlet VOC emissions by at least 99% by weight as determined by the test method specified in Section 6.4.7. [District Rules 2201 and 4623] Y

The control efficiency of any VOC control device, measured and calculated as carbon, shall be determined by EPA Method 25, except when the outlet concentration must be below 50 ppm in order to meet the standard, in which case EPA Method 25a may be used. EPA Method 18 may be used in lieu of EPA Method 25 or EPA Method 25a provided the identity and approximate concentrations of the analytes/compounds in the sample gas stream are known before analysis with the gas chromatograph and the gas chromatograph is calibrated for each of those known analyte/compound to ensure that the VOC concentrations are neither under- or over-reported. [District Rules 2201 and 4623] Y

All piping, valves, and fittings shall be constructed and maintained in a leak-free condition. [District Rules 2201 and 4623] Y

A leak-free condition is defined as a condition without a gas leak. A gas leak is defined as a reading in excess of 10,000 ppmv, above background, as measured by a portable hydrocarbon detection instrument in accordance with the procedures specified in EPA Test Method 21. A reading in excess of 10,000 ppmv above background is a violation of this permit and Rule 4623 and shall be reported as a deviation. [District Rules 2201 and 4623] Y

Any tank gauging or sampling device on a tank vented to the vapor recovery system shall be equipped with a leak-free cover which shall be closed at all times except during gauging or sampling. [District Rules 2201 and 4623] Y

Operator shall visually inspect tank shell, hatches, seals, seams, cable seals, valves, flanges, connectors, and any other piping components directly affixed to the tank and within five feet of the tank at least once per year for liquid leaks, and with a portable hydrocarbon detection instrument conducted in accordance with EPA Method 21 for gas leaks. Operator shall also visually or ultrasonically inspect as appropriate, the external shell and roof of the uninsulated tank for structural integrity annually. [District Rules 2210 and 4623] Y

Upon detection of a liquid leak, defined as a leak rate of greater than or equal to 30 drops per minute, operator shall repair the leak within 8 hours. For leaks with a liquid leak rate of between 3 and 30 drops per minute, the leaking component shall be repaired within 24 hours after detection. [District Rules 2201 and 4623] Y

Upon detection of a gas leak, defined as a VOC concentration of greater than 10,000 ppmv measured in accordance with EPA Method 21, operator shall take one of the following actions: 1) eliminate the leak within 8 hours after detection; or 2) if the leak cannot be eliminated, then minimize the leak to the lowest possible level within 8 hours after detection by using best maintenance practices, and eliminate the leak within 48 hours after minimization. In no event shall the total time to minimize and eliminate a leak exceed 56 hours after detection [District Rules 2201 and 4623] Y

Components found to be leaking either liquids or gases shall be immediately affixed with a tag showing the component to be leaking. Operator shall maintain records of the liquid or gas leak detection readings, date/time the leak was discovered, and date/time the component was repaired to a leak-free condition. [District Rules 2201 and 4623] Y

Leaking components that have been discovered by the operator that have been immediately tagged and repaired within the timeframes specified in District Rule 4623, Table 3 shall not constitute a violation of this rule. Leaking components as defined by District Rule 4623 discovered by District staff that were not previously identified and/or tagged by the operator, and/or any leaks that were not repaired within the timeframes specified in District Rule 4623, Table 3 shall constitute a violation of this rule. [District Rules 2201 and 4623] Y

If a component type for the tank is found to leak during an annual inspection, operator shall conduct quarterly inspections of that component type on the tank for four consecutive quarters. If no components are found to leak after four consecutive quarters, the operator may revert to annual inspections. [District Rules 2201 and 4623] Y

Any component found to be leaking on two consecutive annual inspections is in violation of the District Rule 4623, even if it is under the voluntary inspection and maintenance program. [District Rule 2201] Y

Operator shall maintain an inspection log containing the following 1) Type of component leaking; 2) Date and time of leak detection, and method of detection; 3) Date and time of leak repair, and emission level of recheck after leak is repaired; 4) Method used to minimize the leak to lowest possible level within 8 hours after detection. [District Rules 2201 and 4623] Y

S-2234-239-0 Slop Oil Tank

Section 4.4 states that tanks exclusively receiving and/or storing an organic liquid with a true vapor pressure (TVP) less than 0.5 psia are exempt from all other requirements except for complying with TVP and API gravity testing provisions pursuant to section 6.2, recordkeeping provisions pursuant to section 6.3.6, test methods provisions pursuant to section 6.4, and compliance schedules pursuant to section 7.2.

The facility has proposed to meet TVP of less than 0.5 psi for the organic liquid stored in the tank. This tank is not served by any vapor recovery system. Therefore, the following conditions will be placed on the permit:

- Permittee shall conduct true vapor pressure (TVP) testing of the organic liquid stored in this tank at least once every 24 months during summer (July - September), and/or whenever there is a change in the source or type of organic liquid stored in this tank in order to maintain exemption from the rule. [District Rule 4623]
- TVP and API gravity test records shall be submitted to the District within 45 days after the date of testing. The record shall include the tank identification number, permit number, type of stored organic liquid, TVP and API gravity of the stored organic liquid, test methods used, and a copy of the test results. [District Rule 4623]
- API gravity shall be determined using ASTM Method D 287-92 (200) e1 "Standard Test Method for API gravity of Crude Petroleum and Petroleum Products (Hydrometer Method)". Sampling for API gravity shall be performed in accordance with ASTM Method D 4057-95 "Standard Practices for Manual Sampling of Petroleum and Petroleum Products". Should the permittee determine that another method is more appropriate for API gravity, the methodology must be approved by the District and US EPA prior to its use. [District Rule 4623]
- TVP of an organic liquid shall be determined by measuring the Reid Vapor Pressure (RVP) using ASTM D323-94 (Test Method for Vapor Pressure for Petroleum Products), and converting the RVP to TVP at the tank's maximum organic liquid storage temperature. The conversion of RVP to TVP shall be done in accordance with the procedure listed in Appendix B of Rule 4623. Should the permittee determine that another method is more appropriate for TVP testing, the methodology must be approved by the District and US EPA prior to its use. [District Rule 4623]

S-2234-233 and '234 Amine and Glycol Sumps

Testing will not be required for these uncontrolled sumps as they will store only triethylene glycol and methyl/diethanolamine with known vapor pressures.

True Vapor Pressure (TVP) of any organic liquid introduced to or stored in the sump shall not exceed 0.5 psia. [District Rule 2201 and 4623] Y

Compliance is expected with this Rule.

Rule 4801 Sulfur Compounds

The gas combusted in the IC engine, O2 heater, hot oil heater, and flare will contain no more than 1.0 gr S/100 scf and therefore is expected to have exhaust sulfur compound emissions much less than 2000 ppmv. Therefore compliance with this rule is expected.

Rule 8011 General Requirements

This rule contains general requirements pertaining to all Regulation XIII prohibitions. Applicable sections of Rule 8011 are referenced from the specific prohibitory rules. Therefore, compliance with Rules 8021, 8031, 8041, 8051, and 8071, as evaluated below, will meet the requirements of Rule 8011.

District Rule 8021 Construction, Demolition, Excavation, Extraction And Other Earthmoving Activities

This rule applies to any construction, demolition, excavation, extraction, and other earthmoving activities, including, but not limited to, land clearing, grubbing, scraping, travel on site, and travel on access roads to and from the site.

The following conditions are included to ensure compliance with the rule:

{3433} Disturbances of soil related to any construction, demolition, excavation, extraction, or other earthmoving activities shall comply with the requirements for fugitive dust control in District Rule 8021 unless specifically exempted under Section 4.0 of Rule 8021 or Rule 8011. [District Rules 8011 and 8021] N

{3434} An owner/operator shall submit a Dust Control Plan to the APCO prior to the start of any construction activity on any site that will include 10 acres or more of disturbed surface area for residential developments, or 5 acres or more of disturbed surface area for non-residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of bulk materials on at least three days. [District Rules 8011 and 8021] N

Rule 8041 Carryout and Trackout

This rule applies to all sites that are subject to any of the following rules where carryout or trackout has occurred or may occur on paved public roads or the paved shoulders of a paved public road: Rules 8021 (Construction, Demolition, Excavation, Extraction, and other Earthmoving Activities), 8031 (Bulk Materials), 8061 (Paved and Unpaved Roads), and 8071 (Unpaved Vehicle and Equipment Traffic Areas).

This rule requires an owner/operator to sufficiently prevent or cleanup carryout and trackout as specified in sections 5.1 through 5.9. In addition to the specific requirements of this rule, the facility shall comply with all other applicable requirements of Regulation VIII.

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

An owner/operator shall prevent or cleanup any carryout or trackout in accordance with the requirements of District Rule 8041 Section 5.0, unless specifically exempted under Section 4.0 of Rule 8041 (8/19/04) or Rule 8011(8/19/04). [District Rules 8041 and 8011]

Rule 8051 Open Areas

Open Areas are defined as any of the following described in subsection 3.36.1 through subsection 3.36.3 of this rule. For the purpose of this rule, vacant portions of residential or commercial lots and contiguous parcels that are immediately adjacent to and owned and/or operated by the same individual or entity are

considered one open area. An open area does not include any unpaved vehicle/equipment traffic area as defined in this rule.

3.36.1 an unsubdivided or undeveloped land adjoining a developed or a partially developed residential, industrial, institutional, governmental, or commercial area.

3.36.2 a subdivided residential, industrial, institutional, governmental, or commercial lot, which contains no approved or permitted building or structures of a temporary or permanent nature.

3.36.3 a partially developed residential, industrial, institutional, governmental, or commercial lot and contiguous lots under common ownership.

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

{3436} Whenever open areas are disturbed, or vehicles are used in open areas, the facility shall comply with the requirements of Section 5.0 of District Rule 8051, unless specifically exempted under Section 4.0 of Rule 8051 or Rule 8011. [District Rules 8011 and 8051] N

Rule 8061 Paved and Unpaved Roads

This rule applies to any new or existing public or private paved or unpaved road, road construction project, or road modification project. The following condition is included on the ATCs to ensure compliance:

{3437} Any paved road or unpaved road shall comply with the requirements of District Rule 8061 unless specifically exempted under Section 4.0 of Rule 8061 or Rule 8011. [District Rules 8011 and 8061] N

Rule 8071 Unpaved Vehicle/Equipment Traffic Areas

The purpose of this rule is to limit fugitive dust emissions from unpaved vehicle and equipment traffic areas. Section 5.1 of this rule requires implementation of at least one specific control measure for Visible Dust Emissions whenever the Average Annual Daily Trips (AADT) will exceed 50, Vehicle Daily Trips (VDT) will exceed 150, VDT with 3 or more axles will exceed 25, or when 1000 or more vehicles will park or travel in the area in a given day. Specified control measures are:

- a. *Implement an APCO-approved Fugitive PM10 Management Plan as specified in Rule 8011 (General Requirements):*
- b. *Watering*
- c. *Uniform layer of washed gravel*
- d. *Chemical/organic dust stabilizers/suppressants in accordance with the manufacturer's specifications;*
- e. *Vegetative materials*
- f. *Paving*
- g. *Roadmix*

h. Any other method(s) that can be demonstrated to the satisfaction of the APCO that effectively limits VDE to 20% opacity and meets the conditions of a stabilized unpaved road.

Section 5.2 requires that one or more specific control measures be implemented on each day that 50 or more VDT, or 25 or more VDT with 3 or more axles, originates from within and remains exclusively within an unpaved vehicle/equipment traffic area.

Since this facility will transport chicken litter and additives using a front-end loader over unpaved areas, the AADT of 50 is expected to be exceeded, requiring implementation of a control measure. The following conditions will be placed on the ATCs to ensure compliance:

{3440} On each day that 50 or more Vehicle Daily Trips or 25 or more Vehicle Daily Trips with 3 axles or more will occur on an unpaved vehicle/equipment traffic area, permittee shall apply water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure as required to limit Visible Dust Emissions to 20% opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rule 8011 and 8071] N

Water, gravel, roadmix, or chemical/organic dust stabilizers/suppressants, vegetative materials, or other District-approved control measure shall be applied to unpaved vehicle travel areas as required to limit Visible Dust Emissions to 20% opacity and comply with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011. [District Rule 8071 and 8011]

Where dusting materials are allowed to accumulate on paved surfaces, the accumulation shall be removed daily or water and/or chemical/organic dust stabilizers/suppressants shall be applied to the paved surface as required to maintain continuous compliance with the requirements for a stabilized unpaved road as defined in Section 3.59 of District Rule 8011 and limit Visible Dust Emissions (VDE) to 20% opacity. [District Rule 8011 and 8071] N

Section 5.3 requires an owner/operator to restrict access and periodically stabilize a disturbed surface area whenever a site becomes inactive to comply with the conditions for a stabilized surface as defined in Rule 8011. The following condition will be placed on the ATCs to ensure compliance:

Whenever any portion of the site becomes inactive, Permittee shall restrict access and periodically stabilize any disturbed surface to comply with the conditions for a stabilized surface as defined in Section 3.58 of District Rule 8011. [District Rules 8071 and 8011]

Section 6.0 of this rule requires the owner/operator to comply with the recordkeeping requirements specified in Rule 8011. The following condition, previously mentioned, will be placed on the ATCs to ensure compliance:

Records and other supporting documentation shall be maintained as required to demonstrate compliance with the requirements of the rules under Regulation VIII only for those days that a control measure was implemented. Such records shall include the type of control measure(s) used, the location and extent of coverage, and the date, amount, and frequency of application of dust suppressant, manufacturer's dust suppressant product information sheet that identifies the name of the dust suppressant and application instructions. Records shall be kept for one year following project completion that results in the termination of all dust generating activities. [District Rules 8031, 8071, and 8011]

California Health & Safety Code 42301.6 (School Notice)

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

California Environmental Quality Act (CEQA)

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

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

The District determined that no other agency has broader discretionary approval power over the project and that the District is the first agency to act on the project, therefore establishing the District as the Lead Agency for the project (CEQA Guidelines §15051(b)). The District's engineering evaluation of the project (this document) determined that compliance with District rules and permit conditions would reduce and mitigate the project's potential air quality impacts to less than significant.

An Initial Study is being prepared, to determine if the project may have a significant effect on the environment. A Negative Declaration or Mitigated Negative Declaration will be prepared if there is no substantial evidence that the project or any of its aspects may cause a significant effect on the environment. Otherwise, an Environmental Impact Report will be prepared. The public review period will not be less than 20-days for a Negative or Mitigated Negative Declaration and not less than 30-days for an EIR (CCR §15105)

The issuance of the Authority to Construct (ATC) constitutes the final decision to approve the project and will not be issued until the District has certified the final environmental assessment. Pursuant to CEQA Guidelines §15075 a Notice of Determination will be filed within five (5) days of the issuance of the ATC.

Mitigation of Greenhouse Gas Emissions

On December 17, 2009, the San Joaquin Valley Air Pollution Control District (District) adopted the policy "*District Policy – Addressing GHG Emission Impacts for Stationary Source Projects Under CEQA When Serving as the Lead Agency*". The policy was developed to assist Lead Agencies, project proponents, permit applicants, and interested parties in assessing and reducing the impacts of project specific greenhouse gas (GHG) emissions on global climate

change. The District policy uses an approach intended to streamline the process of determining if project specific GHG emissions would have a significant effect.

The District Policy for greenhouse gas emissions requires that projects undergo environmental review pursuant to CEQA unless they satisfy one of the following conditions:

1. The project equipment be designed and operated in accordance with "Best Performance Standards" (BPS) established by the District. Best performance standards are adopted by the District after review and consideration of possible environmental effects. The District has determined that the operation of equipment that includes BPS results in less than significant cumulative impacts.
2. The project must be designed to achieve a 29% reduction in GHG emissions compared to the 'business as usual' (BAU) design case. The District has determined that projects that achieve a 29% reduction in GHG emissions compared to BAU design case result in less than significant cumulative impacts.
3. The greenhouse gas emissions from the project are rendered less than significant by reducing GHG emissions from an existing activity, or by providing District approved emission reduction credits. The District has determined that such reductions result in projects that have less than significant cumulative impacts.

Projects failing to meet one of the conditions discussed above must undergo environmental review pursuant to CEQA.

Applicant has proposed to meet condition #2 above by demonstrating that GHG emissions from the cryogenic gas plant are at least 29% less than the 'business as usual' (BAU) design case. The BAU case is considered representative of a typical natural gas processing plant built in California during the period 2002 through 2003 and includes the following characteristics:

BAU

1. IC engine-driven compressors powered by natural gas.
2. Flaring of waste gas streams
3. Use of separated ethane (deethanizer gas) as fuel onsite
4. Natural gas-fired combustion equipment (O2 heater, hot oil heater) and natural gas flare pilot and purge
5. GHG from Electricity Generation– Assume zero as worst case

| | |
|--------------------------------------|--|
| <p>Compression</p> | <p>Total compression horsepower = 26,900 (inlet gas) + 20,100 (residue gas) + 11,700 (refrigeration) + 7600 (overhead gas) = 66,300 hp</p> <p>$66,300 \text{ hp} / 0.35 \times 2542.5 \text{ Btu/hp-hr} \times \text{MMBtu}/10^6 \text{ Btu} = 481.6 \text{ MMBtu/hr}$</p> <p>CO2 Emissions: $481.6 \text{ MMBtu/hr} \times 116.7 \text{ lb/MMBtu} = 56,202.72 \text{ lb-CO}_2\text{e/hour}$</p> <p>CH4 Emissions: $481.6 \text{ MMBtu/hr} \times 0.011 \text{ lb/Btu} \times 23 \text{ lb-CO}_2\text{e per lb-CH}_4$ = 121.84 lb-CO2e/hour</p> <p>N2O Emissions : $481.6 \text{ MMBtu/hr} \times 0.00022 \text{ lb/Btu} \times 296 \text{ lb-CO}_2\text{e per lb-N}_2\text{O}$ = 31.36 lb-CO2e/hour</p> <p>Total = $52,202.72 + 121.84 + 31.36 = 52,355.92 \text{ lb-CO}_2\text{e/hour}$</p> <p>$52,355.92 \text{ lb-CO}_2\text{e/hour} \times 8760 \text{ hr/year} \div 2,000 \text{ lb/ton} = 229,319 \text{ tons-CO}_2\text{e/year}$</p> <p>$229,319 \text{ short tons-CO}_2\text{e/year} \times 0.9072 \text{ metric tons/short ton}$ = <u>208,038 metric tons CO2e/yr</u></p> |
| <p>Flaring**</p> | <p>Regeneration Gas from Molecular Sieve (Stream 223) - 208,457 metric tons CO2e/yr CO2 Gas from Amine/Glycol Regeneration (Stream 231) - 159,620 metric tons CO2e/yr Total = $208,457 + 159,620$ = <u>368,077 metric tons CO2e/yr</u></p> |
| <p>Combustion of ethane**</p> | <p>Combustion of Ethane from Deethanizer (Stream 184) – <u>552,443 metric tons CO2e/yr</u></p> <p>HHV of Stream 184 = 9,021,430 MMBtu/yr GHG from combustion of natural gas</p> <p>CO2 Emissions: $9,021,430 \text{ MMBtu/yr} \times 116.7 \text{ lb/MMBtu} = 1,052,800,881 \text{ lb-CO}_2\text{e/yr}$</p> <p>CH4 Emissions: $9,021,430 \text{ MMBtu/yr} \times 0.011 \text{ lb/Btu} \times 23 \text{ lb-CO}_2\text{e per lb-CH}_4$ = 2,282,422 lb-CO2e/yr</p> <p>N2O Emissions : $9,021,430 \text{ MMBtu/yr} \times 0.00022 \text{ lb/Btu} \times 296 \text{ lb-CO}_2\text{e per lb-N}_2\text{O}$ = 587,476 lb-CO2e/yr</p> <p>Total = $1,052,800,881 + 2,282,422 + 587,476 = 1,055,670,779 \text{ lb-CO}_2\text{e/yr}$</p> <p>$1,055,670,779 \text{ lb-CO}_2\text{e/yr} \div 2,000 \text{ lb/ton} \times 0.9072 \text{ metric tons/short ton}$ = <u>478,852 metric tons CO2e/yr</u></p> <p>Increase in GHG with Stream 184 as fuel (rather than natural gas) $552,443 \text{ metric tons CO}_2\text{e/yr} - 478,852 \text{ metric tons CO}_2\text{e/yr}$ = <u>73,591 metric tons CO2e/yr</u></p> |

| | |
|---|---|
| Combustion and flare pilot and purge | <p>19.5 MMBtu/hr x 8760 = 170,820 MMBtu/yr (O2 heater) 206.7 MMBtu/hr x 8760 = 1,810,692 MMBtu/yr (hot oil heater) 29,490 MMBtu/yr (flare pilot and purge)</p> <p>Total 2,011,002 MMBtu/yr</p> <p>GHG from combustion of natural gas CO2 Emissions: 2,011,002 MMBtu/yr x 116.7 lb/MMBtu = 234,683,933 lb-CO2e/yr CH4 Emissions: 2,011,002 MMBtu/yr x 0.011 lb/Btu x 23 lb-CO2e per lb-CH4 = 508,784 lb-CO2e/yr N2O Emissions : 2,011,002 MMBtu/yr x 0.00022 lb/Btu x 296 lb-CO2e per lb-N2O = 130,956 lb-CO2e/yr</p> <p>Total = 234,683,933 lb-CO2e/yr + 508,784 lb-CO2e/yr + 130,956 lb-CO2e/yr = 235,323,673 lb-CO2e/yr</p> <p>235,323,673 lb-CO2e/yr ÷ 2,000 lb/ton x 0.9072 metric tons/short ton = <u>106,743 metric tons CO2e/yr</u></p> |
|---|---|

*Greenhouse Gas Emissions (District Policy APR 2015)
 ** Spreadsheets in **Attachment XII**

BAU GHG

= 208,038 + 368,077 + 73,591 + 106,743
 = 756,449 metric tons CO2e/yr

GHG Emissions from Proposed Design

1. Electrically-driven compressors
2. No flaring of waste gas streams
3. Injection of separated ethane (deethanizer gas)
4. Natural gas-fired combustion equipment (O2 heater, hot oil heater) and natural gas flare pilot and purge
5. GHG from Electricity Generation to Power Compressors

| | |
|--------------------------------------|--|
| Compression | 0 metric tons CO2e/yr |
| Flaring | 0 metric tons CO2e/yr |
| Combustion of ethane | 0 metric tons CO2e/yr |
| Combustion and flare pilot and purge | 106,743 metric tons CO2e/yr |
| Indirect GHG Emissions | <p>66,300 hp /0.35 x 2542.5 Btu/hp-hr x MMBtu/10⁵ Btu x 8760 hr/yr = 4,218,816 MMBtu/yr 4,218,816 MMBtu/yr x kWh/0.013080 MMBtu = 322,539,450 kWh/yr 322,539,450 kWh/yr x 0.524 lbCO2/kWh* ÷ 2,000 lb/ton x 0.9072 metric tons/short ton</p> <p>= 76,663 metric tons CO2e/yr</p> |

| | |
|--|--|
| | |
|--|--|

*CPUC- Approved Emissions Factor

GHG Emissions from Proposed Design

106,743 + 76,663 = 183,406 metric tons CO₂e/yr

Reduction in GHG Emissions

$(756,449 - 183,406)/756,449 = \underline{76\%}$

The project is designed to achieve significantly more than 29% reduction in GHG emissions compared to the 'business as usual" (BAU) design case. Therefore GHG emissions compared to BAU result in less than significant cumulative impacts.

IX. Recommendation

Compliance with all applicable rules and regulations is expected. Pending a successful NSR Public Noticing period, issue Authorities to Construct S-2234-216-0 through '-240-0 subject to the conditions included on the attached draft Authority to Construct in **Attachment XIII**.

X. Billing Information

| Annual Permit Fees | | | |
|---------------------------|--------------|-----------------|------------|
| Permit Number | Fee Schedule | Fee Description | Annual Fee |
| S-2234-216 | 3020-01H | 26,900 hp | \$1030.00 |
| S-2234-217 | 3020-06 | miscellaneous | \$105.00 |
| S-2234-218 | 3020-02H | 19.5 MMBtu/hr | \$1030.00 |
| S-2234-219 | 3020-01D | 120 hp | \$314.00 |
| S-2234-220 | 3020-01A | 30 hp | \$117.00 |
| S-2234-221 | 3020-01H | 4043 hp | \$1030.00 |
| S-2234-222 | 3020-01H | 20,100 hp | \$1030.00 |
| S-2234-223 | 3020-01D | 120 hp | \$314.00 |
| S-2234-224 | 3020-01F | 600 hp | \$607.00 |
| S-2234-225 | 3020-01E | 280 hp | \$412.00 |
| S-2234-226 | 3020-01H | 11,700 hp | \$1030.00 |
| S-2234-227 | 3020-06 | miscellaneous | \$105.00 |
| S-2234-228 | 3020-01A | 17.5 hp | \$117.00 |
| S-2234-229 | 3020-01H | 1210 hp | \$1030.00 |
| S-2234-230 | 3020-02H | 206.7 MMBtu/hr | \$1030.00 |
| S-2234-231 | 3010-01H | 7,600 hp | \$1030.00 |
| S-2234-232 | 3020-01A | 10 hp | \$87.00 |
| S-2234-233 | 3020-05A | 2000 gallons | \$87.00 |
| S-2234-234 | 3020-05A | 3000 gallons | \$87.00 |
| S-2234-235 | 3020-02H | 11,156 MMBtu/hr | \$1030.00 |
| S-2234-236 | 3020-05B | 12,600 gallons | \$93.00 |
| S-2234-237 | 3020-05B | 12,600 gallons | \$93.00 |
| S-2234-238 | 3020-05C | 21,000 gallons | \$135.00 |
| S-2234-239 | 3020-05C | 21,000 gallons | \$135.00 |
| S-2234-240 | 3020-10B | 175 hp | \$117.00 |

Attachments

- I: Project Location Map
- II: Process Flow Diagrams
- III: Manufacturer's Information on Low NOx Burner
- IV: Fugitive Emissions
- V: IC Engine
- VI: Uncontrolled Tank Emissions
- VII: Emissions Profiles
- VIII: BACT Guidelines
- IX: BACT Analysis
- X: HRA/AAQA
- XI: Statewide and Title V Compliance Certification Forms
- XII: Spreadsheets for GHG Calculations

ATTACHMENT I
Project Location Map

Table 1.1
Location of New Cryogenic Gas Plant

| Cryogenic Gas Plant Location in S-2234 | Location of Cryogenic Gas Plant CGP | | | |
|---|-------------------------------------|------|------|------|
| | Qtr | Sec. | Twn | Rng. |
| | NW | 35 | T30S | R23E |

Figure 1.1
General Location of the New 35R Cryogenic Gas Plant

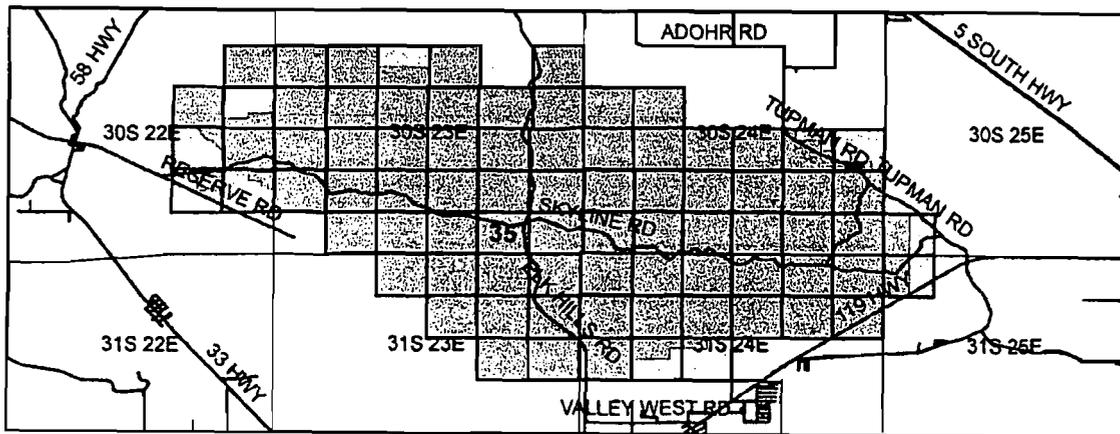
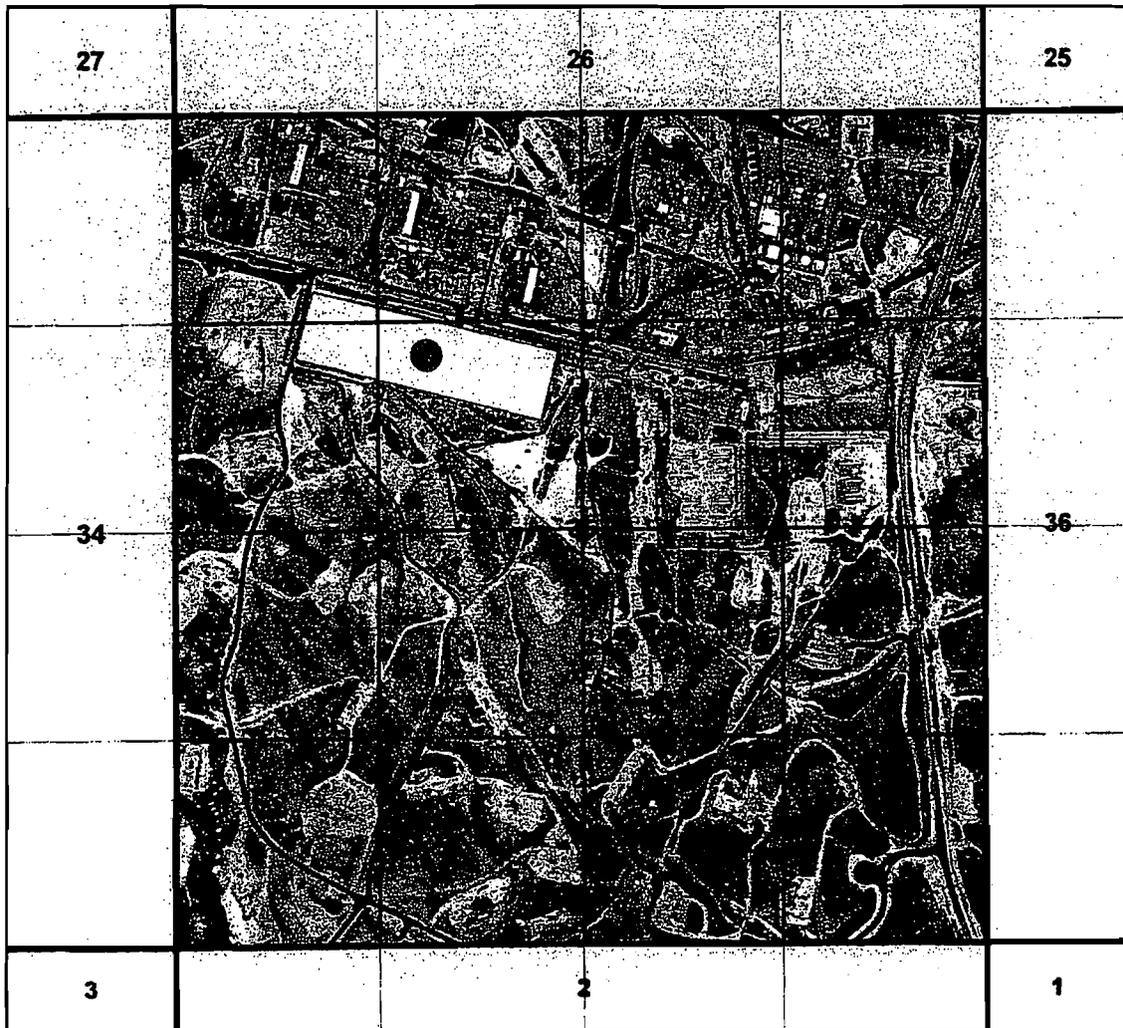


Table 1.2
Geographic Location of New Cryogenic Gas Plant

| Cryogenic Gas Plant Location in S-2234 | Centroid of Gas Processing Plant | | | |
|---|----------------------------------|--------------|--------------|----------------------------|
| | Units | X-Coord | Y-Coord | System Description |
| Longitude and Latitude | Degrees | -119.478141 | 35.277927 | GCS, DD, NAD 1983 |
| State Plane System | Feet | 6,120,495.46 | 2,290,709.30 | PCS, CA Zone-V, NAD 1983 |
| UTM Zone 11 | Meters | 274,609.27 | 3,906,680.93 | PCS, UTM Zone 11, NAD 1983 |
| California Teal | Meters | 47,430.90 | -304,195.66 | PCS, NAD 1983 |

Figure 1.2
Section 35R Location of the New Cryogenic Gas Plant

Plant Location
NW ¼ Section 35R



The Gas Plant Stationary Source (S-2234) is located within the boundaries of the Elk Hills Oilfield. The "core properties" within the gas plant stationary source comprise a contiguous area having a size of about 75 square miles. The cryogenic gas plant will be located near the center of this 75 square mile area. The distances from the gas plant location to the nearest property boundaries are summarized below.

Table 1.3
Distance from Facility to Property Boundary Lines

| Distance From Facility to Property Boundary | Distance to Property Boundary (Miles) | | | |
|---|---------------------------------------|------|-------|------|
| | North | East | South | West |
| | 3.48 | 8.06 | 3.41 | 3.46 |

¹Distance from the new Cryogenic Gas Plant to the nearest property boundary (excluding roads).

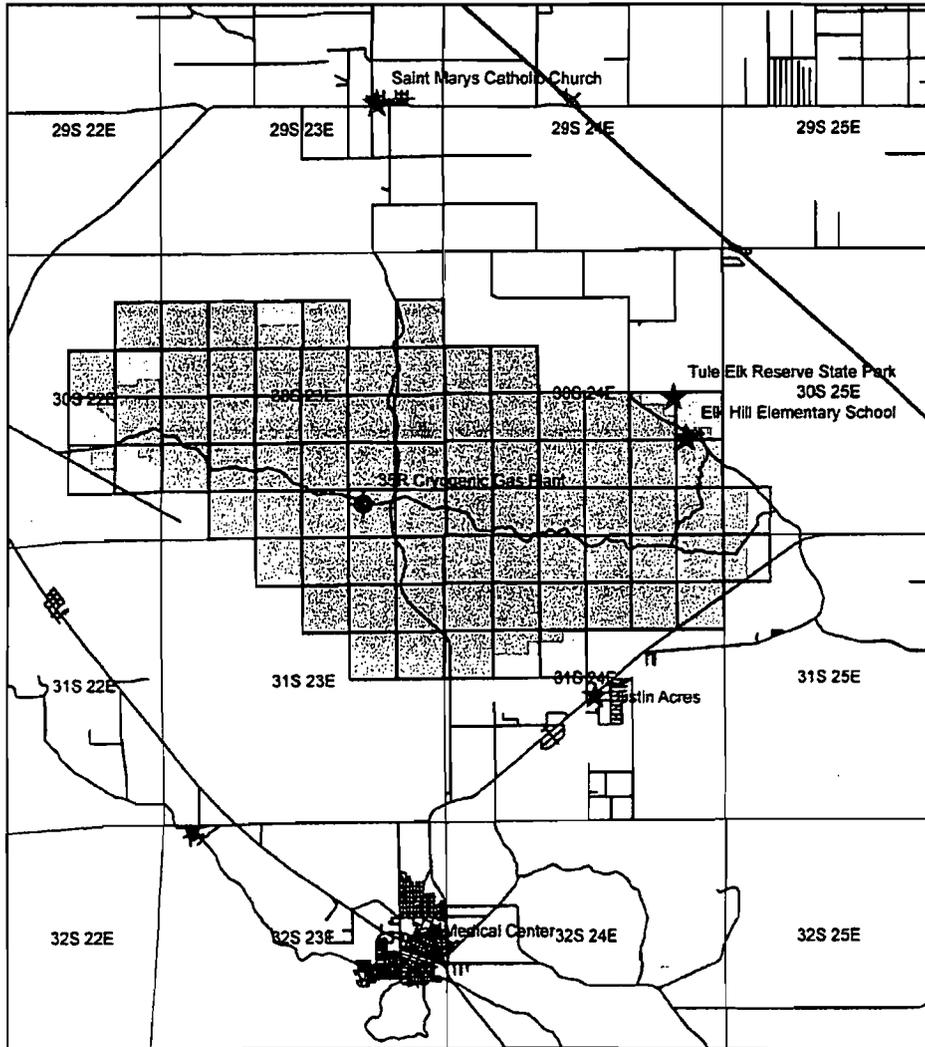
The oilfield location will ensure that the operation of the facility does not result in a public nuisance or a health risk. The nearest populated place is the community of Dustin Acres which is located approximately 6.4 miles SE of the facility. The distance and geographic location of sensitive receptors (schools, hospitals, parks and churches) are summarized below and is shown in Figure 1.3.

Table 1.4
Distance from Facility to Nearest Receptors

| Distance From Facility to Nearest Receptor | Distance, Direction and Location of Nearest Receptors | | | | | |
|--|---|-----------|--------------------|--------------|----------------|-------------|
| | Distance | | UTM Zone 11, NAD83 | | CA Teal, NAD83 | |
| | Miles | Direction | X Meters | Y Meters | X Meters | Y Meters |
| St. Mary's Church | 8.47 | N | 275,476.61 | 3,920,267.53 | 47,882.33 | -290,578.04 |
| Elk Hills School | 6.95 | NE | 285,878.39 | 3,908,605.56 | 58,622.70 | -301,926.28 |
| Tule Elk Reserve Park | 6.95 | NE | 285,481.94 | 3,910,002.42 | 58,184.24 | -300,541.03 |
| Dustin Acres at Business | 6.38 | SE | 282,409.91 | 3,899,994.01 | 55,422.50 | -310,646.64 |
| Taft Medical Center | 9.47 | S | 276,679.60 | 3,891,315.61 | 49,965.41 | -319,501.91 |

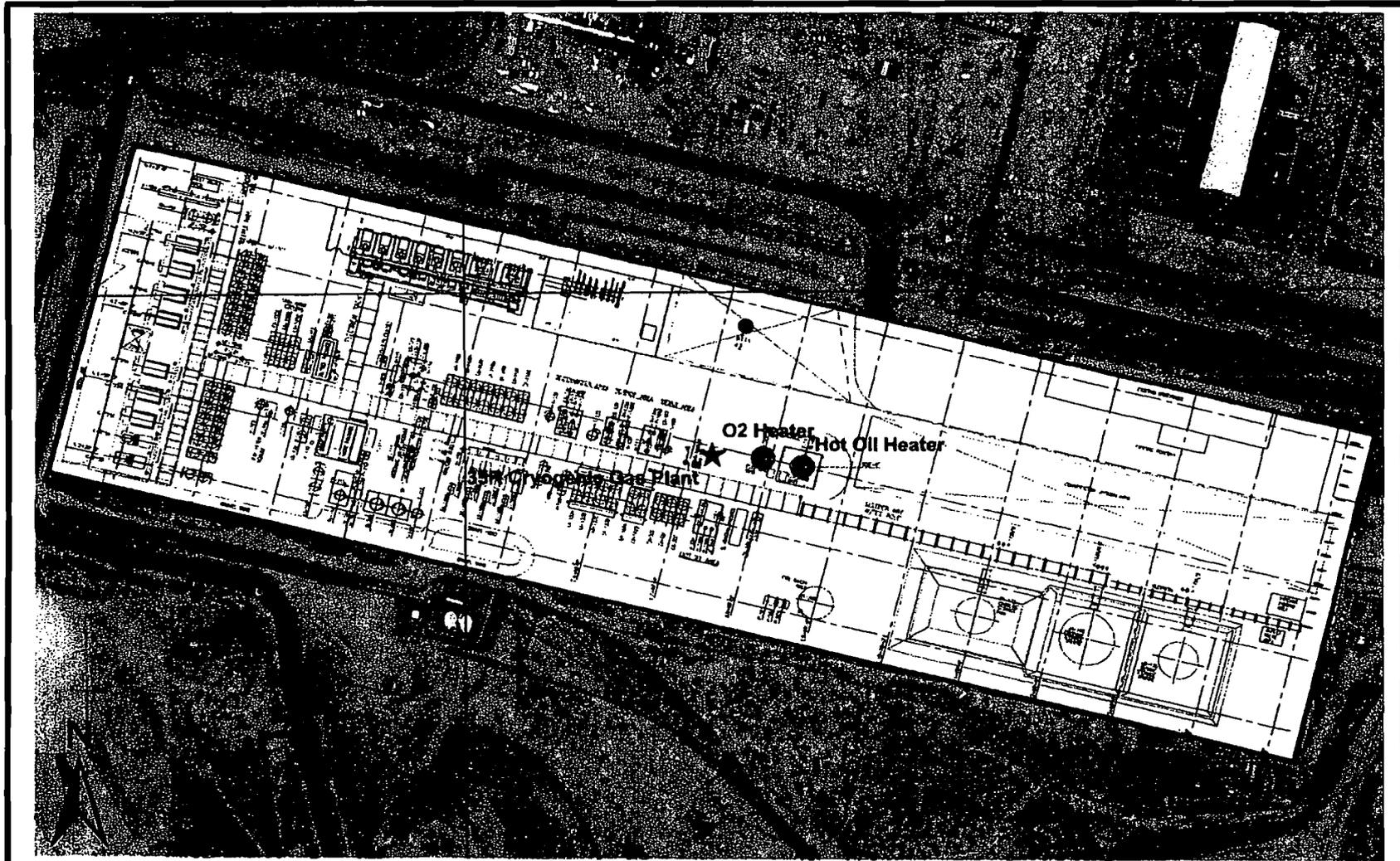
²Business not located within Occidental of Elk Hills Inc., Elk Hills Oilfield;

Figure 1.3
Location of Nearest Business (Dustin Acres) and
Nearest Sensitive Receptors (i.e. School, Park, Hospital or Church)

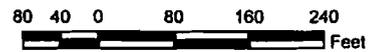


The facility will occupy approximately 16.71 acres in the NW ½ of Section 35R (T30S/R23E). An aerial view showing the location of the facility within the quarter section is shown below. A detailed plot plan showing the arrangement of the equipment within the facility is included at the end of this part of the report.

Figure 1.4
 Aerial View of Cryogenic Gas Plant (NW ¼ of Section 35R)



Location of the 35R Cryogenic Gas Plant
 Within The NW 1/4 of Section 35R (T30S/R23E)



Sheet No.

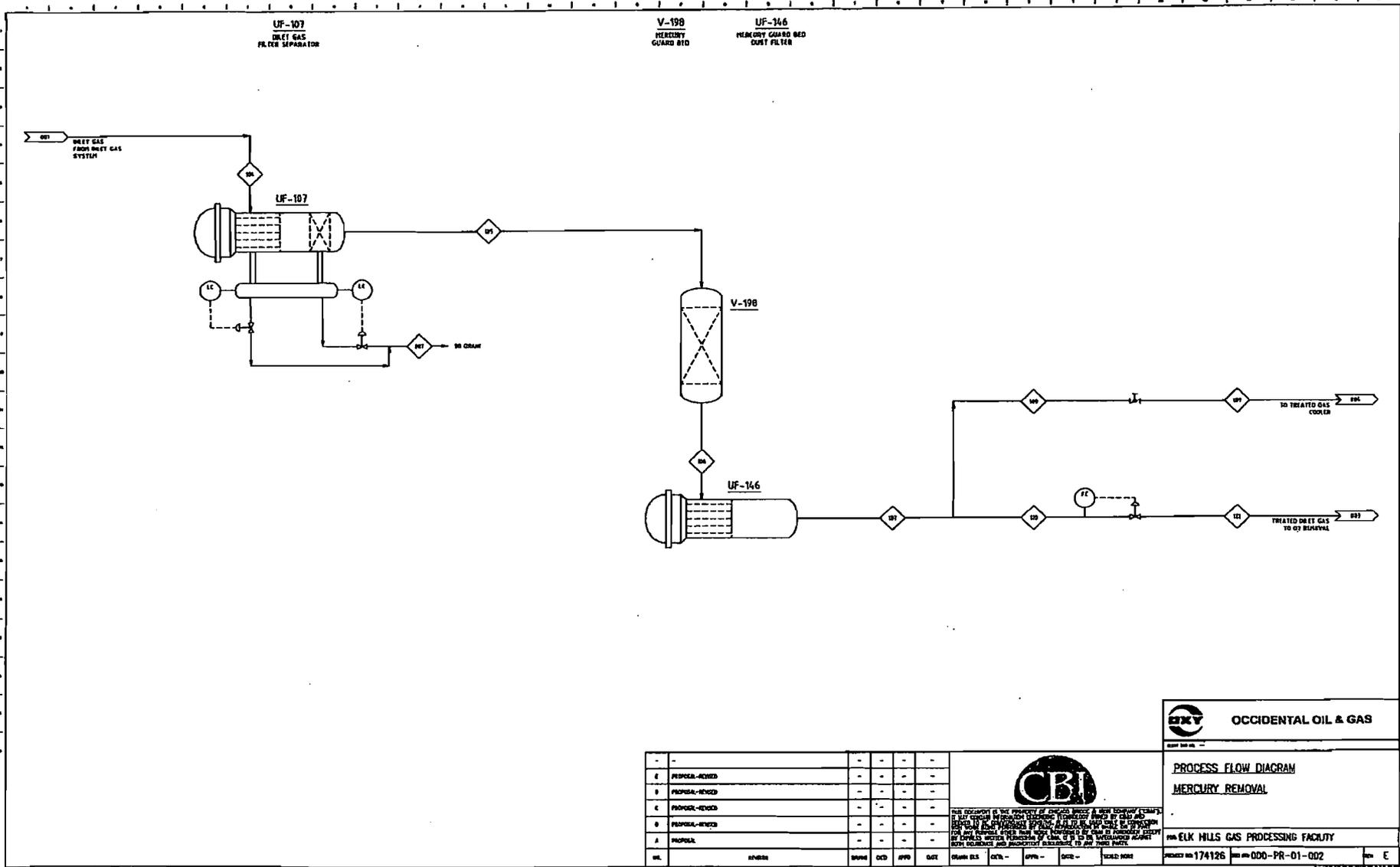
Vector Environmental, Inc.

Drawn By: M.V. Kelly

File:

Date:

ATTACHMENT II
Process Flow Diagrams



OCY OCCIDENTAL OIL & GAS



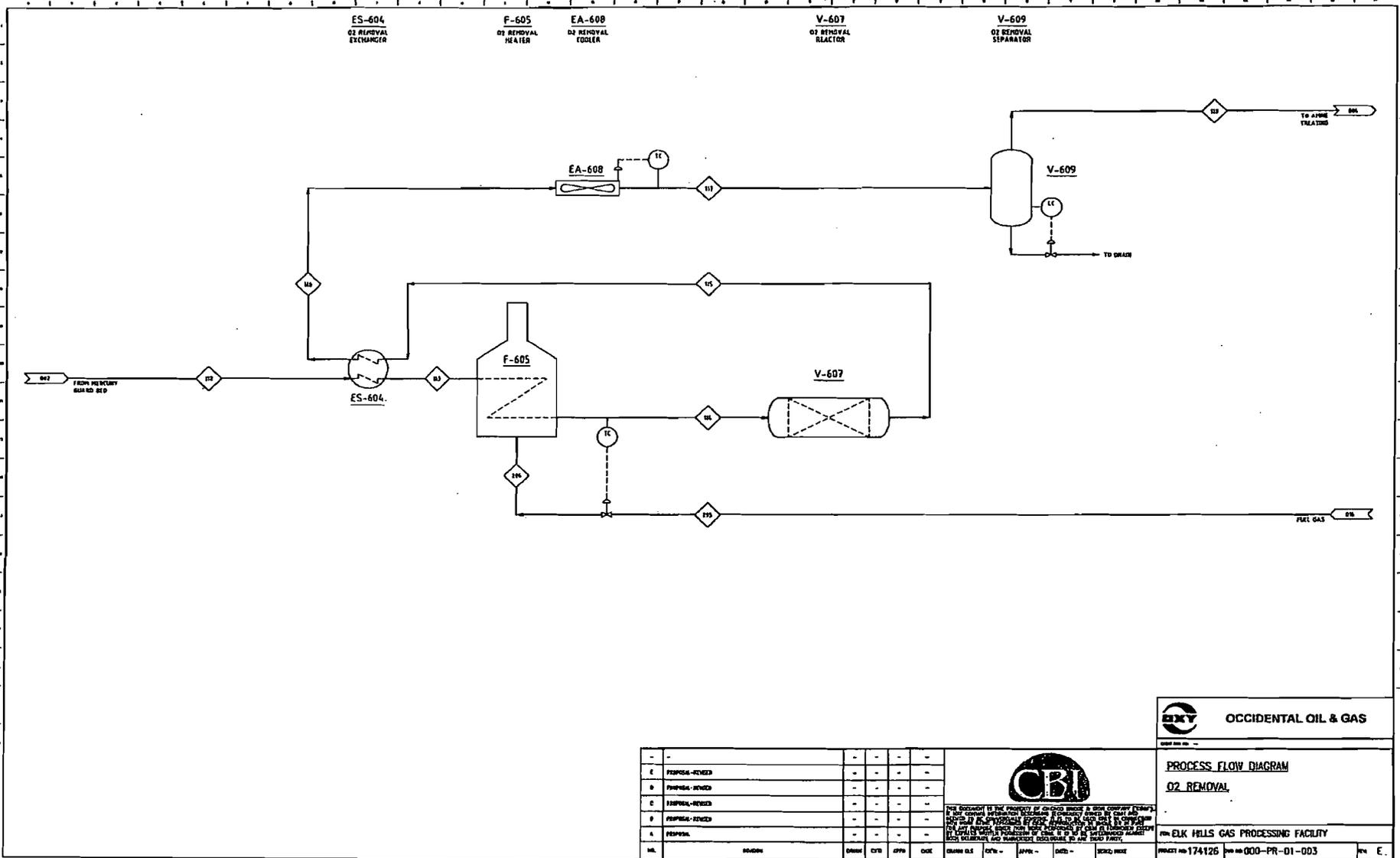
**PROCESS FLOW DIAGRAM
MERCURY REMOVAL**

100 ELK HILLS GAS PROCESSING FACILITY

| | | | | | |
|----------|------|----|------|------|------|
| REVISION | DATE | BY | CHKD | APPD | DATE |
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PROJECT NO 174126 REV 000-PR-01-002 SHEET NO 1 OF 1 E



OCXY OCCIDENTAL OIL & GAS

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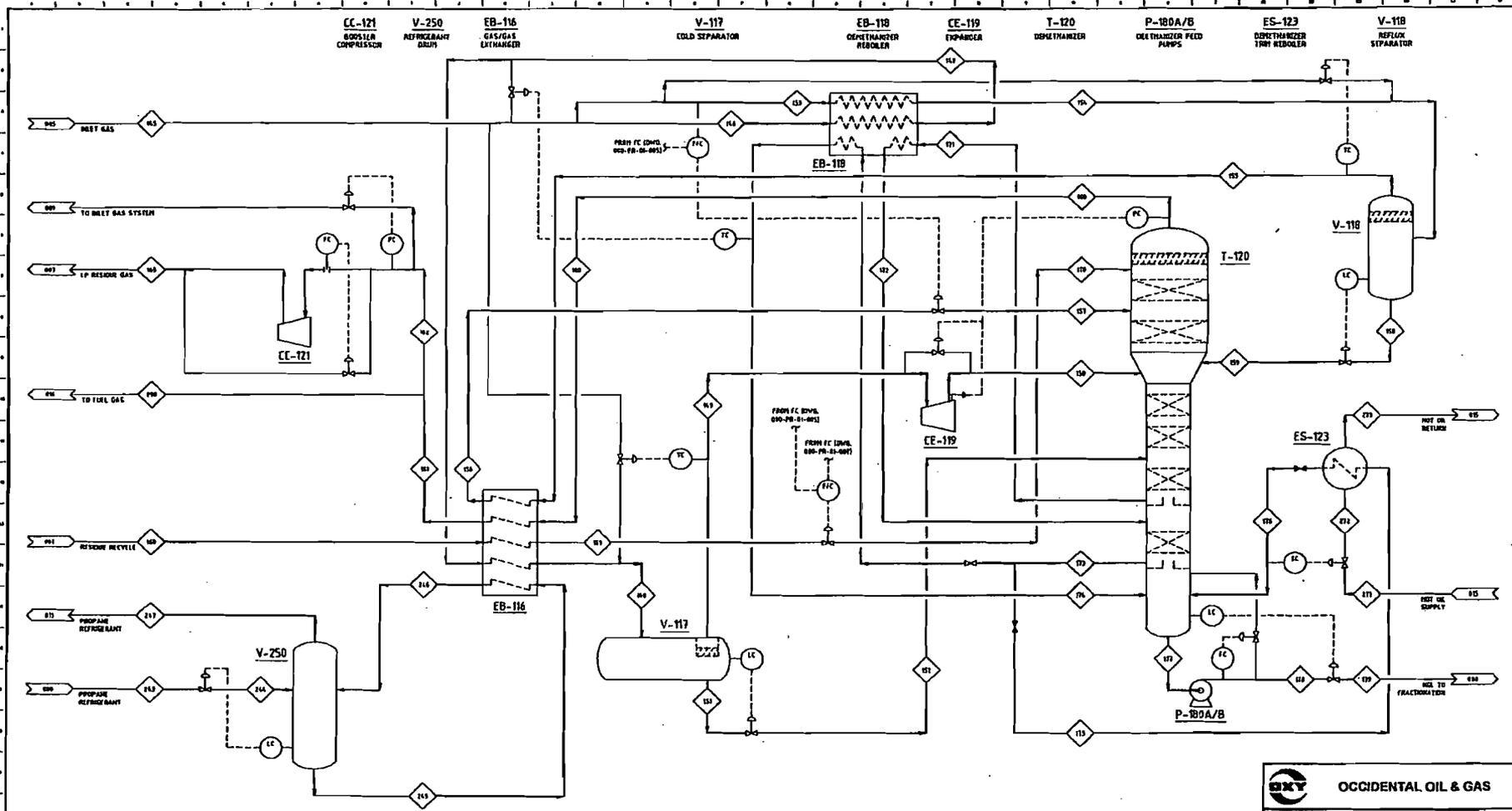
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PROCESS FLOW DIAGRAM
O₂ REMOVAL

ELK HILLS GAS PROCESSING FACILITY

PROJECT NO. 174126 SHEET NO. 000-PR-01-003



OCCEANICAL OIL & GAS

| | | | | |
|-----|------------------|---------|---------|---------|
| - | - | - | - | - |
| E | PROPOSED-ADDED | - | - | - |
| B | PROPOSED-REVISED | - | - | - |
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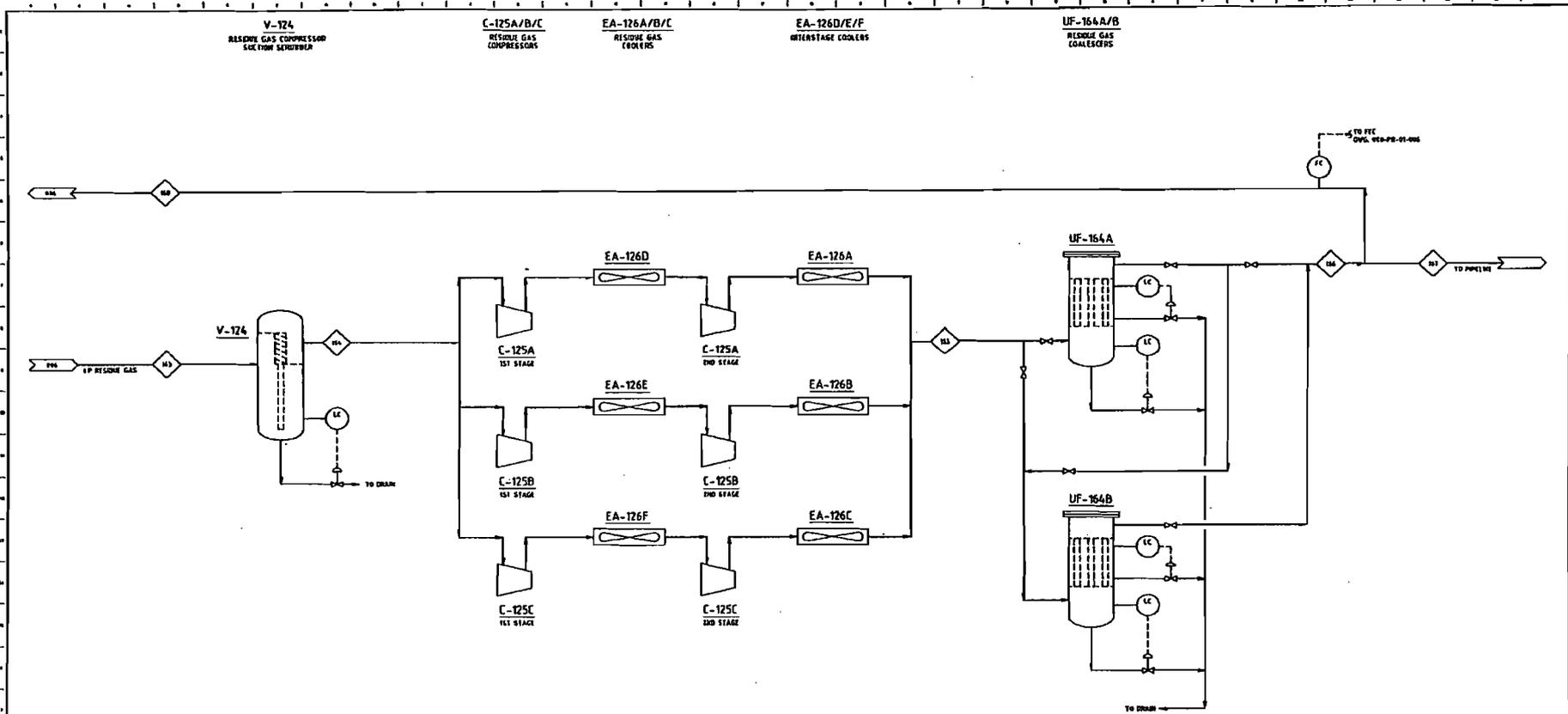


PROCESS FLOW DIAGRAM
NGL RECOVERY

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ELK HILLS GAS PROCESSING FACILITY
PROJECT NO. 174126 SHEET NO. DDO-PR-01-006

DATE: 11/11/83



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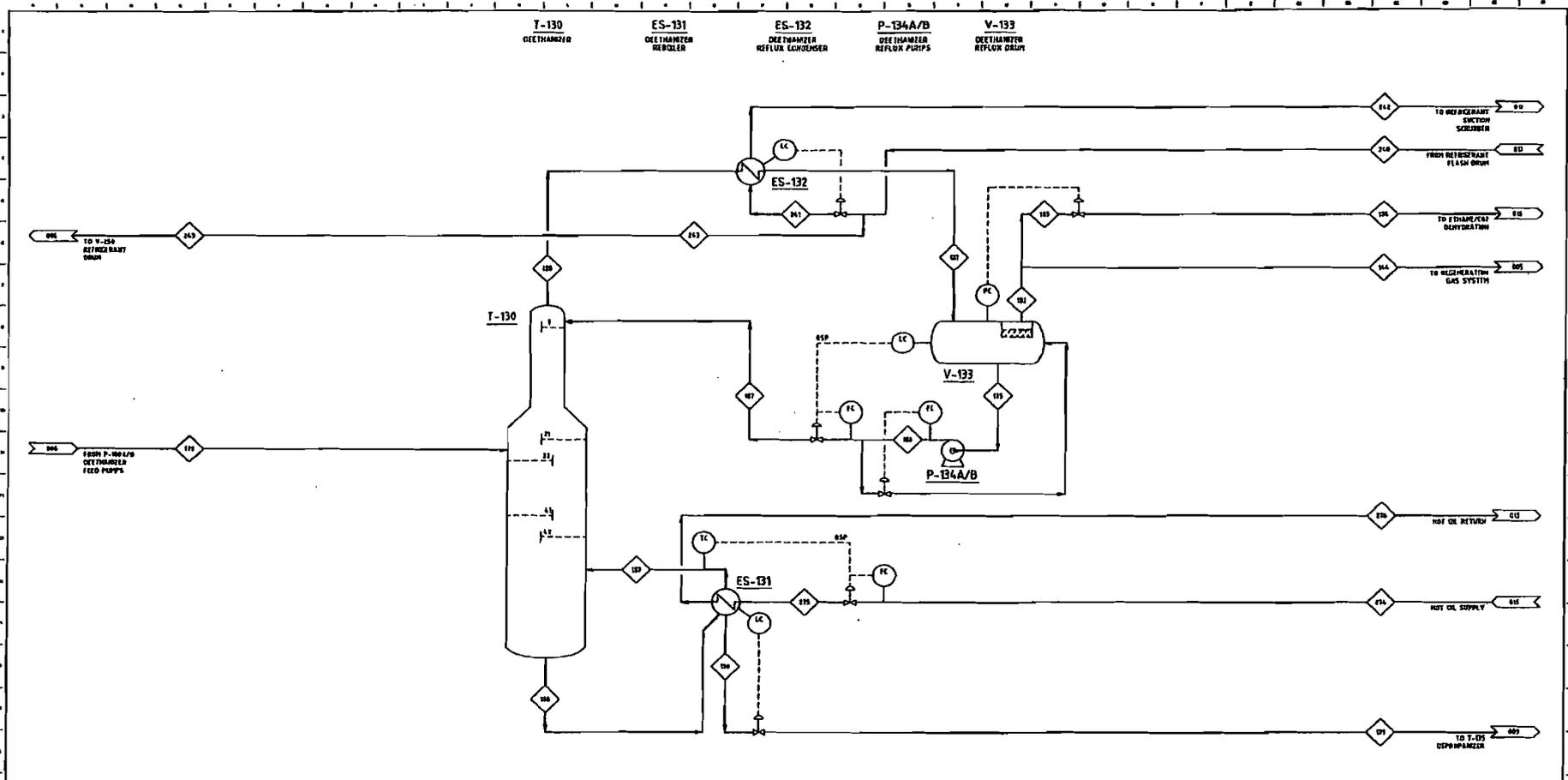
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PROCESS FLOW DIAGRAM
RESIDUE GAS COMPRESSION

FOR ELK HILLS GAS PROCESSING FACILITY
 PROJECT NO. 174126 JOB NO. DDD-PR-01-007 REV. E

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PROCESS FLOW DIAGRAM
DEETHANIZER

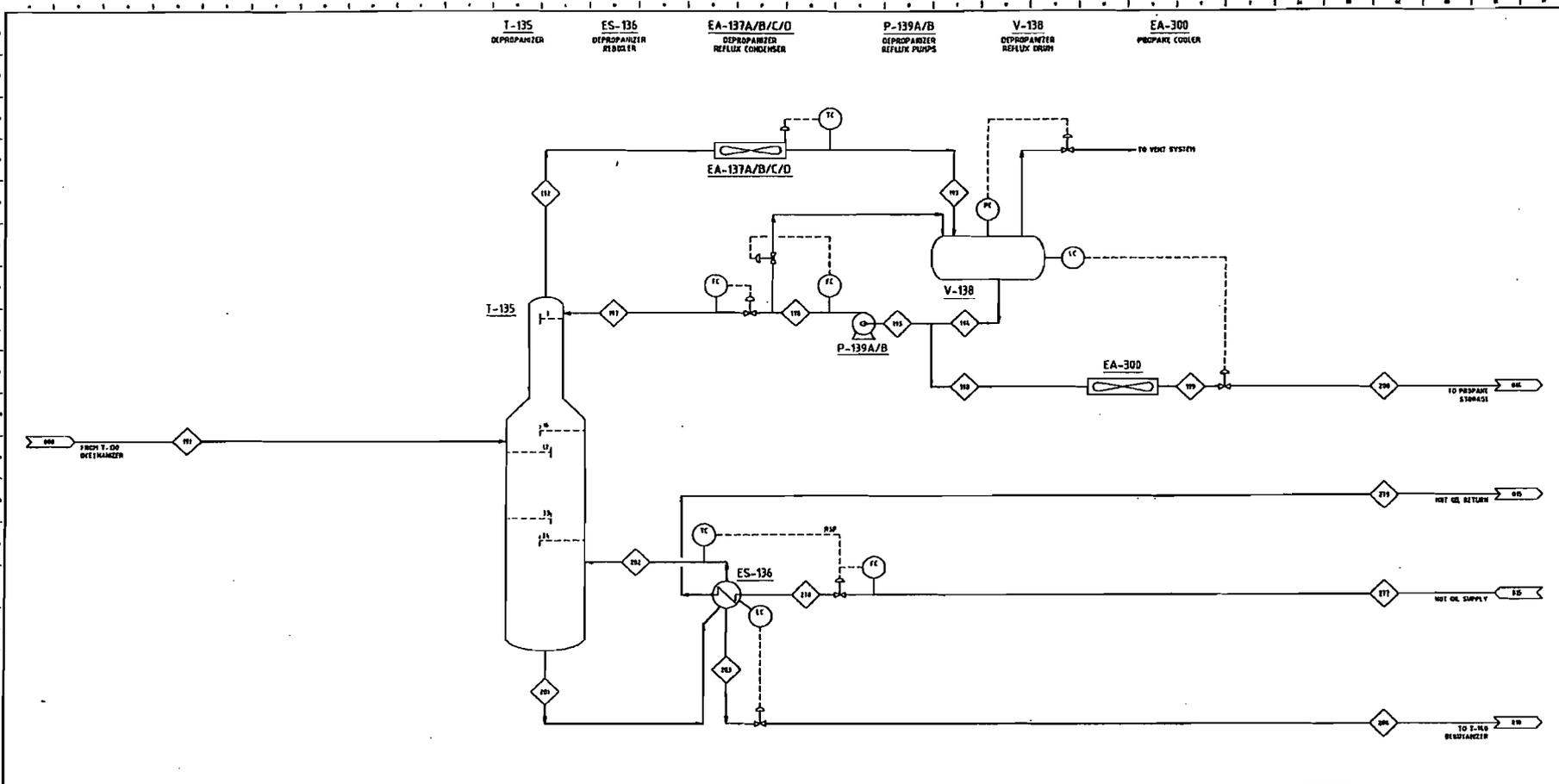
ELK HILLS GAS PROCESSING FACILITY

REVISION 174126 REV 000-PR-01-008

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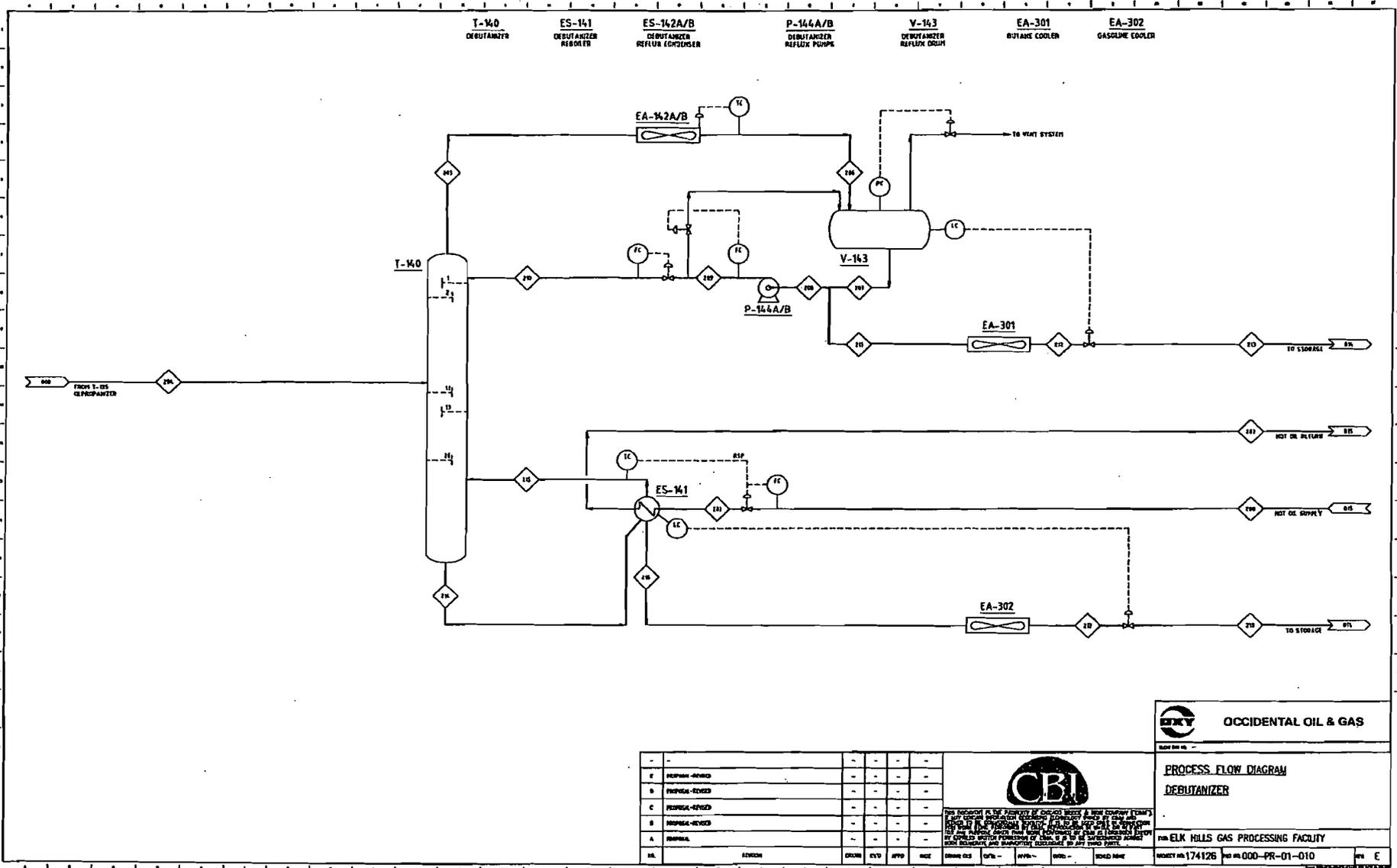


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PROCESS FLOW DIAGRAM
DEPROPANIZER

FROM ELK HILLS GAS PROCESSING FACILITY

PROJECT NO: 174126 DRAWING NO: QDD-PR-01-009 REV: E



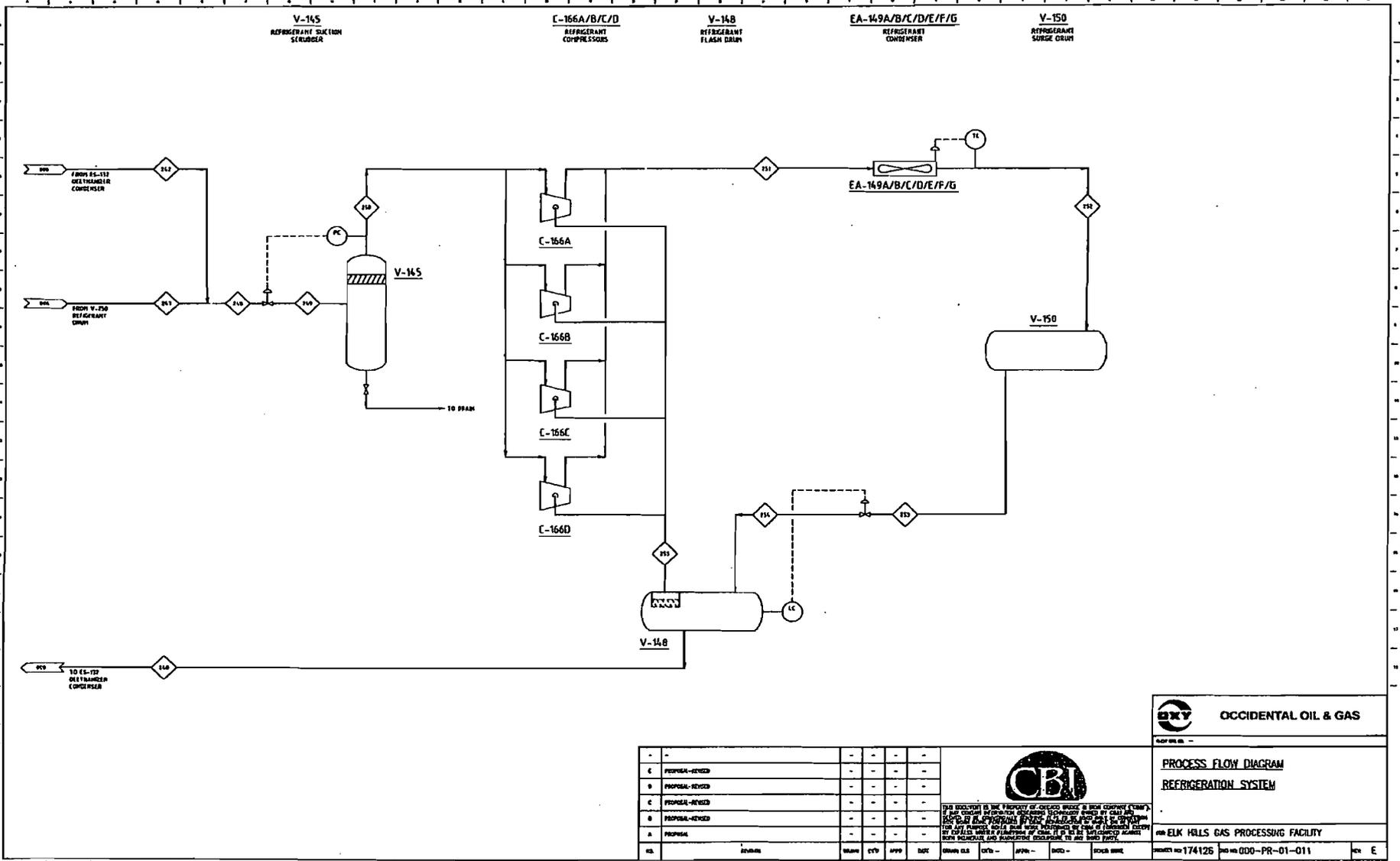
OCCEANIC OIL & GAS



**PROCESS FLOW DIAGRAM
DEBUTANIZER**

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ELK HILLS GAS PROCESSING FACILITY
 DRAWING NO. 174126
 REV. NO. 000-PR-01-010
 SHEET NO. 1 OF 1



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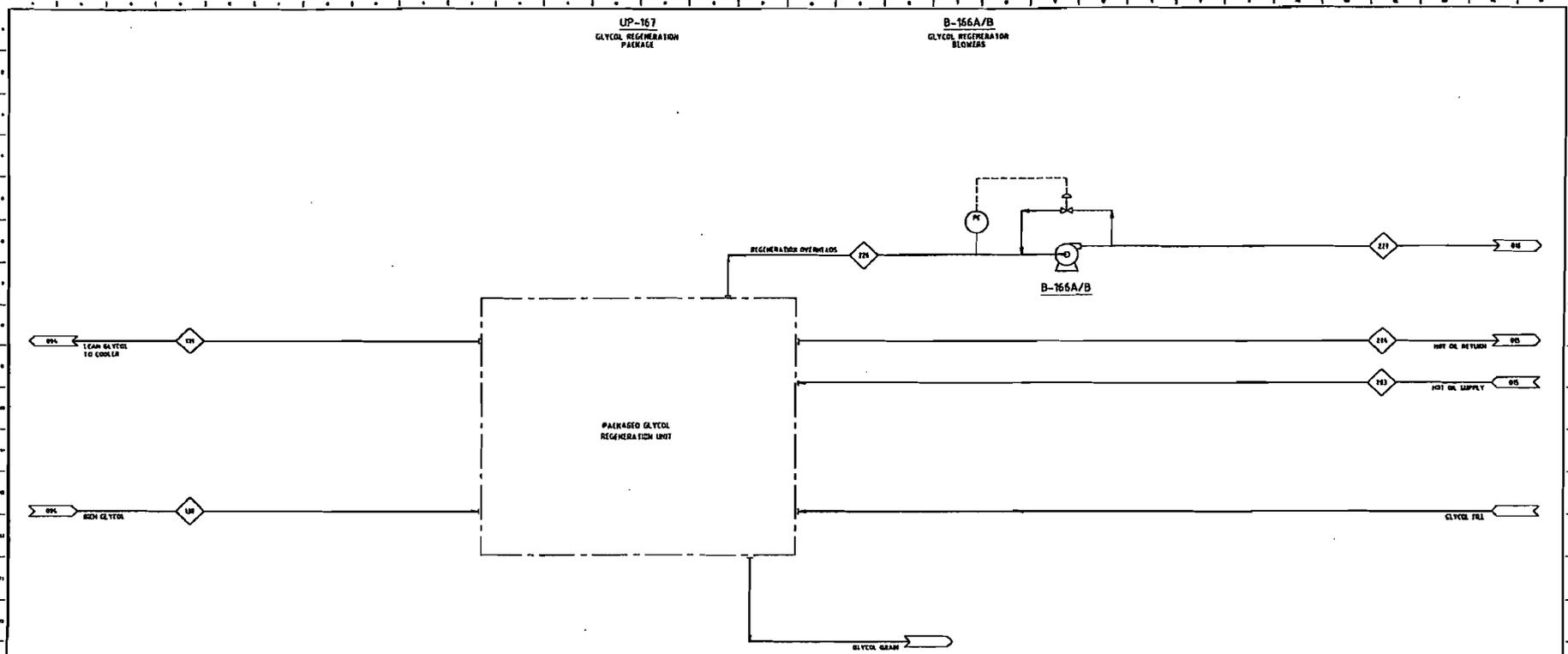


PROCESS FLOW DIAGRAM
REFRIGERATION SYSTEM

FOR ELK HILLS GAS PROCESSING FACILITY
SHEET NO 174126 AND NO ODO-PR-01-011

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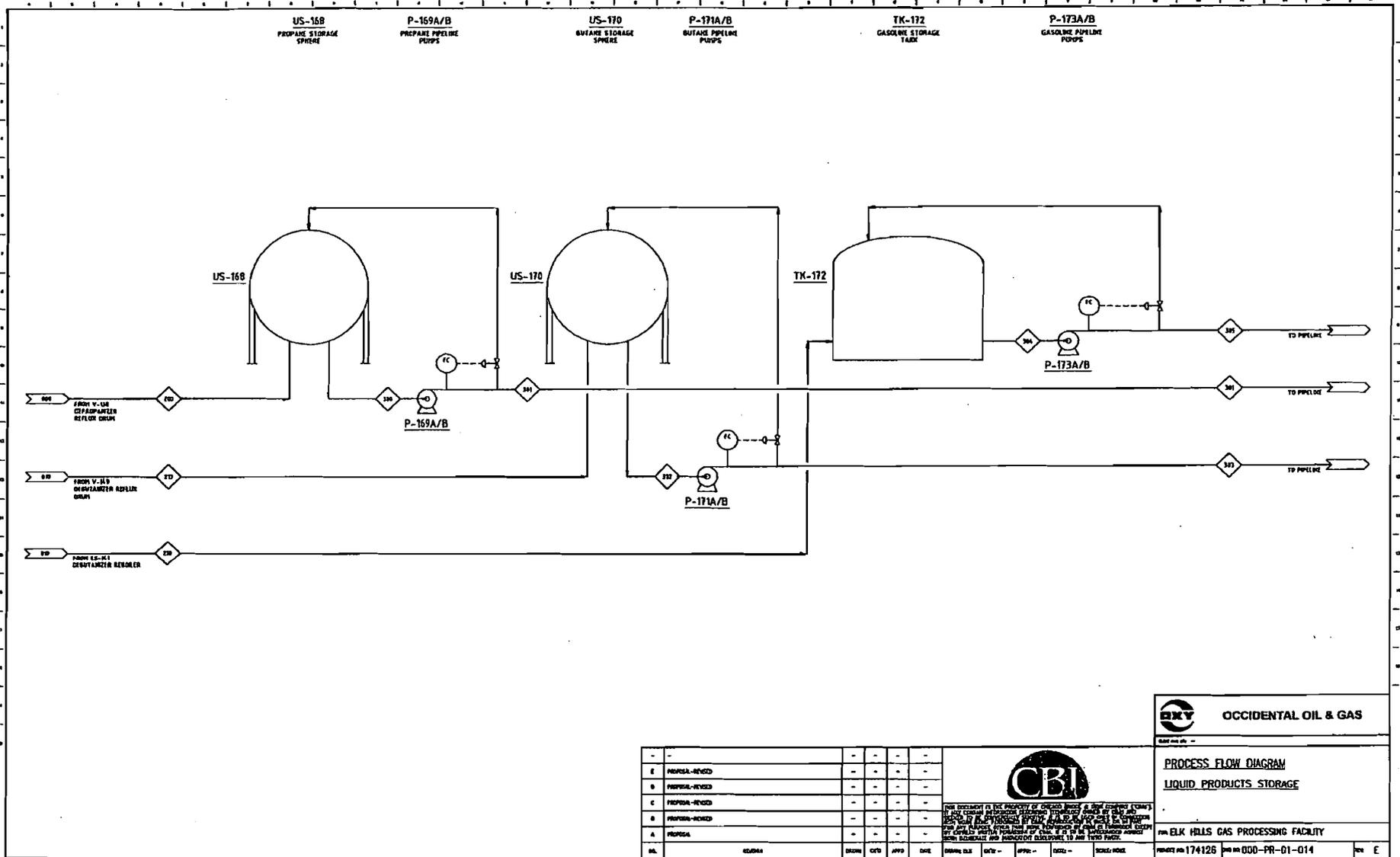
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PROCESS FLOW DIAGRAM
GLYCOL REGENERATION

FROM ELK HILLS GAS PROCESSING FACILITY

PROJECT NO 174126 DRAWING NO OOD-PR-01-013 SHEET NO E



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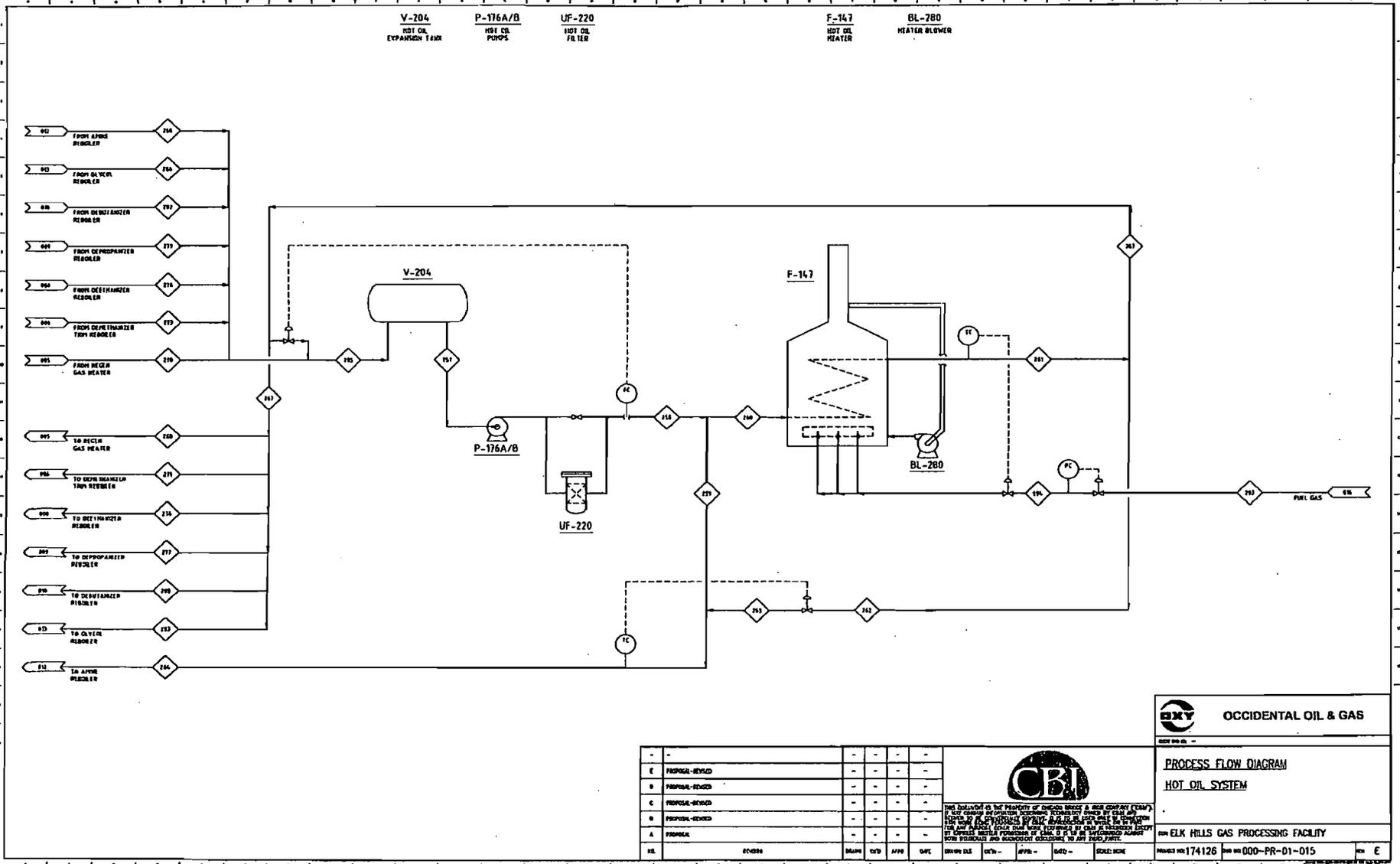
PROCESS FLOW DIAGRAM
LIQUID PRODUCTS STORAGE

ELK HILLS GAS PROCESSING FACILITY

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PROJECT NO. 174126 SHEET NO. 000-PR-01-014



**ATTACHMENT III
Manufacturer's Information on Low NOx Burner**



COENTM
COEN COMPANY, INC.

TODD

C-RMBTM Cell-Rapid Mix Burner

Coen's efficient, reliable, ultra-low-NOx burner just got even better.

IMPROVED ULTRA-LOW EMISSIONS & OPTIMUM PERFORMANCE

- Sub 5ppm NOx
- Less than 50ppm CO
- Extremely stable combustion
- Safe operation with simple controls
- Excellent burner turndown
- Low installation, operating and maintenance costs

BASED ON PROVEN ULTRA-LOW-NOx BURNER DESIGN

- More than 350 *Rapid Mix Burners (RMBs)* installed since 1994
- Thermal NOx controlled by FGR
- Prompt NOx controlled by rapid mixing of fuel and air
- No premix inside register prevents flashback
- Stabilized by high-swirl primary zone and refractory quarl
- Simple, rugged design with no moving parts

INDUSTRY REQUIREMENTS DEMAND IMPROVED BURNER PERFORMANCE

California's Central Valley region recently passed a regulation requiring that many existing industrial boilers be upgraded to meet a NOx requirement of less than 9ppm. As part of the rule's implementation, an extension was given to users who agreed to meet a NOx level of 6ppm. Other California air districts are proposing updated regulations that would require a NOx level of 5ppm. In most applications, the current versions of the *RMB* can operate at 6 to 7ppm, which easily allows them to meet a 9ppm NOx requirement. In order to meet a 5 or 6ppm NOx requirement, a burner was required that would reliably operate at 3 to 4ppm.

A solution was engineered by using multiple single-zone burners applied in unison, thus allowing configurations such as one-over-one, or three rows of two — to meet the required capacity, maintain the fully swirling flow through each burner, and fit within the confines of the given boiler furnace geometry. The *C-RMB* not only reduces costs and space requirements, but it is a proven alternative to the catalytic control of NOx emissions.

CELL BURNER ARRANGEMENT

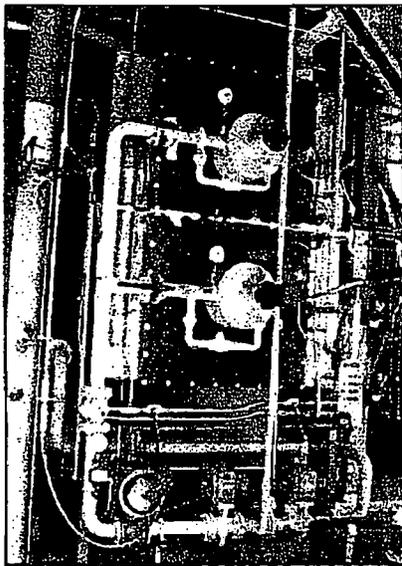
The patented ultra-low-NOx *C-RMB* utilizes multiple burner "cells," rather than one large single burner to break the combustion into multiple zones. The two-cell concept has proven extremely successful in several installations and can accommodate boilers with heat inputs up to 120 MMBtu/hr. Additional burner cells can be added for boilers requiring higher heat inputs.

C-RMB™ Cell-Rapid Mix Burner

| CUSTOMER NEEDS | OPERATIONS | AIR QUALITY |
|-----------------------|----------------------|-------------------------------------|
| • Easy to Install | • Simple Controls | • Meets BACT |
| • Quick Start-ups | • Excellent Turndown | • Ultra-Low-NOx |
| • Lower Cost | • Fast Ramp Rates | • Low CO |
| • Trouble-free Design | • No Moving Parts | • Low Emissions over Turndown Range |

INITIAL TESTING

The C-RMB performed exceptionally well in preliminary testing conducted at an end user site. Although the 30,000 lb/hr boiler was only required to meet NOx levels of 9ppm, which could be accomplished by installing a single RMB with 30% FGR, it was equipped with two burner "cells" and tested with higher FGR levels. The boiler was operated with NOx levels between 4 to 5ppm when operating with two burners at boiler loads up to around 70%. The FGR rate required to operate at this NOx level was consistent with the results from firing the burners independently — ranging from 40 to 45%.



C-RMB INSTALLATION

C-RMB MEETS PROJECT GOALS

The C-RMB was installed at a tomato processing facility in central California as part of the retrofit of two 80,000 lb/hr "D" style package watertube boilers. The facility was required to meet an emission limit of 6ppm NOx and 90ppm CO on both boilers. Both units were set up to operate below 5ppm NOx and 50ppm CO, and have been operated in automatic with a ramp rate from 20 to 100% firing rate within three minutes. Source testing of these boilers was performed and based on the successful results, the user ordered another C-RMB to retrofit a third boiler at this site.

COEN'S DEPENDABLE BURNER MANAGEMENT SYSTEMS AND EXCEPTIONAL SERVICE

Coen Company designs the highest quality, most advanced and dependable burner systems in the world. Our ultra-low-NOx technologies offer significant financial and performance benefits compared to other burner or post-combustion systems.

Coen's engineers take the time to listen, analyze and understand the needs of every burner management system's design. Each system is evaluated for fuel-firing configurations, individual burner characteristics, and operator interface preference.

Contact your Coen representative

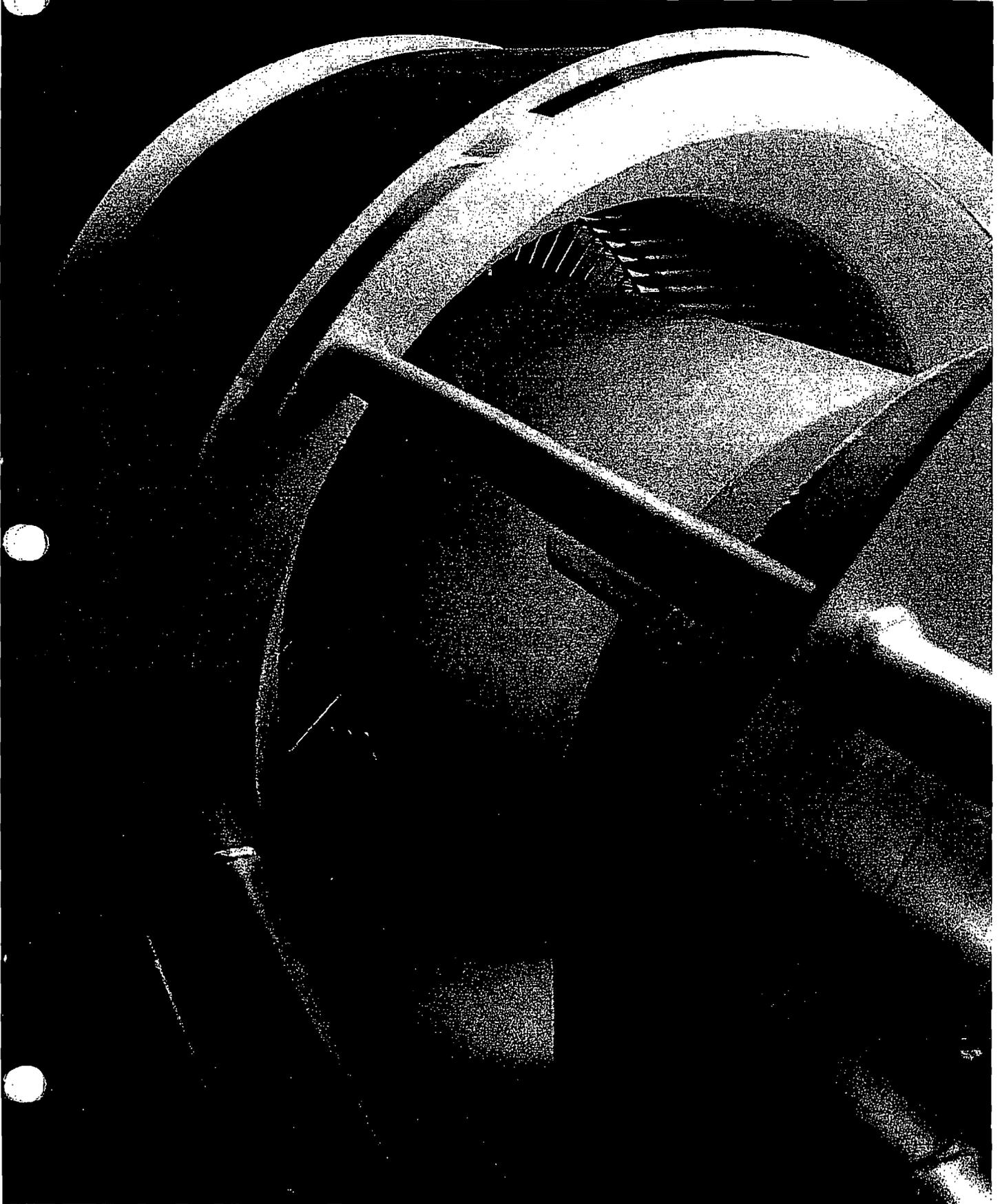
For more information, contact your Coen representative or call 1-800-368-2222. Coen Company, Inc. is a leader in burner management systems and services. We are committed to providing the highest quality products and services to our customers.



JOHN ZINK
JOHN ZINK COMPANY LLC

RMB™
Ultra-low Emissions Rapid Mix Burner

TODD®
Combustion



SCR Emission Levels. Low-NOx Burner Prices

Ultra low-NOx emissions used to come with a catch – the high costs and complexities of SCR systems. The patented TODD® Rapid Mix Burner (RMB) from John Zink Company revolutionizes the concept of economical NOx reduction by delivering single-digit NOx emissions, ultra-low CO and VOC emissions at a fraction of the cost of SCRs.

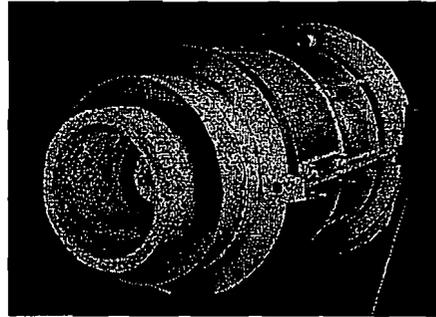
Quite simply, the RMB is the smart, ultra low-NOx solution that *delivers*.

Guaranteed Emissions

- Less than 9 ppm NOx
- Less than 25 ppm CO
- Less than 3 ppm VOC

With the added benefits of:

- easy installation and start-up;
- a compact, stable flame that eliminates the risk of flame impingement;
- no moving parts provides reliable and repeatable operation with nothing to adjust;
- streamlined air quality permitting tasks; and
- opportunities for emission-reduction credits.



Clean Combustion is the TODD® Solution

Previously, ultra low-NOx levels could only be achieved with SCRs – and hefty price tags. The TODD RMB has changed this with its revolutionary rapid-mix technology, which not only cuts costs but space requirements as well. Today, RMB technology is the best commercially available and proven alternative to the catalytic control of NOx emissions.

Breakthrough Thinking for Advanced Performance

The RMB's innovative technology comes from "start-over" thinking on avoiding the fundamental conditions for NOx formation:

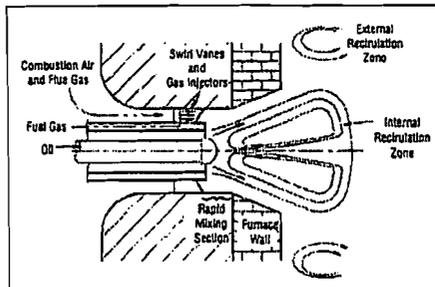
- fuel-rich regions with their potential for prompt NOx formation; and
- higher flame temperatures that produce thermal NOx.

The answer? A radically different gaseous injection and mixing system that utilizes:

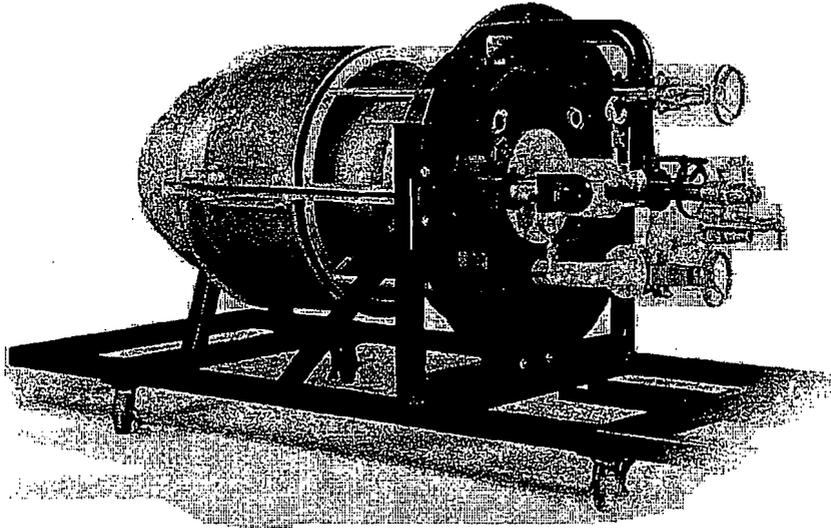
- rapid mixing of combustion air and fuel gas prior to the ignition point;
- burner geometry that produces an extremely stable flame; and
- the introduction of FGR to dramatically reduce peak flame temperatures.

The Ultimate NOx Control by Design

The basic RMB design utilizes a parallel-flow air register with no moving parts. Combustion air premixed with FGR enters the register where the entire mixture passes through a set of axial swirl vanes. These vanes, which are attached to a central gas reservoir, have hollow bases that are machined for gas injection. In fact, the swirl vanes actually are the gas injectors, which create the RMB's near perfect fuel/air mixture.



Desired stoichiometry and this ideal fuel/air mixture virtually eliminate prompt NOx (the first 15-20 ppm of NOx typically formed in other burners). Thermal NOx is then minimized using FGR mixed with combustion air upstream of the burner to control flame temperature.



Guaranteed Results, Reliable Operation

For boilers firing natural gas, the RMB's single-digit NOx and ultra-low CO and VOC emissions are guaranteed. Regardless of heat input. With or without preheated combustion air. What's more, a variety of gaseous fuels can be fired by the RMB with similar results. It's no surprise then that TODD burners account for more successful 9 ppm results than any other brand operating today.

When firing oil, the RMB uses TODD's advanced atomizers and FGR to provide NOx levels consistent with conventional low-NOx oil burners.

The RMB contains no moving parts and requires no burner adjustments. Its stable, extremely compact flame is half the length of a staged combustion flame, reducing the required furnace dimensions and eliminating impingement. Unlike other burners, this makes the RMB suitable for use on both new boilers and retrofits of existing units.

Earn Valuable Emission-Reduction Credits

The RMB helps reduce NOx levels below your local limits, which can result in emission-reduction credits that can be sold or traded on the open market. Credits can also be "banked" to offset future expansion, comply with future regulations, or make other retrofits unnecessary.

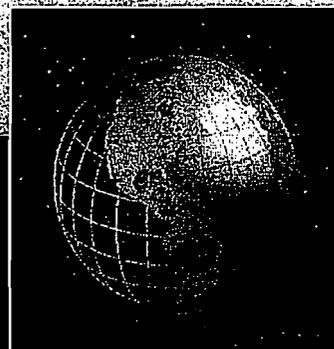
Ultra low-NOx and CO emissions also provide welcomed opportunities for positive or improved community relations. In many cases, ultra-low emissions can also keep new NOx sources below certain "trigger points" for permits, reviews, monitoring and other compliance activities.

In many cases, the result of installing a TODD RMB and achieving NOx levels below local limits can result in reduction credits that will actually pay for your retrofit.

The Right Ultra Low-NOx Solution for Your Application

The RMB is ideal for a variety of applications, including packaged water-tube boilers and field-erected units. In addition, the RMB offers outstanding performance on refractory-lined furnaces for dryers or fluid bed boiler warm up, meeting the same ultra-low emissions by operating with approximately 50 percent excess air and zero FGR. And because the RMB is easy to install and start up, it expedites the construction of new plants, expansions and retrofits.

As the world's provider of cost-effective, ultra-low NOx solutions for combustion applications, John Zink Company has helped companies across the globe turn NOx emission concerns into affordable answers. Find out today how TODD burners can start working for your plant to achieve the clean, economical combustion you're looking for.



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Fax: +1-203-925-0384
www.toddcombustion.com

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Madrid
Singapore
Sydney

Developing Clean Air
Solutions for Planet Earth™

*Manufactured Under Patent
Numbers 5,407,347 and 5,470,224*

JOHN ZINK
JOHN ZINK COMPANY LLC

ATTACHMENT IV
Fugitive Emissions

**Fugitive VOC Emissions From Components
Calculated From Component Counts and EPA ALR Emission Factors**

| Inlet Gas System (Process Flow Diagram No. 001) | | | | | | |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate (lb/day*component) | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 181 | 2,000 | 0.0000 | 7.392E-04 | 0.134 |
| | Light Crude Oil | 261 | 2,000 | 0.0000 | 7.392E-04 | 0.193 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 24 | 2,000 | 0.0000 | 2.376E-03 | 0.057 |
| | Light Crude Oil | 41 | 2,000 | 0.0000 | 3.379E-03 | 0.139 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Connectors | Gas/Light Liquid | 1,204 | 2,000 | 0.0000 | 4.488E-04 | 0.540 |
| | Light Crude Oil | 3,160 | 2,000 | 0.0000 | 4.541E-04 | 1.435 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 770 | 2,000 | 0.0000 | 1.373E-04 | 0.106 |
| | Light Crude Oil | 410 | 2,000 | 0.0000 | 8.448E-05 | 0.035 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 2.638 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

| P&ID Drawing No. 004 - Inlet Gas Separator | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor (lb/day*Component) | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 14 | 2,000 | 0.0000 | 7.392E-04 | 0.010 |
| | Light Crude Oil | 22 | 2,000 | 0.0000 | 7.392E-04 | 0.016 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 2 | 2,000 | 0.0000 | 2.376E-03 | 0.005 |
| | Light Crude Oil | 13 | 2,000 | 0.0000 | 3.379E-03 | 0.044 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 18 | 2,000 | 0.0000 | 4.488E-04 | 0.008 |
| | Light Crude Oil | 44 | 2,000 | 0.0000 | 4.541E-04 | 0.020 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 18 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 10 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.107 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 005 - Inlet Gas Coalescing Filter

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 14 | 2,000 | 0.0000 | 7.392E-04 | 0.010 |
| | Light Crude Oil | 39 | 2,000 | 0.0000 | 7.392E-04 | 0.029 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 12 | 2,000 | 0.0000 | 3.379E-03 | 0.041 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 24 | 2,000 | 0.0000 | 4.488E-04 | 0.011 |
| | Light Crude Oil | 64 | 2,000 | 0.0000 | 4.541E-04 | 0.029 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 17 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 16 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.130 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

P&ID Drawing No. 005 Inlet Gas Trim Cooler Components (EA-101)

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 250 | 2,000 | 0.0000 | 4.488E-04 | 0.112 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 6 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.113 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 006 - Inlet Gas Compression

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 27 | 2,000 | 0.0000 | 7.392E-04 | 0.020 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 16 | 2,000 | 0.0000 | 4.488E-04 | 0.007 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 58 | 2,000 | 0.0000 | 1.373E-04 | 0.008 |
| | Light Crude Oil | 2 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.042 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

P&ID Drawing No. 006 Rich Inlet Gas Compressor Components (C-104A/B)

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 52 | 2,000 | 0.0000 | 7.392E-04 | 0.038 |
| | Light Crude Oil | 100 | 2,000 | 0.0000 | 7.392E-04 | 0.074 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 6 | 2,000 | 0.0000 | 2.376E-03 | 0.014 |
| | Light Crude Oil | 8 | 2,000 | 0.0000 | 3.379E-03 | 0.027 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 442 | 2,000 | 0.0000 | 4.488E-04 | 0.198 |
| | Light Crude Oil | 526 | 2,000 | 0.0000 | 4.541E-04 | 0.239 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 290 | 2,000 | 0.0000 | 1.373E-04 | 0.040 |
| | Light Crude Oil | 190 | 2,000 | 0.0000 | 8.448E-05 | 0.016 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.647 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 006 Interstage Coolers (EA-105E/F) & Inlet Gas Coolers (EA-105A/B) Components

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|--|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 1,000 | 2,000 | 0.0000 | 4.541E-04 | 0.454 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 24 | 2,000 | 0.0000 | 1.373E-04 | 0.003 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.457 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

P&ID Drawing No. 007 - Inlet Gas Compression

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|--|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 22 | 2,000 | 0.0000 | 7.392E-04 | 0.016 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 4 | 2,000 | 0.0000 | 2.376E-03 | 0.010 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 12 | 2,000 | 0.0000 | 4.488E-04 | 0.005 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 43 | 2,000 | 0.0000 | 1.373E-04 | 0.006 |
| | Light Crude Oil | 2 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.037 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

Fugitive VOC Emissions From Components
Calculated From Component Counts and EPA ALR Emission Factors

P&ID Drawing No. 007 Rich Inlet Gas Compressors (C-104C/D) Components

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|--|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 52 | 2,000 | 0.0000 | 7.392E-04 | 0.038 |
| | Light Crude Oil | 100 | 2,000 | 0.0000 | 7.392E-04 | 0.074 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 6 | 2,000 | 0.0000 | 2.376E-03 | 0.014 |
| | Light Crude Oil | 8 | 2,000 | 0.0000 | 3.379E-03 | 0.027 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 442 | 2,000 | 0.0000 | 4.488E-04 | 0.198 |
| | Light Crude Oil | 526 | 2,000 | 0.0000 | 4.541E-04 | 0.239 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 290 | 2,000 | 0.0000 | 1.373E-04 | 0.040 |
| | Light Crude Oil | 190 | 2,000 | 0.0000 | 8.448E-05 | 0.016 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.647 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

P&ID Drawing No. 007 Interstage Coolers (EA-105G/H) & Inlet Gas Coolers Components (EA-105C/D)

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|--|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 1,000 | 2,000 | 0.0000 | 4.541E-04 | 0.454 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 24 | 2,000 | 0.0000 | 1.373E-04 | 0.003 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.457 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Components
Calculated From Component Counts and EPA ALR Emission Factors**

Mercury Removal (Process Flow Diagram No. 002)

| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate (lb/day*component) | Fugitive VOC Emissions (lb/day) |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 45 | 2,000 | 0.0000 | 7.392E-04 | 0.033 |
| | Light Crude Oil | 38 | 2,000 | 0.0000 | 7.392E-04 | 0.028 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 15 | 2,000 | 0.0000 | 2.376E-03 | 0.036 |
| | Light Crude Oil | 12 | 2,000 | 0.0000 | 3.379E-03 | 0.041 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Connectors | Gas/Light Liquid | 69 | 2,000 | 0.0000 | 4.488E-04 | 0.031 |
| | Light Crude Oil | 56 | 2,000 | 0.0000 | 4.541E-04 | 0.025 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 61 | 2,000 | 0.0000 | 1.373E-04 | 0.008 |
| | Light Crude Oil | 30 | 2,000 | 0.0000 | 8.448E-05 | 0.003 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.205 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

P&ID Drawing No. 008 - Inlet Gas Filter Separator

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor (lb/day*Component) | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 16 | 2,000 | 0.0000 | 7.392E-04 | 0.012 |
| | Light Crude Oil | 38 | 2,000 | 0.0000 | 7.392E-04 | 0.028 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 5 | 2,000 | 0.0000 | 2.376E-03 | 0.012 |
| | Light Crude Oil | 12 | 2,000 | 0.0000 | 3.379E-03 | 0.041 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 24 | 2,000 | 0.0000 | 4.488E-04 | 0.011 |
| | Light Crude Oil | 56 | 2,000 | 0.0000 | 4.541E-04 | 0.025 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 30 | 2,000 | 0.0000 | 1.373E-04 | 0.004 |
| | Light Crude Oil | 30 | 2,000 | 0.0000 | 8.448E-05 | 0.003 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.135 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 008A - Mercury Guard Bed

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 29 | 2,000 | 0.0000 | 7.392E-04 | 0.021 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 10 | 2,000 | 0.0000 | 2.376E-03 | 0.024 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 45 | 2,000 | 0.0000 | 4.488E-04 | 0.020 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 31 | 2,000 | 0.0000 | 1.373E-04 | 0.004 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.070 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Components
Calculated From Component Counts and EPA ALR Emission Factors**

O2 Removal (Process Flow Diagram No. 003)

| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate (lb/day*component) | Fugitive VOC Emissions (lb/day) |
|--|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 36 | 2,000 | 0.0000 | 7.392E-04 | 0.027 |
| | Light Crude Oil | 26 | 2,000 | 0.0000 | 7.392E-04 | 0.019 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 9 | 2,000 | 0.0000 | 2.376E-03 | 0.021 |
| | Light Crude Oil | 7 | 2,000 | 0.0000 | 3.379E-03 | 0.024 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Connectors | Gas/Light Liquid | 308 | 2,000 | 0.0000 | 4.488E-04 | 0.138 |
| | Light Crude Oil | 44 | 2,000 | 0.0000 | 4.541E-04 | 0.020 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 42 | 2,000 | 0.0000 | 1.373E-04 | 0.006 |
| | Light Crude Oil | 14 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.256 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

P&ID Drawing No. 008C - Oxygen Removal Heaters

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor (lb/day*Component) | Fugitive VOC Emissions (lb/day) |
|--|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 23 | 2,000 | 0.0000 | 7.392E-04 | 0.017 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 36 | 2,000 | 0.0000 | 4.488E-04 | 0.016 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 18 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.043 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 008D - Oxygen Removal Reactor

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 11 | 2,000 | 0.0000 | 7.392E-04 | 0.008 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 5 | 2,000 | 0.0000 | 2.376E-03 | 0.012 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 20 | 2,000 | 0.0000 | 4.488E-04 | 0.009 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 12 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.031 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

P&ID Drawing No. 008E Oxygen Removal Discharge Cooler and Scrubber

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 2 | 2,000 | 0.0000 | 7.392E-04 | 0.001 |
| | Light Crude Oil | 26 | 2,000 | 0.0000 | 7.392E-04 | 0.019 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 1 | 2,000 | 0.0000 | 2.376E-03 | 0.002 |
| | Light Crude Oil | 7 | 2,000 | 0.0000 | 3.379E-03 | 0.024 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 2 | 2,000 | 0.0000 | 4.488E-04 | 0.001 |
| | Light Crude Oil | 44 | 2,000 | 0.0000 | 4.541E-04 | 0.020 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 6 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 14 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.070 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

Fugitive VOC Emissions From Components
Calculated From Component Counts and EPA ALR Emission Factors

| P&ID Drawing No. 008E O2 Removal Gas Cooler (EA-608) Components | | | | | | |
|--|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 250 | 2,000 | 0.0000 | 4.488E-04 | 0.112 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 6 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.113 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Components
Calculated From Component Counts and EPA ALR Emission Factors**

| Inlet Gas Treating (Process Flow Diagram No. 004) | | | | | | |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate lb/day*component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 26 | 2,000 | 0.0000 | 7.392E-04 | 0.019 |
| | Light Crude Oil | 102 | 2,000 | 0.0000 | 7.392E-04 | 0.075 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 11 | 2,000 | 0.0000 | 2.376E-03 | 0.026 |
| | Light Crude Oil | 36 | 2,000 | 0.0000 | 3.379E-03 | 0.122 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Connectors | Gas/Light Liquid | 538 | 2,000 | 0.0000 | 4.488E-04 | 0.241 |
| | Light Crude Oil | 158 | 2,000 | 0.0000 | 4.541E-04 | 0.072 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 52 | 2,000 | 0.0000 | 1.373E-04 | 0.007 |
| | Light Crude Oil | 87 | 2,000 | 0.0000 | 8.448E-05 | 0.007 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.570 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

| P&ID Drawing No. 009 - Inlet Gas Amine Contactor | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 12 | 2,000 | 0.0000 | 7.392E-04 | 0.009 |
| | Light Crude Oil | 37 | 2,000 | 0.0000 | 7.392E-04 | 0.027 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 5 | 2,000 | 0.0000 | 2.376E-03 | 0.012 |
| | Light Crude Oil | 15 | 2,000 | 0.0000 | 3.379E-03 | 0.051 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 18 | 2,000 | 0.0000 | 4.488E-04 | 0.008 |
| | Light Crude Oil | 60 | 2,000 | 0.0000 | 4.541E-04 | 0.027 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 16 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 33 | 2,000 | 0.0000 | 8.448E-05 | 0.003 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.139 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

Fugitive VOC Emissions From Components
Calculated From Component Counts and EPA ALR Emission Factors

| P&ID Drawing No. 009 - Treated Gas Cooler (EA-109) Components | | | | | | |
|--|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 250 | 2,000 | 0.0000 | 4.488E-04 | 0.112 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 6 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.113 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

| P&ID Drawing No. 010 - Glycol Contactor | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 7.392E-04 | 0.002 |
| | Light Crude Oil | 27 | 2,000 | 0.0000 | 7.392E-04 | 0.020 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 7 | 2,000 | 0.0000 | 3.379E-03 | 0.024 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 6 | 2,000 | 0.0000 | 4.488E-04 | 0.003 |
| | Light Crude Oil | 42 | 2,000 | 0.0000 | 4.541E-04 | 0.019 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 2 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 24 | 2,000 | 0.0000 | 8.448E-05 | 0.002 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.077 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

Fugitive VOC Emissions From Components
Calculated From Component Counts and EPA ALR Emission Factors

P&ID Drawing No. 010 - Lean Glycol Cooler (EA-112) Components

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 250 | 2,000 | 0.0000 | 4.488E-04 | 0.112 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 6 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.113 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

P&ID Drawing No. 011 - Treated Gas Filter Separator

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 11 | 2,000 | 0.0000 | 7.392E-04 | 0.008 |
| | Light Crude Oil | 38 | 2,000 | 0.0000 | 7.392E-04 | 0.028 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 14 | 2,000 | 0.0000 | 3.379E-03 | 0.047 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 14 | 2,000 | 0.0000 | 4.488E-04 | 0.006 |
| | Light Crude Oil | 56 | 2,000 | 0.0000 | 4.541E-04 | 0.025 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 22 | 2,000 | 0.0000 | 1.373E-04 | 0.003 |
| | Light Crude Oil | 30 | 2,000 | 0.0000 | 8.448E-05 | 0.003 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.128 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

Glycol Regeneration (Process Flow Diagram No. 013)

| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate lb/day*component | Fugitive VOC Emissions (lb/day) |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 85 | 2,000 | 0.0000 | 7.392E-04 | 0.063 |
| | Light Crude Oil | 59 | 2,000 | 0.0000 | 7.392E-04 | 0.044 |
| | Heavy Crude Oil | 10 | 2,000 | 0.0000 | 4.118E-04 | 0.004 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 12 | 2,000 | 0.0000 | 2.376E-03 | 0.029 |
| | Light Crude Oil | 10 | 2,000 | 0.0000 | 3.379E-03 | 0.034 |
| | Heavy Crude Oil | 1 | 2,000 | 0.0000 | 1.690E-03 | 0.002 |
| Connectors | Gas/Light Liquid | 43 | 2,000 | 0.0000 | 4.488E-04 | 0.019 |
| | Light Crude Oil | 48 | 2,000 | 0.0000 | 4.541E-04 | 0.022 |
| | Heavy Crude Oil | 6 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 105 | 2,000 | 0.0000 | 1.373E-04 | 0.014 |
| | Light Crude Oil | 55 | 2,000 | 0.0000 | 8.448E-05 | 0.005 |
| | Heavy Crude Oil | 22 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.235 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

P&ID Drawing No. 057 - Glycol Regeneration

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 11 | 2,000 | 0.0000 | 7.392E-04 | 0.008 |
| | Light Crude Oil | 10 | 2,000 | 0.0000 | 7.392E-04 | 0.007 |
| | Heavy Crude Oil | 10 | 2,000 | 0.0000 | 4.118E-04 | 0.004 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 1 | 2,000 | 0.0000 | 1.690E-03 | 0.002 |
| Connectors | Gas/Light Liquid | 6 | 2,000 | 0.0000 | 4.488E-04 | 0.003 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 6 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 24 | 2,000 | 0.0000 | 1.373E-04 | 0.003 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 22 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.034 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

Glycol Regeneration Package

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Fraction Leak | EPA 1995 ALR TOG Factor | Fugitive VOC Emissions (lb/day) |
|--|-------------------|------------------|-----------------------|---------------|-------------------------|---------------------------------|
| Valves | Gas/Light Liquid | 74 | 2,000 | 0.0000 | 7.392E-04 | 0.055 |
| | Light Crude Oil | 49 | 2,000 | 0.0000 | 7.392E-04 | 0.036 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| Pump Seals | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 9 | 2,000 | 0.0000 | 2.376E-03 | 0.021 |
| | Light Crude Oil | 10 | 2,000 | 0.0000 | 3.379E-03 | 0.034 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 37 | 2,000 | 0.0000 | 4.488E-04 | 0.017 |
| | Light Crude Oil | 48 | 2,000 | 0.0000 | 4.641E-04 | 0.022 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| | Gas/Light Liquid | 81 | 2,000 | 0.0000 | 1.373E-04 | 0.011 |
| Flanges | Light Crude Oil | 55 | 2,000 | 0.0000 | 8.448E-05 | 0.005 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.200 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

Inlet Gas Dehydration (Process Flow Diagram No. 005)

| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate (lb/day*Component) | Fugitive VOC Emissions (lb/day) |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 77 | 2,000 | 0.0000 | 7.392E-04 | 0.057 |
| | Light Crude Oil | 27 | 2,000 | 0.0000 | 7.392E-04 | 0.020 |
| | Heavy Crude Oil | 7 | 2,000 | 0.0000 | 4.118E-04 | 0.003 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 18 | 2,000 | 0.0000 | 2.376E-03 | 0.043 |
| | Light Crude Oil | 8 | 2,000 | 0.0000 | 3.379E-03 | 0.027 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 1.690E-03 | 0.003 |
| Connectors | Gas/Light Liquid | 375 | 2,000 | 0.0000 | 4.488E-04 | 0.168 |
| | Light Crude Oil | 50 | 2,000 | 0.0000 | 4.541E-04 | 0.023 |
| | Heavy Crude Oil | 14 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 109 | 2,000 | 0.0000 | 1.373E-04 | 0.015 |
| | Light Crude Oil | 13 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 12 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.360 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

P&ID Drawing No. 012 - Molecular Sieve Dehydration

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor (lb/day*Component) | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 26 | 2,000 | 0.0000 | 7.392E-04 | 0.019 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 8 | 2,000 | 0.0000 | 2.376E-03 | 0.019 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 38 | 2,000 | 0.0000 | 4.488E-04 | 0.017 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 46 | 2,000 | 0.0000 | 1.373E-04 | 0.006 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.062 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 013 - Molecular Sieve Dehydration

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 9 | 2,000 | 0.0000 | 7.392E-04 | 0.007 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 4 | 2,000 | 0.0000 | 2.376E-03 | 0.010 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 17 | 2,000 | 0.0000 | 4.488E-04 | 0.008 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 13 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.026 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

P&ID Drawing No. 014 - Dry Gas Dust Filter

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 33 | 2,000 | 0.0000 | 7.392E-04 | 0.024 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 60 | 2,000 | 0.0000 | 4.488E-04 | 0.027 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 29 | 2,000 | 0.0000 | 1.373E-04 | 0.004 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.062 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 028 - Regeneration Gas Heater

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 7 | 2,000 | 0.0000 | 4.118E-04 | 0.003 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 1.690E-03 | 0.003 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 14 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 12 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.006 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

P&ID Drawing No. 029 - Regen Gas Cooler and Scrubber

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 9 | 2,000 | 0.0000 | 7.392E-04 | 0.007 |
| | Light Crude Oil | 27 | 2,000 | 0.0000 | 7.392E-04 | 0.020 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 8 | 2,000 | 0.0000 | 3.379E-03 | 0.027 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 10 | 2,000 | 0.0000 | 4.488E-04 | 0.004 |
| | Light Crude Oil | 50 | 2,000 | 0.0000 | 4.541E-04 | 0.023 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 15 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 13 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.091 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 029 - Regeneration Gas Cooler (EA-127) Components

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|--|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 250 | 2,000 | 0.0000 | 4.488E-04 | 0.112 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 6 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.113 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| NGL Recovery (Process Flow Diagram No. 006) | | | | | | |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate (lb/day*component) | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 66 | 2,000 | 0.0000 | 7.392E-04 | 0.049 |
| | Light Crude Oil | 125 | 2,000 | 0.0000 | 7.392E-04 | 0.092 |
| | Heavy Crude Oil | 7 | 2,000 | 0.0000 | 4.118E-04 | 0.003 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 1.003E-02 | 0.040 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 14 | 2,000 | 0.0000 | 2.376E-03 | 0.033 |
| | Light Crude Oil | 36 | 2,000 | 0.0000 | 3.379E-03 | 0.122 |
| | Heavy Crude Oil | 1 | 2,000 | 0.0000 | 1.690E-03 | 0.002 |
| Connectors | Gas/Light Liquid | 78 | 2,000 | 0.0000 | 4.488E-04 | 0.035 |
| | Light Crude Oil | 142 | 2,000 | 0.0000 | 4.541E-04 | 0.064 |
| | Heavy Crude Oil | 6 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 76 | 2,000 | 0.0000 | 1.373E-04 | 0.010 |
| | Light Crude Oil | 139 | 2,000 | 0.0000 | 8.448E-05 | 0.012 |
| | Heavy Crude Oil | 8 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.462 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

| P&ID Drawing No. 019 - Expander/Booster Compressor | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor (lb/day*Component) | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 18 | 2,000 | 0.0000 | 7.392E-04 | 0.013 |
| | Light Crude Oil | 6 | 2,000 | 0.0000 | 7.392E-04 | 0.004 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 1 | 2,000 | 0.0000 | 2.376E-03 | 0.002 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 22 | 2,000 | 0.0000 | 4.488E-04 | 0.010 |
| | Light Crude Oil | 8 | 2,000 | 0.0000 | 4.541E-04 | 0.004 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 19 | 2,000 | 0.0000 | 1.373E-04 | 0.003 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.037 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| P&ID Drawing No. 016 - Gas/Gas Exchanger | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 19 | 2,000 | 0.0000 | 7.392E-04 | 0.014 |
| | Light Crude Oil | 15 | 2,000 | 0.0000 | 7.392E-04 | 0.011 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 5 | 2,000 | 0.0000 | 3.379E-03 | 0.017 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 24 | 2,000 | 0.0000 | 4.488E-04 | 0.011 |
| | Light Crude Oil | 22 | 2,000 | 0.0000 | 4.541E-04 | 0.010 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 22 | 2,000 | 0.0000 | 1.373E-04 | 0.003 |
| | Light Crude Oil | 9 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.074 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

| P&ID Drawing No. 017 - Cold Separator | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 5 | 2,000 | 0.0000 | 7.392E-04 | 0.004 |
| | Light Crude Oil | 20 | 2,000 | 0.0000 | 7.392E-04 | 0.015 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 4 | 2,000 | 0.0000 | 2.376E-03 | 0.010 |
| | Light Crude Oil | 10 | 2,000 | 0.0000 | 3.379E-03 | 0.034 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 6 | 2,000 | 0.0000 | 4.488E-04 | 0.003 |
| | Light Crude Oil | 26 | 2,000 | 0.0000 | 4.541E-04 | 0.012 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 10 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 15 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.079 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 018 - Demethanizer Reboilers

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 16 | 2,000 | 0.0000 | 7.392E-04 | 0.012 |
| | Light Crude Oil | 21 | 2,000 | 0.0000 | 7.392E-04 | 0.016 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 4 | 2,000 | 0.0000 | 2.376E-03 | 0.010 |
| | Light Crude Oil | 6 | 2,000 | 0.0000 | 3.379E-03 | 0.020 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 26 | 2,000 | 0.0000 | 4.488E-04 | 0.012 |
| | Light Crude Oil | 34 | 2,000 | 0.0000 | 4.541E-04 | 0.015 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 9 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 16 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.087 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

P&ID Drawing No. 020 - Demethanizer

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 8 | 2,000 | 0.0000 | 7.392E-04 | 0.006 |
| | Light Crude Oil | 26 | 2,000 | 0.0000 | 7.392E-04 | 0.019 |
| | Heavy Crude Oil | 7 | 2,000 | 0.0000 | 4.118E-04 | 0.003 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 2 | 2,000 | 0.0000 | 2.376E-03 | 0.005 |
| | Light Crude Oil | 12 | 2,000 | 0.0000 | 3.379E-03 | 0.041 |
| | Heavy Crude Oil | 1 | 2,000 | 0.0000 | 1.690E-03 | 0.002 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 24 | 2,000 | 0.0000 | 4.541E-04 | 0.011 |
| | Heavy Crude Oil | 6 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 16 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 45 | 2,000 | 0.0000 | 8.448E-05 | 0.004 |
| | Heavy Crude Oil | 8 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.092 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 020A - Deethanizer Feed Pumps (from Demethanizer)

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 37 | 2,000 | 0.0000 | 7.392E-04 | 0.027 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 1.003E-02 | 0.040 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 3 | 2,000 | 0.0000 | 3.379E-03 | 0.010 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 28 | 2,000 | 0.0000 | 4.541E-04 | 0.013 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 50 | 2,000 | 0.0000 | 8.448E-05 | 0.004 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.095 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| Residue Gas Compression (Process Flow Diagram No. 007) | | | | | | |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate (lb/day*component) | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 62 | 2,000 | 0.0000 | 7.392E-04 | 0.046 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 22 | 2,000 | 0.0000 | 3.379E-03 | 0.074 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 121 | 2,000 | 0.0000 | 4.541E-04 | 0.055 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 24 | 2,000 | 0.0000 | 8.448E-05 | 0.002 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.177 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

| P&ID Drawing No. 021 - Residue Gas Compression | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor (lb/day*Component) | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 20 | 2,000 | 0.0000 | 7.392E-04 | 0.015 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 8 | 2,000 | 0.0000 | 3.379E-03 | 0.027 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 34 | 2,000 | 0.0000 | 4.541E-04 | 0.015 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 9 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.058 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 022 - Residue Gas Compressors

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 2 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.000 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

P&ID Drawing No. 022A - Residue Gas Compressors

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 1 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.000 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| P&ID Drawing No. 23 - Residue Gas Coalescer | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|---|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 20 | 2,000 | 0.0000 | 7.392E-04 | 0.015 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 7 | 2,000 | 0.0000 | 3.379E-03 | 0.024 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 43 | 2,000 | 0.0000 | 4.541E-04 | 0.020 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 6 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.058 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

| P&ID Drawing No. 023A - Residue Gas Coalescer | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|---|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 22 | 2,000 | 0.0000 | 7.392E-04 | 0.016 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 7 | 2,000 | 0.0000 | 3.379E-03 | 0.024 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 44 | 2,000 | 0.0000 | 4.541E-04 | 0.020 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 6 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.060 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| Depropanizer (Process Flow Diagram No. 009) | | | | | | |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate lb/day*component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 28 | 2,000 | 0.0000 | 7.392E-04 | 0.021 |
| | Light Crude Oil | 97 | 2,000 | 0.0000 | 7.392E-04 | 0.072 |
| | Heavy Crude Oil | 10 | 2,000 | 0.0000 | 4.118E-04 | 0.004 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 1.003E-02 | 0.040 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 4 | 2,000 | 0.0000 | 2.376E-03 | 0.010 |
| | Light Crude Oil | 23 | 2,000 | 0.0000 | 3.379E-03 | 0.078 |
| | Heavy Crude Oil | 1 | 2,000 | 0.0000 | 1.690E-03 | 0.002 |
| Connectors | Gas/Light Liquid | 1,032 | 2,000 | 0.0000 | 4.488E-04 | 0.463 |
| | Light Crude Oil | 40 | 2,000 | 0.0000 | 4.541E-04 | 0.018 |
| | Heavy Crude Oil | 92 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 64 | 2,000 | 0.0000 | 1.373E-04 | 0.009 |
| | Light Crude Oil | 99 | 2,000 | 0.0000 | 8.448E-05 | 0.008 |
| | Heavy Crude Oil | 14 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.724 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

| P&ID Drawing No. 030 - Depropanizer System | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 11 | 2,000 | 0.0000 | 7.392E-04 | 0.008 |
| | Light Crude Oil | 30 | 2,000 | 0.0000 | 7.392E-04 | 0.022 |
| | Heavy Crude Oil | 10 | 2,000 | 0.0000 | 4.118E-04 | 0.004 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 8 | 2,000 | 0.0000 | 3.379E-03 | 0.027 |
| | Heavy Crude Oil | 1 | 2,000 | 0.0000 | 1.690E-03 | 0.002 |
| Connectors | Gas/Light Liquid | 14 | 2,000 | 0.0000 | 4.488E-04 | 0.006 |
| | Light Crude Oil | 36 | 2,000 | 0.0000 | 4.541E-04 | 0.016 |
| | Heavy Crude Oil | 10 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 13 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 27 | 2,000 | 0.0000 | 8.448E-05 | 0.002 |
| | Heavy Crude Oil | 14 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.097 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| P&ID Drawing No. 031 - Depropanizer Reflux Condenser | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 12 | 2,000 | 0.0000 | 7.392E-04 | 0.009 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 7.392E-04 | 0.003 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 16 | 2,000 | 0.0000 | 4.488E-04 | 0.007 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 18 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 14 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.023 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

| P&ID Drawing No. 031 - Depropanizer Reflux Condensers (EA-137A/B/C/D) Components | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 1,000 | 2,000 | 0.0000 | 4.488E-04 | 0.449 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 24 | 2,000 | 0.0000 | 1.373E-04 | 0.003 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.452 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| P&ID Drawing No. 032 - Depropanizer Reflux Drum | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 5 | 2,000 | 0.0000 | 7.392E-04 | 0.004 |
| | Light Crude Oil | 63 | 2,000 | 0.0000 | 7.392E-04 | 0.047 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 1.003E-02 | 0.040 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 1 | 2,000 | 0.0000 | 2.376E-03 | 0.002 |
| | Light Crude Oil | 15 | 2,000 | 0.0000 | 3.379E-03 | 0.051 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 2 | 2,000 | 0.0000 | 4.488E-04 | 0.001 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 4.541E-04 | 0.002 |
| | Heavy Crude Oil | 82 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 9 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 58 | 2,000 | 0.0000 | 8.448E-05 | 0.005 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.152 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| Debutanizer (Process Flow Diagram Nos. 010) | | | | | | |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate (lb/day*component) | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 21 | 2,000 | 0.0000 | 7.392E-04 | 0.016 |
| | Light Crude Oil | 93 | 2,000 | 0.0000 | 7.392E-04 | 0.069 |
| | Heavy Crude Oil | 10 | 2,000 | 0.0000 | 4.118E-04 | 0.004 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 1.003E-02 | 0.040 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 23 | 2,000 | 0.0000 | 3.379E-03 | 0.078 |
| | Heavy Crude Oil | 1 | 2,000 | 0.0000 | 1.690E-03 | 0.002 |
| Connectors | Gas/Light Liquid | 520 | 2,000 | 0.0000 | 4.488E-04 | 0.233 |
| | Light Crude Oil | 130 | 2,000 | 0.0000 | 4.541E-04 | 0.059 |
| | Heavy Crude Oil | 10 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 45 | 2,000 | 0.0000 | 1.373E-04 | 0.006 |
| | Light Crude Oil | 89 | 2,000 | 0.0000 | 8.448E-05 | 0.008 |
| | Heavy Crude Oil | 14 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.521 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

| P&ID Drawing No. 033 - Debutanizer System | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor (lb/day*Component) | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 10 | 2,000 | 0.0000 | 7.392E-04 | 0.007 |
| | Light Crude Oil | 23 | 2,000 | 0.0000 | 7.392E-04 | 0.017 |
| | Heavy Crude Oil | 10 | 2,000 | 0.0000 | 4.118E-04 | 0.004 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 8 | 2,000 | 0.0000 | 3.379E-03 | 0.027 |
| | Heavy Crude Oil | 1 | 2,000 | 0.0000 | 1.690E-03 | 0.002 |
| Connectors | Gas/Light Liquid | 14 | 2,000 | 0.0000 | 4.488E-04 | 0.006 |
| | Light Crude Oil | 38 | 2,000 | 0.0000 | 4.541E-04 | 0.017 |
| | Heavy Crude Oil | 10 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 10 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 24 | 2,000 | 0.0000 | 8.448E-05 | 0.002 |
| | Heavy Crude Oil | 14 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.091 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 034 - Debutanizer Reflux Condenser

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 6 | 2,000 | 0.0000 | 7.392E-04 | 0.004 |
| | Light Crude Oil | 6 | 2,000 | 0.0000 | 7.392E-04 | 0.004 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 4 | 2,000 | 0.0000 | 4.488E-04 | 0.002 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 4.541E-04 | 0.002 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 14 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 14 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.016 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

P&ID Drawing No. 034 - Debutanizer Reflux Condensers (EA-142A/B) Components

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 500 | 2,000 | 0.0000 | 4.488E-04 | 0.224 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 12 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.226 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 035 - Debutanizer Reflux Drum

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 5 | 2,000 | 0.0000 | 7.392E-04 | 0.004 |
| | Light Crude Oil | 64 | 2,000 | 0.0000 | 7.392E-04 | 0.047 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 1.003E-02 | 0.040 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 15 | 2,000 | 0.0000 | 3.379E-03 | 0.051 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 2 | 2,000 | 0.0000 | 4.488E-04 | 0.001 |
| | Light Crude Oil | 88 | 2,000 | 0.0000 | 4.541E-04 | 0.040 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 9 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 51 | 2,000 | 0.0000 | 8.448E-05 | 0.004 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.188 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| Deethanizer (Process Flow Diagram No. 008) | | | | | | |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate lb/day*component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 12 | 2,000 | 0.0000 | 7.392E-04 | 0.009 |
| | Light Crude Oil | 31 | 2,000 | 0.0000 | 7.392E-04 | 0.023 |
| | Heavy Crude Oil | 10 | 2,000 | 0.0000 | 4.118E-04 | 0.004 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 5 | 2,000 | 0.0000 | 2.376E-03 | 0.012 |
| | Light Crude Oil | 5 | 2,000 | 0.0000 | 3.379E-03 | 0.017 |
| | Heavy Crude Oil | 1 | 2,000 | 0.0000 | 1.690E-03 | 0.002 |
| Connectors | Gas/Light Liquid | 14 | 2,000 | 0.0000 | 4.488E-04 | 0.006 |
| | Light Crude Oil | 42 | 2,000 | 0.0000 | 4.541E-04 | 0.019 |
| | Heavy Crude Oil | 10 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 18 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 27 | 2,000 | 0.0000 | 8.448E-05 | 0.002 |
| | Heavy Crude Oil | 16 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.096 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

| P&ID Drawing No. 025 - Deethanizer System | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 28 | 2,000 | 0.0000 | 7.392E-04 | 0.021 |
| | Heavy Crude Oil | 10 | 2,000 | 0.0000 | 4.118E-04 | 0.004 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 5 | 2,000 | 0.0000 | 3.379E-03 | 0.017 |
| | Heavy Crude Oil | 1 | 2,000 | 0.0000 | 1.690E-03 | 0.002 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 36 | 2,000 | 0.0000 | 4.541E-04 | 0.016 |
| | Heavy Crude Oil | 10 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 26 | 2,000 | 0.0000 | 8.448E-05 | 0.002 |
| | Heavy Crude Oil | 14 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.062 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 026 - Deethanizer Reflux Condenser

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 12 | 2,000 | 0.0000 | 7.392E-04 | 0.009 |
| | Light Crude Oil | 3 | 2,000 | 0.0000 | 7.392E-04 | 0.002 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 5 | 2,000 | 0.0000 | 2.376E-03 | 0.012 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 14 | 2,000 | 0.0000 | 4.488E-04 | 0.006 |
| | Light Crude Oil | 6 | 2,000 | 0.0000 | 4.541E-04 | 0.003 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 18 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 1 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.035 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

Refrigeration System (Process Flow Diagram No. 011)

| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate lb/day*component | Fugitive VOC Emissions (lb/day) |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 200 | 2,000 | 0.0000 | 7.207E-04 | 0.144 |
| | Light Crude Oil | 238 | 2,000 | 0.0000 | 7.019E-04 | 0.167 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 4.118E-04 | 0.001 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 33 | 2,000 | 0.0000 | 2.304E-03 | 0.076 |
| | Light Crude Oil | 33 | 2,000 | 0.0000 | 2.765E-03 | 0.091 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 1.690E-03 | 0.003 |
| Connectors | Gas/Light Liquid | 2,692 | 2,000 | 0.0000 | 2.811E-04 | 0.757 |
| | Light Crude Oil | 1,118 | 2,000 | 0.0000 | 4.468E-04 | 0.499 |
| | Heavy Crude Oil | 4 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 786 | 2,000 | 0.0000 | 1.319E-04 | 0.104 |
| | Light Crude Oil | 404 | 2,000 | 0.0000 | 8.176E-05 | 0.033 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 1.876 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

P&ID Drawing No. 044 - Refrigerant Suction Scrubber

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 12 | 2,000 | 0.0000 | 7.392E-04 | 0.009 |
| | Light Crude Oil | 10 | 2,000 | 0.0000 | 7.392E-04 | 0.007 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 4.118E-04 | 0.001 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 3.379E-03 | 0.014 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 1.690E-03 | 0.003 |
| Connectors | Gas/Light Liquid | 12 | 2,000 | 0.0000 | 4.488E-04 | 0.005 |
| | Light Crude Oil | 20 | 2,000 | 0.0000 | 4.541E-04 | 0.009 |
| | Heavy Crude Oil | 4 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 17 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 5 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.058 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 045 - Refrigerant Compressors

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 42 | 2,000 | 0.0000 | 7.392E-04 | 0.031 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 9 | 2,000 | 0.0000 | 2.376E-03 | 0.021 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 24 | 2,000 | 0.0000 | 4.488E-04 | 0.011 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 70 | 2,000 | 0.0000 | 1.373E-04 | 0.010 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.073 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

P&ID Drawing No. 045 - Refrigerant Compressors (C-166A/B/C) Components

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 78 | 2,000 | 0.0000 | 7.392E-04 | 0.058 |
| | Light Crude Oil | 150 | 2,000 | 0.0000 | 7.392E-04 | 0.111 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 9 | 2,000 | 0.0000 | 2.376E-03 | 0.021 |
| | Light Crude Oil | 12 | 2,000 | 0.0000 | 3.379E-03 | 0.041 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 663 | 2,000 | 0.0000 | 4.488E-04 | 0.298 |
| | Light Crude Oil | 789 | 2,000 | 0.0000 | 4.541E-04 | 0.358 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 435 | 2,000 | 0.0000 | 1.373E-04 | 0.060 |
| | Light Crude Oil | 285 | 2,000 | 0.0000 | 8.448E-05 | 0.024 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.970 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 045A - Refrigerant Compressors

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 14 | 2,000 | 0.0000 | 7.392E-04 | 0.010 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 8 | 2,000 | 0.0000 | 4.488E-04 | 0.004 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 24 | 2,000 | 0.0000 | 1.373E-04 | 0.003 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.024 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

P&ID Drawing No. 045A - Refrigerant Compressor (C-166D) Components

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 26 | 2,000 | 0.0000 | 7.392E-04 | 0.019 |
| | Light Crude Oil | 50 | 2,000 | 0.0000 | 7.392E-04 | 0.037 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 3.379E-03 | 0.014 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 221 | 2,000 | 0.0000 | 4.488E-04 | 0.099 |
| | Light Crude Oil | 263 | 2,000 | 0.0000 | 4.541E-04 | 0.119 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 145 | 2,000 | 0.0000 | 1.373E-04 | 0.020 |
| | Light Crude Oil | 95 | 2,000 | 0.0000 | 8.448E-05 | 0.008 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.323 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| P&ID Drawing No. 046 - Refrigerant Flash Drum | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 9 | 2,000 | 0.0000 | 7.392E-04 | 0.007 |
| | Light Crude Oil | 16 | 2,000 | 0.0000 | 7.392E-04 | 0.012 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 5 | 2,000 | 0.0000 | 2.376E-03 | 0.012 |
| | Light Crude Oil | 7 | 2,000 | 0.0000 | 3.379E-03 | 0.024 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 8 | 2,000 | 0.0000 | 4.488E-04 | 0.004 |
| | Light Crude Oil | 28 | 2,000 | 0.0000 | 4.541E-04 | 0.013 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 18 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 6 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.073 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

| P&ID Drawing No. 047 - Refrigerant Condenser | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 6 | 2,000 | 0.0000 | 7.392E-04 | 0.004 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 12 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.006 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 047 - Refrigerant Condensers (EA-149A/B/C) Components

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 750 | 2,000 | 0.0000 | 4.488E-04 | 0.337 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 18 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.339 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

P&ID Drawing No. 048 - Refrigerant Condenser

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 8 | 2,000 | 0.0000 | 7.392E-04 | 0.006 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 16 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.008 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| P&ID Drawing No. 048 - Refrigerant Condensers (EA-149D/E/F/G) Components | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 1,000 | 2,000 | 0.0000 | 4.488E-04 | 0.449 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 24 | 2,000 | 0.0000 | 1.373E-04 | 0.003 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.452 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

| P&ID Drawing No. 049 - Refrigerant Surge Drum | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 5 | 2,000 | 0.0000 | 7.392E-04 | 0.004 |
| | Light Crude Oil | 12 | 2,000 | 0.0000 | 7.392E-04 | 0.009 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 1 | 2,000 | 0.0000 | 2.376E-03 | 0.002 |
| | Light Crude Oil | 6 | 2,000 | 0.0000 | 3.379E-03 | 0.020 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 6 | 2,000 | 0.0000 | 4.488E-04 | 0.003 |
| | Light Crude Oil | 18 | 2,000 | 0.0000 | 4.541E-04 | 0.008 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 7 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 13 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.048 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

Amine System (Process Flow Diagram No. 012)

| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate lb/day*component | Fugitive VOC Emissions (lb/day) |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 74 | 2,000 | 0.0000 | 7.392E-04 | 0.055 |
| | Light Crude Oil | 49 | 2,000 | 0.0000 | 7.392E-04 | 0.036 |
| | Heavy Crude Oil | 10 | 2,000 | 0.0000 | 4.118E-04 | 0.004 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 9 | 2,000 | 0.0000 | 2.376E-03 | 0.021 |
| | Light Crude Oil | 10 | 2,000 | 0.0000 | 3.379E-03 | 0.034 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Connectors | Gas/Light Liquid | 37 | 2,000 | 0.0000 | 4.488E-04 | 0.017 |
| | Light Crude Oil | 48 | 2,000 | 0.0000 | 4.541E-04 | 0.022 |
| | Heavy Crude Oil | 4 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 83 | 2,000 | 0.0000 | 1.373E-04 | 0.011 |
| | Light Crude Oil | 60 | 2,000 | 0.0000 | 8.448E-05 | 0.005 |
| | Heavy Crude Oil | 18 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.205 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

P&ID Drawing No. 056 - Amine Regeneration

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 10 | 2,000 | 0.0000 | 4.118E-04 | 0.004 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 4 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 2 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 5 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 18 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.005 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| Amine Regeneration Package | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 74 | 2,000 | 0.0000 | 7.392E-04 | 0.055 |
| | Light Crude Oil | 49 | 2,000 | 0.0000 | 7.392E-04 | 0.036 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 9 | 2,000 | 0.0000 | 2.376E-03 | 0.021 |
| | Light Crude Oil | 10 | 2,000 | 0.0000 | 3.379E-03 | 0.034 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 37 | 2,000 | 0.0000 | 4.488E-04 | 0.017 |
| | Light Crude Oil | 48 | 2,000 | 0.0000 | 4.541E-04 | 0.022 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 81 | 2,000 | 0.0000 | 1.373E-04 | 0.011 |
| | Light Crude Oil | 55 | 2,000 | 0.0000 | 8.448E-05 | 0.005 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| | | | | | 19.000000 | 0.200 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

Liquid Products Storage - Butane (Process Flow Diagram No. 014)

| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate (lb/day*component) | Fugitive VOC Emissions (lb/day) |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 19 | 2,000 | 0.0000 | 7.392E-04 | 0.014 |
| | Light Crude Oil | 71 | 2,000 | 0.0000 | 7.392E-04 | 0.052 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 1.003E-02 | 0.040 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 5 | 2,000 | 0.0000 | 2.376E-03 | 0.012 |
| | Light Crude Oil | 13 | 2,000 | 0.0000 | 3.379E-03 | 0.044 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Connectors | Gas/Light Liquid | 22 | 2,000 | 0.0000 | 4.488E-04 | 0.010 |
| | Light Crude Oil | 320 | 2,000 | 0.0000 | 4.541E-04 | 0.145 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 27 | 2,000 | 0.0000 | 1.373E-04 | 0.004 |
| | Light Crude Oil | 103 | 2,000 | 0.0000 | 8.448E-05 | 0.009 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.330 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

P&ID Drawing No. 037 - Butane Storage

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor (lb/day*Component) | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 19 | 2,000 | 0.0000 | 7.392E-04 | 0.014 |
| | Light Crude Oil | 32 | 2,000 | 0.0000 | 7.392E-04 | 0.024 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 5 | 2,000 | 0.0000 | 2.376E-03 | 0.012 |
| | Light Crude Oil | 10 | 2,000 | 0.0000 | 3.379E-03 | 0.034 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 22 | 2,000 | 0.0000 | 4.488E-04 | 0.010 |
| | Light Crude Oil | 32 | 2,000 | 0.0000 | 4.541E-04 | 0.015 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 27 | 2,000 | 0.0000 | 1.373E-04 | 0.004 |
| | Light Crude Oil | 45 | 2,000 | 0.0000 | 8.448E-05 | 0.004 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.115 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 037 - Butane Cooler (EA-301) Components

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|--|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 250 | 2,000 | 0.0000 | 4.541E-04 | 0.114 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 6 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.114 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

P&ID Drawing No. 040 - Butane Pipeline Pumps

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|--|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 39 | 2,000 | 0.0000 | 7.392E-04 | 0.029 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 1.003E-02 | 0.040 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 3 | 2,000 | 0.0000 | 3.379E-03 | 0.010 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 38 | 2,000 | 0.0000 | 4.541E-04 | 0.017 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 52 | 2,000 | 0.0000 | 8.448E-05 | 0.004 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.101 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

Liquid Products Storage - Gasoline (Process Flow Diagram No. 014)

| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate lb/day*component | Fugitive VOC Emissions (lb/day) |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 20 | 2,000 | 0.0000 | 7.392E-04 | 0.015 |
| | Light Crude Oil | 56 | 2,000 | 0.0000 | 7.392E-04 | 0.041 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 1.003E-02 | 0.040 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 1 | 2,000 | 0.0000 | 2.376E-03 | 0.002 |
| | Light Crude Oil | 5 | 2,000 | 0.0000 | 3.379E-03 | 0.017 |
| | Heavy Crude Oil | 1 | 2,000 | 0.0000 | 1.690E-03 | 0.002 |
| Connectors | Gas/Light Liquid | 14 | 2,000 | 0.0000 | 4.488E-04 | 0.006 |
| | Light Crude Oil | 306 | 2,000 | 0.0000 | 4.541E-04 | 0.139 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 28 | 2,000 | 0.0000 | 1.373E-04 | 0.004 |
| | Light Crude Oil | 84 | 2,000 | 0.0000 | 8.448E-05 | 0.007 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.273 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

P&ID Drawing No. 038 - Gasoline Storage

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 20 | 2,000 | 0.0000 | 7.392E-04 | 0.015 |
| | Light Crude Oil | 17 | 2,000 | 0.0000 | 7.392E-04 | 0.013 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 1 | 2,000 | 0.0000 | 2.376E-03 | 0.002 |
| | Light Crude Oil | 2 | 2,000 | 0.0000 | 3.379E-03 | 0.007 |
| | Heavy Crude Oil | 1 | 2,000 | 0.0000 | 1.690E-03 | 0.002 |
| Connectors | Gas/Light Liquid | 14 | 2,000 | 0.0000 | 4.488E-04 | 0.006 |
| | Light Crude Oil | 18 | 2,000 | 0.0000 | 4.541E-04 | 0.008 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 28 | 2,000 | 0.0000 | 1.373E-04 | 0.004 |
| | Light Crude Oil | 26 | 2,000 | 0.0000 | 8.448E-05 | 0.002 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.059 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| P&ID Drawing No. 038 - Gasoline Cooler (EA-302) Components | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 250 | 2,000 | 0.0000 | 4.541E-04 | 0.114 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 6 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.114 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

| P&ID Drawing No. 041 - Gasoline Pipeline Pumps | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 39 | 2,000 | 0.0000 | 7.392E-04 | 0.029 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 1.003E-02 | 0.040 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 3 | 2,000 | 0.0000 | 3.379E-03 | 0.010 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 38 | 2,000 | 0.0000 | 4.541E-04 | 0.017 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 52 | 2,000 | 0.0000 | 8.448E-05 | 0.004 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.101 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

Liquid Products Storage - Propane (Process Flow Diagram No. 014)

| Type of Component | Component Service1, 2 | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate lb/day*component | Fugitive VOC Emissions (lb/day) |
|---|-----------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 19 | 2,000 | 0.0000 | 7.392E-04 | 0.014 |
| | Light Crude Oil | 71 | 2,000 | 0.0000 | 7.392E-04 | 0.052 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 1.003E-02 | 0.040 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 5 | 2,000 | 0.0000 | 2.376E-03 | 0.012 |
| | Light Crude Oil | 13 | 2,000 | 0.0000 | 3.379E-03 | 0.044 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Connectors | Gas/Light Liquid | 22 | 2,000 | 0.0000 | 4.488E-04 | 0.010 |
| | Light Crude Oil | 320 | 2,000 | 0.0000 | 4.541E-04 | 0.145 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 27 | 2,000 | 0.0000 | 1.373E-04 | 0.004 |
| | Light Crude Oil | 103 | 2,000 | 0.0000 | 8.448E-05 | 0.009 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.330 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

P&ID Drawing No. 036 - Propane Storage

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 19 | 2,000 | 0.0000 | 7.392E-04 | 0.014 |
| | Light Crude Oil | 32 | 2,000 | 0.0000 | 7.392E-04 | 0.024 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 5 | 2,000 | 0.0000 | 2.376E-03 | 0.012 |
| | Light Crude Oil | 10 | 2,000 | 0.0000 | 3.379E-03 | 0.034 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 22 | 2,000 | 0.0000 | 4.488E-04 | 0.010 |
| | Light Crude Oil | 32 | 2,000 | 0.0000 | 4.541E-04 | 0.015 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 27 | 2,000 | 0.0000 | 1.373E-04 | 0.004 |
| | Light Crude Oil | 45 | 2,000 | 0.0000 | 8.448E-05 | 0.004 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.115 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 036 - Propane Cooler (EA-300) Components

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 250 | 2,000 | 0.0000 | 4.541E-04 | 0.114 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 6 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.114 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

P&ID Drawing No. 039 - Propane Pipeline Pumps

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 39 | 2,000 | 0.0000 | 7.392E-04 | 0.029 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 1.003E-02 | 0.040 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 3 | 2,000 | 0.0000 | 3.379E-03 | 0.010 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 38 | 2,000 | 0.0000 | 4.541E-04 | 0.017 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 52 | 2,000 | 0.0000 | 8.448E-05 | 0.004 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.101 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

Hot Oil System (Process Flow Diagram No. 015)

| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate lb/day*component | Fugitive VOC Emissions (lb/day) |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 53 | 2,000 | 0.0000 | 7.392E-04 | 0.039 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 106 | 2,000 | 0.0000 | 4.118E-04 | 0.044 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 4 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 8 | 2,000 | 0.0000 | 2.376E-03 | 0.019 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 22 | 2,000 | 0.0000 | 1.690E-03 | 0.037 |
| Connectors | Gas/Light Liquid | 102 | 2,000 | 0.0000 | 4.488E-04 | 0.046 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 142 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 28 | 2,000 | 0.0000 | 1.373E-04 | 0.004 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 106 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.189 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

P&ID Drawing No. 051 - Hot Oil Expansion Tank

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 11 | 2,000 | 0.0000 | 7.392E-04 | 0.008 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 21 | 2,000 | 0.0000 | 4.118E-04 | 0.009 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 10 | 2,000 | 0.0000 | 1.690E-03 | 0.017 |
| Connectors | Gas/Light Liquid | 20 | 2,000 | 0.0000 | 4.488E-04 | 0.009 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 30 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 6 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 17 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.051 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| P&ID Drawing No. 052 - Hot Oil Pumps | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 32 | 2,000 | 0.0000 | 4.118E-04 | 0.013 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 4 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 4 | 2,000 | 0.0000 | 1.690E-03 | 0.007 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 40 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 34 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.020 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

| P&ID Drawing No. 053 - Hot Oil Heater | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 53 | 2,000 | 0.0000 | 4.118E-04 | 0.022 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 8 | 2,000 | 0.0000 | 1.690E-03 | 0.014 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 72 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 55 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.035 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 054 - F-147 Burner Controls

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 30 | 2,000 | 0.0000 | 7.392E-04 | 0.022 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 1 | 2,000 | 0.0000 | 2.376E-03 | 0.002 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 42 | 2,000 | 0.0000 | 4.488E-04 | 0.019 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 14 | 2,000 | 0.0000 | 1.373E-04 | 0.002 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.045 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

P&ID Drawing No. 055 - F-147 Burners

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 12 | 2,000 | 0.0000 | 7.392E-04 | 0.009 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 4 | 2,000 | 0.0000 | 2.376E-03 | 0.010 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 40 | 2,000 | 0.0000 | 4.488E-04 | 0.018 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 8 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.037 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

Fuel Gas System (Process Flow Diagram No. 016)

| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate lb/day*component | Fugitive VOC Emissions (lb/day) |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Valves | Gas/Light Liquid | 102 | 2,000 | 0.0000 | 7.392E-04 | 0.075 |
| | Light Crude Oil | 136 | 2,000 | 0.0000 | 7.392E-04 | 0.101 |
| | Heavy Crude Oil | 16 | 2,000 | 0.0000 | 4.118E-04 | 0.007 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 14 | 2,000 | 0.0000 | 2.376E-03 | 0.033 |
| | Light Crude Oil | 24 | 2,000 | 0.0000 | 3.379E-03 | 0.081 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 1.690E-03 | 0.003 |
| Connectors | Gas/Light Liquid | 966 | 2,000 | 0.0000 | 4.488E-04 | 0.434 |
| | Light Crude Oil | 596 | 2,000 | 0.0000 | 4.541E-04 | 0.271 |
| | Heavy Crude Oil | 32 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 406 | 2,000 | 0.0000 | 1.373E-04 | 0.056 |
| | Light Crude Oil | 205 | 2,000 | 0.0000 | 8.448E-05 | 0.017 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 1.077 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

P&ID Drawing No. 042 - Ethane/CO2 Glycol Contactor

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 36 | 2,000 | 0.0000 | 7.392E-04 | 0.027 |
| | Heavy Crude Oil | 16 | 2,000 | 0.0000 | 4.118E-04 | 0.007 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 16 | 2,000 | 0.0000 | 3.379E-03 | 0.054 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 1.690E-03 | 0.003 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 70 | 2,000 | 0.0000 | 4.541E-04 | 0.032 |
| | Heavy Crude Oil | 32 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 13 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.124 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| P&ID Drawing No. 043 Ethane/CO2 Compressor | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 26 | 2,000 | 0.0000 | 7.392E-04 | 0.019 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 4 | 2,000 | 0.0000 | 2.376E-03 | 0.010 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 14 | 2,000 | 0.0000 | 4.488E-04 | 0.006 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 49 | 2,000 | 0.0000 | 1.373E-04 | 0.007 |
| | Light Crude Oil | 1 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| | | | | | | 19.000000 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

| P&ID Drawing No. 043 - Ethane/CO2 Compressor (C-215A) Components | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 26 | 2,000 | 0.0000 | 7.392E-04 | 0.019 |
| | Light Crude Oil | 50 | 2,000 | 0.0000 | 7.392E-04 | 0.037 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 3.379E-03 | 0.014 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 221 | 2,000 | 0.0000 | 4.488E-04 | 0.099 |
| | Light Crude Oil | 263 | 2,000 | 0.0000 | 4.541E-04 | 0.119 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 145 | 2,000 | 0.0000 | 1.373E-04 | 0.020 |
| | Light Crude Oil | 95 | 2,000 | 0.0000 | 8.448E-05 | 0.008 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.323 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| P&ID Drawing No. 043 - Ethane Cooler (EA-295A) Components | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 250 | 2,000 | 0.0000 | 4.488E-04 | 0.112 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 10 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.114 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

| P&ID Drawing No. 043A Ethane/CO2 Compressor | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 24 | 2,000 | 0.0000 | 7.392E-04 | 0.018 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 4 | 2,000 | 0.0000 | 2.376E-03 | 0.010 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 10 | 2,000 | 0.0000 | 4.488E-04 | 0.004 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 47 | 2,000 | 0.0000 | 1.373E-04 | 0.006 |
| | Light Crude Oil | 1 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.038 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

P&ID Drawing No. 043A - Ethane/CO2 Compressor (C-215B) Components

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|--|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 26 | 2,000 | 0.0000 | 7.392E-04 | 0.019 |
| | Light Crude Oil | 50 | 2,000 | 0.0000 | 7.392E-04 | 0.037 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 3.379E-03 | 0.014 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 221 | 2,000 | 0.0000 | 4.488E-04 | 0.099 |
| | Light Crude Oil | 263 | 2,000 | 0.0000 | 4.541E-04 | 0.119 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 145 | 2,000 | 0.0000 | 1.373E-04 | 0.020 |
| | Light Crude Oil | 95 | 2,000 | 0.0000 | 8.448E-05 | 0.008 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.323 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

P&ID Drawing No. 043A - Ethane Cooler (EA-295B) Components

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
|--|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 250 | 2,000 | 0.0000 | 4.488E-04 | 0.112 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 10 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.114 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

Fuel Gas Scrubber System (Process Flow Diagram No. 016)

| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate lb/day*component |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|
| Valves | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 |
| | Light Crude Oil | 21 | 2,000 | 0.0000 | 7.392E-04 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 |
| Others | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 |
| | Light Crude Oil | 8 | 2,000 | 0.0000 | 3.379E-03 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 |
| Connectors | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 |
| | Light Crude Oil | 38 | 2,000 | 0.0000 | 4.541E-04 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 |
| Flanges | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 |
| | Light Crude Oil | 10 | 2,000 | 0.0000 | 8.448E-05 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | |

Weight percentage of VOC in the total organic compounds in gas?

Weight percentage of VOC in the total organic compounds in oil?

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

P&ID Drawing No. 024 - Fuel Gas Scrubber

| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component |
|-------------------|-------------------|------------------|-----------------------|---------------|--|
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 |
| | Light Crude Oil | 21 | 2,000 | 0.0000 | 7.392E-04 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 |
| | Light Crude Oil | 8 | 2,000 | 0.0000 | 3.379E-03 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 |
| | Light Crude Oil | 38 | 2,000 | 0.0000 | 4.541E-04 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 |
| | Light Crude Oil | 10 | 2,000 | 0.0000 | 8.448E-05 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| Flare System | | | | | | |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate (lb/day*component) | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 6 | 2,000 | 0.0000 | 7.392E-04 | 0.004 |
| | Light Crude Oil | 41 | 2,000 | 0.0000 | 7.392E-04 | 0.030 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 4.118E-04 | 0.001 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 1.003E-02 | 0.040 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 13 | 2,000 | 0.0000 | 3.379E-03 | 0.044 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Connectors | Gas/Light Liquid | 12 | 2,000 | 0.0000 | 4.488E-04 | 0.005 |
| | Light Crude Oil | 60 | 2,000 | 0.0000 | 4.541E-04 | 0.027 |
| | Heavy Crude Oil | 4 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 6 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 27 | 2,000 | 0.0000 | 8.448E-05 | 0.002 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.162 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

| P&ID Drawing No. 065 - Flare Header | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor (lb/day*Component) | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 6 | 2,000 | 0.0000 | 7.392E-04 | 0.004 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 12 | 2,000 | 0.0000 | 4.488E-04 | 0.005 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.010 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| P&ID Drawing No. 066 - Flare Knock-out Drum | | | | | | |
|--|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 41 | 2,000 | 0.0000 | 7.392E-04 | 0.030 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 4.118E-04 | 0.001 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 1.003E-02 | 0.040 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 2 | 2,000 | 0.0000 | 2.376E-03 | 0.005 |
| | Light Crude Oil | 13 | 2,000 | 0.0000 | 3.379E-03 | 0.044 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 60 | 2,000 | 0.0000 | 4.541E-04 | 0.027 |
| | Heavy Crude Oil | 4 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 27 | 2,000 | 0.0000 | 8.448E-05 | 0.002 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.150 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

| P&ID Drawing No. 067 - Flare System | | | | | | |
|--|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 1 | 2,000 | 0.0000 | 2.376E-03 | 0.002 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.003 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| Open Drain Sumps (3) | | | | | | |
|--|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate (lb/day*Component) | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 10 | 2,000 | 0.0000 | 7.392E-04 | 0.007 |
| | Heavy Crude Oil | 7 | 2,000 | 0.0000 | 4.118E-04 | 0.003 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 1.003E-02 | 0.040 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 4 | 2,000 | 0.0000 | 2.376E-03 | 0.010 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 3.379E-03 | 0.014 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 1.690E-03 | 0.003 |
| Connectors | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 10 | 2,000 | 0.0000 | 4.541E-04 | 0.005 |
| | Heavy Crude Oil | 8 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 8 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 18 | 2,000 | 0.0000 | 8.448E-05 | 0.002 |
| | Heavy Crude Oil | 11 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.084 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

| P&ID Drawing No. 062 - Open Drain Sump (Miscellaneous Drains) | | | | | | |
|--|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor (lb/day*Component) | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 3 | 2,000 | 0.0000 | 7.392E-04 | 0.002 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 2 | 2,000 | 0.0000 | 1.003E-02 | 0.020 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 2 | 2,000 | 0.0000 | 2.376E-03 | 0.005 |
| | Light Crude Oil | 2 | 2,000 | 0.0000 | 3.379E-03 | 0.007 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 2 | 2,000 | 0.0000 | 4.541E-04 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 4 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 7 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.036 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| P&ID Drawing No. 068 - Amine and Glycol Sumps (Amine Sump) | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 7 | 2,000 | 0.0000 | 7.392E-04 | 0.005 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 2 | 2,000 | 0.0000 | 1.003E-02 | 0.020 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 1 | 2,000 | 0.0000 | 2.376E-03 | 0.002 |
| | Light Crude Oil | 2 | 2,000 | 0.0000 | 3.379E-03 | 0.007 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 8 | 2,000 | 0.0000 | 4.541E-04 | 0.004 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 2 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 11 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.039 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

| P&ID Drawing No. 068 - Amine and Glycol Sumps (Glycol Sump) | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Heavy Crude Oil | 7 | 2,000 | 0.0000 | 4.118E-04 | 0.003 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 1 | 2,000 | 0.0000 | 2.376E-03 | 0.002 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 2 | 2,000 | 0.0000 | 1.690E-03 | 0.003 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 4.541E-04 | 0.000 |
| | Heavy Crude Oil | 8 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 2 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 11 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.009 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| Methanol Injection Pump | | | | | | |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate lb/day*component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 7 | 2,000 | 0.0000 | 7.392E-04 | 0.005 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 2 | 2,000 | 0.0000 | 1.003E-02 | 0.020 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 1 | 2,000 | 0.0000 | 3.379E-03 | 0.003 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 16 | 2,000 | 0.0000 | 4.541E-04 | 0.007 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.036 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

| P&ID Drawing No. 062 - Open Drain Sump and Methanol Injection Pump | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor lb/day*Component | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 7 | 2,000 | 0.0000 | 7.392E-04 | 0.005 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 2 | 2,000 | 0.0000 | 1.003E-02 | 0.020 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 2.376E-03 | 0.000 |
| | Light Crude Oil | 1 | 2,000 | 0.0000 | 3.379E-03 | 0.003 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 16 | 2,000 | 0.0000 | 4.541E-04 | 0.007 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.036 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| Amine Storage Tank | | | | | | |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate (lb/day*component) | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 8 | 2,000 | 0.0000 | 7.392E-04 | 0.006 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 2 | 2,000 | 0.0000 | 1.003E-02 | 0.020 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 2 | 2,000 | 0.0000 | 2.376E-03 | 0.005 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 8 | 2,000 | 0.0000 | 4.541E-04 | 0.004 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 11 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.036 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

| P&ID Drawing No. 069 - Amine Storage Tank | | | | | | |
|---|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor (lb/day*Component) | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 8 | 2,000 | 0.0000 | 7.392E-04 | 0.006 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 2 | 2,000 | 0.0000 | 1.003E-02 | 0.020 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 2 | 2,000 | 0.0000 | 2.376E-03 | 0.005 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 8 | 2,000 | 0.0000 | 4.541E-04 | 0.004 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 1.373E-04 | 0.000 |
| | Light Crude Oil | 11 | 2,000 | 0.0000 | 8.448E-05 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.036 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| Produced Water Storage Tank | | | | | | |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate (lb/day*component) | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 2 | 2,000 | 0.0000 | 7.392E-04 | 0.001 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 2 | 2,000 | 0.0000 | 4.541E-04 | 0.001 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 4 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 1 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.010 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

| P&ID Drawing No. 071 - Produced Water and Slop Tank (Produced Water Tank) | | | | | | |
|--|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor (lb/day*Component) | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 2 | 2,000 | 0.0000 | 7.392E-04 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 2 | 2,000 | 0.0000 | 4.541E-04 | 0.001 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 4 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 1 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.010 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

**Fugitive VOC Emissions From Associated Components
Calculated From Component Counts and EPA ALR Emission Factors**

| Slop Tank | | | | | | |
|---|----------------------------------|------------------|------------------------------|--------------------------------|---|---------------------------------|
| Type of Component | Component Service ^{1,2} | Component Counts | Weighted Average Leak (ppmv) | Weighted Average Leak Fraction | Weighted Average Leak Rate (lb/day*component) | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 3 | 2,000 | 0.0000 | 7.392E-04 | 0.002 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 4.541E-04 | 0.002 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 4 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 5 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Light Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| | Heavy Crude Oil | 0 | 0 | 0.0000 | 0.000E+00 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.012 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | ----- |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | ----- |

1. Fugitive emission from components in liquid service were calculated with "Light Crude Oil" emission factors.
2. Fugitive emission from Hot Oil Service and Glycol Service were calculated using "Heavy Oil" emission factors.

| P&ID Drawing No. 071 - Produced Water and Slop Tank (Slop Tank) | | | | | | |
|--|-------------------|------------------|-----------------------|---------------|--|---------------------------------|
| Type of Component | Component Service | Component Counts | Leak Threshold (ppmv) | Leak Fraction | EPA 1995 ALR TOG Factor (lb/day*Component) | Fugitive VOC Emissions (lb/day) |
| Valves | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 7.392E-04 | 0.000 |
| | Light Crude Oil | 3 | 2,000 | 0.0000 | 7.392E-04 | 0.002 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 4.118E-04 | 0.000 |
| Pump Seals | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 1.214E-02 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 1.003E-02 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Others | Gas/Light Liquid | 3 | 2,000 | 0.0000 | 2.376E-03 | 0.007 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.379E-03 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 1.690E-03 | 0.000 |
| Connectors | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 4.488E-04 | 0.000 |
| | Light Crude Oil | 4 | 2,000 | 0.0000 | 4.541E-04 | 0.002 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Flanges | Gas/Light Liquid | 4 | 2,000 | 0.0000 | 1.373E-04 | 0.001 |
| | Light Crude Oil | 5 | 2,000 | 0.0000 | 8.448E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 0.000E+00 | 0.000 |
| Open-ended Lines | Gas/Light Liquid | 0 | 2,000 | 0.0000 | 3.960E-04 | 0.000 |
| | Light Crude Oil | 0 | 2,000 | 0.0000 | 3.538E-05 | 0.000 |
| | Heavy Crude Oil | 0 | 2,000 | 0.0000 | 3.168E-04 | 0.000 |
| Total Fugitive VOC Emissions From Associated Components (lb/day) | | | | | | 0.012 |
| Weight percentage of VOC in the total organic compounds in gas? | | | | | | 100.0 |
| Weight percentage of VOC in the total organic compounds in oil? | | | | | | 100.0 |

ATTACHMENT V
Information on IC Engine



**Fire
Power**

EPA Tier 3 Emission Data
Fire Pump NSPS Compliant

CFP7E-F10 Fire Pump Driver

Type: 4 Cycle; In-Line; 6 Cylinder
Aspiration: Turbocharged, Charge Air Cooled

| 15 PPM Diesel Fuel | | | | | | | | | | | | | | | | | | |
|--------------------|-----|------------------|------|----------------------------|-------|----------|-------|-------|-------------------|-------|----------|-------|-------|-------------|-----|----------|-------|-----|
| RPM | BHP | Fuel Consumption | | D2 Cycle Exhaust Emissions | | | | | | | | | | Exhaust | | | | |
| | | Gal/Hr | L/hr | Grams per BHP - HR | | | | | Grams per kW - HR | | | | | Temperature | | Gas Flow | | |
| | | | | NMHC | NOx | NMHC+NOx | CO | PM | NMHC | NOx | NMHC+NOx | CO | PM | °F | °C | CFM | L/sec | |
| 1470 | 153 | 7.9 | 29.9 | | | | | | | | | | | | 906 | 486 | 937 | 442 |
| 1760 | 175 | 9.0 | 34.1 | | | | | | | | | | | | 821 | 438 | 1061 | 501 |
| 1900 | 162 | 9.2 | 34.8 | | | | | | | | | | | | 781 | 416 | 1079 | 509 |
| 2100 | 171 | 9.0 | 34.1 | 0.062 | 2.475 | 2.537 | 1.193 | 0.111 | 0.083 | 3.319 | 3.402 | 1.600 | 0.149 | 795 | 424 | 1255 | 592 | |
| 2350 | 172 | 9.2 | 34.8 | | | | | | | | | | | 805 | 429 | 1375 | 649 | |
| 2600 | 174 | 9.8 | 37.1 | | | | | | | | | | | 886 | 474 | 1513 | 714 | |
| 2700 | 127 | 7.2 | 27.3 | | | | | | | | | | | 877 | 469 | 1392 | 657 | |

The emissions values above are based on CARB approved calculations for converting EPA (500 ppm) fuel to CARB (15 ppm) fuel.

| 300-4000 PPM Diesel Fuel | | | | | | | | | | | | | | | | | | |
|--------------------------|-----|------------------|------|----------------------------|-------|----------|-------|-------|-------------------|-------|----------|-------|-------|-------------|-----|----------|-------|-----|
| RPM | BHP | Fuel Consumption | | D2 Cycle Exhaust Emissions | | | | | | | | | | Exhaust | | | | |
| | | Gal/Hr | L/hr | Grams per BHP - HR | | | | | Grams per kW - HR | | | | | Temperature | | Gas Flow | | |
| | | | | NMHC | NOx | NMHC+NOx | CO | PM | NMHC | NOx | NMHC+NOx | CO | PM | °F | °C | CFM | L/sec | |
| 1470 | 153 | 7.9 | 29.9 | | | | | | | | | | | | 906 | 486 | 937 | 442 |
| 1760 | 175 | 9.0 | 34.1 | | | | | | | | | | | | 821 | 438 | 1061 | 501 |
| 1900 | 162 | 9.2 | 34.8 | | | | | | | | | | | | 781 | 416 | 1079 | 509 |
| 2100 | 171 | 9.0 | 34.1 | 0.075 | 2.685 | 2.759 | 1.193 | 0.127 | 0.1 | 3.600 | 3.700 | 1.600 | 0.170 | 795 | 424 | 1255 | 592 | |
| 2350 | 172 | 9.2 | 34.8 | | | | | | | | | | | 805 | 429 | 1375 | 649 | |
| 2600 | 174 | 9.8 | 37.1 | | | | | | | | | | | 886 | 474 | 1513 | 714 | |
| 2700 | 127 | 7.2 | 27.3 | | | | | | | | | | | 877 | 469 | 1392 | 657 | |

QSB6.7 Base Model Manufactured by Cummins Inc.
- Using fuel rating 91422

Reference EPA Standard Engine Family: ACEXL0409AAB
Reference CARB Executive Order: U-R-002-0516

No special options needed to meet current regulation emissions for all 50 states

Test Methods:

EPA/CARB Nonroad emissions recorded per 40CFR89 (ref. ISO8178-1) and weighted at load points prescribed in Subpart E, Appendix A, for Constant Speed Engines (ref. ISO8178-4, D2).

Diesel Fuel Specifications:

Cetane Number: 40-48
Reference: ASTM D975 No. 2-D

Reference Conditions:

Air Inlet Temperature: 25°C (77°F)
Fuel Inlet Temperature: 40°C (104°F)
Barometric Pressure: 100 kPa (29.53 in Hg)
Humidity: 10.7 g/kg (75 grains H₂O/lb) of dry air; required for NOx correction

Restrictions: Intake Restriction set to a maximum allowable limit for clean filter; Exhaust Back Pressure set to maximum allowable limit.

Tests conducted using alternate test methods, instrumentation, fuel or reference conditions can yield different results.



Fire Power

Engine Performance Curve

Cummins Fire Power
De Pere, WI 54115

<http://www.cumminsfirepower.com>

Basic Engine Model
CFP7E-F10

Curve Number: FR - 9142

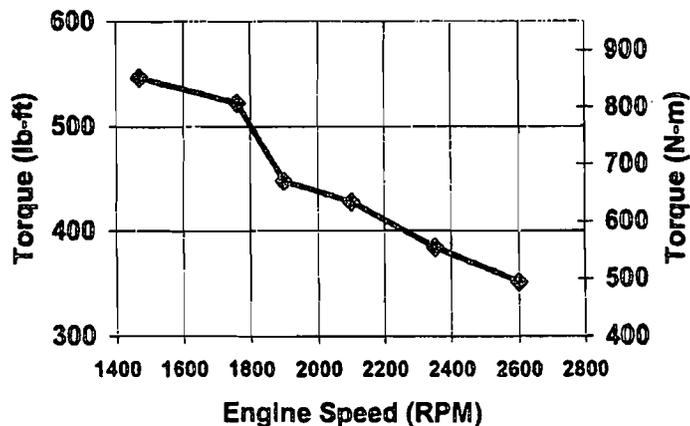
Revision Date: March 201

Engine Family: **Industrial**
Displacement - in.3 (liter): **409 (6.7)**
Compression Ratio: **17.2:1**
No. of Cylinders: **6**
Fuel System: **Bosch Electronic CR**

CPL Code: **8611**
Emission Certification: **EPA/CARB Tier 3**
Aspiration: **Turbocharged, Chrg Air Cooled**
Engine Configuration: **D31331CX03**
Minimum speed: **1470 RPM**
Maximum speed: **2700 RPM**

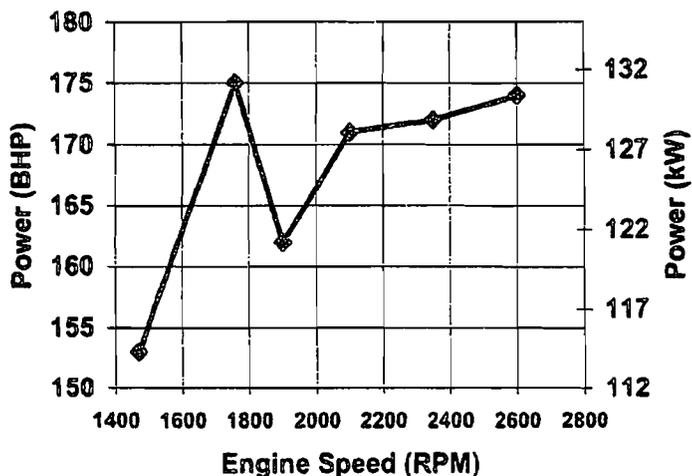
Torque Output

| RPM | lb-ft | N-m |
|------|-------|-----|
| 1470 | 547 | 741 |
| 1760 | 522 | 708 |
| 1900 | 448 | 607 |
| 2100 | 428 | 580 |
| 2350 | 384 | 521 |
| 2600 | 351 | 477 |
| 2700 | 247 | 335 |



Horsepower Output

| RPM | BHP | kW |
|------|-----|-----|
| 1470 | 153 | 114 |
| 1760 | 175 | 130 |
| 1900 | 162 | 121 |
| 2100 | 171 | 128 |
| 2350 | 172 | 128 |
| 2600 | 174 | 130 |
| 2700 | 127 | 95 |



1. Curves shown above represent mature gross engine performance capabilities obtained and corrected in accordance with SAE J1349 conditions of 29.61 in Hg (100 kPa) barometric pressure [300 ft. (91.4 m) altitude], 77 °F (25 °C) inlet air temperature, and 0.30 in. Hg (1 kPa) water vapor pressure with No. 2 diesel fuel.

2. The engine may be operated without changing the fuel setting up to 300 ft. (91.4 m) altitude and up to 77 °F (25 °C) ambient temperature. For sustained operation at high altitudes, the fuel rate of the engine should be adjusted to limit performance by 3% per 1,000 ft. (305 m) above 300 ft. (91.4 m) altitude. For sustained operation at high ambient temperatures, the fuel rate of the engine should be adjusted to limit performance by 1% per 10 °F above 77 °F (2% per 11 °C above 25 °C).

3. Engine is certified at speeds between 1470 and 2700 RPM.

Jim Vanden Boogard
Director of Engineering

Certified Within 5

| | | |
|---|---|---|
|  | Engine Datasheet Cummins Fire Power De Pere, WI 54115 http://www.cumminsfirepower.com | Basic Engine Model CFP7E-F10,F20,F30,F40,F50,F60 |
| | Configuration Number: D313013CX03 Installation Drawing: 15547 | Curve Number: FR - 914 CPL Code: 86 Engine Family: Industr Revision Date: March 20 |

General Engine Data

| | |
|--|-------------------------------|
| Type..... | 4 Cycle; In-Line; 6 Cylinder |
| Aspiration..... | Turbocharged, Chrg Air Cooled |
| Bore & Stroke - in. (mm)..... | 4.21 x 4.88 (107 x 124) |
| Displacement - in. ³ (litre)..... | 409 (6.7) |
| Compression Ratio..... | 17.2:1 |
| Valves per Cylinder - Intake..... | 4 |
| - Exhaust..... | 4 |
| Maximum Allowable Bending Moment @ Rear Face of Block - lb.-ft. (N-m)..... | 1000 (1356) |

Air Induction System

| | |
|---|-----------------------|
| Max. Temperature Rise Between Ambient Air and Engine Air Inlet - °F (°C)..... | 30.6 (17.0) |
| Maximum Inlet Restriction with Dirty Filter - in. H ₂ O (mm H ₂ O)..... | 25 (635) |
| Recommended Air Cleaner Element - (Standard)..... | FLG Industrial AH1196 |

Lubrication System

| | |
|--|--|
| Oil Pressure Range at Rated - PSI (kPa) | 40-70 (276-414) |
| Oil Capacity of Pan (High - Low) - U.S. quarts (litre) | 15-13 (14-16) |
| Total System Capacity - U.S. Gal. (litre) | 4.0 (15.1) |
| Recommended Lube Oil Filter | Fleetguard (Cummins)..... LF3970 (3401544) |

Cooling System

| | |
|---|-----------------|
| Raw Water Working Pressure Range at Heat Exchanger - PSI (kPa) | 60 (413) MAX |
| Recommended Min. Water Supply Pipe Size to Heat Exchanger - in. (mm)..... | 0.75 (19.05) |
| Recommended Min. Water Disch. Pipe Size From Heat Exchanger - in. (mm)..... | 1.00 (25.40) |
| Coolant Water Capacity (Engine Side) - U.S. gal. (litre) | 3.75 (14.2) |
| Standard Thermostat - Type..... | Modulating |
| - Range - deg F (deg C) | 180-199 (82-93) |
| Minimum Raw Water Flow | |
| with Water Temperatures to 50 °F (10 °C) - U.S. GPM (litre/s) | 20 (1.26) |
| with Water Temperatures to 75 °F (24 °C) - U.S. GPM (litre/s) | 25 (1.58) |
| with Water Temperatures to 90 °F (32 °C) - U.S. GPM (litre/s) | 30 (1.89) |

A jacket water heater is mandatory on this engine. The recommended heater wattage is 1500 down to 40 °F (4 °C).

Exhaust System

| | |
|---|-------------|
| Max. Back Pressure Imposed by Complete Exhaust System in in. H ₂ O (kPa) | 40.8 (10.2) |
| Exhaust Pipe Size Normally Acceptable - in. (mm) | 4.0 (102) |

Noise Emissions

| | |
|-----------------|-----------|
| Top..... | 92.5 dBa |
| Right Side..... | 94.3 dBa |
| Left Side..... | 93.8 dBa |
| Front..... | 92.1 dBa |
| Exhaust..... | 114.2 dBa |

The noise emission values are estimated sound pressure levels at 3.3 ft. (1 m.).

Fuel Supply / Drain System

| Fuel Consumption | 1470 | 1760 | 1900 | 2100 | 2350 | 2600 | 2700 |
|------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| CFP7E-F60 Gal/hr (L/hr) | 11.3 (42.7) | 12.9 (48.9) | 12.0 (45.5) | 12.8 (48.4) | 13.1 (49.6) | 14.0 (53.1) | 10.3 (38) |
| CFP7E-F50 Gal/hr (L/hr) | 10.6 (40.1) | 12.1 (46.0) | 11.3 (42.8) | 12.0 (45.4) | 12.4 (46.8) | 13.2 (49.9) | 9.6 (36) |
| CFP7E-F40 Gal/hr (L/hr) | 9.9 (37.6) | 11.4 (43.0) | 10.6 (40.0) | 11.3 (42.6) | 11.6 (43.8) | 12.3 (46.7) | 9.0 (34) |
| CFP7E-F30 Gal/hr (L/hr) | 9.1 (34.6) | 10.6 (40.1) | 9.8 (37.3) | 10.5 (40.7) | 10.8 (40.7) | 11.5 (43.5) | 8.4 (31) |
| CFP7E-F20 Gal/hr (L/hr) | 8.6 (32.5) | 9.8 (37.2) | 9.1 (34.5) | 9.7 (36.7) | 10.0 (37.9) | 10.6 (40.3) | 7.8 (29) |
| CFP7E-F10 Gal/hr (L/hr) | 7.9 (29.9) | 9.0 (34.2) | 9.2 (31.8) | 9.0 (33.9) | 9.2 (34.8) | 9.8 (37.1) | 7.2 (27) |

| Fuel Type | Number 2 Diesel Only | |
|--|-----------------------------|------------------|
| Minimum Supply Line Size - in. (mm) | 0.5 | (12.70) |
| Minimum Drain Line Size - in. (mm) | 0.375 | (9.53) |
| Maximum Fuel Height above C/L Fire Pump ft (m) | 30 | (9) |
| Recommended Fuel Filter - Primary | Fleetguard (Cummins)..... | FF5612 (4989106) |
| - Secondary | FS1212 | (3308638) |
| Maximum Restriction @ Lift Pump-Inlet - With Clean Filter - in. Hg (mm Hg) | 5.0 | (127) |
| Maximum Restriction @ Lift Pump-Inlet - With Dirty Filter - in. Hg (mm Hg) | 10.0 | (254) |
| Maximum Return Line Restriction - Without Check Valves - in. Hg (mm Hg) | 5.9 | (150) |
| Minimum Fuel Tank Vent Capability - ft ³ /hr (m ³ /hr) | 7.1 | (0.21) |
| Maximum Fuel Temperature @ Lift Pump Inlet - °F (°C) | 158 | (70) |

Starting and Electrical System

| | 12V | 24V |
|---|------------|------------|
| Min. Recommended Batt. Capacity - Cold Soak at 0°F (-18°C) or Above | | |
| Engine Only - Cold Cranking Amperes - (CCA) | 1500 | 900 |
| Engine Only - Reserve Capacity - Minutes | 430 | 430 |
| Battery Cable Size (Maximum Cable Length Not to Exceed 5 ft. [1.5 m] AWG) | 2/0 | 2/0 |
| Maximum Resistance of Starting Circuit - Ohms | 0.001 | 0.002 |
| Typical Cranking Speed - RPM | 120 | 120 |
| Alternator (Standard), Internally Regulated - Ampere | 95 | 70 |
| Wiring for Automatic Starting (Negative Ground) | Standard | |
| Reference Wiring Diagram | 16260 | |

Performance Data

All data is based on the engine operating with fuel system, water pump, lubricating oil pump, air cleaner, and alternator; not included are compressor, fan, optional equipment, and driven components. Data is based on operation at SAE standard J139 conditions of 300 ft. (91.4 m) altitude, 29.61 in. (752 mm) Hg dry barometer, and 77 °F (25 °C) intake air temperature, using No.2 diesel or a fuel corresponding to ASTM-D2.

| | | |
|---|-----|--------|
| Altitude Above Which Output Should be Limited - ft. (m) | 300 | (91.4) |
| Correction Factor per 1000 ft. (305 m) above Altitude Limit | 3% | |
| Temperature Above Which Output Should be Limited - °F (°C) | 77 | (25) |
| Correction Factor per 10 °F (11 °C) Above Temperature Limit | 1% | (2%) |

Exhaust Emissions (EPA Tier T3) [Reference Emissions Data Doc. 9614]

| | g/kW-hr | g/BHP-hr |
|--|----------------|-----------------|
| Hydrocarbons (HC/OMHCE)..... | 0.120 | 0.09 |
| Oxides of Nitrogen (NOx)..... | 0.335 | 0.25 |
| Non-Methane Hydrocarbons + NOx (NMHC+NOx)..... | 0.370 | 0.28 |
| Carbon Monoxide (CO)..... | 1.60 | 1.19 |
| Particulate..... | 0.17 | 0.13 |

FM Approved and UL Listed Ratings for CFP7E-F10, F20, F30, F40, F50, F60

| Engine Speed - RPM | 1470 | 1760 | 1900 | 2100 | 2350 | 2600 | 2700 |
|--------------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------|
| CFP7E-F60 Output - BHP (kW) . | 218 (163) | 250 (186) | 232 (173) | 244 (182) | 245 (183) | 249 (186) | 182 (13) |
| Ventilation Air CFM (litre/sec) | 479.6 (226) | 536.9 (253) | 524 (247) | 580 (274) | 636 (300) | 699.6 (330) | 643.6 (30) |
| Exhaust Flow - CFM (litre/sec) .. | 1194 (564) | 1344 (634) | 1297 (612) | 1439 (679) | 1557 (735) | 1713 (808) | 1576 (74) |
| Exhaust Temp.- °F (°C) . # | 1012 (544) | 1004 (540) | 913 (489) | 934 (501) | 939 (504) | 1033 (556) | 1023 (55) |
| Heat Rejection | | | | | | | |
| To Coolant BTU/min. (kW) | 4291 (75) | 4615 (81) | 4367 (77) | 4672 (82) | 4997 (88) | 5497 (97) | 5222 (92) |
| To Ambient BTU/min (kW) | 1090 (19) | 1160 (20) | 1261 (22) | 1362 (24) | 1488 (26) | 1564 (27) | 1533 (27) |
| CFP7E-F50 Output - BHP (kW) . | 205 (153) | 235 (175) | 218 (163) | 229 (171) | 231 (172) | 234 (174) | 171 (12) |
| Ventilation Air CFM (litre/sec) | 456.8 (216) | 511.4 (241) | 519 (245) | 576 (272) | 634 (299) | 697.4 (329) | 641.6 (30) |
| Exhaust Flow - CFM (litre/sec) .. | 1117 (527) | 1280 (604) | 1263 (596) | 1390 (656) | 1538 (726) | 1692 (799) | 1556 (73) |
| Exhaust Temp.- °F (°C) | 978 (526) | 956.6 (514) | 887 (475) | 902 (483) | 925 (496) | 1018 (548) | 1007 (54) |
| Heat Rejection | | | | | | | |
| To Coolant BTU/min. (kW) | 4031 (71) | 4395 (77) | 4165 (73) | 4447 (78) | 4895 (86) | 5385 (95) | 5115 (90) |
| To Ambient BTU/min (kW) | 1057 (19) | 1125 (20) | 1223 (21) | 1321 (23) | 1444 (25) | 1517 (27) | 1487 (26) |
| CFP7E-F40 Output - BHP (kW) . | 192 (143) | 220 (164) | 204 (152) | 215 (160) | 216 (161) | 219 (163) | 160 (11) |
| Ventilation Air CFM (litre/sec) | 435 (205) | 487 (230) | 511 (241) | 571 (270) | 629 (297) | 691.9 (327) | 636.5 (30) |
| Exhaust Flow - CFM (litre/sec) .. | 1055 (498) | 1219 (575) | 1218 (575) | 1363 (643) | 1500 (708) | 1650 (779) | 1518 (71) |
| Exhaust Temp.- °F (°C) | 954 (512) | 911 (488) | 853 (456) | 874 (468) | 897 (481) | 986.7 (530) | 978.8 (52) |
| Heat Rejection | | | | | | | |
| To Coolant BTU/min. (kW) | 3803 (67) | 4186 (74) | 3926 (69) | 4263 (75) | 4707 (83) | 5178 (91) | 4919 (86) |
| To Ambient BTU/min (kW) | 1026 (18) | 1091 (19) | 1186 (21) | 1282 (23) | 1256 (22) | 1231 (22) | 1206 (21) |
| CFP7E-F30 Output - BHP (kW) . | 177 (132) | 205 (153) | 190 (142) | 200 (149) | 201 (150) | 204 (152) | 149 (11) |
| Ventilation Air CFM (litre/sec) | 403 (190) | 480 (227) | 502 (237) | 567 (268) | 627 (296) | 689.7 (326) | 634.5 (29) |
| Exhaust Flow - CFM (litre/sec) .. | 1026 (484) | 1174 (554) | 1180 (557) | 1305 (616) | 1468 (693) | 1615 (762) | 1486 (70) |
| Exhaust Temp.- °F (°C) | 939 (504) | 879 (471) | 828 (442) | 836 (447) | 872 (467) | 959.2 (515) | 949.6 (51) |
| Heat Rejection | | | | | | | |
| To Coolant BTU/min. (kW) | 3622 (64) | 3978 (70) | 3757 (66) | 4043 (71) | 4533 (80) | 4986 (88) | 4737 (83) |
| To Ambient BTU/min (kW) | 994.8 (17) | 1059 (19) | 1151 (20) | 1243 (22) | 1218 (21) | 1194 (21) | 1170 (21) |
| CFP7E-F20 Output - BHP (kW) . | 166 (124) | 190 (142) | 176 (131) | 185 (138) | 187 (139) | 189 (141) | 138 (10) |
| Ventilation Air CFM (litre/sec) | 396 (187) | 467 (220) | 486 (229) | 562 (265) | 621 (293) | 683.1 (322) | 628.5 (29) |
| Exhaust Flow - CFM (litre/sec) .. | 994 (469) | 1121 (529) | 1134 (535) | 1286 (607) | 1422 (671) | 1564 (738) | 1439 (67) |
| Exhaust Temp.- °F (°C) | 922 (494) | 848 (453) | 801 (427) | 821 (438) | 840 (449) | 924 (496) | 914.8 (49) |
| Heat Rejection | | | | | | | |
| To Coolant BTU/min. (kW) | 3486 (61) | 3745 (66) | 3523 (62) | 3877 (68) | 4343 (76) | 4777 (84) | 4538 (80) |
| To Ambient BTU/min (kW) | 965 (17) | 1027 (18) | 1116 (20) | 1206 (21) | 1182 (21) | 1158 (20) | 1135 (20) |
| CFP7E-F10 Output - BHP (kW) . | 153 (114) | 175 (130) | 162 (121) | 171 (128) | 172 (128) | 174 (130) | 127 (95) |
| Ventilation Air CFM (litre/sec) | 386 (182) | 450 (212) | 472 (223) | 558 (263) | 616 (291) | 677.6 (320) | 623.4 (29) |
| Exhaust Flow - CFM (litre/sec) .. | 937 (442) | 1061 (501) | 1079 (509) | 1255 (592) | 1375 (649) | 1513 (714) | 1392 (65) |
| Exhaust Temp.- °F (°C) | 906 (486) | 821 (438) | 781 (416) | 795 (424) | 805 (429) | 885.5 (474) | 876.6 (46) |
| Heat Rejection | | | | | | | |
| To Coolant BTU/min. (kW) | 3259 (57) | 3521 (62) | 3232 (57) | 3698 (65) | 4126 (73) | 4539 (80) | 4312 (76) |
| To Ambient BTU/min (kW) | 936 (16) | 996.1 (18) | 1083 (19) | 1170 (21) | 1146 (20) | 1123 (20) | 1101 (19) |

All Data is Subject to Change Without Notice.

Director of Engineering: *Jim Vanden Boogard*
 Cummins Fire Power, De Pere, WI 54115 U.S.A.



AIR RESOURCES BOARD

CUMMINS INC.

EXECUTIVE ORDER U-R-002-0516
New Off-Road
Compression-Ignition Engines

Pursuant to the authority vested in the Air Resources Board by Sections 43013, 43018, 43101, 43102, 43104 and 43105 of the Health and Safety Code; and

Pursuant to the authority vested in the undersigned by Sections 39515 and 39516 of the Health and Safety Code and Executive Order G-02-003;

IT IS ORDERED AND RESOLVED: That the following compression-ignition engines and emission control systems produced by the manufacturer are certified as described below for use in off-road equipment. Production engines shall be in all material respects the same as those for which certification is granted.

| MODEL YEAR | ENGINE FAMILY | DISPLACEMENT (liters) | FUEL TYPE | USEFUL LIFE (hours) |
|---|---------------|-----------------------|---|---------------------|
| 2010 | ACEXL0409AAB | 6.7 | Diesel | 8000 |
| SPECIAL FEATURES & EMISSION CONTROL SYSTEMS | | | TYPICAL EQUIPMENT APPLICATION | |
| Direct Diesel Injection, Turbocharger, Charge Air Cooler, Engine Control Module | | | Loader, Tractor, Dozer, Pump and Compressor | |

The engine models and codes are attached.

The following are the exhaust certification standards (STD) and certification levels (CERT) for hydrocarbon (HC), oxides of nitrogen (NOx), or non-methane hydrocarbon plus oxides of nitrogen (NMHC+NOx), carbon monoxide (CO), and particulate matter (PM) in grams per kilowatt-hour (g/kw-hr), and the opacity-of-smoke certification standards and certification levels in percent (%) during acceleration (Accel), lugging (Lug), and the peak value from either mode (Peak) for this engine family (Title 13, California Code of Regulations, (13 CCR) Section 2423):

| RATED POWER CLASS | EMISSION STANDARD CATEGORY | | EXHAUST (g/kw-hr) | | | | | OPACITY (%) | | |
|-------------------|----------------------------|------|-------------------|-----|----------|-----|------|-------------|-----|------|
| | | | HC | NOx | NMHC+NOx | CO | PM | ACCEL | LUG | PEAK |
| 75 ≤ kW < 130 | Tier 3 | STD | N/A | N/A | 4.0 | 5.0 | 0.30 | 20 | 15 | 50 |
| 130 ≤ kW < 225 | Tier 3 | STD | N/A | N/A | 4.0 | 3.5 | 0.20 | 20 | 15 | 50 |
| | | CERT | - | - | 3.7 | 1.6 | 0.17 | 6 | 2 | 14 |

BE IT FURTHER RESOLVED: That for the listed engine models, the manufacturer has submitted the information and materials to demonstrate certification compliance with 13 CCR Section 2424 (emission control labels), and 13 CCR Sections 2425 and 2426 (emission control system warranty).

Engines certified under this Executive Order must conform to all applicable California emission regulations.

This Executive Order is only granted to the engine family and model-year listed above. Engines in this family that are produced for any other model-year are not covered by this Executive Order.

Executed at El Monte, California on this 14 day of July 2009.

Annette Hebert, Chief
Mobile Source Operations Division

Engine Model Summary Template

U-12-002-0516
Attachment pg 4/2
3/3/2010

| Engine Family | 1.Engine Code | 2.Engine Model | 3.BHP@RPM (SAE Gross) | 4.Fuel Rate: mm/stroke @ peak HP (for diesel only) | 5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only) | 6.Torque @ RPM (SEA Gross) | 7.Fuel Rate: mm/stroke@peak torque | 8.Fuel Rate: (lbs/hr)@peak torque | 9.Emission Control Device Per SAE J1930 |
|---------------|---------------|----------------|--------------------------|--|--|-------------------------------|--|--------------------------------------|--|
| ACEXL0409AAB | 8611;FR91421 | QSB6.7 | 275@2500 | 129 | 108.8 | 730@1500 | 151 | 76.4 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR91595 | QSB6.7 | 250@2500 | 117 | 98.8 | 730@1500 | 151 | 76.2 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR91596 | QSB6.7 | 240@2500 | 114 | 96.1 | 730@1500 | 151 | 76.2 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR91427 | QSB6.7 | 260@2400 | 124 | 100.4 | 730@1500 | 150 | 75.9 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR91600 | QSB6.7 | 240@2000 | 136 | 91.8 | 730@1500 | 150 | 75.9 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR91429 | QSB6.7 | 260@2300 | 129 | 99.8 | 730@1500 | 149 | 75.3 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR92276 | QSB6.7 | 260@2500 | 124 | 104.5 | 550@1500 | 120 | 60.6 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR91433 | QSB6.7 | 260@2200 | 135 | 99.8 | 730@1500 | 150 | 75.9 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR92279 | QSB6.7 | 275@2300 | 135 | 104.5 | 725@1500 | 149 | 75.2 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR92599 | QSB6.7 | 275@2500 | 126 | 105.7 | 620@1500 | 129 | 65.4 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR91653 | QSB6.7 | 220@2200 | 114 | 84.4 | 700@1500 | 148 | 75 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR91688 | QSB6.7 | 185@2500 | 97 | 81.8 | 575@1500 | 128 | 64.7 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR91598 | QSB6.7 | 193@2200 | 104 | 77.1 | 674@1400 | 142 | 67 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR92419 | QSB6.7 | 205@2500 | 90 | 76.1 | 625@1500 | 128 | 64.9 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR92113 | QSB6.7 | 190@2500 | 98 | 82.3 | 520@1500 | 112 | 56.9 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR92441 | QSB6.7 | 215@2500 | 105 | 88.7 | 620@1500 | 129 | 65.3 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR91597 | QSB6.7 | 215@2500 | 107 | 90.9 | 655@1500 | 146 | 73.4 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR92288 | QSB6.7 | 220@2500 | 110 | 92.8 | 640@1500 | 135 | 68.5 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91435 | QSB6.7 | 190@2200 | 98 | 72.7 | 685@1400 | 141 | 66.6 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91496 | QSB6.7 | 200@2100 | 107 | 75.8 | 547@1500 | 117 | 59.2 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91440 | QSB6.7 | 220@2000 | 124 | 83.5 | 700@1400 | 146 | 73.9 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91434 | QSB6.7 | 220@2200 | 111 | 82.3 | 700@1500 | 148 | 74.9 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91428 | QSB6.7 | 190@2400 | 92 | 74.5 | 685@1500 | 140 | 70.8 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91430 | QSB6.7 | 220@2300 | 110 | 85.5 | 700@1500 | 149 | 75.4 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91439 | QSB6.7 | 189@2050 | 109 | 75.3 | 548@1500 | 121 | 61.3 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91637 | QSB6.7 | 203@2000 | 108 | 73 | 694@1450 | 148 | 69.8 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91445 | QSB6.7 | 205@1800 | 126 | 76.7 | 685@1300 | 143 | 62.7 | ECM TC CAC |

Engine Model Summary Template

U-12-02-0511
Attachment 2/2
3/3/2010

| Engine Family | 1.Engine Code | 2.Engine Model | 3.BHP@RPM (SAE Gross) | 4.Fuel Rate: mm/stroke @ peak HP (for diesel only) | 5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only) | 6.Torque @ RPM (SEA Gross) | 7.Fuel Rate: mm/stroke@peak torque | 8.Fuel Rate: (lbs/hr)@peak torque | 9.Emission Control Device Per SAE J1930 |
|---------------|---------------|----------------|--------------------------|--|--|-------------------------------|--|--------------------------------------|--|
| ACEXL0409AAB | 8466;FR91431 | QSB6.7 | 190@2300 | 102 | 78.9 | 685@1500 | 145 | 73.5 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR92058 | QSB6.7 | 195@2300 | 100 | 77.7 | 542@1200 | 109 | 44 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR92059 | QSB6.7 | 220@2300 | 110 | 110.2 | 597@1500 | 128 | 64.5 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR92112 | QSB6.7 | 185@2200 | 96 | 71.2 | 685@1400 | 141 | 66.6 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR92095 | QSB6.7 | 186@2200 | 99 | 73.4 | 547@1500 | 114 | 57.7 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91955 | QSB6.7 | 220@2200 | 116 | 86.1 | 650 @ 1500 | 135 | 68.3 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR92212 | QSB6.7 | 185@2200 | 99 | 73.3 | 546@1400 | 113 | 53.5 | ECM TC CAC |
| ACEXL0409AAB | 0656;FR91910 | QSB7-G3 | 233@1500 | 166 | 84 | NA | NA | NA | ECM TC CAC |
| ACEXL0409AAB | 0656;FR91910 | QSB7-G3 | 250@1800 | 151 | 91.8 | NA | NA | NA | ECM TC CAC |
| ACEXL0409AAB | 0656;FR92054 | QSB7-G2 | 234@1800 | 140 | 84.9 | NA | NA | NA | ECM TC CAC |
| ACEXL0409AAB | 0656;FR92054 | QSB7-G2 | 204@1500 | 143 | 72.3 | NA | NA | NA | ECM TC CAC |
| ACEXL0409AAB | 0656;FR92053 | QSB7-G1 | 173@1800 | 105 | 63.7 | NA | NA | NA | ECM TC CAC |
| ACEXL0409AAB | 0656;FR92053 | QSB7-G1 | 154@1500 | 113 | 57.2 | NA | NA | NA | ECM TC CAC |
| ACEXL0409AAB | 8611;FR92866 | QSB6.7 | 240@2200 | 124 | 92 | 650@1500 | 136 | 69 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR91599 | QSB6.7 | 215@2100 | 116 | 82.1 | 700@1500 | 146 | 68.9 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR92515 | QSB6.7 | 275@2500 | 129 | 108.7 | 575@1500 | 125.9 | 63.7 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR93156 | QSB6.7 | 205@2500 | 97.9 | 85.75 | 575@1700 | 130.9 | 66.1 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR93156 | QSB6.7 | 205@2500 | 97.9 | 85.75 | 575@1700 | 130.9 | 66.1 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR92694 | QSB6.7 | 200@2200 | 104.1 | 77.4 | 694@1500 | 149 | 75.4 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR93357 | QSB6.7 | 186@2200 | 99 | 73.4 | 435@1500 | 114 | 58.0 | ECM TC CAC |

Engine Model Summary Template

U-Pr-002-0516
 Attachment pg 1/2
 3/15/2010

| Engine Family | 1.Engine Code | 2.Engine Model | 3.BHP@RPM (SAE Gross) | 4.Fuel Rate: mm/stroke @ peak HP (for diesels only) | 5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only) | 6.Torque @ RPM (SEA Gross) | 7.Fuel Rate: mm/stroke@peak torque | 8.Fuel Rate: (lbs/hr)@peak torque | 9.Emission Control Device Per SAE J1930 |
|---------------|---------------|----------------|--------------------------|---|--|-------------------------------|--|--------------------------------------|--|
| ACEXL0409AAB | 8611;FR91421 | QSB6.7 | 275@2500 | 129 | 108.8 | 730@1500 | 151 | 76.4 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR91595 | QSB6.7 | 250@2500 | 117 | 98.8 | 730@1500 | 151 | 76.2 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR91596 | QSB6.7 | 240@2500 | 114 | 96.1 | 730@1500 | 151 | 76.2 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR91427 | QSB6.7 | 260@2400 | 124 | 100.4 | 730@1500 | 150 | 75.9 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR91600 | QSB6.7 | 240@2000 | 136 | 91.8 | 730@1500 | 150 | 75.9 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR91429 | QSB6.7 | 260@2300 | 129 | 99.8 | 730@1500 | 149 | 75.3 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR92276 | QSB6.7 | 260@2500 | 124 | 104.5 | 550@1500 | 120 | 60.6 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR91433 | QSB6.7 | 260@2200 | 135 | 99.8 | 730@1500 | 150 | 75.9 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR92279 | QSB6.7 | 275@2300 | 135 | 104.5 | 725@1500 | 149 | 75.2 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR92599 | QSB6.7 | 275@2500 | 125 | 105.7 | 620@1500 | 129 | 65.4 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR91653 | QSB6.7 | 220@2200 | 114 | 84.4 | 700@1500 | 148 | 75 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR91688 | QSB6.7 | 185@2500 | 97 | 81.8 | 575@1500 | 128 | 64.7 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR91598 | QSB6.7 | 193@2200 | 104 | 77.1 | 674@1400 | 142 | 67 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR92419 | QSB6.7 | 205@2500 | 90 | 76.1 | 625@1500 | 128 | 64.9 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR92113 | QSB6.7 | 190@2500 | 98 | 82.3 | 520@1500 | 112 | 56.9 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR92441 | QSB6.7 | 215@2500 | 105 | 88.7 | 620@1500 | 129 | 65.3 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR91597 | QSB6.7 | 215@2500 | 107 | 90.9 | 655@1500 | 146 | 73.4 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR92288 | QSB6.7 | 220@2500 | 110 | 92.8 | 640@1500 | 135 | 68.5 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91435 | QSB6.7 | 190@2200 | 98 | 72.7 | 685@1400 | 141 | 66.6 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91496 | QSB6.7 | 200@2100 | 107 | 75.8 | 547@1500 | 117 | 59.2 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91440 | QSB6.7 | 220@2000 | 124 | 83.5 | 700@1400 | 146 | 73.9 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91434 | QSB6.7 | 220@2200 | 111 | 82.3 | 700@1500 | 148 | 74.9 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91428 | QSB6.7 | 190@2400 | 92 | 74.5 | 685@1500 | 140 | 70.8 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91430 | QSB6.7 | 220@2300 | 110 | 85.5 | 700@1500 | 149 | 75.4 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91439 | QSB6.7 | 189@2050 | 109 | 75.3 | 548@1500 | 121 | 61.3 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91637 | QSB6.7 | 203@2000 | 108 | 73 | 694@1450 | 148 | 69.8 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91445 | QSB6.7 | 205@1800 | 126 | 76.7 | 685@1300 | 143 | 62.7 | ECM TC CAC |

Engine Model Summary Template

U-12-002-0516
Attachment pg 2/2
3/15/2010

| Engine Family | 1.Engine Code | 2.Engine Model | 3.BHP@RPM (SAE Gross) | 4.Fuel Rate: mm/stroke @ peak HP (for diesel only) | 5.Fuel Rate: (lbs/hr) @ peak HP (for diesels only) | 6.Torque @ RPM (SEA Gross) | 7.Fuel Rate: mm/stroke@peak torque | 8.Fuel Rate: (lbs/hr)@peak torque | 9.Emission Control Device Per SAE J1930 |
|---------------|---------------|----------------|--------------------------|--|--|-------------------------------|--|--------------------------------------|--|
| ACEXL0409AAB | 8466;FR91431 | QSB6.7 | 190@2300 | 102 | 78.9 | 685@1500 | 145 | 73.5 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR92058 | QSB6.7 | 195@2300 | 100 | 77.7 | 542@1200 | 109 | 44 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR92059 | QSB6.7 | 220@2300 | 110 | 110.2 | 597@1500 | 128 | 64.5 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR92112 | QSB6.7 | 185@2200 | 96 | 71.2 | 685@1400 | 141 | 66.6 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR91955 | QSB6.7 | 220@2200 | 116 | 86.1 | 650 @ 1500 | 135 | 68.3 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR92212 | QSB6.7 | 185@2200 | 99 | 73.3 | 546@1400 | 113 | 53.5 | ECM TC CAC |
| ACEXL0409AAB | 0656;FR91910 | QSB7-G3 | 233@1500 | 166 | 84 | NA | NA | NA | ECM TC CAC |
| ACEXL0409AAB | 0656;FR91910 | QSB7-G3 | 250@1800 | 151 | 91.8 | NA | NA | NA | ECM TC CAC |
| ACEXL0409AAB | 0656;FR92054 | QSB7-G2 | 234@1800 | 140 | 84.9 | NA | NA | NA | ECM TC CAC |
| ACEXL0409AAB | 0656;FR92054 | QSB7-G2 | 204@1500 | 143 | 72.3 | NA | NA | NA | ECM TC CAC |
| ACEXL0409AAB | 0656;FR92053 | QSB7-G1 | 173@1800 | 105 | 63.7 | NA | NA | NA | ECM TC CAC |
| ACEXL0409AAB | 0656;FR92053 | QSB7-G1 | 154@1500 | 113 | 57.2 | NA | NA | NA | ECM TC CAC |
| ACEXL0409AAB | 8611;FR92866 | QSB6.7 | 240@2200 | 124 | 92 | 650@1500 | 136 | 69 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR91599 | QSB6.7 | 215@2100 | 116 | 82.1 | 700@1500 | 146 | 68.9 | ECM TC CAC |
| ACEXL0409AAB | 8611;FR92515 | QSB6.7 | 275@2500 | 129 | 108.7 | 575@1500 | 125.9 | 63.7 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR93156 | QSB6.7 | 205@2500 | 97.9 | 85.75 | 575@1700 | 130.9 | 66.1 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR93156 | QSB6.7 | 205@2500 | 97.9 | 85.75 | 575@1700 | 130.9 | 66.1 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR92694 | QSB6.7 | 200@2200 | 104.1 | 77.4 | 694@1500 | 149 | 75.4 | ECM TC CAC |
| ACEXL0409AAB | 8466;FR93357 | QSB6.7 | 186@2200 | 99 | 73.4 | 435@1500 | 114 | 58.0 | ECM TC CAC |
| ACEXL0409AAB | 8610;FR92095 | QSB6.7 | 186@2200 | 99 | 73.4 | 547@1500 | 114 | 58.0 | ECM TC CAC |

P-952A/B Fire Water Pumps (Runs during testing)

BHP (Calc) = 130 hp
engine selected 175 hp Cummins Fire Power Engines
model # CFP7E-F10
operating speed 1760 rpm
Emission Certification EPA/CARB Tier 3

| Exhaust Emissions | CFP7E-F10 |
|-------------------|----------------|
| HC/OMHCE | 0.062 g/BHP-hr |
| NOx | 2.475 g/BHP-hr |
| NMHC + NOx | 2.537 g/BHP-hr |
| CO | 1.193 g/BHP-hr |
| Pariculate | 0.111 g/BHP-hr |

F-703 Hot Oil Heater (Continuous)

Maximum Heat Input: 206.7 MMBtu/hr
Expected Emissions:
NOx 5 ppmv (@3% excess O2)
CO 400 ppmv (@3% excess O2)
SO2 0.06 ppmv (@3% excess O2)

Stack Height: 123 ft
Stack Diameter: 117 inches

F-551 O2 Removal Heater (Continuous)

Maximum Heat Input: 19.5 MMBtu/hr
Expected Emissions:
NOx 9 ppmv (@3% excess O2)
CO 200 ppmv (@3% excess O2)
SO2 0.06 ppmv (@3% excess O2)

Stack Height: 20 ft
Stack Diameter: 18 inches

ATTACHMENT VI
Uncontrolled Tank Emissions