PERMIT-TO-INSTALL APPLICATION
OHIO RIVER CLEAN FUELS FACILITY
VILLAGE OF WELLSVILLE, COLUMBIANA AND JEFFERSON COUNTIES, OHIO

SUBMITTED TO:

OHIO ENVIRONMENTAL PROTECTION AGENCY

SUBMITTED BY:

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MODULE 6

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1.0 PROCESS DESCRIPTION

1.1 Fischer-Tropsch

The Fischer-Tropsch (F-T) reaction will be carried out in three separate and parallel "trains" each having a single F-T reactor vessel. Each reactor produces several product and by-product streams. The liquid products will be routed to a common F-T Fractionator Heater (154 MMBtu/hr) and then to a single F-T fractionator column. F-T fractionator column products will be routed to the Product Upgrade block. Tailgas streams from the F-T reactors will be combined and sent to a common sponge oil column.

The F-T reaction will involve conversion of carbon monoxide (CO) and hydrogen (H_2) formed in the gasifier to hydrocarbons and water. CO and H_2 will undergo synthesis at the surface of the catalyst particles according to the following reactions:

$$CO + 2\,H_2 = \text{-}CH_2 + H_2O + \text{Heat}$$
$$\text{-}CH_2\text{-} + \text{-}CH_2\text{-} + H_2 = H\text{-}(CH_2)_n\text{–}H \text{ (paraffin)}$$

Unreacted carbon monoxide and hydrogen, together with lower molecular weight hydrocarbons and byproduct water, will exit the reactor as a vapor. The vapor stream is cooled in two stages. In the first stage, higher molecular weight hydrocarbons will condense to form a "heavy" Light F-T liquid (HLFTL) intermediate product. In the second stage of cooling, lower and intermediate molecular weight hydrocarbons and water will condense yielding two liquid phases and a vapor stream. The upper liquid phase ("light" Light F-T liquid – LLFTL) consists of the lower and intermediate molecular weight hydrocarbons. The lower liquid phase will be oily water produced by the F-T reaction. The oily water will contain about 1% low molecular weight alcohol species. Very high molecular weight hydrocarbons will remain in the liquid state under reactor conditions and must be withdrawn directly from the reactor as a liquid stream (heavy F-T liquids – HFTL).

Most of the uncondensed vapors from the reactor cooling step (i.e., F-T tailgas) will be compressed and mixed with incoming syngas feed for return to the F-T reactors. A smaller portion, referred to as tailgas, will be purged to control build-up of inert gases and non-condensable light hydrocarbons in the reactor vapor loop. The purged tailgas will be combined with the tailgas streams of the other two F-T trains and fed to the sponge oil column located between the F-T reactors and the F-T fractionator column. At the sponge oil column, light hydrocarbon products will be absorbed. The tailgas, depleted of light hydrocarbons, will exit the top of the sponge oil column from where it will be diverted for use as fuel in process heaters and the combustion turbines. The sponge oil column will not be a source of atmospheric emissions.

Six process heaters will be used in the F-T process. The F-T process heater design duties and draft types are listed below. The relationships of these heaters to process components are illustrated in figures provided in Attachment 6A.

Heater Name	Design Duty (MMBtu/hr)	Draft Type
FT Fractionator Fired Heater	154.0	Mechanical
Nitrogen Heater	4.0	Natural
Hot Oil Heater	4.0	Natural
Hydrogen Stripping Heater	4.0	Natural
Oxidation Gas Heater	4.0	Natural
Reduction Gas Heater	4.0	Natural

1.2 Product Upgrade

F-T products will be refined to FT-diesel, FT-naphtha, and liquefied petroleum gas (LPG) in a single product upgrade train. High molecular weight species will be hydrocracked to short chain paraffins. Cracking severity will be limited to minimize loss of high molecular weight species to light ends. Uncracked hydrocarbons will be separated from products and recycled to the hydrocracker reactor, essentially to extinction. Low molecular weight hydrocarbons not requiring hydrocracking will be hydrotreated to saturate olefins and alcohols. Liquid products from the hydrocracking and hydrotreating reactors will feed the F-T fractionator column and its side stripper (see Figure 16), which will split the feeds into a C5-C9 liquid distillate, a side-draw "distillate" (diesel range), and a bottoms stream of unconverted "wax." All of the liquid produced in the F-T reaction section will be exposed to the strong reducing conditions of one of the two hydroprocessing reactors before any exits the plant. Non-condensable overhead vapors will be liquefied by compression and chilling to form LPG. The F-T fractionator column will not be a source of air emissions. The F-T fractionator column will be sized to accommodate the full plant capacity, but will be capable of processing smaller volumes as each of the three F-T trains are brought on line.

Three process heaters will be used in the Product Upgrade section. The Product Upgrade process heater design duties and draft types are listed below. Refer to Attachment 6A for figures illustrating these heaters and other process components.

Heater Name	Design Duty (MMBtu/hr)	Draft Type
Hydrocracker Feed Oil Heater	21.0	Mechanical
Hydrocracker Feed Hydrogen Heater	20.0	Mechanical
Production Fractionation Feed Heater	24.0	Mechanical

1.3 Vents to Low-Pressure Flare

A low-pressure flare will control emissions generated during regeneration of the F-T catalyst. To promote synthesis, the F-T catalyst will be periodically regenerated. When the catalytic activity drops to a selected level, the regeneration process will be initiated. Regeneration is a physical and chemical process that removes hydrocarbon deposits from the catalyst to maintain an active reaction surface. The F-T catalyst regeneration process consists of a semi-batch process where a portion of the catalyst in-process inventory is withdrawn to the regeneration section and an equal amount of regenerated catalyst is returned to it from the regeneration section approximately each week. A slurry containing a particulate catalyst in liquid suspension will be reacted with hydrogen and steam at reduced pressure to hydrogenate and volatilize heavy hydrocarbon deposits from the catalyst surface. Catalyst slurry is withdrawn from the F-T reactor, degassed, dried, oxidized, reduced, re-slurried in wax, and returned to the F-T reactor. These F-T catalyst regeneration steps will generate process vent emissions, although no catalyst will be emitted.

In the rotary dryer, the slurry is heated both indirectly and directly. Indirect heat is supplied by the hot oil circulating through both the agitator arms and rotary dryer shell. Direct heat is supplied to the rotary dryer contents by addition of hot nitrogen through sparge holes in the bottom of the rotary dryer. The hot oil and nitrogen heaters are fueled with tailgas (see Section 1.1 above).

Catalyst activation and reactivation processes will also occur. In the activation step, raw cobalt catalyst is reacted with H_2S and H_2 to convert cobalt to cobalt sulfide, the chemical form needed to function as a catalyst. In the reactivation step, catalyst that has become less efficient is refreshed (reactivated) by passing more H_2S through the catalyst bed. Neither of these steps will produce air emissions.

The low-pressure flare will also control vent emissions from low pressure components in the event of an unscheduled event that requires a vessel to be depressurized in accordance with applicable engineering codes.

1.4 Valves, Flanges, Pumps, & Compressors

This module includes process equipment that requires use of numerous valves, flanges, pumps, compressors, and other components that will be in contact with gaseous or light liquid service and may be subject to leaks. The actual number of components will be refined during the detailed front end engineering design (FEED) study. Additional types of components may be identified during subsequent design phases. Initial estimates of component counts include:

- Pumps (20)
- Valves (250)
- Flanges (540)
- Compressors (13)

2.0 AIR EMISSIONS INVENTORY

Air emissions from the F-T and Product Upgrade processes will be a result of fuel combustion in process heaters, thermal destruction of F-T catalyst regeneration gases in a low pressure flare, and fugitive volatile organic compound (VOC) emissions from equipment leaks. Descriptions of emission sources and their respective potential emissions calculations are provided below.

2.1 Process Heaters

The process heaters at ORCF will be fired by natural gas or tailgas. The F-T process will include five 4-MMBtu/hr process heaters and one 154-MMBtu/hr heater. Emissions from the five 4-MMBtu/hr process heaters will be controlled by good combustion practices, good design, operation, and engineering practices, and use of clean fuels. Emissions from the one 154-MMBtu/hr process heater will be controlled by use of ultra low-NO_x burners and selective catalytic reduction (SCR), good combustion practices, good design, operation, and engineering practices, and use of clean fuels

The Product Upgrade process will include three approximately 20 MMBtu/hr feed heaters, all of which will be controlled by use of ultra low-NO_x burners and SCR, good combustion practices, good design, operation, and engineering practices, and use of clean fuels.

Emission factors for the heaters were obtained from AP-42 Chapter 1.4 – Natural Gas Combustion Tables 1.4-1 and 1.4-2. Emissions were calculated as follows:

$$\frac{MMBtu}{hr} \times \frac{scf}{Btu} \times \frac{lb}{MMscf} = \frac{lb}{hr}$$

Tailgas was utilized as the fuel source for the calculations to represent worst-case emission results. Tailgas represents the worst-case because the emission factor used is gas quantity-based, therefore, since the Btu value of the tailgas is lower than natural gas and thus more tailgas will be required to achieve the desired heater temperatures, the increase in emissions will be proportionately higher. The efficiency for the heaters was assumed to be 73%. Operations were assumed to be continuous for 365 days a year. Particulate emissions are assumed to be less than 1.0 μm in diameter and therefore can be used to represent PM_{10}.

Hazardous air pollutant emission rates from the process heaters are based on the emission factors for natural gas combustion presented in AP-42 Table 1.4-4. Those factors are assumed to be representative of emissions from combustion of tailgas due to the Module 5 gas cleanup steps that will have occurred prior to combustion of any tailgas. With respect to mercury, while elemental mercury is expected to be present in the raw syngas, the combination of carbon filtration, which alone has been shown to remove greater than 90 percent of elemental mercury and partitioning of mercury to slag, flyash, and the wet scrubbing system will remove mercury from syngas and tailgas to an estimated 52 parts per trillion (ppt) concentration. While the basis for EPA's default natural gas mercury emission factor is not provided in the available background document, typical mercury concentrations in natural gas have been reported to range between 1 and 200 $\mu g/m^3$ (Shafawi, A. et al, The Analyst, 1999, 124, 185-189). Even if it is assumed that the natural gas used to derive EPA's emission factors contained only 1 $\mu g/m^3$ (122 ppt) the emission estimates provided by the AP-42 factors would be double than that produced by burning tailgas.

Tables 6B-1 and 6B-2 (Attachment 6B) summarize the respective potential and actual emissions estimates for the process heaters.

2.2 Low-Pressure Flare

Emission estimates for the low pressure flare have been based on AP-42 factors for combustion of the quantity of low-Btu fuel gas equal to the gas volume projected to be vented to the flare from the various low-pressure processes. VOC, CO, NO_x, SO_2 and PM will be emitted. While the composition of the gas streams vented to the low pressure flare will vary, the flare will achieve 98% destruction efficiency for VOC emissions. This control efficiency along with good design and combustion practices for the low pressure flare represent Best Available Control Technology (BACT) for control of emissions from the regeneration of the F-T catalyst and other process vents. The pilot burner for the flare may be fueled by natural gas or tailgas. Engineering design estimates of principal pollutant emissions have been developed on a lb/MMBtu basis, as shown in the Supporting Calculations (Attachment 6B).

2.3 Valves, Flanges, Pumps, & Compressors

Refinery average emission factors were obtained from Table 2-2 of EPA's Protocol for Equipment Leak Emission Estimates (EPA-453/R-95-017). Fugitive emissions were calculated by the following equation based on the EPA's average emission factor approach.

$$Emission = Factor \times W_f \times \#Components$$

The weight fraction (W_f) of total organic carbon (TOC) within the liquids is assumed to be 100% and TOC is assumed to be equal to VOC. To represent worst case conditions, the various streams are all assumed to contain light liquids. Light liquids are defined as liquids for which the sum of the concentrations of individual constituents with a vapor pressure over 0.3 kPa at 20 °C is greater than or equal to 20 weight percent. It is also assumed that there will be 2 flanges per pump and/or process valve. The emission results are summarized in Table 2.3 below.

As indicated in the BACT analysis provided in Section 4.0, use of leakless/sealless or low-emission pumps, valves, and compressors will reduce VOC emissions by over 99%. Implementation of a Leak Detection and Repair (LDAR) program for flanges will reduce fugitive VOC emissions by at least 68%.

Table 2.3 VOC Emission Estimates from Equipment Leaks

Component	Quantity	Emission Factor (lb/hr)	Potential		Actual	
			lb/hr	ton/yr	lb/hr	ton/yr
Pump Seals (light liquid)	20	0.2513	5.0	22.0	0.05	0.2
Valves (light liquid)	250	0.0240	6.0	26.3	0.06	0.3
Flanges (Connectors)	540	0.00055	0.3	1.3	0.1	0.4
Compressor Seals	13	1.4021	18.2	79.8	0.2	0.8
Total			29.7	129.4	0.4	1.7

Hazardous air pollutant emissions from equipment leaks have been determined by partitioning the worst-case emission production profile (50% F-T diesel and 50% F-T naphtha) across the component count. Because F-T diesel does not contain HAPs, it is assumed that only 50% of the VOC emissions indicated above contain HAP emissions. As discussed in Modules 7 and 8, F-T naphtha contains 22.35 molar percent n-hexane. It is therefore assumed that 11.2% of the fugitive VOC emissions (22.35% of 50%) will be n-hexane and the balance will be non-HAP VOCs. Total n-hexane emissions are therefore estimated as 0.2 tpy.

3.0 SOURCE-SPECIFIC APPLICABLE REGULATIONS

This section presents information concerning applicable state and federal regulations as well as specific exemptions, as appropriate. State regulatory references are to the Ohio Administrative Code (OAC), unless otherwise noted. Source-specific regulations are discussed relative to each permit application module. Facility-wide applicable regulations are addressed in Section 5.0 of the Application Introduction.

3.1 State Regulations

3.1.1 Control of Visible Particulate Emissions from Stationary Sources (3745-17-07)

Fischer-Tropsch and Product Upgrade process heaters will be sources of particulate matter. Stationary sources are subject to Chapter 3745-17-07(A)(1)(a) which limits visible particulate emissions to less than 20% opacity as a six-minute average. Chapter 3745-17-07(A)(1)(b) further states that the 20% opacity limit may not be exceeded for more than six consecutive minutes in any sixty minutes and never shall the opacity exceed 60% as a 6-minute average.

3.1.2 Restrictions on Particulate Emissions from Fuel Burning Equipment (3745-17-10)

This rule applies to sources using fuel combustion for the primary purpose of producing heat or power by indirect heat transfer. The process heaters used in the F-T and Product Upgrade processes meet this definition, therefore this rule applies. Section (B)(1) of the rule establishes an emission limit of 0.020 pounds of particulate per MMBtu of actual heat input for fuel burning equipment that fires only gaseous fuel. Allowable emission limits for the ORCF process heaters based on design duty would therefore be:

Table 3.1.2 Summary of Fuel Burning Particulate Limits

Heater Name	Actual Heat Input (Reflecting 73% Efficiency) (MMBtu/hr)	PE Emission Limit (lb/hr)
FT Fractionator Fired Heater	211.0	4.2
Hydrocracker Feed Hydrogen Heater	27.4	0.55
Hydrocracker Feed Oil Heater	28.8	0.58
Production Fractionation Feed Heater	32.9	0.66
Nitrogen Heater	5.5	0.11
Hot Oil Heater	5.5	0.11
Hydrogen Stripping Heater	5.5	0.11
Oxidation Gas Heater	5.5	0.11
Reduction Gas Heater	5.5	0.11

Emission estimates for the process heaters based on AP-42 emission factors for combustion of natural gas are approximately equal to these emission limits.

3.1.3 Control of Emissions of Organic Materials from Stationary Sources (3745-21-07)

This regulation is applicable to all new sources of organic materials. The rule requires sources of photochemically reactive materials to minimize such emissions through the use of the latest available control techniques and operating practices in accordance with best current technology. The use of the low-pressure flare to combust volatile organic materials emitted from the F-T catalyst regeneration and other process vents is determined to be the best current technology.

3.1.4 Control of Carbon Monoxide Emissions from Stationary Sources (3745-21-08)

This regulation applies to carbon monoxide emissions from grey iron cupola, blast furnace, basic oxygen steel furnaces, or the waste gas stream from catalyst regeneration of petroleum cracking systems, petroleum fluid cokers, or other petroleum processes. Because processes in this module have been determined to be subject to Federal regulations applicable to petroleum refineries, this rule is applicable to the process heaters in Module 6. According to Section (E) of this regulation, installation of new sources that will emit carbon monoxide from a petroleum process are prohibited unless the waste gas stream is burned at 1,300 °F for 0.3 seconds or greater in a direct-flame afterburner or boiler equipped with an indicating pyrometer positioned at the operator's eye level. Compliance with this regulation will be achieved through operation of the proposed catalytic oxidation system for the large and medium process heaters.

3.1.5 Permits to Install New Sources (3745-31)

Fischer-Tropsch and Product Upgrade process heaters will generate criteria pollutants from the incomplete combustion of tailgas. The emission units from the process heaters are part of a major stationary source. Because the major stationary source is located within an attainment area for all criteria pollutants, according to 3745-31-12(A), each emissions unit is subject to a BACT. The BACT analysis for these emission units is provided in Section 4.0. In accordance with 3745-31-05(A)(3), sources are also required to employ best available technology (BAT). Because all sources and pollutants are addressed in the BACT analysis, BAT is assumed to have been achieved for affected emission units.

3.2 Federal Regulations

3.2.1 Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries for which Construction, Reconstruction, or Modification Commenced After November 7, 2006 (40 CFR 60 Subpart GGGa)

Portions of the ORCF facility are engaged in producing distillate fuel oils and other products through the distillation, cracking, and reforming of syngas. Therefore, portions of the facility will be subject to Subpart GGGa. The Product Upgrade process components shall be monitored for leaks and repair according to the requirements of §60.592a.

3.2.2 Standards of Performance for Petroleum Refineries for which Construction, Reconstruction, or Modification Commenced After May 14. 2007 (40 CFR 60 Subpart Ja)

The three medium and one large process heaters associated with the Product Upgrade process will be petroleum refinery fuel gas combustion devices and therefore must comply with the emission limitations and requirements of this subpart including specified performance evaluations, test methods, and procedures. The standards for sulfur oxides in §60.102a(g) of this subpart require that either:

- the fuel gas burned in the affected heaters not contain hydrogen sulfide (H_2S) in excess of 162 ppmv (3-hour rolling average) and 60 ppmv daily (365-day rolling average) or,
- the SO_2 concentration in the discharge not exceed 20 ppmv (dry basis at 0% excess air) for a 3-hour rolling average and in excess of 8 ppmv (dry basis at 0% excess air) daily for a 365-day rolling average.

The combustion in a flare of process upset gases or fuel gas that is released to the flare as a result of relief valve leakage or other emergency malfunctions is exempt from this subpart. Although the low pressure flare is discussed in this module, it is not part of the petroleum refining process (it is part of the F-T catalyst regeneration emission unit) so it is not subject to the requirements of this NSPS.

The affected heaters shall be operated in accordance with good air pollution control practice to minimize emissions, as required by 40 CFR 60.11(d). In addition, 40 CFR 60.102a(g)(2) limits the NO_x emissions from process heaters that have a rated capacity greater than 40 MMBtu/hr. Therefore, NO_x emissions from the 154 MMBtu/hr Fractionator Heater may not exceed 40 ppmv (dry basis corrected to 0% excess air) on a 24-hour rolling average basis.

3.2.3 National Emission Standards for Hazardous Air Pollutants from Petroleum Refineries (40 CFR 63, Subpart CC)

The following affected sources are subject to Subpart CC when they are associated with petroleum refining *process units* as defined in 40 CFR 63.641. Section 63.641 defines a *process unit* as:

> "the equipment assembled and connected by pipes or ducts to process raw and/or intermediate materials and to manufacture an intended product. A process unit includes any associated storage vessels. For the purpose of this subpart, process unit includes, but is not limited to, chemical manufacturing process units and petroleum refining process units."

For purposes of this regulatory assessment, the process unit includes equipment starting with the Fractionator Heater and ending at the product storage tanks, as described in this Module of the PTI Application.

Group 1 Miscellaneous Process Vents: Group 1 miscellaneous process vents have a total organic HAP concentration greater than or equal to 20 ppmv with total VOC emissions greater than or equal to 6.8 kg/day (for new sources) at the outlet of the final recovery device, if any, and prior to the control device and prior to discharge to the atmosphere. Certain exclusions also apply, per 63.641. To the extent that Group 1 miscellaneous process vents are present at ORCF, the following citations will apply:

CITATION	GENERAL REQUIREMENTS
63.643(a)(1)	Reduce emissions of organic HAP using a compliant flare. ORCF has made provisions for use of a low-pressure flare to reduce organic HAP emissions.
63.644(a)(2)	Monitoring provisions shall be provided to continuously detect the presence of a pilot flame in the low-pressure flare.
63.645	Test methods and procedures (incorporates the SOCMI Subpart G requirements, 40 CFR 63.116(a), by reference.)

Storage Vessels Associated with Petroleum Refining Process Units: According to Subpart CC, a "Group 1 storage vessel means a storage vessel at an existing source…" (see §63.641). Because ORCF is not an existing source, in accordance with §63.641, ORCF's storage tanks will be considered "Group 2 storage vessels." The storage vessel provisions of Subpart CC apply to Group 1 Storage Vessels only (see §63.646(a)). As stated in §63.640(n)(3), after the compliance date (7/14/94), a Group 2 storage vessel that is part of a new source and is subject to the control requirements in Subpart Kb (§60.112b), is required only to comply with that subpart.

Wastewater Streams and Treatment Operations Associated with Petroleum Refining Process Units: 40 CFR 63.647, Wastewater Provisions, are applicable to Group 1 wastewater streams. A Group 1 wastewater stream is defined in 40 CFR 641 as having a total annual benzene loading ≥ 10 Mg/yr with a flow rate ≥ 0.02 lpm, a benzene concentration ≥ 10 ppmw, and that is not exempt from control under 40 CFR 61, Subpart FF (benzene waste operations). According to the draft NPDES permit for this facility (OEPA Permit No. 3IG00097*AD), there is one wastewater stream (Internal Monitoring Station 605) that contains a discharge limitation for benzene. The maximum discharge limit is 134 μg/l (0.134 ppm). This is significantly lower than the 10 ppm threshold for Subpart CC applicability. Consequently, ORCF does not believe that it will be subject to Subpart CC wastewater stream requirements.

Equipment Leaks: 40 CFR 63.648 Equipment leak standards are applicable to equipment leaks from petroleum refinery process units. An *equipment leak* is defined in 40 CFR 63.641 as:

> "emissions of organic hazardous air pollutants from a pump, compressor, pressure relief device, sampling connection system, open-ended valve or line, valve, or instrumentation system "in organic hazardous air pollutant service" as defined in this section. Vents from wastewater collection and conveyance systems (including, but not limited to wastewater drains, sewer vents, and sump drains), tank mixers, and sample valves on storage tanks are not equipment leaks."

In organic hazardous air pollutant service means:

> "that a piece of equipment either contains or contacts a fluid (liquid or gas) that is at least 5 percent by weight of total organic HAP's as determined according to the provisions of §63.180(d) of subpart H of this part and table 1 of this subpart. The provisions of §63.180(d) of subpart H also specify how to determine that a piece of equipment is not in organic HAP service."

Section 63.648 of Subpart CC states that new sources subject to the equipment leak standards shall comply with Subpart H – *National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks* (40 CFR 63.160). The following Subpart H citations apply.

CITATION	GENERAL REQUIREMENTS
63.162	Standards: General
63.163	Standards: Pumps in light liquid service.
63.164	Standards: Compressors
63.165	Standards: Pressure relief devices in gas/vapor service
63.166	Standards: Sampling connection systems
63.167	Standards: Open-ended valves or lines
63.168	Standards: Valves in gas/vapor service and in light liquid service
63.169	Standards: Pumps, valves, connectors, and agitators in heavy liquid service; instrumentation systems; and pressure relief devices in liquid service
63.170	Standards: Surge control vessels and bottoms receivers
63.171	Standards: Delay of repair
63.172	Standards: Closed-vent systems and control devices
63.173	Standards: Agitators in gas/vapor service and in light liquid service
63.174	Standards: Connectors in gas/vapor service and in light liquid service
63.175	Quality improvement program for valves
63.176	Quality improvement program for pumps
63.180	Test methods and procedures
63.181	Recordkeeping requirements
63.182	Reporting requirements

3.2.3 Chemical Accident Prevention Provisions (40 CFR 68 Subpart G - Risk Management Plan)

The SCR to be implemented for the process heaters will employ ammonia to control NO_x emissions. The quantity of ammonia stored for the SCR system is expected to exceed the storage threshold for applicability of this rule (10,000 pounds). Therefore, ORCF will develop a Risk Management Plant (RMP) that includes accidental release prevention and emergency response policies and program; regulated substances handled; general accidental release prevention program; chemical-specific prevention steps; and measures to be implemented to ensure safety.

4.0 BACT ANALYSIS

As discussed in Section 2.0, the Fischer-Tropsch and Product Upgrade processes will generate air emissions from three process activities: fuel combustion in process heaters; venting of F-T catalyst regeneration exhaust and other process vents to a low pressure flare; and fugitive emissions of VOC from leaking valves, flanges, pumps, and compressors. The BACT analyses for all nine process heaters are presented together in Sections 4.1 through 4.5. The heaters include five units with ratings of 4 MMBtu/hr (referred to here are "small units"), three "medium units" with rating of 20, 21, and 24 MMBtu/hr and one "large unit" with a rating of 154 MMBtu/hr. The small units will all operate under natural draft and will each vent to a dedicated stack. The medium and large units will operate via forced (mechanical) draft and will be ducted to a common stack.

Section 4.6 presents the BACT analysis for VOC emissions from the low pressure flare. The BACT analysis for VOC emissions from equipment leaks is presented in Section 4.7.

4.1 Process Heaters – Particulate Matter

The nine process heaters associated with the Fischer-Tropsch and Product Upgrade operations will be sources of particulate emissions (PE). The process heaters are not primary sources of particulates because they will burn clean tailgas or natural gas. The particulates in the exhaust will consist of residual inerts that have passed through the upstream cleanup processes. This section presents the BACT analysis for PE from those sources. The following table provides technical details regarding the proposed ORCF process heaters.

Table 4.1 Summary of ORCF Process Heaters

<table>
<tr><th>Description</th><th>Mechanical or Natural Draft</th><th>Heat Input Rating (MMBtu/hr)</th><th>BACT Analysis Reference</th></tr>
<tr><td>F-T Fractionator Fired Heater</td><td rowspan="4">Mechanical</td><td>154.0</td><td>Large</td></tr>
<tr><td>Hydrocracker Feed Hydrogen Heater</td><td>20.0</td><td rowspan="3">Medium</td></tr>
<tr><td>Hydrocracker Feed Oil Heater</td><td>21.0</td></tr>
<tr><td>Production Fractionation Feed Heater</td><td>24.0</td></tr>
<tr><td>Nitrogen Heater</td><td rowspan="5">Natural</td><td rowspan="5">4.0</td><td rowspan="5">Small</td></tr>
<tr><td>Hot Oil Heater</td></tr>
<tr><td>Hydrogen Stripping Heater</td></tr>
<tr><td>Oxidation Gas Heater</td></tr>
<tr><td>Reduction Gas Heater</td></tr>
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4.1.1 Available Control Technologies – Particulate Matter

Separate reviews of the RACT, BACT, LAER Clearinghouse (RBLC) database were conducted for Process 12.300 "Gaseous Fuel & Gaseous Fuel Mixtures (>100 MMBtu/h & ≤250 MMBtu/h)" and for Process 13.300 "Gaseous Fuel & Gaseous Fuel Mixtures (≤100 MMBtu/h). The following particulate control technologies were identified:

- Clean fuel use and good combustion practices
- No reasonable controls

In addition to use of clean fuels as a particulate emissions control, add-on technologies such as fabric fume collectors and scrubbers could be applied. However, these add-on technologies have limitations when applied to clean combustion gases. These limitations are discussed below.

Fabric fume collectors are generally designed to capture and remove high concentration particulate streams. Fabric design generally limits the inlet air temperatures to a maximum level of approximately 500 °F (significantly lower than the expected 650 to 775 °F exhaust temperature range from these process heaters). Removal efficiencies for particulates are generally close to 99% with outlet loadings less than or equal to 0.005 gr/dscf.

Wet scrubbers are generally designed to capture and remove high concentration particulate streams. Wet scrubbers are generally designed to operate at temperatures greater than those of fabric fume collectors. Removal efficiencies for particulates are generally close to 99% with outlet loadings of less than or equal to 0.01 gr/dscf.

4.1.2 Technically Infeasible Options – Particulate Matter

Fabric fume collectors and wet scrubbers, while technically feasible if design modifications are performed, are not necessary based on the expected concentrations of particulates after the gas stream. Table 4.1.2 presents the PE emission rates, expected flow rates, and outlet grain loading of particulate from the process heaters.

Table 4.1.2 Summary of Process Heater Particulate Emissions

Source	Emission Rate			Flow Rate (scfm)	Grain Loading (gr/dscf)
	tpy	Lb/hr	Grains/min		
Small Units (4 MMBtu/hr)	0.4	0.091	10.65	2,213	0.0044
Medium Unit (20 MMBtu/hr)	2.0	0.456	53.3	11,620	0.0046
Medium Unit (21 MMBtu/hr)	1.9	0.433	50.6	11,067	0.0046
Medium Unit (24 MMBtu/hr)	2.3	0.525	50.6	13,280	0.0046
Large Unit (154 MMBtu/hr)	14.5	3.31	386	85,212	0.0045

The outlet grain loadings are less than the 0.005 established as BACT performance criteria for baghouse units. These numbers are easily achieved given the design criteria and combustion practices established for these process heaters even without the use of add-on controls. However, add-on controls cannot be eliminated as being technically infeasible except for the small process heaters which will not be equipped with mechanical draft systems. Fume collectors and wet scrubbers have been advanced for BACT review for the medium and large process heaters only.

4.1.3 Technology Ranking – Particulate Matter

Table 4.1.3 Estimated PE Control Technology Efficiencies for Process Heaters

Technology	Estimated Control Efficiency (%)	Basis
Fabric Fume Collector	>99	EPA-452/F-03-026
Wet Scrubber	50 to 95%	EPA-452/F-03-015
Use of only clean fuels and good combustion practices	No Data	NA

4.1.4 Evaluate Most Effective Controls – Particulate Matter

Controlling particulate emissions from these process heaters with a baghouse, beyond the levels established for other PE sources as BACT, would require installation of some type of cooling system, probably a dilution air damper to introduce cooler ambient air into the stream to reduce temperatures of the gas such that the 500 °F criteria could be achieved. The dilution air required to cool the gas to 500 °F would be approximately 43% of the inlet volumes.

Assuming the total volume of air to be handled by the baghouse is 143% of the design draft volumes, the costs for this add-on control can be determined. The following costs have been evaluated based upon the large process heater. The total air volume to be processed, including dilution air would be 121,853 scfm (i.e., 85,212 x 1.43). Using the cost model information provided in the USEPA Air Pollution Control Technology Fact Sheet (EPA 452/F-03-026), capital costs for a reverse-air baghouse would range from $9 to $85/scfm. The costs for this alternative are based on a capital cost for the baghouse equipment of $25/scfm and the capital cost factors for fabric filters provided by the US EPA (Table 1.9 from Chapter 6 EPA/452/B-02-01). Accordingly, the total capital investment for this type of device would be approximately $6,500,000.

Indirect capital costs would include engineering and supervision, construction and field expenses, start-up and performance tests, and contingencies. For purposes of this analysis they are assumed to be included in the total capital investment estimated above. The capital recovery cost, therefore, would be the product of the investment ($6,500,000) and the capital recovery factor (CRF).

The CRF is calculated according to the following equation:

$$CRF = [\, i\,(1 + i)^n \,] / [\,(1 + i)^n - 1\,]$$

where:

CRF= capital recovery factor
i = interest rate (assumed at 7 percent)
n = equipment life (assumed 10 years for the equipment)

According to this equation, the CRF is 0.1424 and the resulting annual capital recovery cost would be about $925,600 (i.e., 0.1424 x $6,500,000).

In addition to the direct and indirect capital costs, there would be direct annual costs associated with operating the baghouse. These costs would include operating labor, maintenance labor, materials, utilities, replacement parts, and disposal. Detailed annual operating costs have not been included in this analysis.

Assuming that 99.9% of the particulate emissions from the process heaters could be removed with the baghouse, the cost per ton of pollutants removed would be :

$925,000 / 14.5 tons = $63,793 per ton

As this analysis indicates, control of PE emissions from the process heaters is not cost-effective. The same conclusion is reached for the medium process heaters based on the lower PE levels that would be controlled.

Similarly, using the cost model information provided in the USEPA Air Pollution Control Technology Fact Sheet for wet scrubbers (EPA 452/F-03-015), capital costs would range from $11 to $55/scfm. For the large process heater, the capital cost would be about $2.8 million based on the mid-range value. Based on the CRF of 0.1424, the annual capital recovery cost would be about $400,000. Adding to that the estimated operating and maintenance costs (about $2.7 million), the annualized cost would be approximately $3.1 million. Even assuming that 95% of the particulate emissions from the process heater could be removed with a wet scrubber, the cost per ton of particulate removed would be:

$3,100,000 / 14.5 tons = $213,793 per ton

As in the baghouse analysis, the same conclusion is reached for the medium process heaters. This analysis therefore concludes that add-on control technologies for control of particulate matter from the process heaters are not cost-effective.

4.1.5 Proposed BACT Limits and Control Options – Particulate Matter

Based on the cost-effectiveness evaluation presented above, it is determined that BACT for particulate control from the process heaters is to use clean fuels and good combustion practices. The proposed BACT limits for the process heaters are based on the AP-42 emission factors for particulate matter from combustion of natural gas, as adjusted from the lower heating value of tailgas (487.5 Btu/scf), as shown below. The proposed limits reflect the expectation that exhausts from the medium and large process heaters will be combined to enable cost-effective control of NO_x emissions.

- Proposed PE Limit - Medium and Large Process Heaters: 0.005 gr/dscf
- Proposed PE Limit - Small Process Heaters: 0.005 gr/dscf

4.2 Module 6 - Process Heaters – Carbon Monoxide

The only sources of carbon monoxide (CO) emissions from Fischer-Tropsch and Product Upgrade are the nine process heaters. This section presents the BACT analysis for CO emissions from those sources.

4.2.1 Available Control Technologies – Carbon Monoxide

CO emissions are due to incomplete combustion that typically results from inadequate air and fuel mixing, a lack of available oxygen, or low temperatures in the combustion zone. Fuel quality and good combustion practices can limit CO emissions. The RBLC database contains the following BACT determinations for CO:

- Good combustion practices
- Good design, operation, and engineering practices
- Clean fuels

Additional technologies that have been identified include:

- EMx™ (formerly SCONOx™)
- Catalytic Oxidation

4.2.2 Technically Infeasible Options – Carbon Monoxide

None of the add-on control technologies are technically feasible for the small process heaters because they will not be equipped with mechanical draft systems. The following discussion applies to the medium and large process heaters.

EMx™ (formerly SCONOx™)

EMx™ - a proprietary catalytic oxidation and adsorption technology that uses a single catalyst for the control of NO_x, CO, and VOC emissions. Unlike SCR, the EMx™ system does not use ammonia. Instead, the EMx™ system uses a coated catalyst to oxidize carbon monoxide (CO) to carbon dioxide (CO_2) and water. The EMx™ system can operate effectively at temperatures ranging from 280 to 750 °F but is sensitive to trace amounts of sulfur in the exhaust. EMx™ is technically feasible for this application because the operating temperature is within the exhaust ranges for the process heaters and the exhaust gas will not contain quantities of residual sulfur that would adversely affect performance. However, EMx™ has not been demonstrated on process heaters. The largest known application is on a 43-MW combined cycle plant. Technical problems associated with operation in conjunction with process heaters are unknown. Additional concerns with EMx™ control technology include process complexity (multiple catalytic oxidation/absorption/regeneration systems), reliance on only one supplier, and the relatively brief operating history of the technology. Based on these considerations, EMx™ technology is determined to be technologically infeasible for the ORCF process heaters.

4.2.3 Technology Ranking – Carbon Monoxide

Table 4.2.3 Estimated CO Control Technology Efficiencies for Process Heaters

Technology	Estimated Control Efficiency (%)	Basis
Oxidation Catalyst (medium and large units only)	92.5 (90-95)	EPA/452/B-02-001 Ch. 2
Good Design, Operation, Engineering, & Combustion Practices	No Data	NA

4.2.4 Evaluate Most Effective Controls – Carbon Monoxide

Large and Medium Process Heaters

Catalytic Oxidation

Catalytic oxidation is a post-combustion technology that uses a catalyst to oxidize CO into CO_2 or H_2O. The technology has most commonly been applied to natural gas fired combustion turbines. Catalytic oxidizers are vulnerable to chemicals and/or particulate matter that masks or fouls the surface of the catalyst. However, at ORCF the potential for fouling of the catalyst by particulate and other materials in the exhaust gas will be minimal because clean gas will be used. Catalytic oxidation allows reactions to occur at temperatures in the 300 to 900 °F range that absent a catalyst would require much greater temperatures to drive the reactions. The exhaust from the process heaters at ORCF will be in the 600 to 800 °F range. This allows catalytic oxidation to be technically feasible.

Since these four process heaters will already be ducted together to a single SCR to control NO_x emissions (as discussed in the Section 4.3.4 of this analysis) a single catalytic oxidizer can be installed to control their cumulative CO emissions.

Using the cost model information provided in the USEPA Air Pollution Control Technology Fact Sheet for catalytic incineration (EPA-452/F-03-018), capital costs would range from $22 to $90/scfm. For the combined flow of the four process heaters (one large and three medium: 121,179 scfm), the capital cost is estimated to be $6.79 million based on the mid-range cost. Based on the CRF of 0.1424, the annual capital recovery cost would be about $966,330. Adding to that the estimated operating and maintenance costs (about $1.76 million), the annualized cost would be approximately $2.72 million. Assuming a control efficiency of 92.5% for the four process heaters, the cost per ton of CO removed would be:

$2,720,000 / 210.25 tons = $12,937 per ton

Based on the outcome of this analysis, ORCF concludes that use of an oxidation catalyst would not be a cost-effective control technology for carbon monoxide control from the four combined process heaters.

<u>Small Process Heaters</u>

Good combustion practices, good design, operation, and engineering practices, and use of clean fuels are the only feasible control strategies and they have historically been selected as BACT for CO emissions from small process heaters.

4.2.5 Proposed BACT Limits and Control Options – Carbon Monoxide

Use of good combustion practices, good design, operation, and engineering practices, and use of clean fuels have been selected as BACT for potential CO emissions from the proposed process heaters. The proposed BACT limit for CO emissions from process heaters shown below is based on the proposed hourly emission rate divided by the heat input of each unit. Because burner vendors have not been selected at this time, performance guarantees are not available. Upon conclusion of the FEED study, ORCF will revisit this proposed BACT limit and incorporate updated information into the permit application documents.

- Proposed CO Limit - Process Heaters: 0.24 lb/MMBtu

4.3 Module 6 - Process Heaters –Nitrogen Oxide

The only sources of nitrogen oxides (NO_x) emissions from Fischer-Tropsch and Product Upgrade are the nine process heaters. This section presents the BACT analysis for NO_x emissions from those sources.

4.3.1 Available Control Technologies – Nitrogen Oxide

The criteria pollutant NO_x is primarily formed in combustion processes in two ways:
1) the reaction of elemental nitrogen and oxygen in the combustion air within the high temperature environment of the combustor (thermal NO_x), and 2) the oxidation of nitrogen contained in the fuel (fuel NO_x). The RBLC database contains the following BACT determinations for NO_x from combustion processes similar to the process heaters:

- Low-NO_x burners (LNB)
- Ultra Low-NO_x burners (ULNB)
- Selective catalytic reduction (SCR)
- Flue gas recirculation (FGR)
- Good Combustion Practices (GCP)

The following technologies or combinations of technologies have also been used to control NO_x from combustion sources:

- Selective non-catalytic reduction (SNCR)
- Non-selective catalytic reduction (NSCR)
- EMx™ (formerly SCONOx™)
- ULNB with SCR
- LNB with SCR
- LNB with SNCR

4.3.2 Technically Infeasible Options – Nitrogen Oxide

Selective Non-Catalytic Reduction

Selective non-catalytic reduction is a post-combustion NO_x control technology that uses ammonia or urea to react with NO_x to form nitrogen and water. As the name implies, a catalyst is not needed. The technology requires that the reagent and the exhaust gas are uniformly mixed within a narrow temperature range (1,600 to 2,100 °F). No examples have been found where SNCR has been applied to small thermal dryers or process heaters. Because the process heaters will generate a gas stream that exits the low pressure flare between 650 and 775 °F, additional heat input would be required to increase the flue gas temperature to the required operating range.

That increase in temperature would in turn produce additional NO_x emissions. SCNR is therefore considered to be technically infeasible for control of NO_x from the process heaters.

Non-Selective Catalytic Reduction

Non-selective catalytic reduction (NSCR) uses a catalyst without injected reagents to reduce NO_x emissions in an exhaust gas stream. NSCR is typically used in automobile exhaust and rich-burn stationary internal combustion engines. NSCR uses a platinum/rhodium catalyst and is only effective in a stoichiometric or fuel-rich environment where the combustion gas is nearly depleted of oxygen. This type of environment does not exist in the exhaust from the process heaters therefore NSCR is not technologically feasible for this application.

EMx™ (formerly SCONOx™)

EMx™ - a proprietary catalytic oxidation and adsorption technology that uses a single catalyst for the control of NO_x, CO, and VOC emissions. Unlike SCR, the EMx™ system does not use ammonia. Instead, the EMx™ system uses a coated catalyst to oxidize nitrogen oxide (NO) to nitrogen dioxide (NO_2) and to adsorb NO_2 onto the coating on the catalyst. As discussed in Section 4.2.2, the EMx™ system has been determined to be technologically infeasible for the ORCF process heaters.

Selective Catalytic Reduction

Selective catalytic reduction is a post-combustion NO_x control technology that uses ammonia or urea to react with NO_x to form nitrogen and water. As the name implies, a catalyst is needed. The technology requires that the reagent and the exhaust gas are uniformly mixed within a temperature range of 300 to 900 °F. Because the process heaters will generate a gas stream that exits the low pressure flare between 650 and 775 °F, no additional heat input would be required to increase the flue gas temperature to the required operating range. SCR is only feasible for mechanical draft controlled process heaters. Natural draft has been selected as a design feature of these five process heaters. SCR is therefore considered to be technically infeasible for control of NO_x from the 4MMBtu/hr natural draft process heaters.

Low & Ultra Low-NO_x Burners

LNB technology is designed for burners with a minimum capacity of 10 MMBtu/hr. It is therefore considered to be technically infeasible for the small process heaters.

4.3.3 Technology Ranking – Nitrogen Oxide

Technically feasible NO_x control options for the process heaters are ranked here according to expected potential emission reductions.

Table 4.3.3 Estimated NO_x Control Technology Efficiencies for Process Heaters

Technology	Estimated Control Efficiency (%)	Basis
Ultra LNB with SCR	95	Based on combination of control efficiencies: 75% LNB + 80% SCR
LNB with SCR	88	EPA-452/F-03-032, 11/99
SCR	80 (70-90)	EPA-452/F-03-032, 7/03
ULNB	75	EPA-452/F-03-032, 11/99
LNB and FGR	55	EPA-452/F-03-032, 11/99
LNB	50	EPA-452/F-03-032, 11/99
FGR*	10	Derived from LNB + FGR
Good Combustion Practices	ND	NA

* FGR requires mechanical draft and is not a stand-alone technology; it is typically combined with LNBs.

4.3.4 Evaluate Most Effective Controls – Nitrogen Oxide

Medium and Large Process Heaters

Mechanical draft has been selected as a design feature of these four process heaters. Therefore SCR is an available control technology. Cost evaluations presented in Attachment 6C indicate that SCR is cost-effective for the large process heater alone but is not for the medium-sized process heaters alone. However, it has been determined that if all four units (one large and three medium) are ducted together, a single SCR would be cost-effective. As shown in Table 4.3.4, the cost effectiveness of the highest ranked technology, ultra low-NO_x burners and ducting to a single SCR, has also been shown to be cost effective. Therefore ducting of the three medium process heaters and the large process heater to a single SCR has been selected as BACT.

Table 4.3.4 Cost Effectiveness of NO_x Control Technologies for Process Heaters

Technology	Estimated Cost Effectiveness for Different Sized Heaters (US Dollars per ton NO_x controlled)			
	154 MMBtu/hr	24 MMBtu/hr	21 MMBtu/hr	20 MMBtu/hr
ULNB + Ducting to single SCR	$4,454			
ULNB + Individual SCRs	$4,515	$7,140	$7,429	$7,534
LNB + SCR	$4,872	$7,675	$7,983	$8,094
Individual SCRs	$1,909	$7,833	$8,140	$8,245
Ducting to single SCR	$2,200			
ULNB	$3,683	$688	$728	$747
ULNB + FGR	$3,640	$1,572	$1,675	$1,718
LNB + FGR	$5,291	$2,235	$2,377	$2,436
LNB	$5,521	$975	$1,026	$1,052
FGR*	$1,499	$7,418	$7,945	$8,138
GCP	NA	NA	NA	NA

* FGR requires mechanical draft and is not a stand-alone technology; it is typically combined with LNBs.

4.3.5 Proposed BACT Limits and Control Options – Nitrogen Dioxide

Medium and Large Process Heaters

While emission estimates have indicated NO_x, emission limits will be reported in terms of the regulated air pollutant, NO_2. The proposed BACT limit for NO_2 emissions from the combined medium and large process heater stack is shown below. Because burner and SCR vendors have not been selected at this time, performance guarantees are not available. Upon conclusion of the FEED study, ORCF will revisit this proposed BACT limit and incorporate updated information into the permit application documents.

- Proposed NO_2 Limit - Medium and Large Process Heaters: 0.08 lb/MMBtu

The proposed BACT limit is based on the proposed hourly emission rate of the four process heaters combined (16.8 lb/hr) divided by the heat input of the combined units (219 MMBtu/hr).

Small Process Heaters

Good combustion practices has been selected as BACT for these process heaters as this represents the most effective control technology identified. The proposed BACT limit is based on the proposed hourly emission rate (1.12 lb/hr) divided by the heat input of the combined units (4 MMBtu/hr).

- Proposed NO_2 Limit - Small Process Heaters: 0.28 lb/MMBtu

4.4 Module 6 - Process Heaters – Volatile Organic Compounds (VOC)

Volatile Organic Compound (VOC) emissions are due to incomplete combustion that typically results from inadequate air and fuel mixing, a lack of available oxygen, or low temperatures in the combustion zone. Fuel quality and good combustion practices can limit VOC emissions.

4.4.1 Available Control Technologies – VOC

The RBLC database contains the following BACT determinations for VOC from combustion processes similar to the process heaters:

- Good combustion practices
- Good design, operation, and engineering practices
- Clean fuels
- Catalytic Oxidation

In addition, EMx™ (formerly SCONOx™) has been applied to the control of VOC emissions from combustion sources.

4.4.2 Technically Infeasible Options - Volatile Organic Compounds (VOC)

Add-on control technologies, such as catalytic oxidation, are technically infeasible for the small process heaters because they will not be equipped with mechanical draft systems. As discussed in Section 4.2.2, EMx™ has been determined to be technically infeasible for the ORCF process heaters.

4.4.3 Technology Ranking – Volatile Organic Compounds (VOC)

Table 4.4.3 Estimated CO Control Technology Efficiencies for Process Heaters

Technology	Estimated Control Efficiency (%)	Basis
Oxidation Catalyst	92.5 (90-95)	EPA/452/B-02-001 Ch. 2
Good Design, Operation, Engineering, & Combustion Practices	ND	NA

4.4.4 Evaluate Most Effective Controls – VOC

Catalytic oxidation is a post-combustion control that uses a catalyst to oxidize VOC into primarily CO_2 and H_2O. Further discussion of this technology is provided in Section 4.2.4. Use of an oxidation catalyst was determined to be not cost-effective for control of CO emissions. Use of the same technology for control of VOC emissions would therefore not be cost-effective either because fewer tons of VOC would be controlled. Consequently, good combustion practices, good design, operation, and engineering practices, and use of clean fuels have been selected as BACT for VOC emissions from the process heaters.

4.4.5 Proposed BACT Limits and Control Options - VOC

Good combustion practices has been selected as BACT for these process heaters as this represents the most effective control technology identified. The proposed BACT limit is based on the proposed hourly emission rate divided by the heat input of the respective units.

- Proposed VOC Limit - Process Heaters: 0.02 lb/MMBtu

4.5 Module 6 - Process Heaters – Sulfur Dioxide

Fuel gas burned in the process heaters will be a source of sulfur dioxide (SO_2) emissions. This section presents the BACT analysis for SO_2 emissions from that source.

4.5.1 Available Control Technologies – Sulfur Dioxide

Sulfur dioxide (SO_2) emissions are due to combustion of sulfur present in fuel. The control of SO_2 emissions is most directly related to using low sulfur fuel. The RBLC database contains the following BACT determinations for SO_2:

- Various fuel sulfur limits (%)
- Clean Fuels (Low Sulfur Fuels)
- Natural Gas
- Good combustion practice

4.5.2 Technically Infeasible Options – Sulfur Dioxide

All of the above-listed technologies are feasible for control of SO_2 emissions from the process heaters.

4.5.3 Technology Ranking – Sulfur Dioxide

Good combustion practices including good design of the process heaters and proper maintenance are determined to be the only feasible technologies for control of sulfur dioxide emissions from the process heaters.

4.5.4 Evaluate Most Effective Controls – Sulfur Dioxide

A combination of good design, good combustion practices, and proper maintenance is selected as BACT for SO_2 emissions from the process heaters.

4.5.5 Proposed BACT Limits and Control Options – Sulfur Dioxide

The use of good design and good combustion practices has been selected as BACT for potential SO_2 emissions from the process heaters.

<u>Medium and Large Process Heaters</u>

The proposed BACT limit for SO_2 emissions from the combined medium and large process heater stack is shown below. Because burner vendors have not been selected at this time, performance guarantees are not available. Upon conclusion of the FEED study, ORCF will revisit this proposed BACT limit and incorporate updated information into the permit application documents.

- Proposed SO_2 Limit - Medium and Large Process Heaters: 0.002 lb/MMBtu

The proposed BACT limit is based on the proposed hourly emission rate of the four process heaters combined (0.37 lb/hr) divided by the heat input of the combined units (219 MMBtu/hr).

Small Process Heaters

Good combustion practices have been selected as BACT for these process heaters as this represents the most effective control technology identified. The proposed BACT limit is based on the proposed hourly emission rate (0.0069 lb/hr) divided by the heat input of the combined units (4 MMBtu/hr).

- Proposed VOC Limit - Small Process Heaters: 0.002 lb/MMBtu

4.6 Low-Pressure Flare – VOC

The second group of air emission sources from this module are various vents associated with the regeneration of the F-T catalyst. Gases produced during the regeneration process will contain volatile organic compounds (VOCs). A low-pressure flare will be used to destroy these VOC emissions prior to being vented to the atmosphere. This section presents the BACT analysis for VOC emissions from the low-pressure flare.

4.6.1 Available Control Technologies – VOC

VOC emissions are due to incomplete combustion that typically results from inadequate air and fuel mixing, a lack of available oxygen, or low temperatures in the combustion zone. Fuel quality and good combustion practices can limit VOC emissions. A review of the RBLC database for Process Type 19.3 – Flares, located BACT determinations for VOC as follow:

- Flare is VOC control (i.e., the flare was indicated as BACT for the process)
- Good combustion practice
- Limited operation

4.6.2 Technically Infeasible Options – Volatile Organic Compounds

Limiting the operating hours of the flare is technically infeasible. The duration and frequency of process vent discharges cannot be anticipated.

4.6.3 Technology Ranking – Volatile Organic Compounds

Good design and combustion practices are the only feasible control strategies that have been identified. Good combustion practice has historically been selected as BACT for VOC emissions from flares.

4.6.4 Evaluate Most Effective Controls – Volatile Organic Compounds

A combination of good design and combustion practices is selected as BACT for VOC emissions from the high pressure flare.

4.6.5 Proposed BACT Limits and Control Options – Volatile Organic Compounds

The use of good design and good combustion practices has been selected as BACT for potential VOC emissions from the low-pressure flare. The proposed BACT limit is based on the proposed hourly emission rate (0.033 lb/hr) divided by the heat input of the combined units (146 MMBtu/hr).

- Proposed VOC Limit – Low-Pressure Flare: 0.0002 lb/MMBtu

4.7 Low-Pressure Flare – Carbon Monoxide

The low pressure flare will be a source of carbon monoxide (CO) emissions. This section presents the BACT analysis for CO emissions from that source.

4.7.1 Available Control Technologies – Carbon Monoxide

Carbon monoxide emissions are due to incomplete combustion that typically results from inadequate air and fuel mixing, a lack of available oxygen, or low temperatures in the combustion zone. Fuel quality and good combustion practices can limit CO emissions. A search of RBLC for Process Type 19.3 - Flares, located several BACT determinations for carbon monoxide, as listed below.

- Limited operating hours
- Follow requirements of 40 CFR 60.18
- Good combustion practice
- Good design and proper operating practices, comply with 40 CFR 60.18
- Proper maintenance including monitoring for the presence of a flame

4.7.2 Technically Infeasible Options – Carbon Monoxide

Limiting the operating hours of the flare is technically infeasible. The duration and frequency of process upsets and emergencies cannot be anticipated.

The requirements of 40 CFR 60.18 apply to control devices that are used to achieve compliance with other applicable subparts of 40 CFR 60 and 61. While operation of the flare is not subject to these guidelines, because prior BACT determinations have referenced them, they are presented here:

- Flares shall be designed for and operated with no visible emissions except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.
- Flares shall be operated with a flame present at all times
- An option is provided for adhering with a heat content specification (minimum 300 Btu/scf for steam- or air-assisted, 200 Btu/scf if nonassisted) and a maximum tip velocity depending on the type of flare, or specific stack dimensions for nonassisted flares.

Because engineering details of the final flare design have not been developed at this time, the feasibility of adherence to the 40 CFR 60.18 guidelines can not be determined.

4.7.3 Technology Ranking – Carbon Monoxide

Good design and combustion practices are the only feasible control strategies that have been identified. Good combustion practice has historically been selected as BACT for CO emissions from flares.

4.7.4 Evaluate Most Effective Controls – Carbon Monoxide

A combination of good design and combustion practices is selected as BACT for CO emissions from the low pressure flare.

4.7.5 Proposed BACT Limits and Control Options – Carbon Monoxide

The use of good design and good combustion practices has been selected as BACT for potential CO emissions from the low pressure flare. The proposed BACT limit of 0.17 lb/MMBtu is based on the maximum hourly projected emissions (25.2 lb/hr) and the maximum flare heat input (146 MMBtu/hr)

4.8 Low-Pressure Flare – Nitrogen Oxides

The low pressure flare will be a source of nitrogen oxide (NO_x) emissions. This section presents the BACT analysis for NO_x emissions from that source.

4.8.1 Available Control Technologies – Nitrogen Oxides

A search of RBLC for Process Type 19.3 - Flares, located several BACT determinations for nitrogen oxides, as listed below.

- Limited operating hours
- Follow requirements of 40 CFR 60.18
- Good combustion practice
- Good design and proper operating practices, comply with 40 CFR 60.18
- Proper maintenance including monitoring for the presence of a flame

4.8.2 Technically Infeasible Options – Nitrogen Oxides

Limiting the operating hours of the flare is technically infeasible. The duration and frequency of process upsets and emergencies cannot be anticipated.

The requirements of 40 CFR 60.18 apply to control devices that are used to achieve compliance with other applicable subparts of 40 CFR 60 and 61, as discussed above in Section 4.2.2. Because engineering details of the final flare design have not been developed at this time, the feasibility of adherence to the 40 CFR 60.18 guidelines can not be determined.

4.8.3 Technology Ranking – Nitrogen Oxides

Good design and combustion practices are the only feasible control strategies that have been identified. Good combustion practice has historically been selected as BACT for NO_x emissions from flares.

4.8.4 Evaluate Most Effective Controls – Nitrogen Oxides

A combination of good design and combustion practices is selected as BACT for NO_x emissions from the high pressure flare.

4.8.5 Proposed BACT Limits and Control Options – Nitrogen Oxides

The use of good design and good combustion practices has been selected as BACT for potential NOx emissions from the low pressure flare. The proposed BACT limit of 0.21 lb/MMBtu is based on the maximum hourly projected emissions (30.0 lb/hr) and the maximum flare heat input (146 MMBtu/hr).

4.9 Low-Pressure Flare – Particulate Matter

The low pressure flare will be a source of particulate matter emissions. This section presents the BACT analysis for particulate matter emissions from the high pressure flare.

4.9.1 Available Control Technologies – Particulate Matter

A search of RBLC for Process Type 19.3 - Flares, located several BACT determinations for particulate matter. In all cases, the BACT determinations referenced air assist with smokeless design and operation.

4.9.2 Technically Infeasible Options – Particulate Matter

Smokeless design is technically feasible for particulate matter control from the low pressure flare.

4.9.3 Technology Ranking – Particulate Matter

Smokeless design is the only feasible control strategy that has been identified for particulate matter emissions from the low pressure flare.

4.9.4 Evaluate Most Effective Controls – Particulate Matter

Smokeless design has been selected as BACT for control of particulate matter emissions from the low pressure flare.

4.9.5 Proposed BACT Limits and Control Options – Particulate Matter

Smokeless design has been selected as BACT for potential particulate emissions from the high pressure flare. The proposed BACT limit of 0.02 lb/MMBtu is based on the projected emissions (2.3 lb/hr) and the maximum flare heat input (146 MMBtu/hr).

4.10 Low-Pressure Flare – Sulfur Dioxide

The low pressure flare will be a negligible source of sulfur dioxide (SO_2) emissions. This section presents the BACT analysis for SO_2 emissions from that source.

4.10.1 Available Control Technologies – Sulfur Dioxide

Sulfur dioxide (SO_2) emissions are due to combustion of sulfur present in fuel. The control of SO_2 emissions is most directly related to using low sulfur fuel. A review of the RBLC database for Process Type 19.3 - Flares, located BACT determinations for SO_2 as follow:

- Various fuel sulfur limits (%)
- Follow requirements of 40 CFR 60.18
- Good combustion practice
- Good design and proper operating practices, comply with 40 CFR 60.18
- Proper maintenance including monitoring for the presence of a flame

4.10.2 Technically Infeasible Options – Sulfur Dioxide

It is technically infeasible to limit the sulfur content of gases vented to the high pressure flare to a specific sulfur percentage. However, the gases vented to the low pressure flare are not expected to contain sulfur compounds because the primary gas stream will be associated with regeneration of F-T catalyst beds which will contain negligible concentrations of sulfur compounds. As such, emission estimates for this process have been based on combustion of natural gas which has inherently low concentrations of sulfur compounds.

As discussed above, because engineering details of the final flare design have not been developed at this time, the feasibility of adherence to the 40 CFR 60.18 guidelines can not be determined.

4.10.3 Technology Ranking – Sulfur Dioxide

Good combustion practices including good design of the flare and proper maintenance are determined to be the only feasible technologies for control of sulfur dioxide emissions from the low pressure flare.

4.10.4 Evaluate Most Effective Controls – Sulfur Dioxide

A combination of good design, good combustion practices, and proper maintenance is selected as BACT for SO_2 emissions from the low pressure flare.

4.10.5 Proposed BACT Limits and Control Options – Sulfur Dioxide

The use of good design and good combustion practices has been selected as BACT for potential SO_2 emissions from the low pressure flare. The proposed BACT limit of 0.001 lb/MMBtu is based on the maximum hourly projected emissions (0.2 lb/hr) and the maximum flare heat input (146 MMBtu/hr).

4.11 Equipment Leaks and Fugitives - Volatile Organic Compounds (VOC)

The final group of emission sources associated with this module is the collection of numerous valves, flanges, pumps, compressors, and other components that will be in contact with gaseous or light liquid service and may be subject to leaks.

4.11.1 Available Control Technologies – VOC

A review of the past 10 years of RBLC determinations located the following control technologies associated with BACT or other case-by-case determinations:

- Leakless/Sealless Components
- Leak Detection and Repair (LDAR) Program

4.11.2 Technically Infeasible Options – VOC

Both of the above–listed technologies are feasible for control of fugitive VOC emissions from pumps, valves, and compressors used in the Fischer-Tropsch and Product Upgrade processes. However, leakless technologies are not technically feasible for threaded or bolted flanges. Welded or soldered flanges, while effectively leakless, would present operational complications that are considered to be technically infeasible. Therefore, leakless flanges will not be advanced for further evaluation.

4.11.3 Technology Ranking – VOC

Table 4.11.3 Estimated VOC Control Technology Efficiencies for Equipment Leaks

Technology	Estimated Control Efficiency (%)	Basis
Leakless/Sealless Components	>99	EPA 453/R-95-017, November 1995, Table 5-1
LDAR (Valves – light liquid)	76*	EPA 453/R-95-017, November 1995, Table 5-3
LDAR (Pumps – light liquid)	68*	

*Monthly monitoring - 10,000 ppmv leak definition

4.11.4 Evaluate Most Effective Controls – VOC

The most effective control for fugitive VOC emissions from pump, valve, and compressor leaks is expected to be the use of leakless/sealless or low-emission components. For flanges, the most effective control technology is determined to be implementation of an effective LDAR program.

4.11.5 Proposed BACT Limits and Control Options –VOC

The use of leakless/sealless or low-emission pumps, valves, and compressors has been selected as BACT for potential fugitive VOC emissions. For control of fugitive VOC emissions from flanges, ORCF will implement an ongoing LDAR program. The frequency of LDAR will be determined through compliance with applicable regulations. The proposed BACT limit for fugitive VOC emissions is shown below.

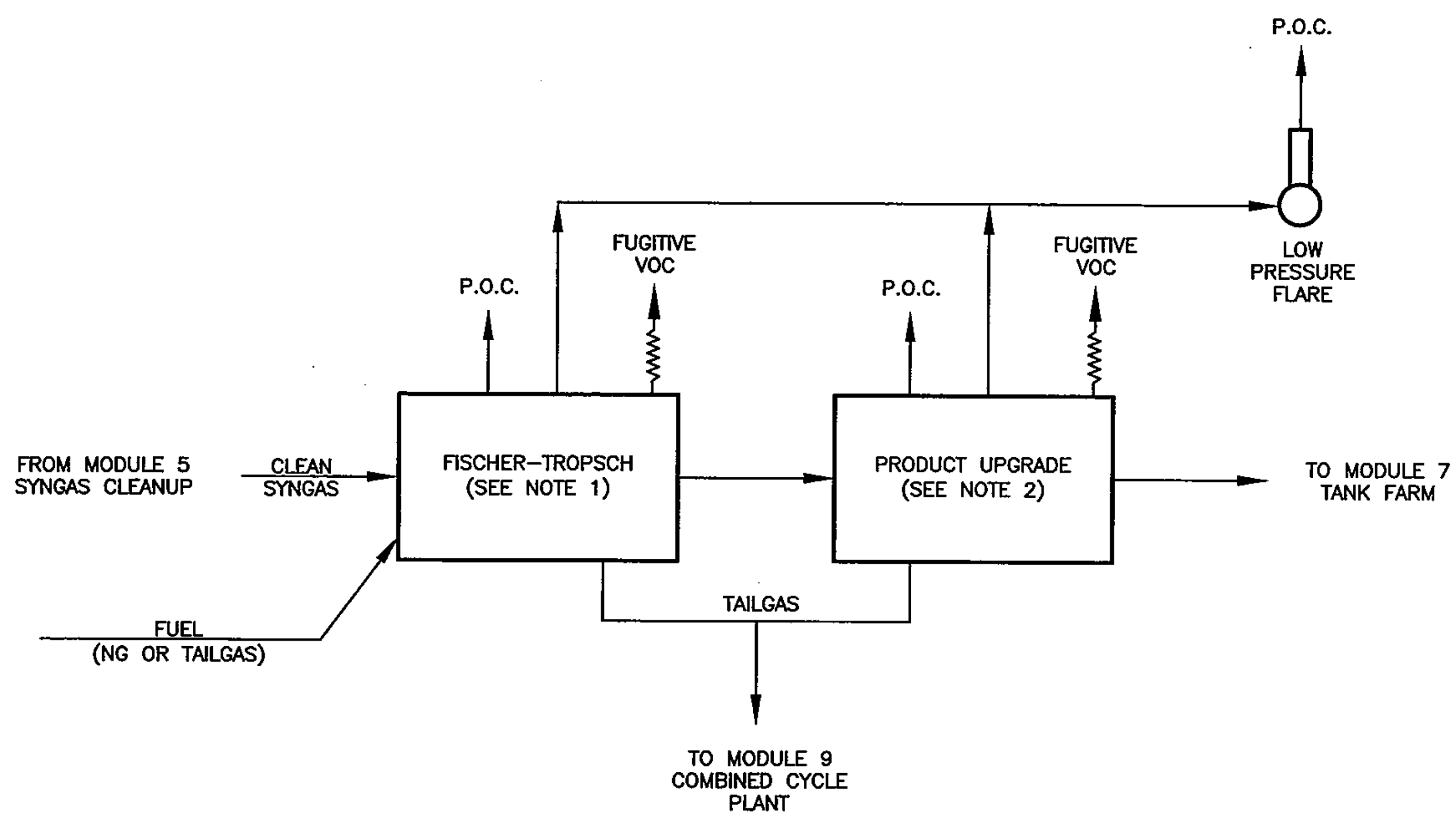
Proposed VOC Limit – Equipment Leaks: 1.7 tons per year

ATTACHMENT 6A
MODULE 6
FIGURES

\\SVR-PITT\CADD\PROJECTS\2006\061-933\DWG\061933-ENV4-6.DWG {FIG 13} (LCOLAIZZI) - DEC 12, 2007 - 15:54:26

SUBMITTAL & REVISION RECORD

NO	DATE	DESCRIPTION
A	08/13/07	DRAFT SUBMISSION, AS: 061-933-FIGURE-15-MODULE-6-BLOCK-FLOW-DIAGRAM.dwg
B	12/17/07	AIR PERMIT APPLICATION



NOTE 1:
FISCHER–TROPSCH
EMISSION SOURCES
HEATERS
- –FRACTIONATON FIRED HEATER
- –NITROGEN HEATER
- –HOT OIL HEATER
- –HYDROGEN STRIPPING HEATER
- –OXIDATION GAS HEATER
- –REDUCTION GAS HEATER

OTHERS
- –PUMPS
- –VALVES
- –FLANGES
- –COMPRESSORS
- –PRESSURE RELEASE VALVES

NOTE 2:
PRODUCT UPGRADE
EMISSION SOURCES
HEATERS
- –HYDROCRACKER FEED OIL HEATER
- –HYDROCRACKER FEED HYDROGEN HEATER
- –PRODUCTION FRACTIONATION FEED HEATER

OTHER
- –PUMPS
- –VALVES
- –FLANGES
- –COMPRESSORS
- –PRESSURE RELEASE VALVES

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MODULE 6
FISCHER-TROPSCH & PRODUCT UPGRADE

APPROVED:				PROJECT NO: 061-933.0002	FIGURE NO: 13
DRAWN BY: JRW/LKC	CHKD BY: DJL	DWG SCALE: N.T.S.		DATE: 11/26/07	

\\SVR-PITT\CADD\PROJECTS\2006\061-933\DWG\061933-ENV4-6.DWG {FIG 14} (LCOLAIZZI) - JUL 15, 2008 - 13:6:23

SUBMITTAL & REVISION RECORD

NO	DATE	DESCRIPTION
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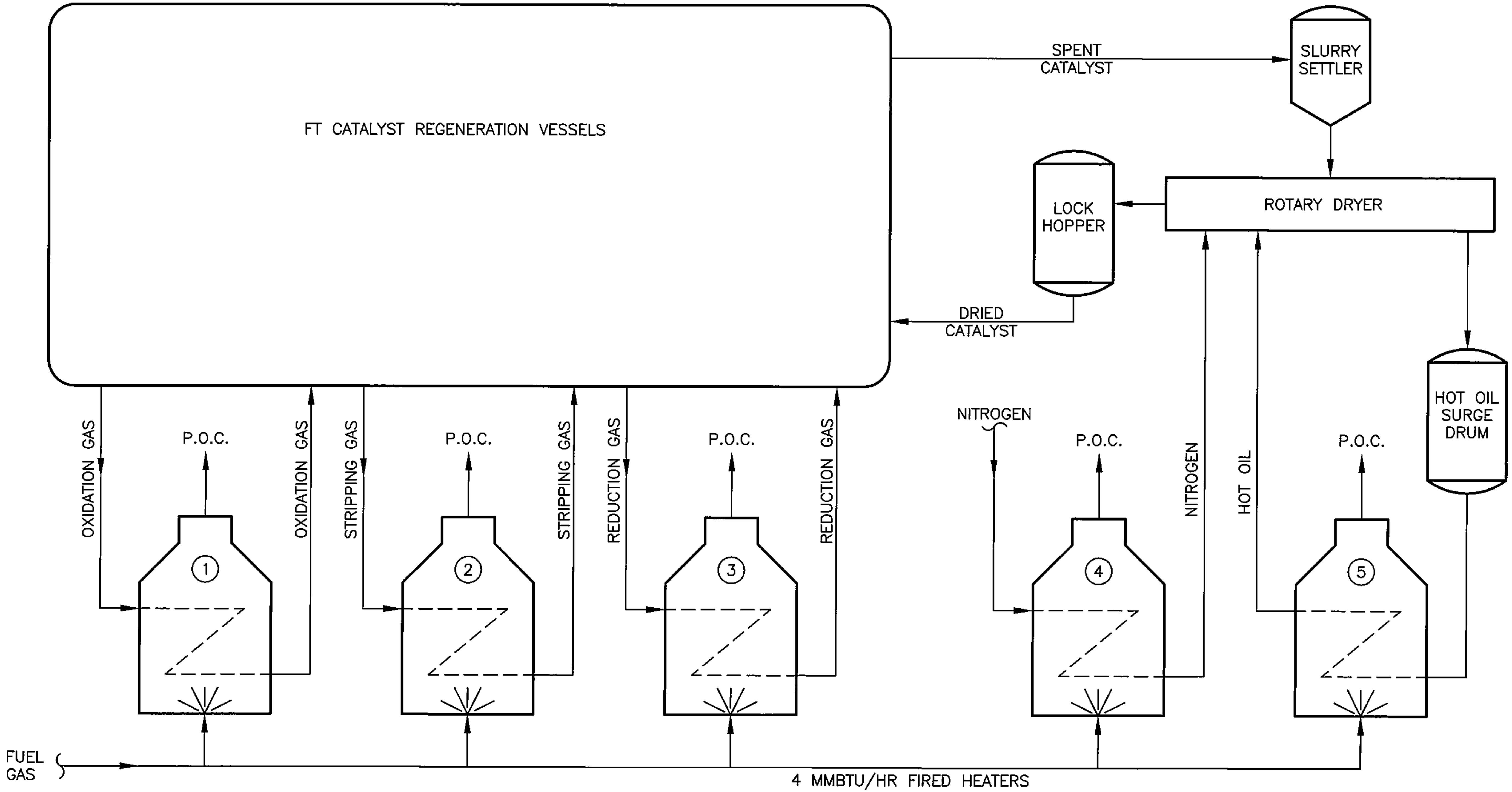
B	12/17/07	AIR PERMIT APPLICATION



FISCHER - TROPSCH (1 OF 2)
CATALYST ACTIVATION / REACTIVATION

1. OXIDATION GAS HEATER
2. HYDROGEN STRIPPING HEATER
3. REDUCTION GAS HEATER
4. NITROGEN HEATER
5. HOT OIL HEATER

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MODULE 6 - FISCHER-TROPSCH & PRODUCT UPGRADE
4 MMBTU/HR FIRED HEATERS

APPROVED:	Kam			PROJECT NO: 061-933.0002	FIGURE NO: 14
DRAWN BY: LKC	CHKD BY: DJL	DWG SCALE: N.T.S.		DATE: 11/26/07	

SUBMITTAL & REVISION RECORD

NO	DATE	DESCRIPTION
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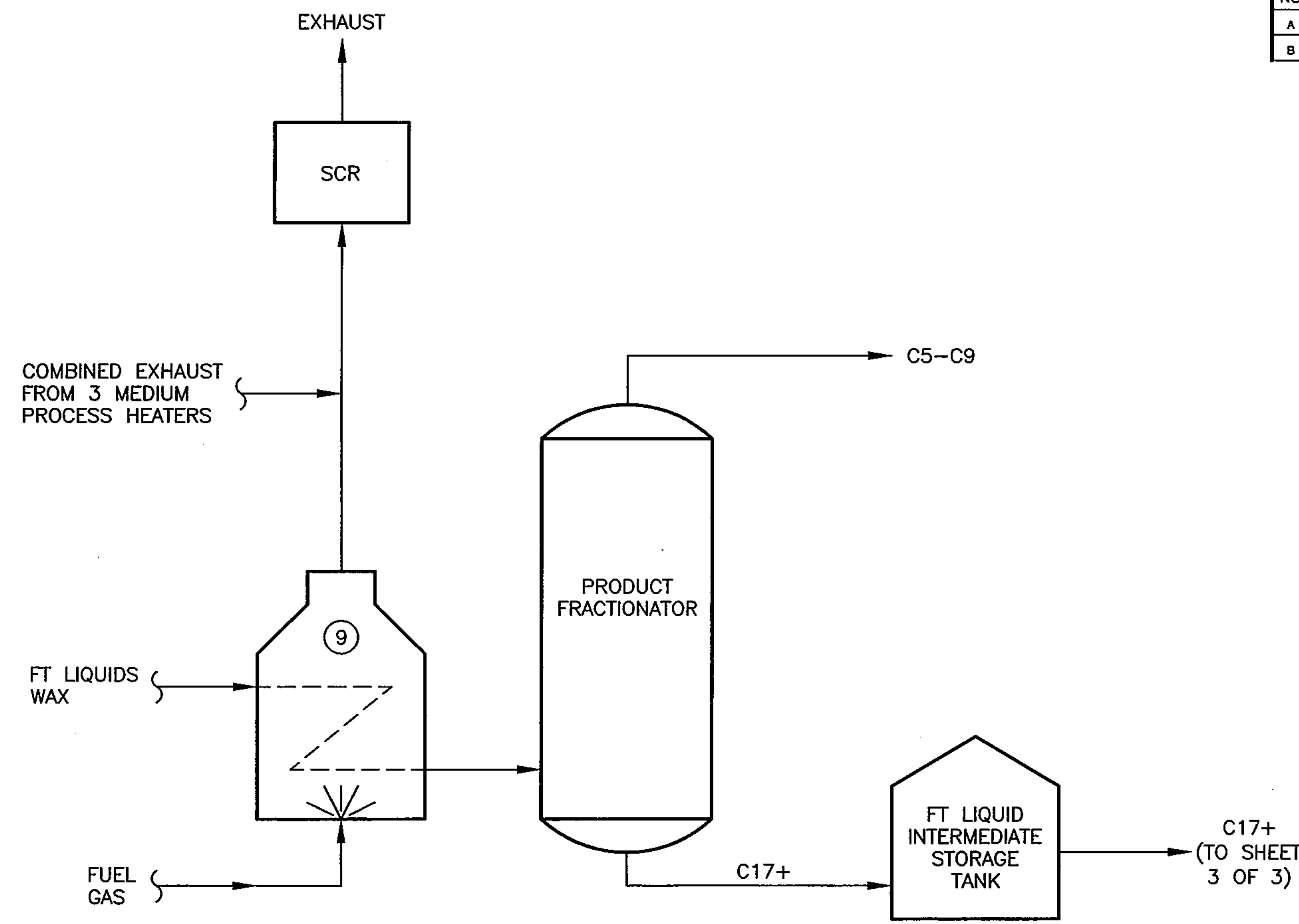
B	12/17/07	AIR PERMIT APPLICATION



FISCHER - TROPSCH (2 OF 2)
CATALYST ACTIVATION / REACTIVATION

9. FT FRACTIONATOR FEED HEATER, 154 MMBTU/HR

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MODULE 6 - FISCHER-TROPSCH & PRODUCT UPGRADE
154 MMBTU/HR FIRED HEATERS

APPROVED:	[signature]			PROJECT NO: 061-933.0002	FIGURE NO: 15
DRAWN BY: LKC	CHKD BY: DJL	DWG SCALE: N.T.S.		DATE: 11/26/07	

SUBMITTAL & REVISION RECORD

NO	DATE	DESCRIPTION
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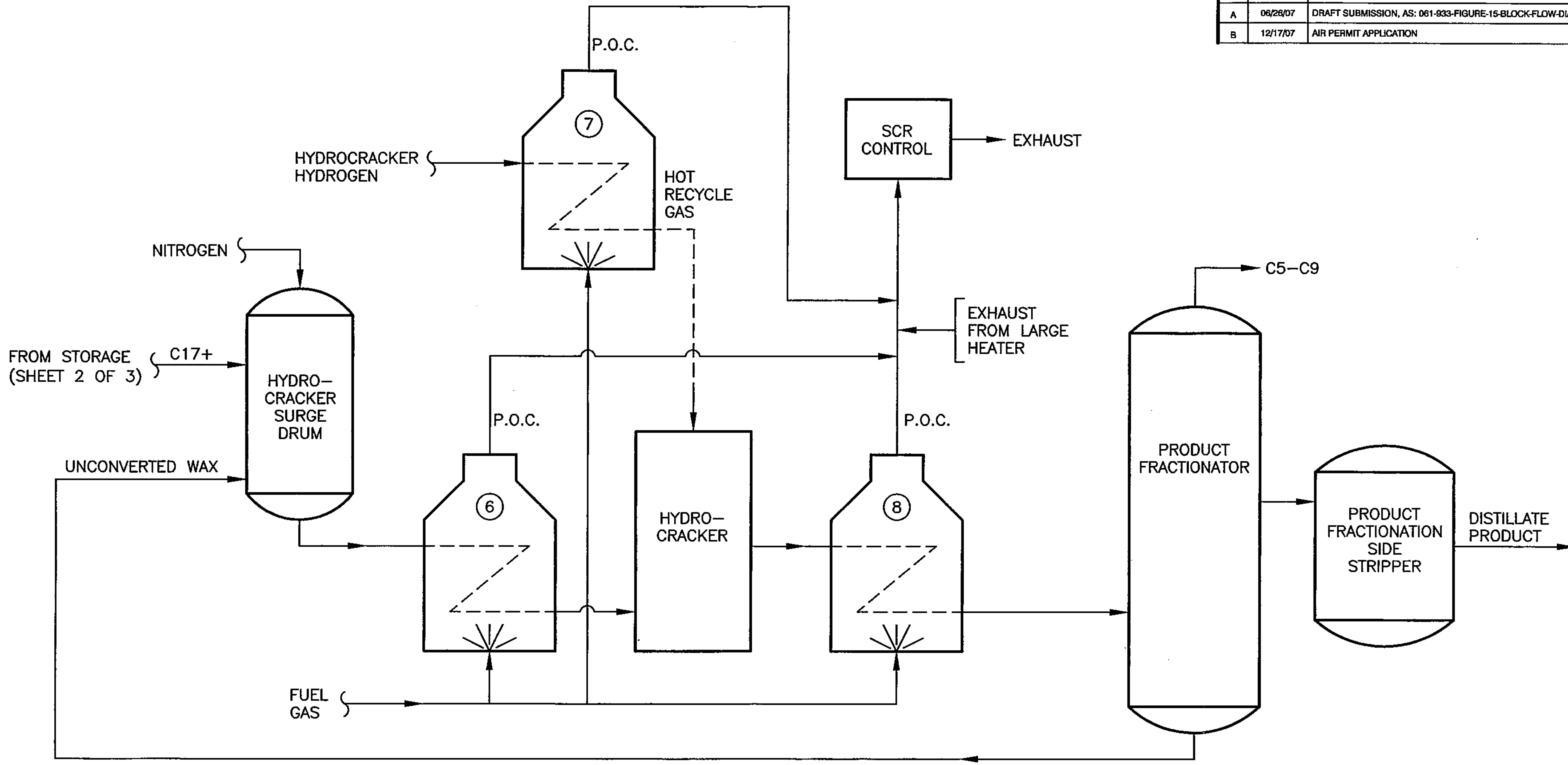
B	12/17/07	AIR PERMIT APPLICATION



PRODUCT UPGRADE
HYDROCRACKING / FRACTIONATION

FIRED HEATERS:
6. HYDROCRACKER FEED OIL HEATER (21 MMBTU/HR)
7. HYDROCRACKER FEED HYDROGEN HEATER (20 MMBTU/HR)
8. PRODUCT FRACTIONATION FEED HEATER (24 MMBTU/HR)

LEGEND
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MODULE 6 - FISCHER-TROPSCH & PRODUCT UPGRADE
20, 21, & 24 MMBTU/HR FIRED HEATERS

APPROVED:	[signature]			PROJECT NO: 061-933.0002	FIGURE NO: 16
DRAWN BY: LKC	CHKD BY: DJL	DWG SCALE: N.T.S.		DATE: 11/26/07	

ATTACHMENT 6B
MODULE 6
SUPPORTING CALCULATIONS

Table 6B-1

Potential Emissions from the Process Heaters

			Pollutant	CO		Pb		NO_X		PE		SO2		VOC	
		AP-42 EF	EF	84		0.0005		280	(Large)	7.6		0.6		5.5	
Process Heaters		(Sec. 1.4)	(lb/MMscf)					100							
Assumptions															
487.5	Btu/scf - Tailgas HV														
0.73	Fired Heater Efficiency														
				CO		Pb		NOx		PE		SO2		VOC	
Unit	Heater Name	Design Duty MMBtu/hr	Est. Tailgas SCFH	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Fischer-Tropsch	F-T Fractionator Fired Heater	154.0	434,359.0	36.5	159.8	0.0002	0.0010	121.62	532.7	3.30	14.5	0.26	1.1	2.39	10.5
Fischer-Tropsch	Nitrogen Heater	4.0	11,282.1	0.9	4.2	0.0000	0.0000	1.13	4.9	0.09	0.4	0.01	0.0	0.06	0.3
Fischer-Tropsch	Hot Oil Heater	4.0	11,282.1	0.9	4.2	0.0000	0.0000	1.13	4.9	0.09	0.4	0.01	0.0	0.06	0.3
Fischer-Tropsch	Hydrogen Stripping Heater	4.0	11,282.1	0.9	4.2	0.0000	0.0000	1.13	4.9	0.09	0.4	0.01	0.0	0.06	0.3
Fischer-Tropsch	Oxidation Gas Heater	4.0	11,282.1	0.9	4.2	0.0000	0.0000	1.13	4.9	0.09	0.4	0.01	0.0	0.06	0.3
Fischer-Tropsch	Reduction Gas Heater	4.0	11,282.1	0.9	4.2	0.0000	0.0000	1.13	4.9	0.09	0.4	0.01	0.0	0.06	0.3
Product Upgrade	Hydrocracker Feed Oil Heater	21.0	59,230.8	5.0	21.8	0.0000	0.0001	5.92	25.9	0.45	2.0	0.04	0.2	0.33	1.4
Product Upgrade	Hydrocracker Feed Hydrogen Heater	20.0	56,410.3	4.7	20.8	0.0000	0.0001	5.64	24.7	0.43	1.9	0.03	0.1	0.31	1.4
Product Upgrade	Production Fractionation Feed Heater	24.0	67,692.3	5.7	24.9	0.0000	0.0001	6.77	29.6	0.51	2.3	0.04	0.2	0.37	1.6
	Total (Large and Medium)	**219.0**	**617,692.3**	**51.9**	**227.3**	**0.0**	**0.0**	**140.0**	**613.0**	**4.7**	**20.7**	**0.4**	**1.6**	**3.4**	**14.9**
	Total (Small)	**20.0**	**56,410.3**	**4.7**	**20.8**	**0.0**	**0.0**	**5.6**	**24.7**	**0.4**	**1.9**	**0.0**	**0.1**	**0.3**	**1.4**

Small Process Heaters (4 MMBtu/hr) -Calculations are for single unit

HAPs	(lb/MMscf)	lb/hr	tpy
Total POM	8.80E-05	9.93E-07	4.35E-06
benzene	2.10E-03	2.37E-05	1.04E-04
dichlorobenzene	1.20E-03	1.35E-05	5.93E-05
formaldehyde	7.50E-02	8.46E-04	3.71E-03
hexane	1.80E+00	2.03E-02	8.89E-02
naphthalene	6.10E-04	6.88E-06	3.01E-05
toluene	3.40E-03	3.84E-05	1.68E-04
arsenic	2.00E-04	2.26E-06	9.88E-06
beryllium	1.20E-05	1.35E-07	5.93E-07
cadmium	1.10E-03	1.24E-05	5.44E-05
chromium	1.40E-03	1.58E-05	6.92E-05
cobalt	8.40E-05	9.48E-07	4.15E-06
manganese	3.80E-04	4.29E-06	1.88E-05
mercury	2.60E-04	2.93E-06	1.28E-05
nickel	2.10E-03	2.37E-05	1.04E-04
selenium	2.40E-05	2.71E-07	1.19E-06
Total HAPs		**0.02**	**0.09**

Medium and Large Process Heaters

HAPs	(lb/MMscf)	lb/hr	tpy
Total POM	8.80E-05	5.44E-05	2.38E-04
benzene	2.10E-03	1.30E-03	5.68E-03
dichlorobenzene	1.20E-03	7.41E-04	3.25E-03
formaldehyde	7.50E-02	4.63E-02	2.03E-01
hexane	1.80E+00	1.11E+00	4.87E+00
naphthalene	6.10E-04	3.77E-04	1.65E-03
toluene	3.40E-03	2.10E-03	9.20E-03
arsenic	2.00E-04	1.24E-04	5.41E-04
beryllium	1.20E-05	7.41E-06	3.25E-05
cadmium	1.10E-03	6.79E-04	2.98E-03
chromium	1.40E-03	8.65E-04	3.79E-03
cobalt	8.40E-05	5.19E-05	2.27E-04
manganese	3.80E-04	2.35E-04	1.03E-03
mercury	2.60E-04	1.61E-04	7.03E-04
nickel	2.10E-03	1.30E-03	5.68E-03
selenium	2.40E-05	1.48E-05	6.49E-05
Total HAPs		**1.17**	**5.11**

Notes:
1. Factors from Table 1.4-1, Emission Factors for Nitrogen Oxides (NO_x) and Carbon Monoxide (CO) from Natural Gas Combustion (used for CO & NO_x).
2. Factors from Table 1.4-2, Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion (used for Pb, PE, SO_2, & VOC).
3. Catalyst Regeneration Fired Heaters Operate < 50 % Duty Cycle. Calculations are at 100 %.
4. Operating Year = **365** Days
5. Fired Heater Efficiency includes 10% Excess Fired Heater Duty.
6. Emissions are calculated using mixed tailgas from PSA, F-T and Product Upgrade.

Table 6B-2
Actual Emissions from the Process Heaters

Module 6 - Fischer-Tropsch & Product Upgrade			Pollutant	CO		Pb		NO_X		PE		SO2		VOC	
Process Heaters		AP-42 EF (Sec. 1.4)	EF (lb/MMscf)	84		0.0005		280 100	(Large)	7.6		0.6		5.5	
Assumptions															
487.5	Btu/scf - Tailgas HV														
0.73	Fired Heater Efficiency														
88	Assumed % control efficiency for NO_x emissions from heaters with design duties ≥20 MMBtu/hr (control via ultra-low NO_x burners & selective catalytic reduction).														
				CO		Pb		NOx		PE		SO2		VOC	
Unit	Heater Name	Design Duty MMBtu/hr	Est. Tailgas SCFH	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Fischer-Tropsch	F-T Fractionator Fired Heater	154.0	434,359.0	36.5	159.8	2.2E-04	9.5E-04	14.6	63.9	3.30	14.5	0.3	1.1	2.4	10.5
Fischer-Tropsch	Nitrogen Heater	4.0	11,282.1	0.9	4.2	5.6E-06	2.5E-05	1.1	4.9	0.09	0.4	0.0	0.0	0.1	0.3
Fischer-Tropsch	Hot Oil Heater	4.0	11,282.1	0.9	4.2	5.6E-06	2.5E-05	1.1	4.9	0.09	0.4	0.0	0.0	0.1	0.3
Fischer-Tropsch	Hydrogen Stripping Heater	4.0	11,282.1	0.9	4.2	5.6E-06	2.5E-05	1.1	4.9	0.09	0.4	0.0	0.0	0.1	0.3
Fischer-Tropsch	Oxidation Gas Heater	4.0	11,282.1	0.9	4.2	5.6E-06	2.5E-05	1.1	4.9	0.09	0.4	0.0	0.0	0.1	0.3
Fischer-Tropsch	Reduction Gas Heater	4.0	11,282.1	0.9	4.2	5.6E-06	2.5E-05	1.1	4.9	0.09	0.4	0.0	0.0	0.1	0.3
Product Upgrade	Hydrocracker Feed Oil Heater	21.0	59,230.8	5.0	21.8	3.0E-05	1.3E-04	0.7	3.1	0.45	2.0	0.0	0.2	0.3	1.4
Product Upgrade	Hydrocracker Feed Hydrogen Heater	20.0	56,410.3	4.7	20.8	2.8E-05	1.2E-04	0.7	3.0	0.43	1.9	0.0	0.1	0.3	1.4
Product Upgrade	Production Fractionation Feed Heater	24.0	67,692.3	5.7	24.9	3.4E-05	1.5E-04	0.8	3.6	0.51	2.3	0.0	0.2	0.4	1.6
	Total (Large and Medium)	**219.0**	**617,692.3**	**51.9**	**227.3**	**3.1E-04**	**1.4E-03**	**16.8**	**73.6**	**4.7**	**20.7**	**0.4**	**1.6**	**3.4**	**14.9**
	Total (Small)	**20.0**	**56,410.3**	**4.7**	**20.8**	**2.8E-05**	**1.2E-04**	**5.6**	**24.7**	**0.4**	**1.9**	**0.0**	**0.1**	**0.3**	**1.4**

Small Process Heaters (4 MMBtu/hr) -Calculations are for single unit

	Actual Emissions (no add-on control)		
HAPs	(lb/MMscf)	lb/hr	tpy
Total POM	8.80E-05	9.93E-07	4.35E-06
benzene	2.10E-03	2.37E-05	1.04E-04
dichlorobenzene	1.20E-03	1.35E-05	5.93E-05
formaldehyde	7.50E-02	8.46E-04	3.71E-03
hexane	1.80E+00	2.03E-02	8.89E-02
naphthalene	6.10E-04	6.88E-06	3.01E-05
toluene	3.40E-03	3.84E-05	1.68E-04
arsenic	2.00E-04	2.26E-06	9.88E-06
beryllium	1.20E-05	1.35E-07	5.93E-07
cadmium	1.10E-03	1.24E-05	5.44E-05
chromium	1.40E-03	1.58E-05	6.92E-05
cobalt	8.40E-05	9.48E-07	4.15E-06
manganese	3.80E-04	4.29E-06	1.88E-05
mercury	2.60E-04	2.93E-06	1.28E-05
nickel	2.10E-03	2.37E-05	1.04E-04
selenium	2.40E-05	2.71E-07	1.19E-06
Total HAPs		**0.02**	**0.09**

Medium and Large Process Heaters

	Actual Emissions (no add-on control)		
HAPs	(lb/MMscf)	lb/hr	tpy
Total POM	8.80E-05	5.44E-05	2.38E-04
benzene	2.10E-03	1.30E-03	5.68E-03
dichlorobenzene	1.20E-03	7.41E-04	3.25E-03
formaldehyde	7.50E-02	4.63E-02	2.03E-01
hexane	1.80E+00	1.11E+00	4.87E+00
naphthalene	6.10E-04	3.77E-04	1.65E-03
toluene	3.40E-03	2.10E-03	9.20E-03
arsenic	2.00E-04	1.24E-04	5.41E-04
beryllium	1.20E-05	7.41E-06	3.25E-05
cadmium	1.10E-03	6.79E-04	2.98E-03
chromium	1.40E-03	8.65E-04	3.79E-03
cobalt	8.40E-05	5.19E-05	2.27E-04
manganese	3.80E-04	2.35E-04	1.03E-03
mercury	2.60E-04	1.61E-04	7.03E-04
nickel	2.10E-03	1.30E-03	5.68E-03
selenium	2.40E-05	1.48E-05	6.49E-05
Total HAPs		**1.17**	**5.11**

Notes:
1. Factors from Table 1.4-1, Emission Factors for Nitrogen Oxides (NO_x) and Carbon Monoxide (CO) from Natural Gas Combustion (used for CO & NO_x).
2. Factors from Table 1.4-2, Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion (used for Pb, PE, SO_2, & VOC).
3. Catalyst Regeneration Fired Heaters Operate < 50 % Duty Cycle. Calculations are at 100 %.
4. Operating Year = 365 Days
5. Fired Heater Efficiency includes 10% Excess Fired Heater Duty.
6. Emissions are calculated using mixed tailgas from PSA, F-T and Product Upgrade.
7. Emissions from the heaters with design duties of 4.0 MMBtu/hr are controlled via good combustion practices, good design, operation, and engineering practices.
8. See BACT analysis for further details regarding the selection of control technologies.
9. Common ducting for control of NOx is assumed for medium and large process heaters (all heaters > 4 MMBtu/hr).

Supporting Calculations

Low Pressure Flare Pilot Burner Emissions

Assumptions

0.55 MMBtu/hr HHV of tailgas for pilot burners
0.001 MMscfh of tailgas for pilot burners
98 % flare destruction efficiency of VOC emissions
487.5 Btu/scf - assumed LHV of tailgas

Emissions Calculations

AP-42 Section 1.4 (Natural Gas Combustion) emission factors have been used below to estimate emissions from tailgas combustion in the pilot flame burner. This burner is assumed to operate 8,760 hr/yr.

Pollutant	Emission Factor (lb/MMscf)	Actual Emissions (Controlled) lb/hr	Actual Emissions (Controlled) tpy	Potential Emissions (Uncontrolled) lb/hr	Potential Emissions (Uncontrolled) tpy
Carbon Monoxide	84	0.09	0.42	0.09	0.42
Sulfur Dioxide	0.6	0.00	0.00	0.00	0.00
Nitrogen Oxides	100	0.11	0.49	0.11	0.49
Lead	0.0005	0.00	0.00	0.00	0.00
PE and PM10	7.6	0.01	0.04	0.01	0.04
VOC	5.5	0.01	0.03	0.01	0.03
HAPs					
Total POM	8.80E-05	9.93E-08	4.35E-07	9.93E-08	4.35E-07
benzene	2.10E-03	2.37E-06	1.04E-05	2.37E-06	1.04E-05
dichlorobenzene	1.20E-03	1.35E-06	5.93E-06	1.35E-06	5.93E-06
formaldehyde	7.50E-02	8.46E-05	3.71E-04	8.46E-05	3.71E-04
hexane	1.80E+00	2.03E-03	8.89E-03	2.03E-03	8.89E-03
naphthalene	6.10E-04	6.88E-07	3.01E-06	6.88E-07	3.01E-06
toluene	3.40E-03	3.84E-06	1.68E-05	3.84E-06	1.68E-05
arsenic	2.00E-04	2.26E-07	9.88E-07	2.26E-07	9.88E-07
beryllium	1.20E-05	1.35E-08	5.93E-08	1.35E-08	5.93E-08
cadmium	1.10E-03	1.24E-06	5.44E-06	1.24E-06	5.44E-06
chromium	1.40E-03	1.58E-06	6.92E-06	1.58E-06	6.92E-06
cobalt	8.40E-05	9.48E-08	4.15E-07	9.48E-08	4.15E-07
manganese	3.80E-04	4.29E-07	1.88E-06	4.29E-07	1.88E-06
mercury	2.60E-04	2.93E-07	1.28E-06	2.93E-07	1.28E-06
nickel	2.10E-03	2.37E-06	1.04E-05	2.37E-06	1.04E-05
selenium	2.40E-05	2.71E-08	1.19E-07	2.71E-08	1.19E-07
Total HAPs		**2.13E-03**	**9.33E-03**	**2.13E-03**	**9.33E-03**

Supporting Calculations

Low Pressure Flare Emissions

Assumptions

7.17 MMscfd low-Btu fuel gas sent to low pressure flare on continuous basis
0.30 MMscfh low-Btu fuel gas sent to low pressure flare on continuous basis
145.7 MMBtu/hr heat input from F-T catalyst regeneration and other process vents
98 % flare destruction efficiency of VOC emissions
Potential VOC emissions are uncontrolled.
Actual emissions of VOC assume 98% destruction efficiency of the flare, no other controls apply.

Emissions Calculations

Flare emission factors are based on combustion of natural gas (AP-42 Section 1.4)
Annual average (lb/hr) emission estimates assume that the total annual emissions occur continously for 8,760 hr/yr.

Pollutant	Emission Factor (lb/MMscf)	Actual Emissions (Controlled) lb/hr	Actual Emissions (Controlled) tpy	Potential Emissions (Uncontrolled) lb/hr	Potential Emissions (Uncontrolled) tpy
Carbon Monoxide	84	25.1	109.9	25.1	109.9
Sulfur Dioxide	0.6	0.2	0.8	0.2	0.8
Nitrogen Oxides	100	29.9	130.9	29.9	130.9
Lead	0.0005	0.0	0.0	0.0	0.0
PE and PM10	7.6	2.3	9.9	2.3	9.9
VOC	5.5	0.0	0.1	1.6	7.2
HAPs					
Total POM	8.80E-05	5.26E-07	2.30E-06	2.63E-05	1.15E-04
benzene	2.10E-03	1.25E-05	5.50E-05	6.27E-04	2.75E-03
dichlorobenzene	1.20E-03	7.17E-06	3.14E-05	3.59E-04	1.57E-03
formaldehyde	7.50E-02	4.48E-04	1.96E-03	2.24E-02	9.82E-02
hexane	1.80E+00	1.08E-02	4.71E-02	5.38E-01	2.36E+00
naphthalene	6.10E-04	3.65E-06	1.60E-05	1.82E-04	7.98E-04
toluene	3.40E-03	2.03E-05	8.90E-05	1.02E-03	4.45E-03
arsenic	2.00E-04	5.98E-05	2.62E-04	5.98E-05	2.62E-04
beryllium	1.20E-05	3.59E-06	1.57E-05	3.59E-06	1.57E-05
cadmium	1.10E-03	3.29E-04	1.44E-03	3.29E-04	1.44E-03
chromium	1.40E-03	4.18E-04	1.83E-03	4.18E-04	1.83E-03
cobalt	8.40E-05	2.51E-05	1.10E-04	2.51E-05	1.10E-04
manganese	3.80E-04	1.14E-04	4.97E-04	1.14E-04	4.97E-04
mercury	2.60E-04	7.77E-05	3.40E-04	7.77E-05	3.40E-04
nickel	2.10E-03	6.27E-04	2.75E-03	6.27E-04	2.75E-03
selenium	2.40E-05	7.17E-06	3.14E-05	7.17E-06	3.14E-05
Total HAPs		**1.29E-02**	**5.65E-02**	**5.64E-01**	**2.47E+00**

Supporting Calculations

Summary: Combined Actual and Potential Low Pressure Flare Emissions

Pilot Burner and Low Pressure Flare Venting Emissions (Combined)
Combined heat input to low pressure flare is estimated at 146 MMBtu/hr

	Actual Emissions (Controlled)		Potential Emissions (Uncontrolled)	
Pollutant	lb/hr	tpy	lb/hr	tpy
Carbon Monoxide	25.2	110.3	25.2	110.3
Sulfur Dioxide	0.2	0.8	0.2	0.8
Nitrogen Oxides	30.0	131.4	30.0	131.4
Lead	0.0	0.0	0.0	0.0
PE and PM10	2.3	10.0	2.3	10.0
VOC	3.3E-02	0.1	1.6	7.2
HAPs				
Total POM	6.25E-07	2.74E-06	2.64E-05	1.16E-04
benzene	1.49E-05	6.53E-05	6.30E-04	2.76E-03
dichlorobenzene	8.52E-06	3.73E-05	3.60E-04	1.58E-03
formaldehyde	5.33E-04	2.33E-03	2.25E-02	9.85E-02
hexane	1.28E-02	5.60E-02	5.40E-01	2.36E+00
naphthalene	4.33E-06	1.90E-05	1.83E-04	8.01E-04
toluene	2.42E-05	1.06E-04	1.02E-03	4.47E-03
arsenic	6.00E-05	2.63E-04	6.00E-05	2.63E-04
beryllium	3.60E-06	1.58E-05	3.60E-06	1.58E-05
cadmium	3.30E-04	1.45E-03	3.30E-04	1.45E-03
chromium	4.20E-04	1.84E-03	4.20E-04	1.84E-03
cobalt	2.52E-05	1.10E-04	2.52E-05	1.10E-04
manganese	1.14E-04	4.99E-04	1.14E-04	4.99E-04
mercury	7.80E-05	3.42E-04	7.80E-05	3.42E-04
nickel	6.30E-04	2.76E-03	6.30E-04	2.76E-03
selenium	7.20E-06	3.15E-05	7.20E-06	3.15E-05
Total HAPs	**1.50E-02**	**6.59E-02**	**5.66E-01**	**2.48E+00**

ATTACHMENT 6C
MODULE 6
DOCUMENTATION

LIST OF REFERENCES

- U.S. EPA, AP-42 Section 1.4 – *Natural gas Combustion*, July 1998.
- U.S. EPA, *Air Pollution Control Technology Fact Sheet – Catalytic Incinerator* (EPA-452/F-03-018).
- U.S. EPA, *Air Pollution Control Technology Fact Sheet - Fabric Filter Reverse Air-Cleaned Type,* (EPA-452/F-03-026).
- U.S. EPA, *Air Pollution Control Technology Fact Sheet – Packed Bed/Packed Tower Scrubber* (EPA-452/F-03-015).
- U.S. EPA, *Air Pollution Control Technology Fact Sheet – Selective Catalytic Reduction* (EPA-452/F-03-032).
- U.S. EPA, *Protocol for Equipment Leak Emission Estimates* (EPA-453/R-95-017), November, 1995.
- U.S. EPA, RACT/BACT/LAER Clearinghouse (RBLC); website: http://cfpub.epa.gov/RBLC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Carbon Monoxide

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
OK-0102	PONCA CITY REFINERY	PROCESS HEATERS AND BOILERS			Process heaters H-1001, H-9901, H-9902, USLD-5/5a, NH-6007, H-6014, H-6015, H-5001, H-0057, H-0058, and H-0059, and steam boilers B-0009 and B-0010. Maximum heat rate ranges from 12 mmBtu/h to 241 mmBtu/h. Ultra low NOx burners.	ULTRA LOW NOX BURNERS REQUIRED BY CONSENT DECREE, BACT IS GOOD COMBUSTION PRACTICE.	0.04	LB/MMBTU		0.04	LB/MMBTU	
LA-0114	ST. JAMES STYRENE PLANT	SUPERHEATER	165	MMBTU/H		PROPER OPERATING TECHNIQUES WITH AUTOMATIC CONTROL3% EXCESS O2	0.04	LB/MMBTU		0.04	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	VACUUM CRUDE CHARGE HEATER	101	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-02100		0.04	LB/MMBTU	THREE-HOUR ROLLING AVG	0.04	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	HYDROCRACKER UNIT MAIN FRACTIONATOR HEATER	211	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-10500		0.04	LB/MMBTU	THREE-HOUR ROLLING AVG	0.04	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT INTERHEATER NO. 1	192	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY EQUIPMENT ID # B-05120		0.04	LB/MMBTU	3-HR AVERAGE	0.04	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT INTERHEATER NO. 2	129	MMBTU/H	THIS EQUIPMENT IS IDENTIFIED BY ID # B-05130		0.04	LB/MMBTU	3-HR AVERAGE	0.04	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	DISTILLATE HYDROTREATER SPLITTER REBOILER	117	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # B-08509		0.04	LB/MMBTU	3-HR AVERAGE	0.04	LB/MMBTU	
AK-0037	KENAI REFINERY	CRUDE HEATER, H101A	140	MMBTU/H	INSTALLED PRIOR TO 1975, THEREFORE NOT REQUIRED TO COMPLY WITH THE PSD PROGRAM. DESIGN CAPACITY OF 140.0 MMBTU/H AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. *FUELS ARE NATURAL GAS, REFINERY GAS AND LPG. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL.	NONE INDICATED.	0.04	LB/MMBTU		0.04	LB/MMBTU	
AK-0037	KENAI REFINERY	CRUDE HEATER, H101B	165	MMBTU/H	DESIGN CAPACITY IS 165.0 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. *SOURCE BURNS COMBINATION OF REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS. IT IS NOT SPECIFIIED WHICH TYPE OF FUEL IS PRIMARY.	NONE INDICATED	0.04	LB/MMBTU		0.04	LB/MMBTU	

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Carbon Monoxide

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT CHARGE HEATER	122	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-05110		0.04	LB/MMBTU	3-HR AVERAGE			
AZ-0046	ARIZONA CLEAN FUELS YUMA	BUTANE CONVERSION UNIT ISOSTRIPPER REBOILER	222	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # B-15110		0.04	LB/MMBTU	3-HR AVERAGE			NOT AVAILABLE
*LA-0213	ST. CHARLES REFINERY	REBOILER 2005-18 & HEATERS F-15-02 (6-81), 2005-14, 2005-17, 2005-29, 2005-32, & 2005-37			6-81: 135 MM BTU/HR 2005-14: 195 MM BTU/HR 2005-17: 159 MM BTU/HR 2005-18: 231 MM BTU/HR 2005-29: 195 MM BTU/HR 2005-32: 159 MM BTU/HR 2005-37: 173 MM BTU/HR SOURCES ALSO FIRE NATURAL GAS.	PROPER EQUIPMENT DESIGN AND OPERATION, GOOD COMBUSTION PRACTICES, AND USE OF GASEOUS FUELS	0.08	LB/MMBTU	HOURLY AVERAGE			
LA-0119	LAKE CHARLES REFINERY	HEATER, CRUDE VACUUM UNIT FEED (H-20002)	150	MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS.	ULTRA LOW NOX BURNERS (ULNB), GOOD DESIGN, USING GASEOUS FUEL, PROPER OPERATING TECHNIQUES.	3	LB/H*	HOURLY MAXIMUM			
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO 1 INTERHEATER	147.2	MMBTU/H			4.13	LB/H		0.03	LB/MMBTU	CALCULATED
LA-0119	LAKE CHARLES REFINERY	HEATER, NO. 4 CTU (H-4050)	237	MMBTU/H	UNIT BURNS NATURAL GAS AND REFINERY OFF GAS. FORMERLY IDENTIFIED AS H-40001	ULTRA LOW NOX BURNERS (ULNB), GOOD DESIGN, USE GASEOUS FUEL, PROPER OPERATING TECHNIQUES	4.7	LB/H*	HOURLY MAXIMUM	0.02	LB/MMBTU	CALCULATED BY CATC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Carbon Monoxide

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
TX-0478	CITGO CORPUS CHRISTI REFINERY - WEST PLANT	MIXED DISTILLATE HYDROHEATER REBOILER HEATER	82	MMBTU/H	ORGANIC NITROGEN AND SULFUR FROM THE FEED STREAMS. FEEDSTOCK IS MIXED WITH HYDROGEN , HEATED, AND FED TO A REACTOR. A CATALYTIC REACTION CONVERTS THE ORGANIC SULFUR TO HYDROGEN SULFIDE AND THE NITROGEN COMPOUNDS TO AMMONIA. THE EFFLUENT STREAM IS COOLED AND EXCESS HYDROGEN REMOVED FOR RECYCLE. HYDROGEN SULFIDE IS REMOVED FROM THE HYDROGEN STREAM BY AN AMINE ABSORBER AND ROUTED TO THE SRU. NEW EQUIPMENT UNDER THE AMENDMENT INCLUDES A SECOND REACTOR, ADDITIONAL PREHEAT TRAIN, AN ADDITIONAL REACTOR PRODUCT FLASH DRUM, A HYDROGEN PURIFICATION MEMBRANE AND AN ADDITIONAL HYDROGEN MAKEUP COMPRESSOR. AS PART OF THE		6.8	LB/H				
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 REFORMER CHARGE HEATER	248	MMBTU/H			6.95	LB/H		0.03	LB/MMBTU	
PA-0231	UNITED REFINERY CO.	DELAYED COKER UNIT, HEATER	116	MMBTU/H	The unit is subject to the NSPS 40 CFR Subpart J, Subpart GGG, Subpart QQQ. The unit is also subject to MACT standards in 40 CFR 63 Subpart CC, and NESHAP requirements in 40 CFR 61 Subpart FF.	GOOD COMBUSTION PRACTICE	8.28	LB/H		0.07	LB/MMBTU	Calculated using heat input
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II WEST REACTOR FEED HEATER	104.25	MMBTU/H	EMISSION POINT NO. BTU-HF106.	NONE INDICATED	8.6	LB/H		0.082	LB/MMBTU	CALCULATED
PA-0231	UNITED REFINERY CO.	NORTH CRUDE HEATER	147	MMBTU/H	The north crude heater was modified by installing low NOx burners. The reduction of NOx emissions reduces the overall increase below significant levels allowing the project to net out" of NSR and PSD for NOx."	BACT AND BAT REMAIN AS GOOD COMBUSTION PRACTICES	9.27	LB/H		0.063	LB/MMBTU	Calculated based on heat input
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-NO. 1 REACTOR FEED HEATER	121.74	MMBTU/H	EMISSION POINT NO. BTU-HF103.	NONE INDICATED	10	LB/H		0.082	LB/MMBTU	CALCULATED

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Carbon Monoxide

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
LA-0193	STYRENE MONOMER PLANT	BZ RECOVERY COLUMN HEATER HS-2103	182.1	MMBTU/H		GOOD COMBUSTION PRACTICES - GOOD EQUIPMENT DESIGN, USE OF GASEOUS FUELS FOR GOOD MIXING, AND PROPER COMBUSTION TECHNIQUES	15	LB/H	HOURLY MAXIMUM	0.08	LB/MMBTU	ANNUAL AVERAGE
LA-0193	STYRENE MONOMER PLANT	REHEATER HS-8220	195	MMBTU/H	84.6 MMBTU/HR PROCESS GAS 110.4 MMBTU/HR NATURAL GAS	GOOD COMBUSTION PRACTICES - GOOD EQUIPMENT DESIGN, USE OF GASEOUS FUELS FOR GOOD MIXING, AND PROPER COMBUSTION TECHNIQUES	16.1	LB/H	HOURLY MAXIMUM	0.08	LB/MMBTU	ANNUAL AVERAGE
TX-0375	LYONDELL - CITGO REFINING, LP	ORTHOXYLENE II HEATER	226.42	MMBTU/H	EMISSION POINT NO.: ORTHOII-H2.	NONE INDICATED	18.6	LB/H		0.082	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	BOILER NO. 12	245	MMBTU/H	EMISSION PT NO: BOILER-12. SHALL BE SHUTDOWN.	NONE INDICATED	20.2	LB/H		0.08	LB/MMBTU	CALCULATED
TX-0442	SHELL OIL DEER PARK	TWENTY ONE FURNACES					500	PPMV				
TX-0442	SHELL OIL DEER PARK	DHT H2 HEATER					500	PPMV				
CA-1113	PRAXAIR	HEATER-OTHER PROCESS	117.6	MMBTU/H	PROCESING CORPORATION, TYPE: HYDROGEN REFORMER, MODEL: LH 1207 B001, FUNC EQUIP: PROVIDES HEAT TO CATYST FILLED TUBES TO PRODUCE HYDROGEN-*, FUEL_TYPE: NATURAL GAS (WARM UP AND SUPPLEMENT), SCHEDULE: CONTINUOUS, H/D: 24, D/W: 7, W/Y: 52, NOTES: AMMONIA IS MIXED INTO FLUE GAS, AND THE MIXTURE IS PASSED THROUGH A CATALYST BED, IN WHICH THE AMMONIA REACTS WITH NOX REDUCING IT TO N2. SCR DESIGN OPERATING TEMPERATURE IS 760F, AND DESIGN REMOVAL EFFICIENCY IS 90%. A SOURCE TEST IS REQUIRED WITHIN 90 DAYS AFTER STARTUP FOR NOX, CO, ROG, NH3, PM, SOX. THE FACILITY IS IN RECLAIM, AND WILL HAVE CEMS FOR NOX AND O2. THE PERMIT REQUIRES CEMS FOR NH3		4000	PPMVD @ 3	1H			NOT AVALUABLE

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Carbon Monoxide

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
*LA-0211	GARYVILLE REFINERY	A & B VACUUM TOWER HEATERS (3-08 & 4-08)	155.2	MMBTU/H EA.		PROPER DESIGN, OPERATION, AND GOOD ENGINEERING PRACTICES				0.04	LB/MM BTU	30-DAY ROLLING AVERAGE
*LA-0211	GARYVILLE REFINERY	NAPHTHA HYDROTREATER STRIPPER REBOILER HEATER (6-08) & KHT STRIPPER REBOILER HEATER (10-08)			6-08: 138.4 MMBTU/H 10-08: 121.8 MMBTU/H	PROPER DESIGN, OPERATION, AND GOOD ENGINEERING PRACTICES				0.04	LB/MMBTU	30-DAY ROLLING AVERAGE
*LA-0211	GARYVILLE REFINERY	SATS GAS PLANT HOT OIL HEATER (14-08)	183.3	MMBTU/H		PROPER DESIGN, OPERATION, AND GOOD ENGINEERING PRACTICES				0.04	LB/MMBTU	30-DAY ROLLING AVERAGE

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Nitrogen Oxides (NO_x)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT CHARGE HEATER	122	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-05110	LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION	0.0125	LB/MMBTU	3-HR AVERAGE	0.0125	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT INTERHEATER NO. 1	192	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY EQUIPMENT ID # B-05120	LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION	0.0125	LB/MMBTU	3-HOUR AVERAGE	0.0125	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT INTERHEATER NO. 2	129	MMBTU/H	THIS EQUIPMENT IS IDENTIFIED BY ID # B-05130	LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION	0.0125	LB/MMBTU	3-HR AVERAGE	0.0125	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	BUTANE CONVERSION UNIT ISOSTRIPPER REBOILER	222	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # B-15110	LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION	0.0125	LB/MMBTU	3-HR AVERAGE	0.0125	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	VACUUM CRUDE CHARGE HEATER	101	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-02100	LOW NOX BURNERS AND SELECTIVE CATALYTIC REDUCTION	0.0125	LB/MMBTU	THREE-HOUR ROLLING AVG	0.125	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	HYDROCRACKER UNIT MAIN FRACTIONATOR HEATER	211	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-10500	LOW-NOX BURNERS	0.025	LB/MMBTU	THREE HOUR ROLLING AVG	0.025	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	DISTILLATE HYDROTREATER SPLITTER REBOILER	117	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # B-08509	LOW NOX BURNERS	0.032	LB/MMBTU	3-HR AVERAGE	0.032	LB/MMBTU	
*LA-0213	ST. CHARLES REFINERY	REBOILER 2005-18 & HEATERS F-15-02 (6-81), 2005-14, 2005-17, 2005-29, 2005-32, & 2005-37			6-81: 135 MM BTU/HR 2005-14: 195 MM BTU/HR 2005-17: 159 MM BTU/HR 2005-18: 231 MM BTU/HR 2005-29: 195 MM BTU/HR 2005-32: 159 MM BTU/HR 2005-37: 173 MM BTU/HR SOURCES ALSO FIRE NATURAL GAS.	ULTRA LOW NOX BURNERS	0.04	LB/MMBTU	THREE 1-HOUR TEST AVERAGE			
OK-0089	TPI PETROLEUM INC., VALERO ARDMORE REFINERY	CRUDE UNIT HEATER, H-102A	145	MMBTU/H		ULTRA LOW NOX BURNERS	0.045	LB/MMBTU		0.045	LB/MMBTU	
OK-0089	TPI PETROLEUM INC., VALERO ARDMORE REFINERY	CRUDE UNIT HEATER, H-102B	135	MMBTU/H		ULTRA LOW NOX BURNERS	0.059	LB/MMBTU		0.059	LB/MMBTU	
AK-0037	KENAI REFINERY	CRUDE HEATER, H101B	165	MMBTU/H	DESIGN CAPACITY IS 165.0 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. *SOURCE BURNS COMBINATION OF REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS. IT IS NOT SPECIFIED WHICH TYPE OF FUEL IS PRIMARY.	NONE INDICATED	0.06	LB/MMBTU		0.06	LB/MMBTU	
TX-0429	VALERO REFINING CO. - TEXAS CITY	BOILERS AND HEATERS			FUELS ARE NATURAL GAS AND REFINERY FUEL GAS. H2S CONCENTRATION < 162 PPMV OR 0.1 GR/DSCF	ULTRA LOW-NOX BURNERS	0.06	LB/MMBTU		0.06	LB/MMBTU	
LA-0114	ST. JAMES STYRENE PLANT	SUPERHEATER	165	MMBTU/H		ULTRA LOW NOX BURNERS	0.07	LB/MMBTU		0.07	LB/MMBTU	

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Nitrogen Oxides (NO_x)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	CRUDE HEATER, H101A	140	MMBTU/H	INSTALLED PRIOR TO 1975, THEREFORE NOT REQUIRED TO COMPLY WITH THE PSD PROGRAM. DESIGN CAPACITY OF 140.0 MMBTU/H AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. *FUELS ARE NATURAL GAS, REFINERY GAS AND LPG. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL.	NONE INDICATED	0.25	LB/MMBTU		0.25	LB/MMBTU	
OK-0098	PONCA CITY REF	CRUDE VACUUM UNIT, HEATER H-0016			Compliance to be verified by stack testing	ULTRA LOW NOX BURNERS	3.73	LB/H	365 day rolling average	0.035	LB/MMBTU	
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II WEST REACTOR FEED HEATER	104.25	MMBTU/H	EMISSION POINT NO. BTU-HF106.	SCR	3.8	LB/H	SEE NOTES	0.036	LB/MMBTU	CALCULATED
PA-0231	UNITED REFINERY CO.	DELAYED COKER UNIT, HEATER	116	MMBTU/H	The unit is subject to the NSPS 40 CFR Subpart J, Subpart GGG, Subpart QQQ. The unit is also subject to MACT standards in 40 CFR 63 Subpart CC, and NESHAP requirements in 40 CFR 61 Subpart FF.	LOW NOX BURNERS	4.04	LB/H		0.035	LB/MMBTU	Calculated using heat input
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-NO. 1 REACTOR FEED HEATER	121.74	MMBTU/H	EMISSION POINT NO. BTU-HF103.	SCR	4.4	LB/H	SEE NOTES	0.036	LB/MMBTU	CALCULATED
LA-0197	ALLIANCE REFINERY	LOW SULFUR GASOLINE FEED HEATER NO. 1	138.12	MMBTU/H	AVERAGE HEAT INPUT = 115.10 MMBTU/H	ULTRA LOW NOX BURNERS WITH INTERNAL FLUE GAS RECIRCULATION	4.6	LB/H	HOURLY MAXIMUM	0.04	LB/MMBTU	ANNUAL AVERAGE
LA-0121	CONVENT REFINERY	HDS-1 HEATER	140	MMBTU/H	EMISSION POINT 96H-201	ULTRA LOW NOX BURNERS	5.6	LB/H		0.04	LB/MMBTU	CALCULATED
PA-0231	UNITED REFINERY CO.	NORTH CRUDE HEATER	147	MMBTU/H	The north crude heater was modified by installing low NOx burners. The reduction of NOx emissions reduces the overall increase below significant levels allowing the project to net out" of NSR and PSD for NOx."	LOW NOX BURNERS	6.68	LB/H		0.045	LB/MMBTU	Calculated using heat input
LA-0119	LAKE CHARLES REFINERY	HEATER, CRUDE VACUUM UNIT FEED (H-20002)	150	MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS.	ULTRA LOW NOX BURNERS	6.8	LB/H*	HOURLY MAXIMUM	0.038	LB/MMBTU*	
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO 1 INTERHEATER	147.2	MMBTU/H			7.36	LB/H		0.05	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	ORTHOXYLENE II HEATER	226.42	MMBTU/H	EMISSION POINT NO.: ORTHOII-H2.	SCR	8.2	LB/H	SEE NOTES	0.036	LB/MMBTU	CALCULATED
OK-0098	PONCA CITY REF	CRUDE CHARGE UNIT, HEATER H-0001			Compliance to be verified by stack testing, then monitored with CEM	ULTRA LOW NOX BURNERS	8.75	LB/H	365 day average	0.05	LB/MMBTU	
LA-0119	LAKE CHARLES REFINERY	HEATER, NO. 4 CTU (H-4050)	237	MMBTU/H	UNIT BURNS NATURAL GAS AND REFINERY OFF GAS. FORMERLY IDENTIFIED AS H-40001	ULTRA LOW NOX BURNERS	9.1	LB/H*	HOURLY MAXIMUM	0.032	LB/MMBTU	

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Nitrogen Oxides (NO_x)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
TX-0478	CITGO CORPUS CHRISTI REFINERY - WEST PLANT	MIXED DISTILLATE HYDROHEATER REBOILER HEATER	82	MMBTU/H	ORGANIC NITROGEN AND SULFUR FROM THE FEED STREAMS. FEEDSTOCK IS MIXED WITH HYDROGEN , HEATED, AND FED TO A REACTOR. A CATALYTIC REACTION CONVERTS THE ORGANIC SULFUR TO HYDROGEN SULFIDE AND THE NITROGEN COMPOUNDS TO AMMONIA. THE EFFLUENT STREAM IS COOLED AND EXCESS HYDROGEN REMOVED FOR RECYCLE. HYDROGEN SULFIDE IS REMOVED FROM THE HYDROGEN STREAM BY AN AMINE ABSORBER AND ROUTED TO THE SRU. NEW EQUIPMENT UNDER THE AMENDMENT INCLUDES A SECOND REACTOR, ADDITIONAL PREHEAT TRAIN, AN ADDITIONAL REACTOR PRODUCT FLASH DRUM, A HYDROGEN PURIFICATION MEMBRANE AND AN ADDITIONAL HYDROGEN MAKEUP COMPRESSOR. AS PART OF THE	LOW NOX BURNERS	9.9	LB/H				
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 REFORMER CHARGE HEATER	248	MMBTU/H			12.4	LB/H		0.05	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	BOILER NO. 12	245	MMBTU/H	EMISSION PT NO: BOILER-12. SHALL BE SHUTDOWN.		19.6	LB/H		0.08	LB/MMBTU	CALCULATED

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Nitrogen Oxides (NO_x)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
CA-1113	PRAXAIR	HEATER-OTHER PROCESS	117.6	MMBTU/H	PROCESING CORPORATION, TYPE: HYDROGEN REFORMER, MODEL: LH 1207 B001, FUNC EQUIP: PROVIDES HEAT TO CATYST FILLED TUBES TO PRODUCE HYDROGEN-*, FUEL_TYPE: NATURAL GAS (WARM UP AND SUPPLEMENT), SCHEDULE: CONTINUOUS, H/D: 24, D/W: 7, W/Y: 52, NOTES: AMMONIA IS MIXED INTO FLUE GAS, AND THE MIXTURE IS PASSED THROUGH A CATALYST BED, IN WHICH THE AMMONIA REACTS WITH NOX REDUCING IT TO N2. SCR DESIGN OPERATING TEMPERATURE IS 760F, AND DESIGN REMOVAL EFFICIENCY IS 90%. A SOURCE TEST IS REQUIRED WITHIN 90 DAYS AFTER STARTUP FOR NOX, CO, ROG, NH3, PM, SOX. THE FACILITY IS IN RECLAIM, AND WILL HAVE CEMS FOR NOX AND O2. THE PERMIT REQUIRES CEMS FOR NH3	SCR SYSTEM	50	PPMVD @ 3% O2	1H	0.061	LB/MMBTU	
*LA-0211	GARYVILLE REFINERY	A & B VACUUM TOWER HEATERS (3-08 & 4-08)	155.2	MMBTU/H EA.		ULTRA LOW NOX BURNERS (ULNB) AND SELECTIVE CATALYTIC REDUCTION (SCR VOLUNTARY)				0.0125	LB/MMBTU	ANNUAL AVERAGE
*LA-0211	GARYVILLE REFINERY	NAPHTHA HYDROTREATER STRIPPER REBOILER HEATER (6-08) & KHT STRIPPER REBOILER HEATER (10-08)			6-08: 138.4 MMBTU/H 10-08: 121.8 MMBTU/H	ULTRA LOW NOX BURNERS (ULNB) WITHOUT AIR PREHEAT				0.03	LB/MMBTU	ANNUAL AVERAGE
*LA-0211	GARYVILLE REFINERY	SATS GAS PLANT HOT OIL HEATER (14-08)	183.3	MMBTU/H		ULTRA LOW NOX BURNERS (ULNB) WITHOUT AIR PREHEAT				0.03	LB/MMBTU	ANNUAL AVERAGE

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Sulfur Dioxide (SO_2)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II WEST REACTOR FEED HEATER	104.25	MMBTU/H	EMISSION POINT NO. BTU-HF106.	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	2.7	LB/H		0.026	LB/MMBTU	CALCULATED
PA-0231	UNITED REFINERY CO.	DELAYED COKER UNIT, HEATER	116	MMBTU/H	The unit is subject to the NSPS 40 CFR Subpart J, Subpart GGG, Subpart QQQ. The unit is also subject to MACT standards in 40 CFR 63 Subpart CC, and NESHAP requirements in 40 CFR 61 Subpart FF.	LOW SULFUR REFINERY GAS	2.71	LB/H		0.023	LB/MMBTU	Calculated using heat input
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-NO. 1 REACTOR FEED HEATER	121.74	MMBTU/H	EMISSION POINT NO. BTU-HF103.	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	3.1	LB/H		0.025	LB/MMBTU	CALCULATED
LA-0197	ALLIANCE REFINERY	LOW SULFUR GASOLINE FEED HEATER NO. 1	138.12	MMBTU/H	AVERAGE HEAT INPUT = 115.10 MMBTU/H	COMBUSTION OF LOW SULFUR (NSPS J COMPLIANT) FUELS	3.1	LB/H	HOURLY MAXIMUM	0.0269	LB/MMBTU	ANNUAL AVERAGE
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO 1 INTERHEATER	147.2	MMBTU/H			5.54	LB/H				

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Sulfur Dioxide (SO_2)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
TX-0478	CITGO CORPUS CHRISTI REFINERY - WEST PLANT	MIXED DISTILLATE HYDROHEATER REBOILER HEATER	82	MMBTU/H	ORGANIC NITROGEN AND SULFUR FROM THE FEED STREAMS. FEEDSTOCK IS MIXED WITH HYDROGEN , HEATED, AND FED TO A REACTOR. A CATALYTIC REACTION CONVERTS THE ORGANIC SULFUR TO HYDROGEN SULFIDE AND THE NITROGEN COMPOUNDS TO AMMONIA. THE EFFLUENT STREAM IS COOLED AND EXCESS HYDROGEN REMOVED FOR RECYCLE. HYDROGEN SULFIDE IS REMOVED FROM THE HYDROGEN STREAM BY AN AMINE ABSORBER AND ROUTED TO THE SRU. NEW EQUIPMENT UNDER THE AMENDMENT INCLUDES A SECOND REACTOR, ADDITIONAL PREHEAT TRAIN, AN ADDITIONAL REACTOR PRODUCT FLASH DRUM, A HYDROGEN PURIFICATION MEMBRANE AND AN ADDITIONAL HYDROGEN MAKEUP COMPRESSOR. AS PART OF THE		5.7	LB/H				
TX-0375	LYONDELL - CITGO REFINING, LP	ORTHOXYLENE II HEATER	226.42	MMBTU/H	EMISSION POINT NO.: ORTHOII-H2.	LOW SULFUR CONTENT FUEL: USE REFINERY FUEL GAS WITH NO MORE THAN 0.1 GR/DSCF H2S OR USE NATURAL GAS WITH NO MORE THAN 0.25 GR/100 DSCF H2S AND NO MORE THAN 5.0 GR/100 DSCF TOTAL S.	5.8	LB/H		0.026	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	BOILER NO. 12	245	MMBTU/H	EMISSION PT NO: BOILER-12. SHALL BE SHUTDOWN.	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	6.3	LB/H		0.026	LB/MMBTU	CALCULATED

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Sulfur Dioxide (SO_2)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
LA-0149	LOUISIANA REFINING DIVISION	DEASPHALTING HEATER	221	MMBTU/H	THE PERMIT INDICATES HEATERS MAY BURN NATURAL GAS, REFINERY GAS, OR A COMBINATION OF THE TWO.	LOW SULFUR FUEL	8.85	LB/H		0.04	LB/MMBTU	CALCULATED
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 REFORMER CHARGE HEATER	248	MMBTU/H			9.33	LB/H				
LA-0149	LOUISIANA REFINING DIVISION	COKER HEATER	241.1	MMBTU/H		USE OF LOW SULFUR FUEL	9.64	LB/H		0.04	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	VACUUM CRUDE CHARGE HEATER	101	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-02100		35	PPMV	DAILY AVERAGE			NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	HYDROCRACKER UNIT MAIN FRACTIONATOR HEATER	211	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-10500	S LIMITED TO 35 PPM.	35	PPMV	DAILY AVERAGE			NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT CHARGE HEATER	122	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-05110	SULFUR LIMITED TO 35 PPM IN FUEL.	35	PPMV	DAILY AVERAGE			NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT INTERHEATER NO. 1	192	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY EQUIPMENT ID # B-05120	S LIMITED TO 35 PPM.	35	PPMV	DAILY AVERAGE			NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT INTERHEATER NO. 2	129	MMBTU/H	THIS EQUIPMENT IS IDENTIFIED BY ID # B-05130	S LIMITED TO 35 PPM.	35	PPMV	DAILY AVERAGE			NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	DISTILLATE HYDROTREATER SPLITTER REBOILER	117	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # B-08509	S LIMITED TO 35 PPM.	35	PPMV	DAILY AVERAGE			NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	BUTANE CONVERSION UNIT ISOSTRIPPER REBOILER	222	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # B-15110	SULFUR LIMITED TO 35 PPM IN FUEL BURNED.	35	PPMV	DAILY AVERAGE			NOT AVAILABLE
PA-0231	UNITED REFINERY CO.	NORTH CRUDE HEATER	147	MMBTU/H	The north crude heater was modified by installing low NOx burners. The reduction of NOx emissions reduces the overall increase below significant levels allowing the project to net out" of NSR and PSD for NOx."	USE OF DESULFURIZED REFINERY GAS	46.22	LB/H		0.3	LB/MMBTU	Calculated using heat input
OK-0095	ARDMORE REFINERY	HOT OIL HEATERS				LOW SULFUR FUEL	160	S02 PPMDV	fuel limit			see note
TX-0442	SHELL OIL DEER PARK	TWENTY ONE FURNACES					300	PPM				
TX-0442	SHELL OIL DEER PARK	DHT H2 HEATER					300	PPMV				
*LA-0211	GARYVILLE REFINERY	A & B VACUUM TOWER HEATERS (3-08 & 4-08)	155.2	MMBTU/H EA.		USE OF LOW SULFUR REFINERY FUEL GAS				25	PPMV AS H	ANNUAL AVERAGE
*LA-0211	GARYVILLE REFINERY	NAPHTHA HYDROTREATER STRIPPER REBOILER HEATER (6-08) & KHT STRIPPER REBOILER HEATER (10-08)			6-08: 138.4 MMBTU/H 10-08: 121.8 MMBTU/H	USE OF LOW SULFUR REFINERY FUEL GAS				25	PPMV AS H	ANNUAL AVERAGE
*LA-0211	GARYVILLE REFINERY	SATS GAS PLANT HOT OIL HEATER (14-08)	183.3	MMBTU/H		USE OF LOW SULFUR REFINERY FUEL GAS				25	PPMV AS H	ANNUAL AVERAGE

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Sulfur Dioxide (SO_2)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
*LA-0213	ST. CHARLES REFINERY	REBOILER 2005-18 & HEATERS F-15-02 (6-81), 2005-14, 2005-17, 2005-29, 2005-32, & 2005-37			6-81: 135 MM BTU/HR 2005-14: 195 MM BTU/HR 2005-17: 159 MM BTU/HR 2005-18: 231 MM BTU/HR 2005-29: 195 MM BTU/HR 2005-32: 159 MM BTU/HR 2005-37: 173 MM BTU/HR SOURCES ALSO FIRE NATURAL GAS.	USE OF PIPELINE QUALITY NATURAL GAS OR REFINERY FUEL GASES WITH AN H2S CONCENTRATION LESS THAN 100 PPMV (ANNUAL AVERAGE).			SEE NOTE			
AK-0037	KENAI REFINERY	CRUDE HEATER, H101A	140	MMBTU/H	INSTALLED PRIOR TO 1975, THEREFORE NOT REQUIRED TO COMPLY WITH THE PSD PROGRAM. DESIGN CAPACITY OF 140.0 MMBTU/H AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. *FUELS ARE NATURAL GAS, REFINERY GAS AND LPG. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL.	NONE INDICATED AS SOURCE WAS INSTALLED PRIOR TO 1975 AND IS NOT SUBJECT TO BACT-PSD.						
AK-0037	KENAI REFINERY	CRUDE HEATER, H101B	165	MMBTU/H	DESIGN CAPACITY IS 165.0 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. *SOURCE BURNS COMBINATION OF REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS. IT IS NOT SPECIFIIED WHICH TYPE OF FUEL IS PRIMARY.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LPG, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S. GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Particulate Matter

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	CRUDE HEATER, H101A	140	MMBTU/H	INSTALLED PRIOR TO 1975, THEREFORE NOT REQUIRED TO COMPLY WITH THE PSD PROGRAM. DESIGN CAPACITY OF 140.0 MMBTU/H AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. *FUELS ARE NATURAL GAS, REFINERY GAS AND LPG. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL.	NONE INDICATED	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	CRUDE HEATER, H101B	165	MMBTU/H	DESIGN CAPACITY IS 165.0 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. *SOURCE BURNS COMBINATION OF REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS. IT IS NOT SPECIFIIED WHICH TYPE OF FUEL IS PRIMARY.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	
LA-0119	LAKE CHARLES REFINERY	HEATER, CRUDE VACUUM UNIT FEED (H-20002)	150	MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS.	GOOD COMBUSTION PRACTICES, USE CLEAN GASEOUS FUEL	1.1	LB/H	HOURLY MAXIMUM			
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II WEST REACTOR FEED HEATER	104.25	MMBTU/H	EMISSION POINT NO. BTU-HF106.	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	1.33	LB/H	SEE NOTES	0.013	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-NO. 1 REACTOR FEED HEATER	121.74	MMBTU/H	EMISSION POINT NO. BTU-HF103.	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	1.56	LB/H	SEE NOTES	0.013	LB/MMBTU	CALCULATED FROM FINAL HOURLY EMISS LIMIT
LA-0119	LAKE CHARLES REFINERY	HEATER, NO. 4 CTU (H-4050)	237	MMBTU/H	UNIT BURNS NATURAL GAS AND REFINERY OFF GAS. FORMERLY IDENTIFIED AS H-40001	GOOD COMBUSTION PRACTICES, USE CLEAN GASEOUS FUELS	1.8	LB/H	HOURLY MAXIMUM	0.008	LB/MMBTU	CALCULATED BY CATC

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Particulate Matter

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
TX-0375	LYONDELL - CITGO REFINING, LP	BOILER NO. 12	245	MMBTU/H	EMISSION PT NO: BOILER-12. SHALL BE SHUTDOWN.	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	1.83	LB/H		0.007	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	ORTHOXYLENE II HEATER	226.42	MMBTU/H	EMISSION POINT NO.: ORTHOII-H2.	LOW SULFUR CONTENT FUEL: USE REFINERY FUEL GAS WITH NO MORE THAN 0.1 GR/DSCF H2S OR USE NATURAL GAS WITH NO MORE THAN 0.25 GR/100 DSCF H2S AND NO MORE THAN 5.0 GR/100 DSCF TOTAL S.	2.89	LB/H	SEE NOTES	0.013	LB/MMBTU	CALCULATED
LA-0114	ST. JAMES STYRENE PLANT	SUPERHEATER	165	MMBTU/H		GOOD DESIGN AND OPERATION	0.005	LB/MMBTU		0.005	LB/MMBTU	
*LA-0213	ST. CHARLES REFINERY	REBOILER 2005-18 & HEATERS F-15-02 (6-81), 2005-14, 2005-17, 2005-29, 2005-32, & 2005-37			6-81: 135 MM BTU/HR 2005-14: 195 MM BTU/HR 2005-17: 159 MM BTU/HR 2005-18: 231 MM BTU/HR 2005-29: 195 MM BTU/HR 2005-32: 159 MM BTU/HR 2005-37: 173 MM BTU/HR SOURCES ALSO FIRE NATURAL GAS.	PROPER EQUIPMENT DESIGN AND OPERATION, GOOD COMBUSTION PRACTICES, AND USE OF GASEOUS FUELS	0.0074	LB/MMBTU	ANNUAL AVERAGE			
AZ-0046	ARIZONA CLEAN FUELS YUMA	VACUUM CRUDE CHARGE HEATER	101	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-02100		0.0075	LB/MMBTU	THREE-HOUR AVERAGE	0.0075	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	HYDROCRACKER UNIT MAIN FRACTIONATOR HEATER	211	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-10500		0.0075	LB/MMBTU	THREE-HOUR AVG	0.0075	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT INTERHEATER NO. 1	192	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY EQUIPMENT ID # B-05120		0.0075	LB/MMBTU	3-HR AVERAGE	0.0075	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT INTERHEATER NO. 2	129	MMBTU/H	THIS EQUIPMENT IS IDENTIFIED BY ID # B-05130		0.0075	LB/MMBTU	3-HR AVERAGE	0.0075	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	DISTILLATE HYDROTREATER SPLITTER REBOILER	117	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # B-08509		0.0075	LB/MMBTU	3-HR AVERAGE	0.0075	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT CHARGE HEATER	122	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-05110		0.0075	LB/MMBTU	3-HR AVG.			NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	BUTANE CONVERSION UNIT ISOSTRIPPER REBOILER	222	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # B-15110		0.0075	LB/MMBTU	3-HR AVERAGE			NOT AVAILABLE

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Particulate Matter

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
PA-0231	UNITED REFINERY CO.	DELAYED COKER UNIT, HEATER	116	MMBTU/H	The unit is subject to the NSPS 40 CFR Subpart J, Subpart GGG, Subpart QQQ. The unit is also subject to MACT standards in 40 CFR 63 Subpart CC, and NESHAP requirements in 40 CFR 61 Subpart FF.	SPRAY CHAMBER, GOOD COMBUSTION PRACTICE	0.1	LB/H		0.0009	LB/MMBTU	Calculated using heat input
TX-0478	CITGO CORPUS CHRISTI REFINERY - WEST PLANT	MIXED DISTILLATE HYDROHEATER REBOILER HEATER	82	MMBTU/H	ORGANIC NITROGEN AND SULFUR FROM THE FEED STREAMS. FEEDSTOCK IS MIXED WITH HYDROGEN , HEATED, AND FED TO A REACTOR. A CATALYTIC REACTION CONVERTS THE ORGANIC SULFUR TO HYDROGEN SULFIDE AND THE NITROGEN COMPOUNDS TO AMMONIA. THE EFFLUENT STREAM IS COOLED AND EXCESS HYDROGEN REMOVED FOR RECYCLE. HYDROGEN SULFIDE IS REMOVED FROM THE HYDROGEN STREAM BY AN AMINE ABSORBER AND ROUTED TO THE SRU. NEW EQUIPMENT UNDER THE AMENDMENT INCLUDES A SECOND REACTOR, ADDITIONAL PREHEAT TRAIN, AN ADDITIONAL REACTOR PRODUCT FLASH DRUM, A HYDROGEN PURIFICATION MEMBRANE AND AN ADDITIONAL HYDROGEN MAKEUP COMPRESSOR. AS PART OF THE		0.61	LB/H				
OK-0098	PONCA CITY REF	CRUDE VACUUM UNIT, HEATER H-0016			Compliance to be verified by stack testing	GOOD COMBUSTION PRACTICES	0.8	LB/H	365 day average	0.0075	LB/MMBTU	
LA-0121	CONVENT REFINERY	HDS-1 HEATER	140	MMBTU/H	EMISSION POINT 96H-201	GOOD COMBUSTION PRACTICES	1.04	LB/H		0.02	LB/MMBTU	
LA-0128	CONVENT REFINERY	CRU CHARGE HEATER	144	MMBTU/H	EMISSION POINT 4F-501	GOOD COMBUSTION PRACTICES	1.29	LB/H		0.02	LB/MMBTU	
OK-0098	PONCA CITY REF	CRUDE CHARGE UNIT, HEATER H-0001			Compliance to be verified by stack testing, then monitored with CEM	GOOD COMBUSTION PRACTICES	1.31	LB/H	365 day average	0.0075	LB/MMBTU	
LA-0128	CONVENT REFINERY	CRU INTER HEATER NO.1	140	MMBTU/H	EMISSION POINT 4F-502	GOOD COMBUSTION PRACTICES	1.36	LB/H		0.02	LB/MMBTU	
LA-0193	STYRENE MONOMER PLANT	BZ RECOVERY COLUMN HEATER HS-2103	182.1	MMBTU/H		USE OF CLEAN BURNING FUELS (NATURAL GAS)	1.4	LB/H	HOURLY MAXIMUM	0.01	LB/MMBTU	ANNUAL AVERAGE

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Particulate Matter

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
LA-0193	STYRENE MONOMER PLANT	REHEATER HS-8220	195	MMBTU/H	84.6 MMBTU/HR PROCESS GAS 110.4 MMBTU/HR NATURAL GAS	USE OF CLEAN BURNING FUELS (NATURAL GAS AND PROCESS GAS)	1.5	LB/H	HOURLY MAXIMUM	0.01	LB/MMBTU	ANNUAL AVERAGE
LA-0128	CONVENT REFINERY	VPS1 ATM. HEATER NO.2	201	MMBTU/H	EMISSION POINT 1F-202	GOOD COMBUSTION PRACTICES	1.56	LB/H		0.02	LB/MMBTU	
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO 1 INTERHEATER	147.2	MMBTU/H			1.57	LB/H				
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 REFORMER CHARGE HEATER	248	MMBTU/H			2.64	LB/H				
*LA-0211	GARYVILLE REFINERY	A & B VACUUM TOWER HEATERS (3-08 & 4-08)	155.2	MMBTU/H EA.		PROPER DESIGN, OPERATION, AND GOOD ENGINEERING PRACTICES				0.0075	LB/MMBTU	3-HOUR AVERAGE
*LA-0211	GARYVILLE REFINERY	NAPHTHA HYDROTREATER STRIPPER REBOILER HEATER (6-08) & KHT STRIPPER REBOILER HEATER (10-08)			6-08: 138.4 MMBTU/H 10-08: 121.8 MMBTU/H	PROPER DESIGN, OPERATION, AND GOOD ENGINEERING PRACTICES				0.0075	LB/MMBTU	3-HOUR AVERAGE
*LA-0211	GARYVILLE REFINERY	SATS GAS PLANT HOT OIL HEATER (14-08)	183.3	MMBTU/H		PROPER DESIGN, OPERATION, AND GOOD ENGINEERING PRACTICES				0.0075	LB/MMBTU	3-HOUR AVERAGE

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Volatile Organic Compounds (VOC)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
LA-0114	ST. JAMES STYRENE PLANT	SUPERHEATER	165	MMBTU/H		PROPER OPERATING TECHNIQUES WITH AUTOMATIC CONTROLS, 3% EXCESS O2	0.004	LB/MMBTU		0.004	LB/MMBTU	
OK-0102	PONCA CITY REFINERY	PROCESS HEATERS AND BOILERS			Process heaters H-1001, H-9901, H-9902, USLD-5/5a, NH-6007, H-6014, H-6015, H-5001, H-0057, H-0058, and H-0059, and steam boilers B-0009 and B-0010. Maximum heat rate ranges from 12 mmBtu/h to 241 mmBtu/h. Ultra low NOx burners.	GOOD COMBUSTION PRACTICE	0.0054	LB/MMBTU				
*LA-0213	ST. CHARLES REFINERY	REBOILER 2005-18 & HEATERS F-15-02 (6-81), 2005-14, 2005-17, 2005-29, 2005-32, & 2005-37			6-81: 135 MM BTU/HR 2005-14: 195 MM BTU/HR 2005-17: 159 MM BTU/HR 2005-18: 231 MM BTU/HR 2005-29: 195 MM BTU/HR 2005-32: 159 MM BTU/HR 2005-37: 173 MM BTU/HR SOURCES ALSO FIRE NATURAL GAS.	PROPER EQUIPMENT DESIGN AND OPERATION, GOOD COMBUSTION PRACTICES, AND USE OF GASEOUS FUELS	0.0054	LB/MMBTU	ANNUAL AVERAGE			
TX-0478	CITGO CORPUS CHRISTI REFINERY - WEST PLANT	MIXED DISTILLATE HYDROHEATER REBOILER HEATER	82	MMBTU/H	ORGANIC NITROGEN AND SULFUR FROM THE FEED STREAMS. FEEDSTOCK IS MIXED WITH HYDROGEN , HEATED, AND FED TO A REACTOR. A CATALYTIC REACTION CONVERTS THE ORGANIC SULFUR TO HYDROGEN SULFIDE AND THE NITROGEN COMPOUNDS TO AMMONIA. THE EFFLUENT STREAM IS COOLED AND EXCESS HYDROGEN REMOVED FOR RECYCLE. HYDROGEN SULFIDE IS REMOVED FROM THE HYDROGEN STREAM BY AN AMINE ABSORBER AND ROUTED TO THE SRU. NEW EQUIPMENT UNDER THE AMENDMENT INCLUDES A SECOND REACTOR, ADDITIONAL PREHEAT TRAIN, AN ADDITIONAL REACTOR PRODUCT FLASH DRUM, A HYDROGEN PURIFICATION MEMBRANE AND AN ADDITIONAL HYDROGEN MAKEUP COMPRESSOR. AS PART OF THE		0.44	LB/H				

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "12.3": Industrial-Size Boilers/Furnaces (more than 100 million Btu/H, up to/including 250 million Btu/H); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Volatile Organic Compounds (VOC)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
PA-0231	UNITED REFINERY CO.	DELAYED COKER UNIT, HEATER	116	MMBTU/H	The unit is subject to the NSPS 40 CFR Subpart J, Subpart GGG, Subpart QQQ. The unit is also subject to MACT standards in 40 CFR 63 Subpart CC, and NESHAP requirements in 40 CFR 61 Subpart FF.	GOOD COMBUSTION PRACTICE	0.545	LB/H				
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II WEST REACTOR FEED HEATER	104.25	MMBTU/H	EMISSION POINT NO. BTU-HF106.	NONE INDICATED	0.56	LB/H				
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO 1 INTERHEATER	147.2	MMBTU/H			0.58	LB/H				
LA-0197	ALLIANCE REFINERY	LOW SULFUR GASOLINE FEED HEATER NO. 1	138.12	MMBTU/H	AVERAGE HEAT INPUT = 115.10 MMBTU/H	GOOD COMBUSTION PRACTICES AND GOOD ENGINEERING DESIGN	0.62	LB/H	HOURLY MAXIMUM			
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-NO. 1 REACTOR FEED HEATER	121.74	MMBTU/H	EMISSION POINT NO. BTU-HF103.	NONE INDICATED	0.66	LB/H				
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 REFORMER CHARGE HEATER	248	MMBTU/H			0.98	LB/H				
TX-0375	LYONDELL - CITGO REFINING, LP	ORTHOXYLENE II HEATER	226.42	MMBTU/H	EMISSION POINT NO.: ORTHOII-H2.	NONE INDICATED	1.22	LB/H				
TX-0375	LYONDELL - CITGO REFINING, LP	BOILER NO. 12	245	MMBTU/H	EMISSION PT NO: BOILER-12. SHALL BE SHUTDOWN.	NONE INDICATED	1.32	LB/H				
*LA-0211	GARYVILLE REFINERY	A & B VACUUM TOWER HEATERS (3-08 & 4-08)	155.2	MMBTU/H EA.		PROPER DESIGN, OPERATION, AND GOOD ENGINEERING PRACTICES				0.0015	LB/MMBTU	3-HOUR AVERAGE
*LA-0211	GARYVILLE REFINERY	NAPHTHA HYDROTREATER STRIPPER REBOILER HEATER (6-08) & KHT STRIPPER REBOILER HEATER (10-08)			6-08: 138.4 MMBTU/H 10-08: 121.8 MMBTU/H	PROPER DESIGN, OPERATION, AND GOOD ENGINEERING PRACTICES				0.0015	LB/MMBTU	3-HOUR AVERAGE
*LA-0211	GARYVILLE REFINERY	SATS GAS PLANT HOT OIL HEATER (14-08)	183.3	MMBTU/H		PROPER DESIGN, OPERATION, AND GOOD ENGINEERING PRACTICES				0.0015	LB/MMBTU	3-HOUR AVERAGE

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Carbon Monoxide

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
PA-0231	UNITED REFINERY CO.	FCC FEED HYDROTREATER HEATER	91	MMBTU/H	The unit is subject to the NSPS 40 CFR Subpart J, Subpart GGG, Subpart QQQ. The unit is also subject to MACT standards in 40 CFR 63 Subpart CC, and NESHAP requirements in 40 CFR 61 Subpart FF.	GOOD COMBUSTION PRACTICE	7.46	LB/H		0.08	LB/MMBTU	Calculated using heat input
LA-0193	STYRENE MONOMER PLANT	REGENERATION GAS HEATER HS-2102	14.4	MMBTU/H		GOOD COMBUSTION PRACTICES - GOOD EQUIPMENT DESIGN, USE OF GASEOUS FUELS FOR GOOD MIXING, AND PROPER COMBUSTION TECHNIQUES	1.2	LB/H	HOURLY MAXIMUM	0.08	LB/MMBTU	ANNUAL AVERAGE
LA-0193	STYRENE MONOMER PLANT	PEB RECOVERY COLUMN HEATER HS-2105	25.2	MMBTU/H		GOOD COMBUSTION PRACTICES - GOOD EQUIPMENT DESIGN, USE OF GASEOUS FUELS FOR GOOD MIXING, AND PROPER COMBUSTION TECHNIQUES	2.1	LB/H	HOURLY MAXIMUM	0.08	LB/MMBTU	ANNUAL AVERAGE
AK-0037	KENAI REFINERY	PRIP ABSORBER FEED FURNACE, H1201/1203	10.4	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 10.4 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED	0.02	LB/MMBTU		0.02	LB/MMBTU	
AK-0037	KENAI REFINERY	POWERFORMER REHEATER, H205	48.8	MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS PRIMARY. DESIGN CAPACITY IS 48.8 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. NOT TO EXCEED 7% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	NONE INDICATED	0.035	LB/MMBTU		0.035	LB/MMBTU	

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Carbon Monoxide

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	RESIDUAL OIL HEATER, H612	22.2	MMBTU/H	* SOURCE BURNS NATURAL GAS AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 22.2 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR IS 125 HOURS.	NONE INDICATED	0.035	LB/MMBTU		0.035	LB/MMBTU	
TX-0375	LYONDELL - CITGO REFINING, LP	BENZENE STABILIZER HEATER	38.34	MMBTU/H	EMISSION PT. NO. ARU-H501	NONE INDICATED	3.2	LB/H		0.083	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-NO.4 REACTOR FEED HEATER	49	MMBTU/H		NONE INDICATED	4	LB/H		0.08	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-REFORMATE STABILIZER REBOILER	54.77	MMBTU/H	EMISSION POINT NO. BTU-HF107.	NONE INDICATED	4.5	LB/H		0.08	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	BTU- NO.3 REACTOR FEED HEATER	58.95	MMBTU/H	EMISSION POINT NO. BTU-HF105.	NONE INDICATED	4.9	LB/H		0.083	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-NO.2 REACTOR FEED HEATER	69.68	MMBTU/H	EMISSION POINT NO. BTU-HF104	NONE INDICATED	5.7	LB/H		0.08	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II EAST REACTOR FEED HEATER	75	MMBTU/H	EMISSION POINT NO. ISOMII-F5.	NONE INDICATED	6.2	LB/H		0.083	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II COMBINATION SPLITTER HEATER	77.62	MMBTU/H		NONE INDICATED	6.4	LB/H		0.082	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II XYLENE RERUN TOWER HEATER	83.7	MMBTU/H		NONE INDICATED	6.9	LB/H		0.08	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	ORTHOXYLENE I HEATER	96.23	MMBTU/H	EMISSION POINT NO. ORTHOI-H1.	NONE INDICATED	7.9	LB/H		0.082	LB/MMBTU	CALCULATED
AK-0037	KENAI REFINERY	NATURAL GAS SUPPLY HEATER, H704	2	MMBTU/H	*SOURCE BURNS NATURAL GAS AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 2.0 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.02	LB/MMBTU		0.02	LB/MMBTU	
AK-0037	KENAI REFINERY	POWERFORMER PREHEATER, H201	31.8	MMBTU/H	DESIGN CAPACITY IS 31.8 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. *SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Carbon Monoxide

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	POWERFORMER PREHEATER, H202	51	MMBTU/H	*SOURCE ALSO BURNS REFINERY GAS AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH FUEL IS PRIMARY. DESIGN CAPACITY IS 51.0 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	
AK-0037	KENAI REFINERY	POWERFORMER PREHEATER, H203	27.9	MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH FUEL IS PRIMARY. DESIGN CAPACITY IS 27.9 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	
AK-0037	KENAI REFINERY	POWERFORMER REHEATER, H204	53.8	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS GIVEN AS TO WHICH IS PRIMARY. DESIGN CAPACITY IS 53.8 MMBTU/H, AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. FUEL IS NOT SPECIFIED. OPERATING LIMIT PER YEAR NOT TO EXCEED 7% O2 AS MEASURED IN EXHAUST GAS BY CEMS.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	
AK-0037	KENAI REFINERY	HYDROCRACKER RECYCLE GAS HEATER, H401	38.9	MMBTU/H	* EMISSION POINT BURNS REFINERY GAS, NATURAL GAS, AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS PRIMARY FUEL. DESIGN THROUGPUT IS 38.9 MMBTU/H. AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR NOT TO EXCEED 6% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Carbon Monoxide

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	HYDROCRACKER RECYCLE GAS HEATER, H402	38	MMBTU/H	* THIS SOURCE BURNS NATURAL GAS, LPG AND REFINERY GAS. NO INOFORMATION IS PROVIDED AS TO WHICH FUEL TYPE IS PRIMARY. DESIGN CAPACITY IS 38 MMBTU/H BUT AUTHORIZED RATED. CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR NOT TO EXCEED 6% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	
AK-0037	KENAI REFINERY	HYDROCRACKER FRACTIONATER REBOILER, H403	50	MMBTU/H	* SOURCE BURNS NATURAL GAS, LPG, AND REFINERY GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 50 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR NOT TO EXCEED 6% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	
AK-0037	KENAI REFINERY	HYDROCRACKER STABILIZER REBOILER, H404	64.4	MMBTU/H	* SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 64.4 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR IS NOT TO EXCEED 6% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	
AK-0037	KENAI REFINERY	HOT OIL HEATER, H609	56	MMBTU/H	* SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LPG. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 56 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Carbon Monoxide

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	FIRED STEAM GENERATOR, H701	36.55	MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS; IT IS NOT SPECIFIED WHICH FUEL IS PRIMARY. DESIGN CAPACITY IS 36.55 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	
AK-0037	KENAI REFINERY	FIRED STEAM GENERATOR, H702	36.55	MMBTU/H	*SOURCE BURNS NATURL GAS, REFINERY GAS, AND LPG. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 36.55 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	
AK-0037	KENAI REFINERY	FIRED STEAM GENERATOR, H801	32	MMBTU/H	* SOURCE BURNS NATURAL GAS AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 32 MMBTU/H, BUT THIS AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	
AK-0037	KENAI REFINERY	HOT GLYCOL HEATER, H802	10.8	MMBTU/H	* SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 10.8 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	
AK-0037	KENAI REFINERY	REACTION FURNACE BURNER, H1101	5.2	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 5.2 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	

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And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Carbon Monoxide

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	#1 REHEATER STARTUP BURNER, H1102	1.65	MMBTU/H	*SOURCE BURNS NATURAL GAS, LPG, AND REFINERY GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.65 MMBTU/H.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	
AK-0037	KENAI REFINERY	#2 REHEATER STARTUP BURNER, H1103	1.15	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.15 MMBTU/H.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	
AK-0037	KENAI REFINERY	#3 REHEATER STARTUP BURNER, H1104	1.05	MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.05 MMBTU/H.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	
AK-0037	KENAI REFINERY	TAIL GAS BURNER, H1105	2	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY OF SOURCE IS 2.00 MMBTU/H.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	
AK-0037	KENAI REFINERY	#4 REHEATER STARTUP BURNER, H1106	1.9	MMBTU/H	* SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.90 MMBTU/H.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	
AK-0037	KENAI REFINERY	VACUUM TOWER HEATER, H1701	91	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 91 MMBTU/H.	NONE INDICATED.	0.035	LB/MMBTU		0.035	LB/MMBTU	

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Permit Date Between 1/1/1997 And 11/12/2007
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And Process Contains 'Heater'
Pollutant: Carbon Monoxide

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	PRIP RECYCLER H2 FURNACE, H1202	11.2	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 11.2 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.04	LB/MMBTU		0.04	LB/MMBTU	
AK-0037	KENAI REFINERY	DUCT BURNER FOR STEAM GENERATION, E-1400	36.5	MMBTU/H	*SOURCE BURNS NATURAL GAS, LIQUID PETROLEUM GAS, AND DIESEL. NO INDICATION IS PROVIDED AS TO WHICH FUEL IS PRIMARY. SCC AND PROCESS CODES ARE APPLICABLE WHEN BURNING NATURAL GAS. THE DESIGN CAPACITY IS 36.5 MMBTU/HR AND THE AUTHORIZED CAPACITY IS 1 MMBTU/H. THE OPERATING LIMIT FOR THE SOLAR CENTAUR TURBINE AND DUCT BURNER COMBINATION (CT/E-1400) IS 438 H/YR WHEN BURNING DIESEL FUEL.	NONE INDICATED.	5.5	LB/H				NOT AVAILABLE
AK-0037	KENAI REFINERY	DUCT BURNER FOR STEAM GENERATION, E-1410	36.5	MMBTU/H	*SOURCE BURNS LIQUID PETROLEUM GAS, NATURAL GAS, AND DIESEL. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. OPERATING LIMIT FOR THE COMBINATION OF THE SOLAR CENTAUR TURBINE & DUCT BURNER WHEN BURNING DIESEL FUEL IS 438 H PER YEAR. SCC AND PROCESS CODES ARE APPLICABLE WHEN BURNING NATURAL GAS. THE DESIGN CAPACITY IS 36.5 MMBTU/H.	NONE INDICATED.	5.5	LB/H				NOT AVAILABLE
*LA-0211	GARYVILLE REFINERY	NAPHTHA HYDROTREATER REACTOR CHARGE HEATER (5-08), KHT REACTOR CHARGE HEATER (9-08), & HCU TRAIN 1&2 REACTOR CHARGE HEATERS (11-08 & 12-08)			5-08: 75.7 MMBTU/H 9-08: 73.8 MMBTU/H 11-08: 85.05 MMBTU/H 12-08: 85.05 MMBTU/H	PROPER DESIGN, OPERATION, AND GOOD ENGINEERING PRACTICES				0.04	LB/MMBTU	3-RUN AVERAGE

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And Process Contains 'Heater'
Pollutant: Carbon Monoxide

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
*LA-0213	ST. CHARLES REFINERY	HEATERS 2004-1 - 2004-4, 2005-4, 2005-8, 2005-9, 2005-23, 2005-24, 2005-35, & 2005-36; REBOILERS 2005-5, 2005-6, 2005-7, 2005-12, 2005-27			2004-1: 86 MM BTU/HR 2004-2: 24 MM BTU/HR 2004-3: 52 MM BTU/HR 2004-4: 86 MM BTU/HR 2005-5: 95 MM BTU/HR 2005-6: 95 MM BTU/HR 2005-7: 95 MM BTU/HR 2005-8: 95 MM BTU/HR 2005-9: 42 MM BTU/HR 2005-12: 95 MM BTU/HR 2005-23: 95 MM BTU/HR 2005-24: 42 MM BTU/HR 2005-27: 95 MM BTU/HR 2005-35: 38 MM BTU/HR 2005-36: 15 MM BTU/HR SOURCES ALSO FIRE NATURAL GAS.	PROPER EQUIPMENT DESIGN AND OPERATION, GOOD COMBUSTION PRACTICES, AND USE OF GASEOUS FUELS	0.08	LB/MMBTU	THREE 1-HOUR TEST AVERAGE			
*LA-0213	ST. CHARLES REFINERY	CPF HEATER H-30-03, H-39-01, & H-39-02 (94-28, 94-29, & 94-30)			H-30-03: 68 MM BTU/HR H-39-01: 75 MM BTU/HR H-39-02: 90 MM BTU/HR SOURCES ALSO FIRE NATURAL GAS.	PROPER EQUIPMENT DESIGN AND OPERATION, GOOD COMBUSTION PRACTICES, AND USE OF GASEOUS FUELS	0.08	LB/MM BTU	THREE ONE HOUR TEST AVERAGE			
*LA-0213	ST. CHARLES REFINERY	F-33-05 (94-21)	48	MMBTU/H	SOURCE ALSO FIRES NATURAL GAS.	PROPER EQUIPMENT DESIGN AND OPERATION, GOOD COMBUSTION PRACTICES, AND USE OF GASEOUS FUELS	2.4	LB/H	HOURLY MAXIMUM			
LA-0119	LAKE CHARLES REFINERY	HEATER, HYDRODESULFURIZATION 7 (H-3232)	23	MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS	ULNB, GOOD DESIGN, USING GASEOUS FUEL, PROPER OPERATING TECHNIQUES	0.46	LB/H*	HOURLY MAXIMUM	0.02	LB/MMBTU	CALCULATED BY CATC
LA-0119	LAKE CHARLES REFINERY	HEATER, HYDRODESULFURIZATION 4 (H-1202)	60	MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS	ULTRA LOW NOX BURNERS (ULNB), GOOD DESIGN, USE GASEOUS FUEL, PROPER OPERATING TECHNIQUES	1.2	LB/H	HOURLY MAXIMUM	0.2	LB/MMBTU	CALCULATED BY CATC
LA-0119	LAKE CHARLES REFINERY	HEATER, HYDRODESULFURIZATION 7 (H-3201)	23	MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS	ULTRA LOW NOX BURNERS (ULNB), GOOD DESIGN, USE GASEOUS FUEL, PROPER OPERATING TECHNIQUES.	0.46	LB/H*	HOURLY MAXIMUM	0.043	LB/MMBTU	CALCULATED BY CATC
LA-0119	LAKE CHARLES REFINERY	HEATER, HYDRODESULFURIZATION 4 (H-1201)	36.6	MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS	ULTRA LOW NOX BURNERS (ULNB), GOOD DESIGN, USE GASEOUS FUELS, PROPER OPERATING TECHNIQUES	0.73	LB/H*	HOURLY MAXIMUM	0.02	LB/MMBTU	CALCULATED BY CATC
LA-0119	LAKE CHARLES REFINERY	PETROLEUM REFINING, HEATER, VACUUM UNIT 3 (H-1103)	100	MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS.	ULTRA LOW NOX BURNERS (ULNB), GOOD DESIGN, USE GASEOUS FUELS, PROPER OPERATING TECHNIQUES.	2	LB/H*	HOURLY MAXIMUM	0.02	LB/MMBTU	CALCULATED BY CATC
AZ-0046	ARIZONA CLEAN FUELS YUMA	HYDROCRACKER UNIT CHARGE HEATER	70	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-10200		0.04	LB/MMBTU	THREE-HOUR ROLLING AVG	0.04	LB/MMBTU	

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And Process Contains 'Heater'
Pollutant: Carbon Monoxide

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDEMIS SLIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AZ-0046	ARIZONA CLEAN FUELS YUMA	NAPHTHA HYDROTREATER CHARGE HEATER	21.4	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-04200		0.04	LB/MMBTU		0.04	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT DEBUTANIZER REBOILER	23.2	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # B-05609		0.04	LB/MMBTU	3-HR AVERAGE	0.04	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	DISTILLATE HYDROTREATER CHARGE HEATER	25	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # B-08200		0.04	LB/MMBTU	3-HR AVERAGE	0.04	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	DELAYED COKING UNIT CHARGE HEATER NOS. 1 AND 2	99.5	MMBTU/H	THESE TWO PEICES OF EQUIPMENT ARE IDENTIFIED BY ID #S B-14110A AND B-14110B		0.04	LB/MMBTU	3-HR AVERAGE	0.04	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	SPRAY DRYER HEATER	44	MMBTU/H	EQUIPMENT IDENTIFIED BY ID # E-26502		0.04	LB/MMBTU	3-HR AVERAGE	0.04	LB/MMBTU	
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 REFORMER STABILIZER REPOILER HEATER	20	MMBTU/H			0.56	LB/H		0.03	LB/MMBTU	
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 HYDROTREATER REBOILER HEATER	32.7	MMBTU/H			0.92	LB/H				
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 REBOILER STABILIZER REBOILER HEATER	45.7	MMBTU/H			1.28	LB/H		0.03	LB/MMBTU	CALCULATED
TX-0442	SHELL OIL DEER PARK	FOURTEEN HEATERS					500	PPMV				
*LA-0211	GARYVILLE REFINERY	THERMAL DRYING UNIT HEATEC HEATER (124-1-91)	9.6	MMBTU/H	UNIT DESTROYS VAPORS CREATED BY THE THERMAL DRYING UNT, WHICH HEATS SOLIDS SEGREGATED FROM WASTEWATER BY THE API SEPARATORS.							

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And Process Contains 'Heater'
Pollutant: Nitrogen Oxides (NOx)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT DEBUTANIZER REBOILER	23.2	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # B-05609	LOW NOX BURNERS	0.03	LB/MMBTU	3-HR AVERAGE	0.03	LB/MMBTU	NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	DELAYED COKING UNIT CHARGE HEATER NOS. 1 AND 2	99.5	MMBTU/H	THESE TWO PEICES OF EQUIPMENT ARE IDENTIFIED BY ID #S B-14110A AND B-14110B	LOW NOX BURNERS	0.03	LB/MMBTU	3-HR AVERAGE	0.03	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	SPRAY DRYER HEATER	44	MMBTU/H	EQUIPMENT IDENTIFIED BY ID # E-26502	LOW NOX BURNERS	0.03	LB/MMBTU	3-HR AVERAGE	0.03	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	DISTILLATE HYDROTREATER CHARGE HEATER	25	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # B-08200	LOW NOX BURNERS	0.033	LB/MMBTU	3-HR AVERAGE	0.033	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	HYDROCRACKER UNIT CHARGE HEATER	70	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-10200	LOW NOX BURNERS	0.034	LB/MMBTU	THREE-HOUR ROLLING AVG	0.034	LB/MMBTU	
*LA-0213	ST. CHARLES REFINERY	CPF HEATER H-30-03, H-39-01, & H-39-02 (94-28, 94-29, & 94-30)			H-30-03: 68 MM BTU/HR H-39-01: 75 MM BTU/HR H-39-02: 90 MM BTU/HR SOURCES ALSO FIRE NATURAL GAS.	LOW NOX BURNERS	0.05	LB/MM BTU	THREE ONE HOUR TEST AVERAGE			
*LA-0213	ST. CHARLES REFINERY	F-33-05 (94-21)	48	MMBTU/H	SOURCE ALSO FIRES NATURAL GAS.	LOW NOX BURNERS	3.36	LB/H	HOURLY MAXIMUM	0.07	LB/MMBTU	
PA-0231	UNITED REFINERY CO.	FCC FEED HYDROTREATER HEATER	91	MMBTU/H	The unit is subject to the NSPS 40 CFR Subpart J, Subpart GGG, Subpart QQQ. The unit is also subject to MACT standards in 40 CFR 63 Subpart CC, and NESHAP requirements in 40 CFR 61 Subpart FF.	LOW NOX BURNERS, GOOD COMBUSTION PRACTICE	1.82	LB/H		0.02	LB/MMBTU	Calculated using heat input
AZ-0046	ARIZONA CLEAN FUELS YUMA	NAPHTHA HYDROTREATER CHARGE HEATER	21.4	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-04200	LOW-NOX BURNERS	0.03	LB/MMBTU	THREE-HOUR ROLLING AVG	0.03	LB/MMBTU	
AK-0037	KENAI REFINERY	POWERFORMER REHEATER, H205	48.8	MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS PRIMARY. DESIGN CAPACITY IS 48.8 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. NOT TO EXCEED 7% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	NONE INDICATED	0.08	LB/MMBTU		0.08	LB/MMBTU	

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Nitrogen Oxides (NOx)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	NATURAL GAS SUPPLY HEATER, H704	2	MMBTU/H	*SOURCE BURNS NATURAL GAS AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 2.0 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED	0.1	LB/MMBTU		0.1	LB/MMBTU	
AK-0037	KENAI REFINERY	FIRED STEAM GENERATOR, H702	36.55	MMBTU/H	*SOURCE BURNS NATURL GAS, REFINERY GAS, AND LPG. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 36.55 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED	0.14	LB/MMBTU		0.14	LB/MMBTU	
TX-0375	LYONDELL - CITGO REFINING, LP	BENZENE STABILIZER HEATER	38.34	MMBTU/H	EMISSION PT. NO. ARU-H501	NONE INDICATED	3.8	LB/H		0.099	LB/MMBTU	CALCULATED
AK-0037	KENAI REFINERY	HYDROCRACKER FRACTIONATER REBOILER, H403	50	MMBTU/H	* SOURCE BURNS NATURAL GAS, LPG, AND REFINERY GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 50 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR NOT TO EXCEED 6% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	NONE INDICATED.	0.06	LB/MMBTU		0.06	LB/MMBTU	
AK-0037	KENAI REFINERY	VACUUM TOWER HEATER, H1701	91	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 91 MMBTU/H.	NONE INDICATED.	0.06	LB/MMBTU		0.06	LB/MMBTU	

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Nitrogen Oxides (NOx)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	POWERFORMER REHEATER, H204	53.8	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS GIVEN AS TO WHICH IS PRIMARY. DESIGN CAPACITY IS 53.8 MMBTU/H, AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. FUEL IS NOT SPECIFIED. OPERATING LIMIT PER YEAR NOT TO EXCEED 7% O2 AS MEASURED IN EXHAUST GAS BY CEMS.	NONE INDICATED.	0.08	LB/MMBTU		0.08	LB/MMBTU	
AK-0037	KENAI REFINERY	HYDROCRACKER RECYCLE GAS HEATER, H401	38.9	MMBTU/H	* EMISSION POINT BURNS REFINERY GAS, NATURAL GAS, AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS PRIMARY FUEL. DESIGN THROUGPUT IS 38.9 MMBTU/H. AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR NOT TO EXCEED 6% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	NONE INDICATED.	0.08	LB/MMBTU		0.08	LB/MMBTU	
AK-0037	KENAI REFINERY	HYDROCRACKER RECYCLE GAS HEATER, H402	38	MMBTU/H	* THIS SOURCE BURNS NATURAL GAS, LPG AND REFINERY GAS. NO INOFORMATION IS PROVIDED AS TO WHICH FUEL TYPE IS PRIMARY. DESIGN CAPACITY IS 38 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR NOT TO EXCEED 6% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	NONE INDICATED.	0.08	LB/MMBTU		0.08	LB/MMBTU	

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Nitrogen Oxides (NOx)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	HYDROCRACKER STABILIZER REBOILER, H404	64.4	MMBTU/H	* SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 64.4 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR IS NOT TO EXCEED 6% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	NONE INDICATED.	0.08	LB/MMBTU		0.08	LB/MMBTU	
AK-0037	KENAI REFINERY	FIRED STEAM GENERATOR, H801	32	MMBTU/H	* SOURCE BURNS NATURAL GAS AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 32 MMBTU/H, BUT THIS AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.1	LB/MMBTU		0.1	LB/MMBTU	
AK-0037	KENAI REFINERY	HOT GLYCOL HEATER, H802	10.8	MMBTU/H	* SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 10.8 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.1	LB/MMBTU		0.1	LB/MMBTU	
AK-0037	KENAI REFINERY	PRIP ABSORBER FEED FURNACE, H1201/1203	10.4	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 10.4 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.1	LB/MMBTU		0.1	LB/MMBTU	

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Nitrogen Oxides (NOx)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	PRIP RECYCLER H2 FURNACE, H1202	11.2	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 11.2 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.1	LB/MMBTU		0.1	LB/MMBTU	
AK-0037	KENAI REFINERY	RESIDUAL OIL HEATER, H612	22.2	MMBTU/H	* SOURCE BURNS NATURAL GAS AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 22.2 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR IS 125 HOURS.	NONE INDICATED.	0.14	LB/MMBTU		0.14	LB/MMBTU	
AK-0037	KENAI REFINERY	FIRED STEAM GENERATOR, H701	36.55	MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS; IT IS NOT SPECIFIED WHICH FUEL IS PRIMARY. DESIGN CAPACITY IS 36.55 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.14	LB/MMBTU		0.14	LB/MMBTU	
AK-0037	KENAI REFINERY	REACTION FURNACE BURNER, H1101	5.2	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 5.2 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.14	LB/MMBTU		0.14	LB/MMBTU	
AK-0037	KENAI REFINERY	#1 REHEATER STARTUP BURNER, H1102	1.65	MMBTU/H	*SOURCE BURNS NATURAL GAS, LPG, AND REFINERY GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.65 MMBTU/H.	NONE INDICATED.	0.14	LB/MMBTU		0.14	LB/MMBTU	

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Nitrogen Oxides (NOx)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	#2 REHEATER STARTUP BURNER, H1103	1.15	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.15 MMBTU/H.	NONE INDICATED.	0.14	LB/MMBTU		0.14	LB/MMBTU	
AK-0037	KENAI REFINERY	#3 REHEATER STARTUP BURNER, H1104	1.05	MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.05 MMBTU/H.	NONE INDICATED.	0.14	LB/MMBTU		0.14	LB/MMBTU	
AK-0037	KENAI REFINERY	TAIL GAS BURNER, H1105	2	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY OF SOURCE IS 2.00 MMBTU/H.	NONE INDICATED.	0.14	LB/MMBTU		0.14	LB/MMBTU	
AK-0037	KENAI REFINERY	#4 REHEATER STARTUP BURNER, H1106	1.9	MMBTU/H	* SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.90 MMBTU/H.	NONE INDICATED.	0.14	LB/MMBTU		0.14	LB/MMBTU	
AK-0037	KENAI REFINERY	POWERFORMER PREHEATER, H201	31.8	MMBTU/H	DESIGN CAPACITY IS 31.8 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. *SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL.	NONE INDICATED.	0.25	LB/MMBTU		0.25	LB/MMBTU	

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And Process Contains 'Heater'
Pollutant: Nitrogen Oxides (NOx)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	POWERFORMER PREHEATER, H202	51	MMBTU/H	*SOURCE ALSO BURNS REFINERY GAS AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH FUEL IS PRIMARY. DESIGN CAPACITY IS 51.0 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.25	LB/MMBTU		0.25	LB/MMBTU	
AK-0037	KENAI REFINERY	POWERFORMER PREHEATER, H203	27.9	MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH FUEL IS PRIMARY. DESIGN CAPACITY IS 27.9 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.25	LB/MMBTU		0.25	LB/MMBTU	
AK-0037	KENAI REFINERY	HOT OIL HEATER, H609	56	MMBTU/H	* SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LPG. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 56 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.25	LB/MMBTU		0.25	LB/MMBTU	
AK-0037	KENAI REFINERY	DUCT BURNER FOR STEAM GENERATION, E-1400	36.5	MMBTU/H	*SOURCE BURNS NATURAL GAS, LIQUID PETROLEUM GAS, AND DIESEL. NO INDICATION IS PROVIDED AS TO WHICH FUEL IS PRIMARY. SCC AND PROCESS CODES ARE APPLICABLE WHEN BURNING NATURAL GAS. THE DESIGN CAPACITY IS 36.5 MMBTU/HR AND THE AUTHORIZED CAPACITY IS 1 MMBTU/H. THE OPERATING LIMIT FOR THE SOLAR CENTAUR TURBINE AND DUCT BURNER COMBINATION (CT/E-1400) IS 438 H/YR WHEN BURNING DIESEL FUEL.	NONE INDICATED.	11.3	LB/H	BURNING NATURAL GAS,			NOT AVAILABLE

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And Process Contains 'Heater'
Pollutant: Nitrogen Oxides (NOx)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	DUCT BURNER FOR STEAM GENERATION, E-1410	36.5	MMBTU/H	*SOURCE BURNS LIQUID PETROLEUM GAS, NATURAL GAS, AND DIESEL. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. OPERATING LIMIT FOR THE COMBINATION OF THE SOLAR CENTAUR TURBINE & DUCT BURNER WHEN BURNING DIESEL FUEL IS 438 H PER YEAR. SCC AND PROCESS CODES ARE APPLICABLE WHEN BURNING NATURAL GAS. THE DESIGN CAPACITY IS 36.5 MMBTU/H.	NONE INDICATED.	11.3	LB/H	BURNING NATURAL GAS			NOT AVAILABLE
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-NO.4 REACTOR FEED HEATER	49	MMBTU/H		SCR	1.8	LB/H	SEE NOTES	0.04	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-REFORMATE STABILIZER REBOILER	54.77	MMBTU/H	EMISSION POINT NO. BTU-HF107.	SCR	2	LB/H	SEE NOTES	0.037	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	BTU- NO.3 REACTOR FEED HEATER	58.95	MMBTU/H	EMISSION POINT NO. BTU-HF105.	SCR	2.1	LB/H	SEE NOTES	0.036	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-NO.2 REACTOR FEED HEATER	69.68	MMBTU/H	EMISSION POINT NO. BTU-HF104	SCR	2.5	LB/H	SEE NOTES	0.036	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II EAST REACTOR FEED HEATER	75	MMBTU/H	EMISSION POINT NO. ISOMII-F5.	SCR	2.7	LB/H	SEE NOTES	0.036	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II COMBINATION SPLITTER HEATER	77.62	MMBTU/H		SCR	2.8	LB/H	SEE NOTES	0.036	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II XYLENE RERUN TOWER HEATER	83.7	MMBTU/H		SCR	3	LB/H	SEE NOTES	0.036	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	ORTHOXYLENE I HEATER	96.23	MMBTU/H	EMISSION POINT NO. ORTHOI-H1.	SCR	3.5	LB/H	SEE NOTES	0.036	LB/MMBTU	CALCULATED
*LA-0213	ST. CHARLES REFINERY	HEATERS 2004-1 - 2004-4, 2005-4, 2005-8, 2005-9, 2005-23, 2005-24, 2005-35, & 2005-36; REBOILERS 2005-5, 2005-6, 2005-7, 2005-12, 2005-27			2004-1: 86 MM BTU/HR 2004-2: 24 MM BTU/HR 2004-3: 52 MM BTU/HR 2004-4: 86 MM BTU/HR 2005-5: 95 MM BTU/HR 2005-6: 95 MM BTU/HR 2005-7: 95 MM BTU/HR 2005-8: 95 MM BTU/HR 2005-9: 42 MM BTU/HR 2005-12: 95 MM BTU/HR 2005-23: 95 MM BTU/HR 2005-24: 42 MM BTU/HR 2005-27: 95 MM BTU/HR 2005-35: 38 MM BTU/HR 2005-36: 15 MM BTU/HR SOURCES ALSO FIRE NATURAL GAS.	ULTRA LOW NOX BURNERS	0.04	LB/MMBTU	THREE 1-HOUR TEST AVERAGE			
LA-0121	CONVENT REFINERY	H-OIL TRANSPORT HEATER	21	MMBTU/H	EMISSION POINT 70H-501	ULTRA LOW NOX BURNERS	0.84	LB/H		0.04	LB/MMBTU	CALCULATED

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And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Nitrogen Oxides (NOx)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
LA-0121	CONVENT REFINERY	H-OIL ATM. TOWER HEATER	29.4	MMBTU/H	EMISSION POINT 70H-301.	ULTRA LOW NOX BURNERS	1.18	LB/H		0.04	LB/MMBTU	CALCULATED
LA-0119	LAKE CHARLES REFINERY	HEATER, HYDRODESULFURIZATION 7 (H-3232)	23	MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS	ULTRA LOW NOX BURNERS	1.4	LB/H	HOURLY MAXIMUM	0.06	LB/MMBTU	
LA-0119	LAKE CHARLES REFINERY	HEATER, HYDRODESULFURIZATION 7 (H-3201)	23	MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS	ULTRA LOW NOX BURNERS	1.4	LB/H	HOURLY MAXIMUM	0.06	LB/MMBTU	
LA-0119	LAKE CHARLES REFINERY	HEATER, HYDRODESULFURIZATION 4 (H-1201)	36.6	MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS	ULTRA LOW NOX BURNERS	2.2	LB/H	HOURLY MAXIMUM	0.06	LB/MMBTU	
LA-0119	LAKE CHARLES REFINERY	HEATER, HYDRODESULFURIZATION 4 (H-1202)	60	MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS	ULTRA LOW NOX BURNERS	3.6	LB/H	HOURLY MAXIMUM	0.06	LB/MMBTU	
LA-0119	LAKE CHARLES REFINERY	PETROLEUM REFINING, HEATER, VACUUM UNIT 3 (H-1103)	100	MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS.	ULTRA LOW NOX BURNERS	6	LB/H	HOURLY MAXIMUM	0.06	LB/MMBTU	
*LA-0211	GARYVILLE REFINERY	NAPHTHA HYDROTREATER REACTOR CHARGE HEATER (5-08), KHT REACTOR CHARGE HEATER (9-08), & HCU TRAIN 1&2 REACTOR CHARGE HEATERS (11-08 & 12-08)			5-08: 75.7 MMBTU/H 9-08: 73.8 MMBTU/H 11-08: 85.05 MMBTU/H 12-08: 85.05 MMBTU/H	ULTRA LOW NOX BURNERS (ULNB) WITHOUT AIR PREHEAT				0.03	LB/MMBTU	ANNUAL AVERAGE
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 HYDROTREATER REBOILER HEATER	32.7	MMBTU/H			1.48	LB/H		0.05	LB/MMBTU	CALCULATED
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 REBOILER STABILIZER REBOILER HEATER	45.7	MMBTU/H			2.06	LB/H		0.05	LB/MMBTU	
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 REFORMER STABILIZER REPOILER HEATER	20	MMBTU/H			2.4	LB/H		0.12	LB/MMBTU	CALCULATED
*LA-0211	GARYVILLE REFINERY	THERMAL DRYING UNIT HEATEC HEATER (124-1-91)	9.6	MM BTU/H	UNIT DESTROYS VAPORS CREATED BY THE THERMAL DRYING UNT, WHICH HEATS SOLIDS SEGREGATED FROM WASTEWATER BY THE API SEPARATORS.							

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And Process Contains 'Heater'
Pollutant: Particulate Matter

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
LA-0119	LAKE CHARLES REFINERY	PETROLEUM REFINING, HEATER, VACUUM UNIT 3 (H-1103)	100	MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS.	GOOD COMBUSTION PRACTICES AND USING CLEAN GASEOUS FUELS.	0.8	LB/H	HOURLY MAXIMUM			
LA-0119	LAKE CHARLES REFINERY	HEATER, HYDRODESULFURIZATION 7 (H-3232)	23	MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS	GOOD COMBUSTION PRACTICES, USE CLEAN GASEOUS FUEL	0.2	LB/H	HOURLY MAXIMUM	0.009	LB/MMBTU	CALCULATED BY CATC
LA-0119	LAKE CHARLES REFINERY	HEATER, HYDRODESULFURIZATION 4 (H-1201)	36.6	MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS	GOOD COMBUSTION PRACTICES, USE CLEAN GASEOUS FUEL	0.3	LB/H	HOURLY MAXIMUM			
LA-0119	LAKE CHARLES REFINERY	HEATER, HYDRODESULFURIZATION 4 (H-1202)	60	MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS	GOOD COMBUSTION PRACTICES, USE CLEAN GASEOUS FUEL	0.5	LB/H	HOURLY MAXIMUM	0.008	LB/MMBTU	CALCULATED BY CATC
LA-0119	LAKE CHARLES REFINERY	HEATER, HYDRODESULFURIZATION 7 (H-3201)	23	MMBTU/H	HEATER BURNS NATURAL GAS AND REFINERY OFF GAS	GOOD COMBUSTION PRACTICES, USE CLEAN GASEOUS FUEL	1.1	LB/H*		0.046	LB/MMBTU	CALCULATED BY CATC
TX-0375	LYONDELL - CITGO REFINING, LP	BENZENE STABILIZER HEATER	38.34	MMBTU/H	EMISSION PT. NO. ARU-H501	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	0.29	LB/H		0.007	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-NO.4 REACTOR FEED HEATER	49	MMBTU/H		LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	0.63	LB/H	SEE NOTES	0.013	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-REFORMATE STABILIZER REBOILER	54.77	MMBTU/H	EMISSION POINT NO. BTU-HF107.	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	0.7	LB/H	SEE NOTES	0.013	LB/MMBTU	CALCULATED

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Particulate Matter

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
TX-0375	LYONDELL - CITGO REFINING, LP	BTU- NO.3 REACTOR FEED HEATER	58.95	MMBTU/H	EMISSION POINT NO. BTU-HF105.	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	0.75	LB/H	SEE NOTES	0.013	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-NO.2 REACTOR FEED HEATER	69.68	MMBTU/H	EMISSION POINT NO. BTU-HF104	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	0.89	LB/H	SEE NOTES	0.013	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II EAST REACTOR FEED HEATER	75	MMBTU/H	EMISSION POINT NO. ISOMII-F5.	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	0.96	LB/H	SEE NOTES	0.013	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II COMBINATION SPLITTER HEATER	77.62	MMBTU/H		LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	0.99	LB/H	SEE NOTES	0.013	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II XYLENE RERUN TOWER HEATER	83.7	MMBTU/H		LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	1.06	LB/H	SEE NOTES	0.013	LB/MMBTU	CALCULATED

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And Process Contains 'Heater'
Pollutant: Particulate Matter

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
TX-0375	LYONDELL - CITGO REFINING, LP	ORTHOXYLENE I HEATER	96.23	MMBTU/H	EMISSION POINT NO. ORTHOI-H1.	LOW SULFUR CONTENT FUEL: USE REFINERY FUEL GAS WITH NO MORE THAN 0.1 GR/DSCF H2S OR USE NATURAL GAS WITH NO MORE THAN 0.25 GR/100 DSCF H2S AND NO MORE THAN 5.0 GR/100 DSCF TOTAL S.	1.23	LB/H	SEE NOTES	0.013	LB/MMBTU	CALCULATED
AK-0037	KENAI REFINERY	HYDROCRACKER RECYCLE GAS HEATER, H401	38.9	MMBTU/H	* EMISSION POINT BURNS REFINERY GAS, NATURAL GAS, AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS PRIMARY FUEL. DESIGN THROUGPUT IS 38.9 MMBTU/H. AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR NOT TO EXCEED 6% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	NONE INDICATED	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	HYDROCRACKER STABILIZER REBOILER, H404	64.4	MMBTU/H	* SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 64.4 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR IS NOT TO EXCEED 6% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	NONE INDICATED	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	HOT OIL HEATER, H609	56	MMBTU/H	* SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LPG. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 56 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED	0.005	LB/MMBTU		0.005	LB/MMBTU	

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And Process Contains 'Heater'
Pollutant: Particulate Matter

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	#1 REHEATER STARTUP BURNER, H1102	1.65	MMBTU/H	*SOURCE BURNS NATURAL GAS, LPG, AND REFINERY GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.65 MMBTU/H.	NONE INDICATED	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	#3 REHEATER STARTUP BURNER, H1104	1.05	MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.05 MMBTU/H.	NONE INDICATED	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	#4 REHEATER STARTUP BURNER, H1106	1.9	MMBTU/H	* SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.90 MMBTU/H.	NONE INDICATED	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	POWERFORMER PREHEATER, H201	31.8	MMBTU/H	DESIGN CAPACITY IS 31.8 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. *SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	POWERFORMER PREHEATER, H202	51	MMBTU/H	*SOURCE ALSO BURNS REFINERY GAS AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH FUEL IS PRIMARY. DESIGN CAPACITY IS 51.0 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	

RBLC Matching Facilities for Search Criteria:
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And Process Contains 'Heater'
Pollutant: Particulate Matter

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	POWERFORMER PREHEATER, H203	27.9	MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH FUEL IS PRIMARY. DESIGN CAPACITY IS 27.9 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	POWERFORMER REHEATER, H204	53.8	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS GIVEN AS TO WHICH IS PRIMARY. DESIGN CAPACITY IS 53.8 MMBTU/H, AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. FUEL IS NOT SPECIFIED. OPERATING LIMIT PER YEAR NOT TO EXCEED 7% O2 AS MEASURED IN EXHAUST GAS BY CEMS.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	POWERFORMER REHEATER, H205	48.8	MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS PRIMARY. DESIGN CAPACITY IS 48.8 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. NOT TO EXCEED 7% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	

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And Process Contains 'Heater'
Pollutant: Particulate Matter

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	HYDROCRACKER RECYCLE GAS HEATER, H402	38	MMBTU/H	* THIS SOURCE BURNS NATURAL GAS, LPG AND REFINERY GAS. NO INOFORMATION IS PROVIDED AS TO WHICH FUEL TYPE IS PRIMARY. DESIGN CAPACITY IS 38 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR NOT TO EXCEED 6% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	HYDROCRACKER FRACTIONATER REBOILER, H403	50	MMBTU/H	* SOURCE BURNS NATURAL GAS, LPG, AND REFINERY GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 50 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR NOT TO EXCEED 6% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	RESIDUAL OIL HEATER, H612	22.2	MMBTU/H	* SOURCE BURNS NATURAL GAS AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 22.2 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR IS 125 HOURS.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	FIRED STEAM GENERATOR, H701	36.55	MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS; IT IS NOT SPECIFIED WHICH FUEL IS PRIMARY. DESIGN CAPACITY IS 36.55 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	

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And Process Contains 'Heater'
Pollutant: Particulate Matter

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	FIRED STEAM GENERATOR, H702	36.55	MMBTU/H	*SOURCE BURNS NATURL GAS, REFINERY GAS, AND LPG. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 36.55 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	NATURAL GAS SUPPLY HEATER, H704	2	MMBTU/H	*SOURCE BURNS NATURAL GAS AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 2.0 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	FIRED STEAM GENERATOR, H801	32	MMBTU/H	* SOURCE BURNS NATURAL GAS AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 32 MMBTU/H, BUT THIS AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	HOT GLYCOL HEATER, H802	10.8	MMBTU/H	* SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 10.8 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	REACTION FURNACE BURNER, H1101	5.2	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 5.2 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	

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RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	#2 REHEATER STARTUP BURNER, H1103	1.15	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.15 MMBTU/H.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	TAIL GAS BURNER, H1105	2	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY OF SOURCE IS 2.00 MMBTU/H.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	PRIP ABSORBER FEED FURNACE, H1201/1203	10.4	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 10.4 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	PRIP RECYCLER H2 FURNACE, H1202	11.2	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 11.2 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	
AK-0037	KENAI REFINERY	VACUUM TOWER HEATER, H1701	91	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 91 MMBTU/H.	NONE INDICATED.	0.005	LB/MMBTU		0.005	LB/MMBTU	

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RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	DUCT BURNER FOR STEAM GENERATION, E1400	36.5	MMBTU/H	*SOURCE BURNS NATURAL GAS, DIESEL FUEL, AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH FUEL IS PRIMARY, BUT SCC CODE IS FOR A NATURAL GAS DUCT BURNER. DESIGN CAPACITY IS 36.5 MMBTU/H.	NONE INDICATED.				0.014	LB/MMBTU	
AK-0037	KENAI REFINERY	DUCT BURNER FOR STEAM GENERATION, E1410	36.5	MMBTU/H	*SOURCE BURNS NATURAL GAS, DIESEL, AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS PRIMARY FUEL. SCC CODE PROVIDED HERE IS APPLICABLE TO NATURAL GAS. DESIGN CAPACITY IS 36.5 MMBTU/.	NONE INDICATED.				0.014	LB/MMBTU	
PA-0231	UNITED REFINERY CO.	FCC FEED HYDROTREATER HEATER	91	MMBTU/H	The unit is subject to the NSPS 40 CFR Subpart J, Subpart GGG, Subpart QQQ. The unit is also subject to MACT standards in 40 CFR 63 Subpart CC, and NESHAP requirements in 40 CFR 61 Subpart FF.	GOOD COMBUSTION PRACTICE	0.09	LB/H		0.001	LB/MMBTU	Calculated using heat input
LA-0121	CONVENT REFINERY	H-OIL TRANSPORT HEATER	21	MMBTU/H	EMISSION POINT 70H-501	GOOD COMBUSTION PRACTICES	0.16	LB/H		0.02	LB/MMBTU	
LA-0121	CONVENT REFINERY	H-OIL ATM. TOWER HEATER	29.4	MMBTU/H	EMISSION POINT 70H-301.	GOOD COMBUSTION PRACTICES	0.22	LB/H		0.02	LB/MMBTU	
LA-0128	CONVENT REFINERY	HTU-1 KEROSENE CHARGE HEATER	68	MMBTU/H	EMISSION POINT 3F-402	GOOD COMBUSTION PRACTICES	0.49	LB/H		0.02	LB/MMBTU	
*LA-0211	GARYVILLE REFINERY	NAPHTHA HYDROTREATER REACTOR CHARGE HEATER (5-08), KHT REACTOR CHARGE HEATER (9-08), & HCU TRAIN 1&2 REACTOR CHARGE HEATERS (11-08 & 12-08)			5-08: 75.7 MMBTU/H 9-08: 73.8 MMBTU/H 11-08: 85.05 MMBTU/H 12-08: 85.05 MMBTU/H	PROPER DESIGN, OPERATION, AND GOOD ENGINEERING PRACTICES				0.008	LB/MMBTU	3-HOUR AVERAGE

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And Process Contains 'Heater'
Pollutant: Particulate Matter

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
*LA-0213	ST. CHARLES REFINERY	HEATERS 2004-1 - 2004-4, 2005-4, 2005-8, 2005-9, 2005-23, 2005-24, 2005-35, & 2005-36; REBOILERS 2005-5, 2005-6, 2005-7, 2005-12, 2005-27			2004-1: 86 MM BTU/HR 2004-2: 24 MM BTU/HR 2004-3: 52 MM BTU/HR 2004-4: 86 MM BTU/HR 2005-5: 95 MM BTU/HR 2005-6: 95 MM BTU/HR 2005-7: 95 MM BTU/HR 2005-8: 95 MM BTU/HR 2005-9: 42 MM BTU/HR 2005-12: 95 MM BTU/HR 2005-23: 95 MM BTU/HR 2005-24: 42 MM BTU/HR 2005-27: 95 MM BTU/HR 2005-35: 38 MM BTU/HR 2005-36: 15 MM BTU/HR SOURCES ALSO FIRE NATURAL GAS.	PROPER EQUIPMENT DESIGN AND OPERATION, GOOD COMBUSTION PRACTICES, AND USE OF GASEOUS FUELS	0.0074	LB/MM BTU	ANNUAL AVERAGE			
*LA-0213	ST. CHARLES REFINERY	CPF HEATER H-30-03, H-39-01, & H-39-02 (94-28, 94-29, & 94-30)			H-30-03: 68 MM BTU/HR H-39-01: 75 MM BTU/HR H-39-02: 90 MM BTU/HR SOURCES ALSO FIRE NATURAL GAS.	PROPER EQUIPMENT DESIGN AND OPERATION, GOOD COMBUSTION PRACTICES, AND USE OF GASEOUS FUELS	0.0074	LB/MM BTU	ANNUAL AVERAGE			
*LA-0213	ST. CHARLES REFINERY	F-33-05 (94-21)	48	MMBTU/H	SOURCE ALSO FIRES NATURAL GAS.	PROPER EQUIPMENT DESIGN AND OPERATION, GOOD COMBUSTION PRACTICES, AND USE OF GASEOUS FUELS	0.56	LB/H	HOURLY MAXIMUM			
LA-0193	STYRENE MONOMER PLANT	REGENERATION GAS HEATER HS-2102	14.4	MMBTU/H		USE OF CLEAN BURNING FUELS (NATURAL GAS)	0.11	LB/H	HOURLY MAXIMUM	0.01	LB/MMBTU	ANNUAL AVERAGE
LA-0193	STYRENE MONOMER PLANT	PEB RECOVERY COLUMN HEATER HS-2105	25.2	MMBTU/H		USE OF CLEAN BURNING FUELS (NATURAL GAS)	0.19	LB/H	HOURLY MAXIMUM	0.01	LB/MMBTU	ANNUAL AVERAGE
AZ-0046	ARIZONA CLEAN FUELS YUMA	HYDROCRACKER UNIT CHARGE HEATER	70	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-10200		0.0075	LB/MMBTU	THREE-HOUR AVG	0.008	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	NAPHTHA HYDROTREATER CHARGE HEATER	21.4	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-04200		0.0075	LB/MMBTU	THREE-HOUR AVG	0.008	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT DEBUTANIZER REBOILER	23.2	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # B-05609		0.0075	LB/MMBTU	3-HR AVERAGE			NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	DISTILLATE HYDROTREATER CHARGE HEATER	25	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # B-08200		0.0075	LB/MMBTU	3-HR AVERAGE	0.008	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	DELAYED COKING UNIT CHARGE HEATER NOS. 1 AND 2	99.5	MMBTU/H	THESE TWO PEICES OF EQUIPMENT ARE IDENTIFIED BY ID #S B-14110A AND B-14110B		0.0075	LB/MMBTU	3-HR AVERAGE	0.008	LB/MMBTU	
AZ-0046	ARIZONA CLEAN FUELS YUMA	SPRAY DRYER HEATER	44	MMBTU/H	EQUIPMENT IDENTIFIED BY ID # E-26502		0.0075	LB/MMBTU	3-HR AVERAGE	0.008	LB/MMBTU	
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 REFORMER STABILIZER REPOILER HEATER	20	MMBTU/H			0.2	LB/H				
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 HYDROTREATER REBOILER HEATER	32.7	MMBTU/H			0.35	LB/H				
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 REBOILER STABILIZER REBOILER HEATER	45.7	MMBTU/H			0.49	LB/H				

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Particulate Matter

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
*LA-0211	GARYVILLE REFINERY	THERMAL DRYING UNIT HEATEC HEATER (124-1-91)	9.6	MM BTU/H	UNIT DESTROYS VAPORS CREATED BY THE THERMAL DRYING UNT, WHICH HEATS SOLIDS SEGREGATED FROM WASTEWATER BY THE API SEPARATORS.							

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Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Sulfur Dioxide (SO_2)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	POWERFORMER REHEATER, H205	48.8	MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS PRIMARY. DESIGN CAPACITY IS 48.8 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. NOT TO EXCEED 7% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	A PRORATED CONCENTRATION OF THE FOLLOWING FUEL LIMITS IS CONSIDERED BACT: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LPG, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			
AZ-0046	ARIZONA CLEAN FUELS YUMA	DELAYED COKING UNIT CHARGE HEATER NOS. 1 AND 2	99.5	MMBTU/H	THESE TWO PEICES OF EQUIPMENT ARE IDENTIFIED BY ID #S B-14110A AND B-14110B	FUEL LIMITED TO 35 PPM S.	35	PPMV	DAILY AVERAGE			NOT AVAILABLE
AK-0037	KENAI REFINERY	#1 REHEATER STARTUP BURNER, H1102	1.65	MMBTU/H	*SOURCE BURNS NATURAL GAS, LPG, AND REFINERY GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.65 MMBTU/H.	FUEL SULFUR CONTENT IS LIMITED ACCORDING TO THE FOLLOWING: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% H2S; LPG, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			
AK-0037	KENAI REFINERY	RESIDUAL OIL HEATER, H612	22.2	MMBTU/H	* SOURCE BURNS NATURAL GAS AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 22.2 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR IS 125 HOURS.	FUEL SULFUR CONTENT IS LIMITED AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LPG, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			
AK-0037	KENAI REFINERY	HOT GLYCOL HEATER, H802	10.8	MMBTU/H	* SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 10.8 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LIQUIFED PETROLEUM GAS, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Sulfur Dioxide (SO_2)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	FIRED STEAM GENERATOR, H801	32	MMBTU/H	* SOURCE BURNS NATURAL GAS AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 32 MMBTU/H, BUT THIS AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LIQUIFIED PETROLEUM GAS, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.	500	PPM	AVERAGED OVER 3 HOURS			
AK-0037	KENAI REFINERY	#3 REHEATER STARTUP BURNER, H1104	1.05	MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.05 MMBTU/H.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LIQUIFIED PETROLEUM GAS, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			
AK-0037	KENAI REFINERY	TAIL GAS BURNER, H1105	2	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY OF SOURCE IS 2.00 MMBTU/H.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LIQUIFIED PETROLEUM GAS, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			
AK-0037	KENAI REFINERY	#4 REHEATER STARTUP BURNER, H1106	1.9	MMBTU/H	* SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.90 MMBTU/H.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LIQUIFIED PETROLEUM GAS, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			
AK-0037	KENAI REFINERY	PRIP RECYCLER H2 FURNACE, H1202	11.2	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 11.2 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LIQUIFIED PETROLEUM GAS, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			

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Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Sulfur Dioxide (SO_2)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	VACUUM TOWER HEATER, H1701	91	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 91 MMBTU/H.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LIQUIFIED PETROLEUM GAS, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			
AK-0037	KENAI REFINERY	DUCT BURNER FOR STEAM GENERATION, E-1400	36.5	MMBTU/H	*SOURCE BURNS NATURAL GAS, LIQUID PETROLEUM GAS, AND DIESEL. NO INDICATION IS PROVIDED AS TO WHICH FUEL IS PRIMARY. SCC AND PROCESS CODES ARE APPLICABLE WHEN BURNING NATURAL GAS. THE DESIGN CAPACITY IS 36.5 MMBTU/HR AND THE AUTHORIZED CAPACITY IS 1 MMBTU/H. THE OPERATING LIMIT FOR THE SOLAR CENTAUR TURBINE AND DUCT BURNER COMBINATION (CT/E-1400) IS 438 H/YR WHEN BURNING DIESEL FUEL.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LIQUIFIED PETROLEUM GAS, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.				500	PPM @ 15%	ASSUMED 15% O2
AK-0037	KENAI REFINERY	REACTION FURNACE BURNER, H1101	5.2	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 5.2 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LPG, 0.01% SULFUR; REFINERY GAS 168 PPMV H2S.			SEE POLLUTANT NOTES			
AK-0037	KENAI REFINERY	HYDROCRACKER FRACTIONATER REBOILER, H403	50	MMBTU/H	* SOURCE BURNS NATURAL GAS, LPG, AND REFINERY GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 50 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR NOT TO EXCEED 6% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LPG, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Sulfur Dioxide (SO_2)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	HYDROCRACKER STABILIZER REBOILER, H404	64.4	MMBTU/H	* SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 64.4 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR IS NOT TO EXCEED 6% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LPG, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			
AK-0037	KENAI REFINERY	#2 REHEATER STARTUP BURNER, H1103	1.15	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 1.15 MMBTU/H.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LPG, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			
AK-0037	KENAI REFINERY	PRIP ABSORBER FEED FURNACE, H1201/1203	10.4	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS; NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 10.4 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LPG, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			
AK-0037	KENAI REFINERY	DUCT BURNER FOR STEAM GENERATION, E-1410	36.5	MMBTU/H	*SOURCE BURNS LIQUID PETROLEUM GAS, NATURAL GAS, AND DIESEL. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. OPERATING LIMIT FOR THE COMBINATION OF THE SOLAR CENTAUR TURBINE & DUCT BURNER WHEN BURNING DIESEL FUEL IS 438 H PER YEAR. SCC AND PROCESS CODES ARE APPLICABLE WHEN BURNING NATURAL GAS. THE DESIGN CAPACITY IS 36.5 MMBTU/H.	FUEL SULFUR CONTENT LIMITS AS FOLLOWS: DIESEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LIQUEFIED PETROLEUM GAS, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.				500	PPM @ 15%	ASSUMED @ 15% O2

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And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Sulfur Dioxide (SO_2)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	NATURAL GAS SUPPLY HEATER, H704	2	MMBTU/H	*SOURCE BURNS NATURAL GAS AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 2.0 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	FUEL SULFUR EONTENT LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LIQUIFED PETROLEUM GAS, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.	500	PPM	AVERAGED OVER 3 HOURS			
AK-0037	KENAI REFINERY	HYDROCRACKER RECYCLE GAS HEATER, H401	38.9	MMBTU/H	* EMISSION POINT BURNS REFINERY GAS, NATURAL GAS, AND LPG; NO INDICATION IS PROVIDED AS TO WHICH IS PRIMARY FUEL. DESIGN THROUGPUT IS 38.9 MMBTU/H. AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR NOT TO EXCEED 6% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	FUEL SULFUR LIMITS AS FOLLOWS IS CONSIDERED BACT: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LPG, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			
TX-0375	LYONDELL - CITGO REFINING, LP	BENZENE STABILIZER HEATER	38.34	MMBTU/H	EMISSION PT. NO. ARU-H501	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	1	LB/H		0.026	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-NO.4 REACTOR FEED HEATER	49	MMBTU/H		LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	1.3	LB/H		0.027	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-REFORMATE STABILIZER REBOILER	54.77	MMBTU/H	EMISSION POINT NO. BTU-HF107.	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	1.4	LB/H		0.026	LB/MMBTU	CALCULATED

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Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Sulfur Dioxide (SO_2)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
TX-0375	LYONDELL - CITGO REFINING, LP	BTU- NO.3 REACTOR FEED HEATER	58.95	MMBTU/H	EMISSION POINT NO. BTU-HF105.	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	1.5	LB/H		0.025	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-NO.2 REACTOR FEED HEATER	69.68	MMBTU/H	EMISSION POINT NO. BTU-HF104	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	1.8	LB/H		0.025	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II EAST REACTOR FEED HEATER	75	MMBTU/H	EMISSION POINT NO. ISOMII-F5.	LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	1.9	LB/H		0.025	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II COMBINATION SPLITTER HEATER	77.62	MMBTU/H		LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	2	LB/H		0.026	LB/MMBTU	CALCULATED
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II XYLENE RERUN TOWER HEATER	83.7	MMBTU/H		LOW S FUEL: FUEL GAS WITH H2S CONTENT NO MORE THAN 0.1 GR/DSCF OVER A 3 H ROLLING BASIS, OR NATURAL GAS WITH H2S CONTENT NO MORE THAN 0.25 GR/100 DSCF AND TOTAL S CONTENT NO MORE THAN 5.0 GR/ 100 DSCF.	2.2	LB/H		0.026	LB/MMBTU	CALCULATED

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And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Sulfur Dioxide (SO_2)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
TX-0375	LYONDELL - CITGO REFINING, LP	ORTHOXYLENE I HEATER	96.23	MMBTU/H	EMISSION POINT NO. ORTHOI-H1.	LOW SULFUR CONTENT FUEL: USE REFINERY FUEL GAS WITH NO MORE THAN 0.1 GR/DSCF H2S OR USE NATURAL GAS WITH NO MORE THAN 0.25 GR/100 DSCF H2S AND NO MORE THAN 5.0 GR/100 DSCF TOTAL S.	2.5	LB/H		0.026	LB/MMBTU	CALCULATED
LA-0149	LOUISIANA REFINING DIVISION	LGO HYDROCARBON CHARGE HEATER	69.4	MMBTU/H	THE PERMIT INDICATES HEATERS MAY BURN NATURAL GAS, REFINERY GAS, OR A COMBINATION OF THE TWO.	LOW SULFUR FUEL	2.78	LB/H		0.04	LB/MMBTU	CALCULATED
LA-0149	LOUISIANA REFINING DIVISION	HGO HYDROCARBON STRIPPER REBOILER	78	MMBTU/H	THE PERMIT INDICATES HEATERS MAY BURN NATURAL GAS, REFINERY GAS, OR A COMBINATION OF THE TWO.	LOW SULFUR FUEL	3.13	LB/H		0.04	LB/MMBTU	CALCULATED
LA-0149	LOUISIANA REFINING DIVISION	LGO HYDROCARBON STRIPPER REBOILER	62.1	MMBTU/H		LOW SULFUR FUELS	2.49	LB/H		0.04	LB/MMBTU	CALCULATED
LA-0149	LOUISIANA REFINING DIVISION	HGO HYDROCARBON CHARGE HEATER	98.8	MMBTU/H		LOW SULFUR FUELS	3.95	LB/H		0.04	LB/MMBTU	CALCULATED
PA-0231	UNITED REFINERY CO.	FCC FEED HYDROTREATER HEATER	91	MMBTU/H	The unit is subject to the NSPS 40 CFR Subpart J, Subpart GGG, Subpart QQQ. The unit is also subject to MACT standards in 40 CFR 63 Subpart CC, and NESHAP requirements in 40 CFR 61 Subpart FF.	LOW SULFUR REFINERY GAS	2.44	LB/H		0.027	LB/MMBTU	Calculated using heat input
AK-0037	KENAI REFINERY	HOT OIL HEATER, H609	56	MMBTU/H	* SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LPG. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 56 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED. SOURCE IS NOT SUBJECT TO BACT-PSD BECAUSE IT WAS INSTALLED PRIOR TO 1975.						
AK-0037	KENAI REFINERY	FIRED STEAM GENERATOR, H701	36.55	MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS; IT IS NOT SPECIFIED WHICH FUEL IS PRIMARY. DESIGN CAPACITY IS 36.55 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED. THIS SOURCE IS NOT SUBJECT TO BACT-PSD AS IT WAS INSTALLED PRIOR TO 1975.						

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Sulfur Dioxide (SO_2)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	FIRED STEAM GENERATOR, H702	36.55	MMBTU/H	*SOURCE BURNS NATURL GAS, REFINERY GAS, AND LPG. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL. DESIGN CAPACITY IS 36.55 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	NONE INDICATED. THIS SOURCE IS NOT SUBJECT TO BACT-PSD AS IT WAS INSTALLED PRIOR TO 1975.						
AZ-0046	ARIZONA CLEAN FUELS YUMA	CATALYTIC REFORMING UNIT DEBUTANIZER REBOILER	23.2	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # B-05609	S LIMIT OF 35 PPM.	35	PPMV	DAILY AVERAGE			NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	NAPHTHA HYDROTREATER CHARGE HEATER	21.4	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-04200	S LIMITED TO 35 PPM	35	PPMV	DAILY AVERAGE			NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	HYDROCRACKER UNIT CHARGE HEATER	70	MMBTU/H	THIS UNIT IS IDENTIFIED BY EQUIPMENT ID # B-10200	S LIMITED TO 35 PPM.	35	PPMV	DAILY			NOT AVAILABLE
AZ-0046	ARIZONA CLEAN FUELS YUMA	DISTILLATE HYDROTREATER CHARGE HEATER	25	MMBTU/H	THIS EQUIPMENT IDENTIFIED BY ID # B-08200	S LIMITED TO 35 PPM.	35	PPMV	DAILY AVERAGE			NOT AVAILABLE
AK-0037	KENAI REFINERY	POWERFORMER PREHEATER, H202	51	MMBTU/H	*SOURCE ALSO BURNS REFINERY GAS AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH FUEL IS PRIMARY. DESIGN CAPACITY IS 51.0 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	SOURCE IS NOT SUBJECT TO FUEL LIMITATIONS UNDER BACT-PSD BECAUSE IT WAS INSTALLED PRIOR TO 1975.						
AK-0037	KENAI REFINERY	POWERFORMER PREHEATER, H203	27.9	MMBTU/H	*SOURCE BURNS REFINERY GAS, NATURAL GAS, AND LIQUID PETROLEUM GAS, NO INDICATION IS PROVIDED AS TO WHICH FUEL IS PRIMARY. DESIGN CAPACITY IS 27.9 MMBTU/H, BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H.	SOURCE WAS INSTALLED PRIOR TO 1975 AND IS THEREFORE NOT SUBJECT TO PSD.						
AK-0037	KENAI REFINERY	POWERFORMER PREHEATER, H201	31.8	MMBTU/H	DESIGN CAPACITY IS 31.8 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. *SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS PROVIDED AS TO WHICH IS THE PRIMARY FUEL.	SOURCE WAS INSTALLED PRIOR TO 1975 SO IT IS NOT SUBJECT TO BACT-PSD.						

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Sulfur Dioxide (SO_2)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
AK-0037	KENAI REFINERY	POWERFORMER REHEATER, H204	53.8	MMBTU/H	*SOURCE BURNS NATURAL GAS, REFINERY GAS, AND LIQUID PETROLEUM GAS. NO INDICATION IS GIVEN AS TO WHICH IS PRIMARY. DESIGN CAPACITY IS 53.8 MMBTU/H, AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. FUEL IS NOT SPECIFIED. OPERATING LIMIT PER YEAR NOT TO EXCEED 7% O2 AS MEASURED IN EXHAUST GAS BY CEMS.	SULFUR CONTENT FUEL LIMITS AS FOLLOWS: DIESEL FUEL, 0.35% SULFUR, NATURAL GAS, 0.01% SULFUR; LPG, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			
AK-0037	KENAI REFINERY	HYDROCRACKER RECYCLE GAS HEATER, H402	38	MMBTU/H	* THIS SOURCE BURNS NATURAL GAS, LPG AND REFINERY GAS. NO INOFORMATION IS PROVIDED AS TO WHICH FUEL TYPE IS PRIMARY. DESIGN CAPACITY IS 38 MMBTU/H BUT AUTHORIZED RATED CAPACITY IS 1 MMBTU/H. OPERATING LIMIT PER YEAR NOT TO EXCEED 6% O2 AS MEASURED IN EXHAUST GAS BY REQUIRED CEMS.	THE FOLLOWING FUEL SULFUR CONTENT LIMITS ARE CONSIDERED BACT: DIESEL FUEL, 0.35% SULFUR; NATURAL GAS, 0.01% SULFUR; LPG, 0.01% SULFUR; REFINERY GAS, 168 PPMV H2S.			SEE POLLUTANT NOTES			
*LA-0211	GARYVILLE REFINERY	NAPHTHA HYDROTREATER REACTOR CHARGE HEATER (5-08), KHT REACTOR CHARGE HEATER (9-08), & HCU TRAIN 1&2 REACTOR CHARGE HEATERS (11-08 & 12-08)			5-08: 75.7 MMBTU/H 9-08: 73.8 MMBTU/H 11-08: 85.05 MMBTU/H 12-08: 85.05 MMBTU/H	USE OF LOW SULFUR REFINERY FUEL GAS				25	PPMV AS H	ANNUAL AVERAGE
*LA-0213	ST. CHARLES REFINERY	F-33-05 (94-21)	48	MMBTU/H	SOURCE ALSO FIRES NATURAL GAS.	USE OF PIPELINE QUALITY NATURAL GAS OR REFINERY FUEL GASES WITH AN H2S CONCENTRATION LESS THAN 100 PPMV (ANNUAL AVERAGE).	1.08	LB/H	HOURLY MAXIMUM			

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Sulfur Dioxide (SO_2)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
*LA-0213	ST. CHARLES REFINERY	HEATERS 2004-1 - 2004-4, 2005-4, 2005-8, 2005-9, 2005-23, 2005-24, 2005-35, & 2005-36; REBOILERS 2005-5, 2005-6, 2005-7, 2005-12, 2005-27			2004-1: 86 MM BTU/HR 2004-2: 24 MM BTU/HR 2004-3: 52 MM BTU/HR 2004-4: 86 MM BTU/HR 2005-5: 95 MM BTU/HR 2005-6: 95 MM BTU/HR 2005-7: 95 MM BTU/HR 2005-8: 95 MM BTU/HR 2005-9: 42 MM BTU/HR 2005-12: 95 MM BTU/HR 2005-23: 95 MM BTU/HR 2005-24: 42 MM BTU/HR 2005-27: 95 MM BTU/HR 2005-35: 38 MM BTU/HR 2005-36: 15 MM BTU/HR SOURCES ALSO FIRE NATURAL GAS.	USE OF PIPELINE QUALITY NATURAL GAS OR REFINERY FUEL GASES WITH AN H2S CONCENTRATION LESS THAN 100 PPMV (ANNUAL AVERAGE).			SEE NOTE			
*LA-0213	ST. CHARLES REFINERY	CPF HEATER H-30-03, H-39-01, & H-39-02 (94-28, 94-29, & 94-30)			H-30-03: 68 MM BTU/HR H-39-01: 75 MM BTU/HR H-39-02: 90 MM BTU/HR SOURCES ALSO FIRE NATURAL GAS.	USE OF PIPELINE QUALITY NATURAL GAS OR REFINERY FUEL GASES WITH AN H2S CONCENTRATION LESS THAN 100 PPMV (ANNUAL AVERAGE).			SEE NOTE			
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 REFORMER STABILIZER REPOILER HEATER	20	MMBTU/H			0.75	LB/H				
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 HYDROTREATER REBOILER HEATER.	32.7	MMBTU/H			1.23	LB/H				
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 REBOILER STABILIZER REBOILER HEATER	45.7	MMBTU/H			1.72	LB/H				
AZ-0046	ARIZONA CLEAN FUELS YUMA	SPRAY DRYER HEATER	44	MMBTU/H	EQUIPMENT IDENTIFIED BY ID # E-26502		35	PPMV	DAILY AVERAGE			NOT AVAILABLE
TX-0442	SHELL OIL DEER PARK	FOURTEEN HEATERS					300	PPM				
*LA-0211	GARYVILLE REFINERY	THERMAL DRYING UNIT HEATEC HEATER (124-1-91)	9.6	MMBTU/H	UNIT DESTROYS VAPORS CREATED BY THE THERMAL DRYING UNT, WHICH HEATS SOLIDS SEGREGATED FROM WASTEWATER BY THE API SEPARATORS.							

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Volatile Organic Compounds (VOC)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
PA-0231	UNITED REFINERY CO.	FCC FEED HYDROTREATER HEATER	91	MMBTU/H	The unit is subject to the NSPS 40 CFR Subpart J, Subpart GGG, Subpart QQQ. The unit is also subject to MACT standards in 40 CFR 63 Subpart CC, and NESHAP requirements in 40 CFR 61 Subpart FF.	GOOD COMBUSTION PRACTICE	0.49	LB/H				
TX-0375	LYONDELL - CITGO REFINING, LP	BENZENE STABILIZER HEATER	38.34	MMBTU/H	EMISSION PT. NO. ARU-H501	NONE INDICATED	0.21	LB/H				
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-NO.4 REACTOR FEED HEATER	49	MMBTU/H		NONE INDICATED	0.26	LB/H				
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-REFORMATE STABILIZER REBOILER	54.77	MMBTU/H	EMISSION POINT NO. BTU-HF107.	NONE INDICATED	0.3	LB/H				
TX-0375	LYONDELL - CITGO REFINING, LP	BTU- NO.3 REACTOR FEED HEATER	58.95	MMBTU/H	EMISSION POINT NO. BTU-HF105.	NONE INDICATED	0.32	LB/H				
TX-0375	LYONDELL - CITGO REFINING, LP	BTU-NO.2 REACTOR FEED HEATER	69.68	MMBTU/H	EMISSION POINT NO. BTU-HF104	NONE INDICATED	0.38	LB/H				
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II EAST REACTOR FEED HEATER	75	MMBTU/H	EMISSION POINT NO. ISOMII-F5.	NONE INDICATED	0.4	LB/H				
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II COMBINATION SPLITTER HEATER	77.62	MMBTU/H		NONE INDICATED	0.42	LB/H				
TX-0375	LYONDELL - CITGO REFINING, LP	ISOM II XYLENE RERUN TOWER HEATER	83.7	MMBTU/H		NONE INDICATED	0.45	LB/H				
TX-0375	LYONDELL - CITGO REFINING, LP	ORTHOXYLENE I HEATER	96.23	MMBTU/H	EMISSION POINT NO. ORTHOI-H1.	NONE INDICATED	0.52	LB/H				
*LA-0211	GARYVILLE REFINERY	NAPHTHA HYDROTREATER REACTOR CHARGE HEATER (5-08), KHT REACTOR CHARGE HEATER (9-08), & HCU TRAIN 1&2 REACTOR CHARGE HEATERS (11-08 & 12-08)			5-08: 75.7 MMBTU/H 9-08: 73.8 MMBTU/H 11-08: 85.05 MMBTU/H 12-08: 85.05 MMBTU/H	PROPER DESIGN, OPERATION, AND GOOD ENGINEERING PRACTICES				0.002	LB/MMBTU	3-HOUR AVERAGE
*LA-0213	ST. CHARLES REFINERY	CPF HEATER H-30-03, H-39-01, & H-39-02 (94-28, 94-29, & 94-30)			H-30-03: 68 MM BTU/HR H-39-01: 75 MM BTU/HR H-39-02: 90 MM BTU/HR SOURCES ALSO FIRE NATURAL GAS.	PROPER EQUIPMENT DESIGN AND OPERATION, GOOD COMBUSTION PRACTICES, AND USE OF GASEOUS FUELS	0.0054	LB/MM BTU	ANNUAL AVERAGE			
*LA-0213	ST. CHARLES REFINERY	F-33-05 (94-21)	48	MMBTU/H	SOURCE ALSO FIRES NATURAL GAS.	PROPER EQUIPMENT DESIGN AND OPERATION, GOOD COMBUSTION PRACTICES, AND USE OF GASEOUS FUELS	0.11	LB/H	HOURLY MAXIMUM			

RBLC Matching Facilities for Search Criteria:
Permit Date Between 1/1/1997 And 11/12/2007
And Process Type Contains "13.3": Commercial/Institutional-Size Boilers/Furnaces (100 million Btu/H or less); Gaseous Fuel & Gaseous Fuel Mixtures
And Process Contains 'Heater'
Pollutant: Volatile Organic Compounds (VOC)

RBLCID	FACILITYNAME	PROCESSNAME	THRU PUT	THRUPUT UNIT	PROCESSNOTES	CTRLDESC	EMIS LIMIT1	EMISLIMIT 1UNIT	EMISLIMIT1AVG TIMECONDITION	STDE MISS LIMIT	STDUNIT LIMIT	STDLIMIT AVGTIME CONDITION
*LA-0213	ST. CHARLES REFINERY	HEATERS 2004-1 - 2004-4, 2005-4, 2005-8, 2005-9, 2005-23, 2005-24, 2005-35, & 2005-36; REBOILERS 2005-5, 2005-6, 2005-7, 2005-12, 2005-27			2004-1: 86 MM BTU/HR 2004-2: 24 MM BTU/HR 2004-3: 52 MM BTU/HR 2004-4: 86 MM BTU/HR 2005-5: 95 MM BTU/HR 2005-6: 95 MM BTU/HR 2005-7: 95 MM BTU/HR 2005-8: 95 MM BTU/HR 2005-9: 42 MM BTU/HR 2005-12: 95 MM BTU/HR 2005-23: 95 MM BTU/HR 2005-24: 42 MM BTU/HR 2005-27: 95 MM BTU/HR 2005-35: 38 MM BTU/HR 2005-36: 15 MM BTU/HR SOURCES ALSO FIRE NATURAL GAS.	PROPER EQUIPMENT DESIGN AND OPERATION, GOOD COMBUSTION PRACTICES, AND USE OF GASEOUS FUELS				0.005	LB/MMBTU	ANNUAL AVERAGE
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 REFORMER STABILIZER REPOILER HEATER	20	MMBTU/H			0.08	LB/H				
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 HYDROTREATER REBOILER HEATER	32.7	MMBTU/H			0.13	LB/H				
TX-0395	DIAMOND SHAMROCK MCKEE PLANT	NO. 1 REBOILER STABILIZER REBOILER HEATER	45.7	MMBTU/H			0.18	LB/H				
*LA-0211	GARYVILLE REFINERY	THERMAL DRYING UNIT HEATEC HEATER (124-1-91)	9.6	MMBTU/H	UNIT DESTROYS VAPORS CREATED BY THE THERMAL DRYING UNT, WHICH HEATS SOLIDS SEGREGATED FROM WASTEWATER BY THE API SEPARATORS.							

BACT Analysis - Cost Evaluation

Emission Control Cost Evaluation - Process Heater NO_x Emissions

Definitions

TIC	total capital installed cost
HQ	heater capacity (GJ/hr)
BQ	burner heat release rate (GJ/hr)
NB	number of burners
AOC	annual operating cost
CF	capacity factor expressed in decimal form
CRF	capital recovery factor = [i(1+i)n]/[(1+i)n-1]

Conversions

1.06	Gigajoules (GJ) = 1 million British Thermal Units (MMBtu)
1.00018	USD = 1 CAD (10/3/07 http://www.currencysource.com/tables/USD/1X_USD.htm)
1.416	Inflation Factor (2007 2nd Q. implicit price deflator / 1991 Average implicit price deflator)
1.233	Inflation Factor (2007 2nd Q. implicit price deflator / 1998 Average implicit price deflator)

Assumptions

$6.28	Natural gas cost (USD/MMBtu - September 2007 per http://www.forecasts.org/natural-gas.htm)
0.1424	= CRF
119.532	Second Quarter 2007 USD implicit price deflator
96.9340	Average 1998 USD implicit price deflator
84.4398	Average 1991 USD implicit price deflator
	Mechanical draft process heater design

154	MMBtu/hr process heater
162.4777	= HQ
4	= NB (38.5 MMBtu/hr each)
50	horsepower motor for FGR
532.7	tons of ammonia required annually in SCR ($NH_3 + NO_x + O_2 \rightarrow N_2 + H_2O + CO_2$)
532.7	tons of annual uncontrolled NO_x emissions

24	MMBtu/hr process heater
25.3212	= HQ
3	= NB (8 MMBtu/hr each)
8	horsepower motor for FGR
29.6	tons of ammonia required annually in SCR ($NH_3 + NO_x + O_2 \rightarrow N_2 + H_2O + CO_2$)
29.6	tons of annual uncontrolled NO_x emissions

21	MMBtu/hr process heater
22.15605	= HQ
3	= NB (7 MMBtu/hr each)
8	horsepower motor for FGR
25.9	tons of ammonia required annually in SCR ($NH_3 + NO_x + O_2 \rightarrow N_2 + H_2O + CO_2$)
25.9	tons of annual uncontrolled NO_x emissions

20	MMBtu/hr process heater
21.101	= HQ
3	= NB (6.67 MMBtu/hr each)
8	horsepower motor for FGR
24.7	tons of ammonia required annually in SCR ($NH_3 + NO_x + O_2 \rightarrow N_2 + H_2O + CO_2$)
24.7	tons of annual uncontrolled NO_x emissions

References/Notes

Equations obtained from "Alternative Control Techniques Document - NO_x Emissions from Process Heaters" USEPA September 1993.

Equations yield estimates in average 1990 CAD. Results have been converted to USD utilizing the current rate of exchange and scaled up for inflation from 1991 to 2007 USD.

TIC amounts have been adjusted by the CRF prior to CE calculation.

NB estimates based on API Recommended Practice 535 - "Burners for Fired Heaters in General Refinery Service" sec 4.1.7 - Burner Liberation Typical Sizes.

SCR ductwork equations obtained from "EPA Air Pollution Control Cost Manual" Sixth Edition January 2002 EPA/452/B-02-001& William Vatavuk's "Total Annual Cost Spreadsheet Program for Straight Ductwork" [Results scaled up for inflation from 1998 to 2007 USD].

BACT Analysis - Cost Evaluation (cont.)

Low NOx Burners (50% Control)

Large Process Heater	Medium Process Heaters			
154 MMBtu/hr		**24 MMBtu/hr**	**21 MMBtu/hr**	**20 MMBtu/hr**
Capital Cost				
BQ = HQ/NB x (1.158 + 8/HQ)				
BQ = 49.0	BQ	12.4	11.2	10.8
TIC = 30,000 + HQ [5,230 - (622 x BQ) + (26.1 x BQ^2)]				
TIC $8,654,386	TIC	$84,902	$78,211	$76,487
Annual Operating Cost				
AOC = TIC x 2.75%				
AOC= $238,038	AOC	$2,335	$2,151	$2,104
Cost Effectiveness				
CE = ((TIC * CRF) + AOC) / tpy NO_x				
CE = **$5,521**	CE	**$975**	**$1,026**	**$1,052**

Ultra Low NOx Burners (75% Control)

Large Process Heater	Medium Process Heaters			
154 MMBtu/hr		**24 MMBtu/hr**	**21 MMBtu/hr**	**20 MMBtu/hr**
Capital Cost				
BQ = HQ/NB x (1.158 + 8/HQ)				
BQ = 49.0	BQ	12.4	11.2	10.8
TIC = 35,000 + HQ [5,230 - (622 x BQ) + (26.1 x BQ^2)]				
TIC $8,659,386	TIC	$89,902	$83,211	$81,487
Annual Operating Cost				
AOC = TIC x 2.75%				
AOC= $238,176	AOC	$2,473	$2,289	$2,241
Cost Effectiveness				
CE = ((TIC * CRF) + AOC) / tpy NO_x				
CE = **$3,683**	CE	**$688**	**$728**	**$747**

BACT Analysis - Cost Evaluation (cont.)

SCR (80% Control)

Large Process Heater		**Medium Process Heaters**		
154 MMBtu/hr		**24 MMBtu/hr**	**21 MMBtu/hr**	**20 MMBtu/hr**
Capital Cost				
TIC = 1,373,000 x ((HQ/48.5)^0.6) + 49,000 x (HQ/485)				
TIC = $2,859,212	TIC	$933,265	$861,236	$836,330
Annual Operating Cost				
NH_3 Cost				
NH_3 Cost = HQ x (lb NOx/MMBtu) x (1 mole NO_2/46 lb NO2) x (17 lb NH3/1 mole NH_3) x (mole NH_3/mole NOx) x ($0.125/lb NH_3) x (8,760 hr/yr) x CF				
NH_3 Cost = $82,001	NH_3	$12,779	$11,182	$10,649
Catalyst Replacement Cost				
CRC = 49,000 x (NQ/48.5) / 5 yr				
CRC = $46,483	CRC	$7,244	$6,339	$6,037
Electricity Cost				
EC = (0.3 kWh/ton NH_3) x (ton NH_3) x ($0.06/kWh) x CF				
EC = $107,033	EC	$5,947	$5,204	$4,963
Fuel Penalty Cost				
FP = (0.015) x HQ x 8,760 hr/yr x fuel cost $/MMBtu x CF				
FP = $170,847	FP	$26,625	$23,297	$22,188
Total Annual Operating Cost $406,363	Total	$52,596	$46,022	$43,837
Cost Effectiveness				
CE = ((TIC * CRF) + AOC) / tpy NO_x				
CE = **$1,909**	CE	**$7,833**	**$8,140**	**$8,245**

FGR (10% Control)

Large Process Heater		**Medium Process Heaters**		
154 MMBtu/hr		**24 MMBtu/hr**	**21 MMBtu/hr**	**20 MMBtu/hr**
Capital Cost				
TIC = 12,800 x (HQ)^0.6)				
TIC = $384,327	TIC	$125,984	$116,284	$112,929
Annual Operating Cost				
Electricity Cost				
EC = (motor hp) x (0.75 kW/hp) x (8,760 hr/yr) x ($0.06/kWh) x CF				
EC = $25,116	EC	$4,019	$4,019	$4,019
Cost Effectiveness				
CE = ((TIC * CRF) + AOC) / tpy NO_x				
CE = **$1,499**	CE	**$7,418**	**$7,945**	**$8,138**

BACT Analysis - Cost Evaluation (cont.)

LNB + FGR (55% Control)

Large Process Heater			Medium Process Heaters		
154 MMBtu/hr			**24 MMBtu/hr**	**21 MMBtu/hr**	**20 MMBtu/hr**
Total TIC	$9,038,713		$210,886	$194,496	$189,417
Total Annual Operating Cost	$263,154		$6,354	$6,170	$6,122
Cost Effectiveness					
CE = ((Total TIC x CRF) + AOC) / tons removed					
CE =	**$5,291**	CE	**$2,235**	**$2,377**	**$2,436**

ULNB + FGR (80% Control)

Large Process Heater			Medium Process Heaters		
154 MMBtu/hr			**24 MMBtu/hr**	**21 MMBtu/hr**	**20 MMBtu/hr**
Total TIC	$9,043,713		$215,886	$199,496	$194,417
Total Annual Operating Cost	$263,292		$6,491	$6,307	$6,260
Cost Effectiveness					
CE = ((Total TIC x CRF) + AOC) / tons removed					
CE =	**$3,640**	CE	**$1,572**	**$1,675**	**$1,718**

LNB + SCR (88% Control)

Large Process Heater			Medium Process Heaters		
154 MMBtu/hr			**24 MMBtu/hr**	**21 MMBtu/hr**	**20 MMBtu/hr**
Total TIC	$11,513,598		$1,018,167	$939,447	$912,817
Total Annual Operating Cost	$644,401		$54,931	$48,173	$45,941
Cost Effectiveness					
CE = ((Total TIC x CRF) + AOC) / tons removed					
CE =	**$4,872**	CE	**$7,675**	**$7,983**	**$8,094**

ULNB + SCR (95% Control)

Large Process Heater			Medium Process Heaters		
154 MMBtu/hr			**24 MMBtu/hr**	**21 MMBtu/hr**	**20 MMBtu/hr**
Total TIC	$11,518,598		$1,023,167	$944,447	$917,817
Total Annual Operating Cost	$644,539		$55,069	$48,310	$46,078
Cost Effectiveness					
CE = ((Total TIC x CRF) + AOC) / tons removed					
CE =	**$4,515**	CE	**$7,140**	**$7,429**	**$7,534**

BACT Analysis - Cost Evaluation (cont.)

Ducting all Process Heaters to Single SCR Located at Large Process Heater

Large & Medium Process Heaters Combined

Assumptions/Notes
Exhaust streams from the 3 medium process heaters can be ducted together
Design details such as duct velocity and pressure drop are not critical to cost estimates
Ductwork Costs have been adjusted for inflation
See attached spreadsheet for ductwork cost estimate

Capital Cost
TIC = 1,373,000 x ((HQ/48.5)^0.6) + 49,000 x (HQ/485)
TIC = $3,536,177.40
Ductwork = $73,568.40
Total = $3,609,745.79

Annual Operating Cost

NH_3 Cost

NH_3 Cost = HQ x (lb NOx/MMBtu) x (1 mole NO_2/46 lb NO_2) x (17 lb NH_3/1 mole NH_3) x (mole NH_3/mole NOx) x ($0.125/lb NH_3) x (8,760 hr/yr) x CF
NH_3 Cost = $116,611.13

Catalyst Replacement Cost
CRC = 49,000 x (HQ/48.5) / 5 yr
CRC = $66,102.31

Electricity Cost
EC = (0.3 kWh/ton NH_3) x (ton NH_3) x ($0.06/kWh) x CF
EC = $128,230.42

Fuel Penalty Cost
FP = (0.015) x HQ x 8,760 hr/yr x fuel cost $/MMBtu x CF
FP = $242,957.23

Ductwork Annual Cost Inputs
DAC = $10,925.51

Total Annual Operating Cost $564,826.61

Cost Effectiveness
CE = (TIC + AOC) / tpy NOx
CE = **$2,200.31**

TOTAL ANNUAL COST SPREADSHEET PROGRAM--STRAIGHT DUCTWORK [1]

COST BASE DATE: Second Quarter 1993 [2]

PPI (Fourth Quarter 1998--FINAL): [3]		100.8

INPUT PARAMETERS

-- Inlet stream flowrate (acfm):		18503
-- Duct velocity (ft/min): [4]		2000
-- Duct length (ft): [5]		400
-- Material of construction: [6]		Galv. CS sh.
-- Insulation thickness (in.): (text input) [7]		3
-- Duct design: [8]		Circ.-spiral
-- Cost equation parameters: [9]		
	a:	2.56
	b:	0.937
-- Cost equation form: [10]		1
-- Control system installation factor: [11] (if no system, enter '0')		0
-- Fan-motor combined efficiency (fraction):		0.60

DESIGN PARAMETERS

-- Duct diameter (in.):	41.2
-- Pressure drop (in. w.c.): [12]	0.442

CAPITAL COSTS

Equipment Cost ($)--base:	33,356
' ' ' --escalated:	36,827
Purchased Equipment Cost ($):	39,773
Total Capital Investment ($): [13]	59,660

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ANNUAL COST INPUTS

Operating factor (hours/year):	8760
Electricity price ($/kWhr):	0.060
Annual interest rate (fractional):	0.07
Ductwork economic life (years):	20
Capital recovery factor (system):	0.0944
Taxes, insurance, admin. factor:	0.04

ANNUAL COSTS

Item	Cost ($/yr)	Wt.Fact.
Electricity	842	0.095
Taxes, insurance, administrative	2,386	0.269
Capital recovery	5,631	0.636
Total Annual Cost	8,860	1.000

Notes:

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[1] Data used to develop this program were taken from 'OAQPS Control Cost Manual', 5th edition, Chapter 10. Prices are for CIRCULAR straight ductwork, only.

[2] Base ductwork costs reflect this date.

[3] PPI = Producer Price Index PCU 3444#1 ('Air-conditioning ducts and stove pipe') for year and quarter shown. Ductwork equipment cost has been escalated to this date via this PPI.

[4] See 'Manual,' pp. 10-30 to 10-33.

[5] Duct length is a site-specific parameter that can vary from < 10 to > 1000 ft.

[6] Choices available are: carbon steel sheet (galv. CS sh.) stainless steel sheet (304 SS sh.), coated carbon steel plate (coat. CS pl.), 304 stainless steel plate (304 SS pl.) polyvinyl chloride (PVC), and fiber-reinforced plastic (FRP)

[7] Choices are: 0, 1, and 3.

[8] Choices are: circular spiral (circ.-spiral) and circular longitudinal (circ.-long.)

[9] Equation type and parameters depend on duct material of construction. Parameters reflect 2nd quarter 1993 costs. See 'Manual,' pp. 10-44 to 10-49.

[10] Choices are: power function (1) and exponential (2).

[11] Installation factor depends on control device ductwork is supporting. This factor, when multiplied by Purchased Equipment Cost, yields Total Capital Investment (TCI). If ductwork is installed alone, factor is 1.25 to 1.50. (Default = 1.50.) See 'Manual'.

[12] Pressure drop applies ONLY to circular, spiral-wound galvanized duct with 10 joints per 100 feet. For pressure drop data for other duct types, see 'Manual,' Chapter 10.

[13] Product of installation factor and Purchased Equipment Cost. Costs are presented both in terms of 2nd quarter '93 and above escalation date. Latter costs are based on Producer Price Index PCU 3444#1 ('Air-conditioning ducts and stove pipe')

Air Pollution Control Technology Fact Sheet

Name of Technology: Packed-Bed/Packed-Tower Wet Scrubber

This type of technology is a part of the group of air pollution controls collectively referred to as "wet scrubbers." When used to control inorganic gases, they may also be referred to as "acid gas scrubbers."

Type of Technology: Removal of air pollutants by inertial or diffusional impaction, reaction with a sorbent or reagent slurry, or absorption into liquid solvent.

Applicable Pollutants:

Primarily inorganic fumes, vapors, and gases (e.g., chromic acid, hydrogen sulfide, ammonia, chlorides, fluorides, and SO_2); volatile organic compounds (VOC); and particulate matter (PM), including PM less than or equal to 10 micrometers (μm) in aerodynamic diameter (PM_{10}), PM less than or equal to 2.5 μm in aerodynamic diameter ($PM_{2.5}$), and hazardous air pollutants (HAP) in particulate form (PM_{HAP}).

Absorption is widely used as a raw material and/or product recovery technique in separation and purification of gaseous streams containing high concentrations of VOC, especially water-soluble compounds such as methanol, ethanol, isopropanol, butanol, acetone, and formaldehyde (Croll Reynolds, 1999). Hydrophobic VOC can be absorbed using an amphiphilic block copolymer dissolved in water. However, as an emission control technique, it is much more commonly employed for controlling inorganic gases than for VOC. When using absorption as the primary control technique for organic vapors, the spent solvent must be easily regenerated or disposed of in an environmentally acceptable manner (EPA, 1991). When used for PM control, high concentrations can clog the bed, limiting these devices to controlling streams with relatively low dust loadings (EPA, 1998).

Achievable Emission Limits/Reductions:

Inorganic Gases: Control device vendors estimate that removal efficiencies range from 95 to 99 percent (EPA, 1993).

VOC: Removal efficiencies for gas absorbers vary for each pollutant-solvent system and with the type of absorber used. Most absorbers have removal efficiencies in excess of 90 percent, and packed-tower absorbers may achieve efficiencies greater than 99 percent for some pollutant-solvent systems. The typical collection efficiency range is from 70 to greater than 99 percent (EPA, 1996a; EPA, 1991).

PM: Packed-bed wet scrubbers are limited to applications in which dust loading is low, and collection efficiencies range from 50 to 95 percent, depending upon the application (EPA, 1998).

Applicable Source Type: Point

Typical Industrial Applications:

The suitability of gas absorption as a pollution control method is generally dependent on the following factors: 1) availability of suitable solvent; 2) required removal efficiency; 3) pollutant concentration in the inlet vapor;

4) capacity required for handling waste gas; and, 5) recovery value of the pollutant(s) or the disposal cost of the unrecoverable solvent (EPA, 1996a). Packed-bed scrubbers are typically used in the chemical, aluminum, coke and ferroalloy, food and agriculture, and chromium electroplating industries. These scrubbers have had limited use as part of flue gas desulfurization (FGD) systems, but the scrubbing solution flow rate must be carefully controlled to avoid flooding (EPA, 1998; EPA, 1981).

When absorption is used for VOC control, packed towers are usually more cost effective than impingement plate towers. However, in certain cases, the impingement plate design is preferred over packed-tower columns when either internal cooling is desired, or where low liquid flow rates would inadequately wet the packing (EPA, 1992).

Emission Stream Characteristics:

a. **Air Flow:** Typical gas flow rates for packed-bed wet scrubbers are 0.25 to 35 standard cubic meters per second (sm^3/sec) (500 to 75,000 standard cubic feet per minute (scfm)) (EPA, 1982; EPA, 1998).

b. **Temperature:** Inlet temperatures are usually in the range of 4 to 370°C (40 to 700°F) for waste gases in which the PM is to be controlled, and for gas absorption applications, 4 to 38°C (40 to 100°F). In general, the higher the gas temperature, the lower the absorption rate, and vice-versa. Excessively high gas temperatures also can lead to significant solvent or scrubbing liquid loss through evaporation. (Avallone, 1996; EPA, 1996a).

c. **Pollutant Loading:** Typical gaseous pollutant concentrations range from 250 to 10,000 ppmv (EPA, 1996a). Packed-bed wet scrubbers are generally limited to applications in which PM concentrations are less than 0.45 grams per standard cubic meter (g/sm^3) (0.20 grains per standard cubic foot (gr/scf)) to avoid clogging (EPA, 1982).

d. **Other Considerations:** For organic vapor HAP control applications, low outlet concentrations will typically be required, leading to impractically tall absorption towers, long contact times, and high liquid-gas ratios that may not be cost-effective. Wet scrubbers will generally be effective for HAP control when they are used in combination with other control devices such as incinerators or carbon adsorbers (EPA, 1991).

Emission Stream Pretreatment Requirements:

For absorption applications, precoolers (e.g., spray chambers, quenchers) may be needed to saturate the gas stream or to reduce the inlet air temperature to acceptable levels to avoid solvent evaporation or reduced absorption rates (EPA, 1996a).

Cost Information:

The following are cost ranges (expressed in 2002 dollars) for packed-bed wet scrubbers of conventional design under typical operating conditions, developed using EPA cost-estimating spreadsheets (EPA, 1996a) and referenced to the volumetric flow rate of the waste stream treated. For purposes of calculating the example cost effectiveness, the pollutant used is hydrochloric acid and the solvent is aqueous caustic soda. The costs do not include costs for post-treatment or disposal of used solvent or waste. Costs can be substantially higher than in the ranges shown for applications which require expensive materials, solvents, or treatment methods. As a rule, smaller units controlling a low concentration waste stream will be much more expensive (per unit volumetric flow rate) than a large unit cleaning a high pollutant load flow.

a. **Capital Cost:** \$23,000 to \$117,000 per sm^3/sec (\$11 to \$55 per scfm)

b. **O & M Cost:** \$32,000 to \$104,000 per sm^3/sec (\$15 to \$49 per scfm), annually

c. **Annualized Cost:** \$36,000 to \$165,000 per sm^3/sec (\$17 to \$78 per scfm), annually

d. **Cost Effectiveness:** \$110 to \$550 per metric ton (\$100 to \$500 per short ton), annualized cost per ton per year of pollutant controlled

Theory of Operation:

Packed-bed scrubbers consist of a chamber containing layers of variously-shaped packing material, such as Raschig rings, spiral rings, or Berl saddles, that provide a large surface area for liquid-particle contact. The packing is held in place by wire mesh retainers and supported by a plate near the bottom of the scrubber. Scrubbing liquid is evenly introduced above the packing and flows down through the bed. The liquid coats the packing and establishes a thin film. The pollutant to be absorbed must be soluble in the fluid. In vertical designs (packed towers), the gas stream flows up the chamber (countercurrent to the liquid). Some packed beds are designed horizontally for gas flow across the packing (crosscurrent) (EPA, 1998).

Physical absorption depends on properties of the gas stream and liquid solvent, such as density and viscosity, as well as specific characteristics of the pollutant(s) in the gas and the liquid stream (e.g., diffusivity, equilibrium solubility). These properties are temperature dependent, and lower temperatures generally favor absorption of gases by the solvent. Absorption is also enhanced by greater contacting surface, higher liquid-gas ratios, and higher concentrations in the gas stream (EPA, 1991). Chemical absorption may be limited by the rate of reaction, although the rate-limiting step is typically the physical absorption rate, not the chemical reaction rate (EPA, 1996a; EPA, 1996b).

Inorganic Gases Control:

Water is the most common solvent used to remove inorganic contaminants. Pollutant removal may be enhanced by manipulating the chemistry of the absorbing solution so that it reacts with the pollutant. Caustic solution (sodium hydroxide, NaOH) is the most common scrubbing liquid used for acid-gas control (e.g., HCl, SO_2, or both), though sodium carbonate (Na_2CO_3) and calcium hydroxide (slaked lime, $Ca[OH]_2$) are also used. When the acid gases are absorbed into the scrubbing solution, they react with alkaline compounds to produce neutral salts. The rate of absorption of the acid gases is dependent upon the solubility of the acid gases in the scrubbing liquid (EPA, 1996a; EPA, 1996b).

VOC Control:

Absorption is a commonly applied operation in chemical processing. It is used as a raw material and/or a product recovery technique in separation and purification of gaseous streams containing high concentrations of organics (e.g., in natural gas purification and coke by-product recovery operations). In absorption, the organics in the gas stream are dissolved in a liquid solvent. The contact between the absorbing liquid and the vent gas is accomplished in counter current spray towers, scrubbers, or packed or plate columns (EPA, 1995).

The use of absorption as the primary control technique for organic vapors is subject to several limiting factors. One factor is the availability of a suitable solvent. The VOC must be soluble in the absorbing liquid and even then, for any given absorbent liquid, only VOC that are soluble can be removed. Some common solvents that may be useful for volatile organics include water, mineral oils, or other nonvolatile petroleum oils. Another factor that affects the suitability of absorption for organic emissions control is the availability of vapor/liquid equilibrium data for the specific organic/solvent system in question. Such data are necessary for the design of absorber systems; however, they are not readily available for uncommon organic compounds.

The solvent chosen to remove the pollutant(s) should have a high solubility for the vapor or gas, low vapor pressure, low viscosity, and should be relatively inexpensive. Water is used to absorb VOC having relatively high water solubilities. Amphiphilic block copolymers added to water can make hydrophobic VOC dissolve in water. Other solvents such as hydrocarbon oils are used for VOC that have low water solubilities, though only in industries where large volumes of these oils are available (e.g., petroleum refineries and petrochemical plants) (EPA, 1996a).

Another consideration in the application of absorption as a control technique is the treatment or disposal of the material removed from the absorber. In most cases, the scrubbing liquid containing the VOC is regenerated in an operation known as stripping, in which the VOC is desorbed from the absorbent liquid, typically at elevated temperatures and/or under vacuum. The VOC is then recovered as a liquid by a condenser (EPA, 1995).

PM Control:

In packed-bed scrubbers, the gas stream is forced to follow a circuitous path through the packing material, on which much of the PM impacts. The liquid on the packing material collects the PM and flows down the chamber towards the drain at the bottom of the tower. A mist eliminator (also called a "de-mister") is typically positioned above/after the packing and scrubbing liquid supply. Any scrubbing liquid and wetted PM entrained in the exiting gas stream will be removed by the mist eliminator and returned to drain through the packed bed.

In a packed-bed scrubber, high PM concentrations can clog the bed, hence the limitation of these devices to streams with relatively low dust loadings. Plugging is a serious problem for packed-bed scrubbers because the packing is more difficult to access and clean than other scrubber designs. Mobile-bed scrubbers are available that are packed with low-density plastic spheres that are free to move within the packed bed. These scrubbers are less susceptible to plugging because of the increased movement of the packing material. In general, packed-bed scrubbers are more suitable for gas scrubbing than PM scrubbing because of the high maintenance requirements for control of PM (EPA, 1998).

Advantages:

Advantages of packed-bed towers include (AWMA, 1992):

1. Relatively low pressure drop;
2. Fiberglass-reinforced plastic (FRP) construction permits operation in highly corrosive atmospheres;
3. Capable of achieving relatively high mass-transfer efficiencies;
4. The height and/or type of packing can be changed to improve mass transfer without purchasing new equipment;
5. Relatively low capital cost;
6. Relatively small space requirements; and
7. Ability to collect PM as well as gases.

Disadvantages:

Disadvantages of packed-bed towers include (AWMA, 1992):

1. May create water (or liquid) disposal problem;
2. Waste product collected wet;
3. PM may cause plugging of the bed or plates;
4. When FRP construction is used, it is sensitive to temperature; and

5. Relatively high maintenance costs.

Other Considerations:

For gas absorption, the water or other solvent must be treated to remove the captured pollutant from the solution. The effluent from the column may be recycled into the system and used again. This is usually the case if the solvent is costly (e.g., hydrocarbon oils, caustic solutions, amphiphilic block copolymer). Initially, the recycle stream may go to a treatment system to remove the pollutants or the reaction product. Make-up solvent may then be added before the liquid stream reenters the column (EPA, 1996a).

For PM applications, wet scrubbers generate waste in the form of a slurry. This creates the need for both wastewater treatment and solid waste disposal. Initially, the slurry is treated to separate the solid waste from the water. The treated water can then be reused or discharged. Once the water is removed, the remaining waste will be in the form of a solid or sludge. If the solid waste is inert and nontoxic, it can generally be landfilled. Hazardous wastes will have more stringent procedures for disposal. In some cases, the solid waste may have value and can be sold or recycled (EPA, 1998).

Configuring a control device that optimizes control of more than one pollutant often does not achieve the highest control possible for any of the pollutants controlled alone. For this reason, waste gas flows which contain multiple pollutants (e.g., PM and SO_2, or PM and inorganic gases) are generally controlled with multiple control devices, occasionally more than one type of wet scrubber (EC/R, 1996).

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EPA-452/F-03-026

Air Pollution Control Technology Fact Sheet

Name of Technology: Fabric Filter - Reverse-Air Cleaned Type
- Reverse-Air Cleaned Type with Sonic Horn Enhancement
- Reverse-Jet Cleaned Type

(also referred to as Baghouses)

Type of Technology: Control Device - Capture/Disposal

Applicable Pollutants: Particulate Matter (PM), including particulate matter less than or equal to 10 micrometers (μm) in aerodynamic diameter (PM_{10}), particulate matter less than or equal to 2.5 μm in aerodynamic diameter ($PM_{2.5}$), and hazardous air pollutants (HAPs) that are in particulate form, such as most metals (mercury is the notable exception, as a significant portion of emissions are in the form of elemental vapor).

Achievable Emission Limits/Reductions:

Typical new equipment design efficiencies are between 99 and 99.9%. Older existing equipment have a range of actual operating efficiencies of 95 to 99.9%. Several factors determine fabric filter collection efficiency. These include gas filtration velocity, particle characteristics, fabric characteristics, and cleaning mechanism. In general, collection efficiency increases with increasing filtration velocity and particle size.

For a given combination of filter design and dust, the effluent particle concentration from a fabric filter is nearly constant, whereas the overall efficiency is more likely to vary with particulate loading. For this reason, fabric filters can be considered to be constant outlet devices rather than constant efficiency devices. Constant effluent concentration is achieved because at any given time, part of the fabric filter is being cleaned. As a result of the cleaning mechanisms used in fabric filters, the collection efficiency is constantly changing. Each cleaning cycle removes at least some of the filter cake and loosens particles which remain on the filter. When filtration resumes, the filtering capability has been reduced because of the lost filter cake and loose particles are pushed through the filter by the flow of gas. As particles are captured, the efficiency increases until the next cleaning cycle. Average collection efficiencies for fabric filters are usually determined from tests that cover a number of cleaning cycles at a constant inlet loading. (EPA, 1998a)

Applicable Source Type: Point

Typical Industrial Applications:

Fabric filters can perform very effectively in many different applications. Common applications of fabric filter systems with reverse-air cleaning are presented in Table 1, however, fabric filters can be used in most any process where dust is generated and can be collected and ducted to a central location. Other cleaning-types may also be used in these applications. Sonic horn enhancement of mechanical shaker cleaning is generally used for applications with dense particulates such as utility boilers, metal processing, and mineral products.

Table 1. Typical Industrial Applications of Reverse-Air -Cleaned Fabric Filters (EPA, 1997; EPA, 1998a)

Application		Source Category Code (SCC)
Utility Boilers (Coal)		1-01-002...003
Industrial Boilers (Coal, Wood)		1-02-001...003, 1-02-009
Commercial/Institutional Boilers (Coal, Wood)		1-03-001...003, 1-03-009
Non-Ferrous Metals Processing (Primary and Secondary):		
	Copper	3-03-005, 3-04-002
	Lead	3-03-010, 3-04-004
	Zinc	3-03-030, 3-04-008
	Aluminum	3-03-000...002 3-04-001
	Other metals production	3-03-011...014 3-04-005...006 3-04-010...022
Ferrous Metals Processing:		
	Coke	3-03-003...004
	Ferroalloy Production	3-03-006...007
	Iron and Steel Production	3-03-008...009
	Gray Iron Foundries	3-04-003
	Steel Foundries	3-04-007,-009
Mineral Products:		
	Cement Manufacturing	3-05-006...007
	Coal Cleaning	3-05-010
	Stone Quarrying and Processing	3-05-020
	Other	3-05-003...999
Asphalt Manufacture		3-05-001...002
Grain Milling		3-02-007

Emission Stream Characteristics:

a. **Air Flow:** Baghouses are separated into two groups, standard and custom, which are further separated into low, medium, and high capacity. Standard baghouses are factory-built, off the shelf units. They may handle from less than 0.10 to more than 50 standard cubic meters per second (sm^3/sec) ("hundreds" to more than 100,000 standard cubic feet per minute (scfm)). Custom baghouses are designed for specific applications and are built to the specifications prescribed by the customer. These units are generally much larger than standard units, i.e., from 50 to over 500 sm^3/sec (100,000 to over 1,000,000 scfm). (EPA, 1998b)

b. **Temperature:** Typically, gas temperatures up to about 260°C (500°F), with surges to about 290°C (550°F) can be accommodated routinely, with the appropriate fabric material. Spray coolers or dilution air can be used to lower the temperature of the pollutant stream. This prevents the temperature limits of the fabric from being exceeded. Lowering the temperature, however, increases the humidity of the pollutant stream. Therefore, the minimum temperature of the pollutant stream must remain above the dew point of any condensable in the stream. The baghouse and associated ductwork should be insulated and possibly heated if condensation may occur. (EPA, 1998b)

c. **Pollutant Loading:** Typical inlet concentrations to baghouses are 1 to 23 grams per cubic meter (g/m^3) (0.5 to 10 grains per cubic foot (gr/ft^3)), but in extreme cases, inlet conditions may vary between 0.1 to more than 230 g/m^3 (0.05 to more than 100 gr/ft^3). (EPA, 1998b)

d. **Other Considerations:** Moisture and corrosives content are the major gas stream characteristics requiring design consideration. Standard fabric filters can be used in pressure or vacuum service, but only within the range of about ± 640 millimeters of water column (25 inches of water column). Well-designed and operated baghouses have been shown to be capable of reducing overall particulate emissions to less than 0.05 g/m^3 (0.010 gr/ft^3), and in a number of cases, to as low as 0.002 to 0.011 g/dsm^3 (0.001 to 0.005 gr/dscf). (AWMA, 1992)

Emission Stream Pretreatment Requirements:

Because of the wide variety of filter types available to the designer, it is not usually required to pretreat a waste stream's inlet temperature. However, in some high temperature applications, the cost of high temperature-resistant bags must be weighed against the cost of cooling the inlet temperature with spray coolers or dilution air (EPA, 1998b). When much of the pollutant loading consists of relatively large particles, mechanical collectors such as cyclones may be used to reduce the load on the fabric filter, especially at high inlet concentrations (EPA, 1998b).

Cost Information:

Cost estimates are presented below for reverse-air cleaned fabric filters, for sonic horn enhancement, and for reverse-jet cleaned fabric filters. The costs are expressed in 2002 dollars for reverse-air cleaned and sonic horn enhancement. The cost estimates assume a conventional design under typical operating conditions. The costs do not include auxiliary equipment such as fans and ductwork.

The costs for reverse-air cleaned systems are generated using EPA's cost-estimating spreadsheet for fabric filters (EPA, 1998b). The cost estimate for sonic horn enhancement is obtained from the manufacturer quote given in the OAQPS Control Cost Manual (EPA, 1998b). Sonic horns are presented as an incremental cost to the capital cost for a shaker-cleaned system. The operational and maintenance (O&M) cost for shaker-cleaned systems are reduced by 1% to 3% with the sonic horn enhancement. The capital cost for the reverse-jet cleaned fabric baghouse is based on a manufacturer quote (Carrington, 2000). This quote includes only the baghouse purchased equipment cost. O&M costs, annualized costs, and cost effectiveness were not estimated for reverse-jet. In general, reverse-jet has higher capital costs and O&M costs than reverse-air due to its complexity (see Section 10, Theory of Operation).

Costs are primarily driven by the waste stream volumetric flow rate and pollutant loading. In general, a small unit controlling a low pollutant loading will not be as cost effective as a large unit controlling a high pollutant loading. The costs presented are for flow rates of 470 m^3/sec (1,000,000 scfm) and 1.0 m^3/sec (2,000 scfm), respectively, and a pollutant loading of 9 g/m^3 (4.0 gr/ft^3). For reverse-jet, the capital cost presented is for a baghouse of 378,000 m^3/sec (800,000 scfm).

Pollutants that require an unusually high level of control or that require the fabric filter bags or the unit itself to be constructed of special materials, such as Gore-Tex or stainless steel, will increase the costs of the system (EPA, 1998b). The additional costs for controlling more complex waste streams are not reflected in the estimates given below. For these types of systems, the capital cost could increase by as much as 40% and the O&M cost could increase by as much as 5%.

a. **Capital Cost:** \$19,000 to \$180,000 per sm^3/s (\$9 to \$85 per scfm), reverse-air
\$1,000 to \$1,300 per m^3/sec (\$ 0.51 to \$0.61 per scfm), additional cost for sonic horns
\$2,000 to \$4,200 per m^3/sec (\$1 to \$2 per scfm), reverse-jet purchased equipment cost

b. **O & M Cost:** \$14,000 to \$58,000 per sm^3/s (\$6 to \$27 per scfm), annually

c. **Annualized Cost:** \$17,000 to \$106,000 per sm^3/s (\$8 to \$50 per scfm), annually

d. **Cost Effectiveness:** \$58 to \$372 per metric ton (\$53 to \$337 per short ton)

Theory of Operation:

In a fabric filter, flue gas is passed through a tightly woven or felted fabric, causing PM in the flue gas to be collected on the fabric by sieving and other mechanisms. Fabric filters may be in the form of sheets, cartridges, or bags, with a number of the individual fabric filter units housed together in a group. Bags are most common type of fabric filter. The dust cake that forms on the filter from the collected PM can significantly increase collection efficiency. Fabric filters are frequently referred to as baghouses because the fabric is usually configured in cylindrical bags. Bags may be 6 to 9 m (20 to 30 ft) long and 12.7 to 30.5 centimeters (cm) (5 to 12 inches) in diameter. Groups of bags are placed in isolable compartments to allow cleaning of the bags or replacement of some of the bags without shutting down the entire fabric filter. (STAPPA/ALAPCO, 1996)

Operating conditions are important determinants of the choice of fabric. Some fabrics (e.g., polyolefins, nylons, acrylics, polyesters) are useful only at relatively low temperatures of 95 to 150°C (200 to 300°F). For high-temperature flue gas streams, more thermally stable fabrics such as fiberglass, Teflon®, or Nomex® must be used (STAPPA/ALAPCO, 1996).

Practical application of fabric filters requires the use of a large fabric area in order to avoid an unacceptable pressure drop across the fabric. Baghouse size for a particular unit is determined by the choice of air-to-cloth ratio, or the ratio of volumetric air flow to cloth area. The selection of air-to-cloth ratio depends on the particulate loading and characteristics, and the cleaning method used. A high particulate loading will require the use of a larger baghouse in order to avoid forming too heavy a dust cake, which would result in an excessive pressure drop As an example, a baghouse for a 250 megawatt (MW) utility boiler may have 5,000 separate bags with a total fabric area approaching 46,500 m^2 (500,000 square feet). (ICAC, 1999)

Determinants of baghouse performance include the fabric chosen, the cleaning frequency and methods, and the particulate characteristics. Fabrics can be chosen which will intercept a greater fraction of particulate, and some fabrics are coated with a membrane with very fine openings for enhanced removal of submicron particulate. Such fabrics tend to be more expensive. Cleaning intensity and frequency are important variables in determining removal efficiency. Because the dust cake can provide a significant fraction of the fine particulate removal capability of a fabric, cleaning which is too frequent or too intense will lower the removal efficiency. On the other hand, if removal is too infrequent or too ineffective, then the baghouse pressure drop will become too high. (ICAC, 1999)

Reverse-air cleaning is a popular fabric filter cleaning method that has been used extensively and improved over the years. It is a gentler but sometimes less effective clearing mechanism than mechanical shaking.

Most reverse-air fabric filters operate in a manner similar to shaker-cleaned fabric filters. Typically, the bags are open on the bottom, closed on top and the gas flows from the inside to the outside of the bags with dust being captured on the inside. However, some reverse-air designs collect dust on the outside of the bags. In either design, reverse-air cleaning is performed by forcing clean air through the filters in the opposite direction of the dusty gas flow. The change in direction of the gas flow causes the bag to flex and crack the filter cake. In internal cake collection, the bags are allowed to collapse to some extent during reverse-air cleaning. The bags are usually prevented from collapsing entirely by some kind of support, such as rings that are sewn into the bags. The support enables the dust cake to fall off the bags and into the hopper. Cake release is also aided by the reverse flow of the gas. Because felted fabrics retain dust more than woven fabrics and thus, are more difficult to clean, felts are usually not used in reverse-air systems. (EPA, 1998a)

There are several methods of reversing the flow through the filters. As with mechanical shaker-cleaned fabric filters, the most common approach is to have separate compartments within the fabric filter so that each compartment can be isolated and cleaned separately while the other compartments continue to treat the dusty gas. One method of providing the reverse flow air is by the use of a secondary fan or cleaned gas from the other compartments. Reverse-air cleaning alone is used only in cases where the dust releases easily from the fabric. In many instances, reverse-air is used in conjunction with shaking, pulsing or sonic horns. (EPA, 1998a)

Sonic horns are increasingly being used to enhance the collection efficiency of mechanical shaker and reverse-air fabric filters (AWMA, 1992). Sonic horns utilize compressed air to vibrate a metal diaphragm, producing a low frequency sound wave from the horn bell. The number of horns required is determined by fabric area and the number of baghouse compartments. Typically, 1 to 4 horns per compartment operating at 150 to 200 hertz are required. Compressed air to power the horns is supplied at 275 to 620 kiloPascals (kPa) (40 to 90 pounds per square inch gage (psig)). Sonic horns activate for approximately 10 to 30 seconds during each cleaning cycle (Carr, 1984).

Sonic horn cleaning significantly reduces the residual dust load on the bags. This decreases the pressure drop across the filter fabric by 20 to 60%. It also lessens the mechanical stress on the bags, resulting in longer operational life (Carr, 1984). As stated previously, this can decrease the O&M cost by 1 to 3%, annually. Baghouse compartments are easily retrofitted with sonic horns. Sonic assistance is frequently used with fabric filters at coal-burning utilities (EPA, 1998a).

Reverse-jet is a cleaning method developed in the 1950's to provide better removal of residual dusts. In this method, the reverse air is piped to a ring around the bag with a narrow slot in it. The air flows through the slot, creating a high velocity air stream that flexes the bag at that point. The ring is mounted on a carriage, driven by a motor and cable system, that travels up and down the bag. This method provides excellent cleaning of residual dust. Due to its complexity, however, maintenance requirements are high. In addition, air impingement on the bags results in increased wear (Billings, 1970). The application of reverse-jet cleaning has been declining (EPA, 1998a).

Advantages:

Fabric filters in general provide high collection efficiencies on both coarse and fine (submicron) particulates. They are relatively insensitive to fluctuations in gas stream conditions. Efficiency and pressure drop are relatively unaffected by large changes in inlet dust loadings for continuously cleaned filters. Filter outlet air is very clean and may be recirculated within the plant in many cases (for energy conservation). Collected material is collected dry for subsequent processing or disposal. Corrosion and rusting of components are usually not problems. Operation is relatively simple. Unlike electrostatic precipitators, fabric filter systems do not require the use of high voltage, therefore, maintenance is simplified and flammable dust may be collected with proper care. The use of selected fibrous or granular filter aids (precoating) permits the high-efficiency collection of submicron smokes and gaseous contaminants. Filter collectors are available in a large number of configurations, resulting in a range of dimensions and inlet and outlet flange locations to suit installation requirements. (AWMA, 1992)

Disadvantages:

Temperatures much in excess of 290°C (550°F) require special refractory mineral or metallic fabrics, which can be expensive. Certain dusts may require fabric treatments to reduce dust seepage, or in other cases, assist in the removal of the collected dust. Concentrations of some dusts in the collector, approximately 50 g/m^3 (22 gr/ft^3), may represent a fire or explosion hazard if a spark or flame is accidentally admitted. Fabrics can burn if readily oxidizable dust is being collected. Fabric filters have relatively high maintenance requirements (e.g., periodic bag replacement). Fabric life may be shortened at elevated temperatures and in the presence of acid or alkaline particulate or gas constituents. They cannot be operated in moist environments; hygroscopic materials, condensation of moisture, or tarry adhesive components may cause crusty caking or plugging of the fabric or require special additives. Respiratory protection for maintenance personnel may be required when replacing fabric. Medium pressure drop is required, typically in the range of 100 to 250 mm of water column (4 to 10 inches of water column). (AWMA, 1992)

Other Considerations:

Fabric filters are useful for collecting particles with resistivities either too low or too high for collection with electrostatic precipitators. Fabric filters therefore may be good candidates for collecting fly ash from low-sulfur coals or fly ash containing high unburned carbon levels, which respectively have high and low resistivities, and thus are relatively difficult to collect with electrostatic precipitators. (STAPPA/ALAPCO, 1996)

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EPA-452/F-03-018

Air Pollution Control Technology Fact Sheet

Name of Technology: Catalytic Incinerator

This type of incinerator is also referred to as a catalytic oxidizer, or catalytic reactor.

Type of Technology: Destruction by oxidation.

Applicable Pollutants:

Volatile organic compounds (VOC) and many types of particulate matter (PM). In the past, catalytic incinerators were not recommended as a control device for PM, since the PM, unless removed prior to incineration, often coated (or "blinded") the catalyst so that the catalyst's active sites were prevented from aiding in the oxidation of pollutants in the gas stream (EPA, 1998). Examples are gases containing chlorine, sulfur, and other atoms, such as phosphorous, bismuth, lead, arsenic, antimony, mercury, iron oxide, tin, and zinc that may deactivate the supported noble metal catalysts (EPA, 1991).

However, catalysts have been recently developed that can tolerate almost any compound. Most of these catalysts are single or mixed metal oxides, often supported by a mechanically strong carrier such as various types of alumina. Catalysts such as chromia/alumina, cobalt oxide, and copper oxide/manganese oxide have been used for oxidation of gases containing chlorinated compounds. Platinum-based catalysts are active for oxidation of sulfur containing VOC, although they are rapidly deactivated by the presence of chlorine (EPA, 1996a).

Achievable Emission Limits/Reductions:

VOC destruction efficiency is dependent upon VOC composition and concentration, operating temperature, oxygen concentration, catalyst characteristics, and space velocity. Space velocity is commonly defined as the volumetric flow of gas entering the catalyst bed chamber divided by the volume of the catalyst bed. The relationship between space velocity and VOC destruction efficiency is strongly influenced by catalyst operating temperature. As space velocity increases, VOC destruction efficiency decreases, and as temperature increases, VOC destruction efficiency increases. As an example, a catalytic unit operating at about 450°C (840°F) with a catalyst bed volume of 0.014 to 0.057 cubic meter (m^3) (0.5 to 2 cubic feet (ft^3)) per 0.47 standard cubic meters per second (sm^3/sec) (1,000 standard cubic feet per minute (scfm)) of offgas passing through the device can achieve 95 percent VOC destruction efficiency (EPA, 1992). Higher destruction efficiencies of (98 - 99 percent) are achievable, but require larger catalyst volumes and/or higher temperatures, and are usually designed on a site-specific basis (EPA, 1991).

In EPA's 1990 National Inventory, incinerators as a group, including catalytic incinerators, were reported as being used as control devices for PM and were reported as achieving 25 - 99% control efficiency of PM_{10} at point source facilities (EPA, 1998). Table 1 presents a breakdown of the PM_{10} control efficiency ranges by industry where catalytic incinerators have been reported (EPA, 1996b). The VOC control efficiency reported for these devices ranged from 0 to 99.9%, however, it is assumed that reports of higher efficiencies (greater than 99%) are attributable to thermal incinerators. These ranges of control efficiencies are large because they include facilities that do not have VOC emissions and control only PM, as well as facilities which have low PM emissions and are primarily concerned with controlling VOC (EPA, 1998).

Table 1. PM_{10} Destruction Efficiencies for Catalytic Incinerators and Catalytic Incinerators with Heat Exchanger by Industry (EPA, 1996b)

Industry/Types of Sources	PM_{10} Control Efficiency (%)
Petroleum and Coal Products asphalt roofing processes (blowing, felt saturation); mineral calcining; petroleum refinery processes (asphalt blowing, catalytic cracking, coke calcining, sludge converter); sulfur manufacturing	25 - 99.9
Chemical and Allied Products carbon black manufacturing (mfg); charcoal mfg; liquid waste disposal; miscellaneous chemical mfg processes; pesticide mfg; phthalic anhydride mfg (xylene oxidation); plastics/synthetic organic fiber mfg; solid waste incineration (industrial)	50 - 99.9
Primary Metals Industries by-product coke processes (coal unloading, oven charging and pushing, quenching); gray iron cupola and other miscellaneous processes; secondary aluminum processes (burning/drying, smelting furnace); secondary copper processes (scrap drying, scrap cupola, and miscellaneous processes); steel foundry miscellaneous processes; surface coating oven	70 - 99.9
Electronic and Other Electric Equipment chemical mfg miscellaneous processes; electrical equipment bake furnace; fixed roof tank; mineral production miscellaneous processes; secondary aluminum roll/draw extruding; solid waste incineration (industrial)	70 - 99.9
Electric, Gas, and Sanitary Services internal combustion engines; solid waste incineration (industrial, commercial/ institutional)	90 - 98
Stone, Clay, and Glass Products barium processing kiln; coal cleaning thermal dryer; fabricated plastics machinery; wool fiberglass mfg	50 - 95
Mining asphalt concrete rotary dryer; organic chemical air oxidation units, sulfur production	70 - 99.6
Educational Services solid waste incineration (commercial/ institutional)	80
Paper and Allied Products boiler	95
Printing and Publishing surface coating dryer; fugitives	95

Applicable Source Type: Point

Typical Industrial Applications:

Catalytic incinerators can be used to reduce emissions from a variety of stationary sources. Solvent evaporation processes associated with surface coating and printing operations are a major source of VOC emissions, and catalytic incineration is widely used by many industries in this category. Catalytic incinerators are also used to control emissions from the following (EPA, 1992):

- Varnish cookers;
- Foundry core ovens;
- Filter paper processing ovens;
- Plywood veneer dryers;
- Gasoline bulk loading stations;
- Process vents in the synthetic organic chemical manufacturing industry (SOCMI);
- Rubber products and polymer manufacturing; and
- Polyethylene, polystyrene, and polyester resin manufacturing.

Catalytic oxidation is most suited to systems with lower exhaust volumes, when there is little variation in the type and concentration of VOC, and where catalyst poisons or other fouling contaminants such as silicone, sulfur, heavy hydrocarbons and particulates are not present.

Emission Stream Characteristics:

a. **Air Flow:** Typical gas flow rates for packaged catalytic incinerators are 0.33 to 24 sm^3/sec (700 to 50,000 scfm) (EPA, 1996a).

b. **Temperature:** Catalysts in catalytic incinerators cause the oxidizing reaction to occur at a lower temperature than is required for thermal ignition. Waste gas is heated by auxiliary burners to approximately 320°C to 430°C (600°F to 800°F) before entering the catalyst bed (AWMA, 1992). The maximum design exhaust temperature of the catalyst is typically 540° - 675°C (1000° - 1250°F).

c. **Pollutant Loading:** Catalytic incinerators can and have been used effectively at very low inlet loadings; down to 1 part per million by volume (ppmv) or less (EPA, 1995). As with thermal and recuperative incinerators, for safety considerations, the maximum concentration of the organics in the waste gas must be substantially below the lower flammable level (lower explosive limit, or LEL) of the specific compound being controlled. As a rule, a safety factor of four (i.e., 25% of the LEL) is used (EPA, 1991, AWMA, 1992). The waste gas may be diluted with ambient air, if necessary, to lower the concentration.

d. **Other Considerations:** Characteristics of the inlet stream should be evaluated in detail, because of the sensitivity of catalytic incinerators to VOC inlet stream flow conditions, which may cause catalyst deactivation (EPA, 1992).

Emission Stream Pretreatment Requirements:

Typically, if design conditions are satisfied no pretreatment is required, however, in some cases, PM removal may be necessary before the waste gas enters the incinerator.

Cost Information:

The following are cost ranges (expressed in 2002 dollars) for packaged catalytic incinerators of conventional design with fixed beds under typical operating conditions, developed using EPA cost-estimating spreadsheets (EPA, 1996a) and referenced to the volumetric flow rate of the waste stream treated. The costs do not include costs for a post-oxidation acid gas treatment system. Costs can be substantially higher than the ranges shown when used for low-VOC concentration streams (less than around 100 ppmv). As a rule, smaller units controlling a low concentration waste stream will be much more expensive (per unit volumetric flow rate) than a large unit cleaning a high pollutant load flow. Operation and Maintenance (O & M) Costs, Annualized Cost, and Cost Effectiveness are dominated by the cost of supplemental fuel required.

a. **Capital Cost:** \$47,000 to \$191,000 per sm^3/sec (\$22 to \$90 per scfm)

b. **O & M Cost:** \$8,500 to \$53,000 per sm^3/sec (\$4 to \$25 per scfm), annually

c. **Annualized Cost:** \$17,000 to \$106,000 per sm^3/sec (\$8 to \$50 per scfm), annually

d. **Cost Effectiveness:** \$105 to \$5,500 per metric ton (\$100 to \$5,000 per short ton), annualized cost per ton per year of pollutant controlled. However, when used to treat very low concentrations of toxic air pollutants (less than 100 ppmv), the cost per ton removed may be many thousands of dollars, because only a small amount of pollutant is being destroyed.

Theory of Operation:

Catalytic incinerators operate very similar to thermal/recuperative incinerators, with the primary difference that the gas, after passing through the flame area, passes through a catalyst bed. The catalyst has the effect of increasing the oxidation reaction rate, enabling conversion at lower reaction temperatures than in thermal incinerator units. Catalysts, therefore, also allow for smaller incinerator size. Catalysts typically used for VOC incineration include platinum and palladium. Other formulations include metal oxides, which are used for gas streams containing chlorinated compounds (EPA, 1998).

In a catalytic incinerator, the gas stream is introduced into a mixing chamber where it is also heated. The waste gas usually passes through a recuperative heat exchanger where it is preheated by post combustion gas. The heated gas then passes through the catalyst bed. Oxygen and VOC migrate to the catalyst surface by gas diffusion and are adsorbed onto the catalyst active sites on the surface of the catalyst where oxidation then occurs. The oxidation reaction products are then desorbed from the active sites by the gas and transferred by diffusion back into the gas stream (EPA, 1998).

Particulate matter can rapidly coat the catalyst so that the catalyst active sites are prevented from aiding in the oxidation of pollutants in the gas stream. This effect of PM on the catalyst is called blinding, and will deactivate the catalyst over time. Because essentially all the active surface of the catalyst is contained in relatively small pores, the PM need not be large to blind the catalyst. No general guidelines exist as to the PM concentration and size that can be tolerated by catalysts, because the pore size and volume of catalysts vary widely. This information is likely to be available from the catalyst manufacturers (EPA, 1996a).

The method of contacting the VOC-containing stream with the catalyst serves to distinguish catalytic incineration systems. Both fixed-bed and fluid-bed systems are used.

Fixed-bed catalytic incinerators may use a monolith catalyst or a packed-bed catalyst (EPA, 1996a):

Monolith Catalyst Incinerators - The most widespread method of contacting the VOC-containing stream with the catalyst is the catalyst monolith. In this scheme the catalyst is a porous solid block containing parallel, non-intersecting channels aligned in the direction of the gas flow. Monoliths offer the advantages of minimal attrition due to thermal expansion/contraction during startup/shutdown and low overall pressure drop.

Packed-Bed Catalytic Incinerators - A second contacting scheme is a simple packed-bed in which catalyst particles are supported either in a tube or in shallow trays through which the gases pass. This scheme is not in widespread use due to its inherently high pressure drop, compared to a monolith, and the breaking of catalyst particles due to thermal expansion when the confined catalyst bed is heated/cooled during startup/shutdown. However, the tray type arrangement of a packed-bed scheme, where the catalyst is pelletized, is used by several industries (e.g., heat-set web-offset printing). Pelletized catalyst is advantageous where large amounts of such contaminants as phosphorous or silicon compounds are present.

Fluid-bed catalytic incinerators have the advantage of very high mass transfer rates, although the overall pressure drop is somewhat higher than for a monolith. An additional advantage of fluid-beds is a high bed-side heat transfer as compared to a normal gas heat transfer coefficient. This higher heat transfer rate to heat transfer tubes immersed in the bed allows higher heat release rates per unit volume of gas processed and, therefore, may allow waste gas with higher heating values to be processed without exceeding maximum permissible temperatures in the catalyst bed. In these reactors the gas phase temperature rise from gas inlet to gas outlet is low, depending on the extent of heat transfer through imbedded heat transfer surfaces. The catalyst temperatures depend on the rate of reaction occurring at the catalyst surface and the rate of heat exchange between the catalyst and imbedded heat transfer surfaces.

As a general rule, fluid-bed systems are more tolerant of PM in the gas stream than either fixed-bed or monolithic catalysts. This is due to the constant abrasion of the fluidized catalyst pellets, which helps remove PM from the exterior of the catalysts in a continuous manner. A disadvantage of a fluid-bed is the gradual loss of catalyst by attrition. However, attrition-resistant catalysts have been developed to overcome this disadvantage.

Advantages:

Advantages of catalytic incinerators over other types of incinerators include (AWMA, 1992; Cooper and Alley, 1994):

a. Lower fuel requirements;
b. Lower operating temperatures;
c. Little or no insulation requirements;
d. Reduced fire hazards;
e. Reduced flashback problems; and
f. Less volume/size required.

Disadvantages:

Disadvantages of catalytic incinerators include (AWMA, 1992):

a. High initial cost;
b. Catalyst poisoning is possible;
c. Particulate often must first be removed; and
d. Spent catalyst that cannot be regenerated may need to be disposed.

Other Considerations:

Catalytic incinerators offer many advantages for the appropriate application. However, selection of a catalytic incinerator should be considered carefully, as the sensitivity of catalytic incinerators to VOC inlet stream flow conditions and catalyst deactivation limit their applicability for many industrial processes (EPA, 1992).

References:

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ATTACHMENT 6D
MODULE 6
OEPA APPLICATION FORMS

Section II - Specific Air Contaminant Source Information

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

1. Company identification (name for air contaminant source for which you are applying): FISCHER-TROPSCH SYSTEM

2. List all equipment that are part of this air contaminant source: FISCHER-TROPSCH REACTORS (3) WITH TAILGAS SENT TO SPONGE OIL COLUMN WITH F-T FRACTIONATOR FIRED HEATER (154 MMBtu/hr) CONTROLLED BY COMMON SCR UNIT

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

   When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 **OR** after issuance of PTI ____________

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line # 8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	4.7	4.7	20.7	4.7	20.7
PM_{10} (PM < 10 microns in diameter)	4.7	4.7	20.7	4.7	20.7
Sulfur dioxide (SO_2)	0.4	0.4	1.6	0.4	1.6
Nitrogen oxides (NO_x)	140	16.8	73.6	16.8	73.6
Carbon monoxide (CO)	51.9	51.9	227.3	51.9	227.3
Organic compounds (OC)	3.4	3.4	14.9	3.4	14.9
Volatile organic compounds (VOC)	3.4	3.4	14.9	3.4	14.9
Total HAPs	1.2	1.2	5.1	1.2	5.1
Highest single HAP: (hexane)	1.1	1.1	4.9	1.1	4.9
Air Toxics (see instructions):					

Section II - Specific Air Contaminant Source Information

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

5. **Does this air contaminant source employ emissions control equipment?**

☒ **Yes** - fill out the applicable information below.

☐ **No** - proceed to item # 6.

Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = SO_2; Nitrogen oxides = NOx; Carbon monoxide = CO

☐ **Cyclone/Multiclone**

Manufacturer: ____________ Year installed: ____________

What do you call this control equipment: ____________

Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________

Estimated capture efficiency (%): ________ Basis for efficiency: ____________

Design control efficiency (%): ________ Basis for efficiency: ____________

Type: ☐ Cyclone ☐ Multiclone ☐ Rotoclone ☐ Other ____________

☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Fabric Filter/Baghouse**

Manufacturer: ____________ Year installed: ____________

What do you call this control equipment: ____________

Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________

Estimated capture efficiency (%): ________ Basis for efficiency: ____________

Design control efficiency (%): ________ Basis for efficiency: ____________

Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________

Pressure type: ☐ Negative pressure ☐ Positive pressure

Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other ____________

☐ Lime injection or fabric coating agent used: Type: ________ Feed rate: ________

☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Wet Scrubber**

Manufacturer: ____________ Year installed: ____________

What do you call this control equipment: ____________

Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________

Estimated capture efficiency (%): ________ Basis for efficiency: ____________

Design control efficiency (%): ________ Basis for efficiency: ____________

Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other ____________

Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________

pH range for scrubbing liquid: Minimum: ________ Maximum: ________

Scrubbing liquid flow rate (gal/min): ________

Is scrubber liquid recirculated? ☐ Yes ☐ No

Water supply pressure (psig): ________ NOTE: This item for spray chambers only.

☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Electrostatic Precipitator**

Manufacturer: ____________ Year installed: ____________

What do you call this control equipment: ____________

Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________

Estimated capture efficiency (%):________ Basis for efficiency: ________________
Design control efficiency (%):____________ Basis for efficiency: ________________
Type: ☐ Plate-wire ☐ Flat-plate ☐ Tubular ☐ Wet ☐ Other ____________
Number of operating fields: ____________

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Concentrator**

Manufacturer: ________________________ Year installed: ______________________
What do you call this control equipment: ______________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):________ Basis for efficiency: ________________
Design regeneration cycle time (minutes): ____________
Minimum desorption air stream temperature (°F): _________
Rotational rate (revolutions/hour): ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Catalytic Incinerator**

Manufacturer: Year installed:
What do you call this control equipment:
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other
Estimated capture efficiency (%): Basis for efficiency:
Design control efficiency (%): Basis for efficiency:
Minimum inlet gas temperature (°F):
Combustion chamber residence time (seconds):
Minimum temperature difference (°F) across catalyst during air contaminant source operation:
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Thermal Incinerator/Thermal Oxidizer**

Manufacturer: ________________________ Year installed: ______________________
What do you call this control equipment: ______________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):________ Basis for efficiency: ________________
Design control efficiency (%):__________ Basis for efficiency: ________________
Minimum operating temperature (°F) and location: __________________________ (See line by line instructions.)
Combustion chamber residence time (seconds): ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Flare**

Manufacturer: ________________________ Year installed: ______________________
What do you call this control equipment: ______________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):________ Basis for efficiency: ________________
Design control efficiency (%):__________ Basis for efficiency: ________________
Type: ☐ Enclosed ☐ Elevated (open)
Ignition device: ☐ Electric arc ☐ Pilot flame
Flame presence sensor: ☐ Yes ☐ No

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Condenser**
Manufacturer: __________ Year installed: __________
What do you call this control equipment: __________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other __________
Estimated capture efficiency (%):________ Basis for efficiency: __________
Design control efficiency (%):________ Basis for efficiency: __________

Type: ☐ Indirect contact ☐ Direct contact
Maximum exhaust gas temperature (°F) during air contaminant source operation: _______
Coolant type: __________
Design coolant temperature (°F): Minimum ________ Maximum ________
Design coolant flow rate (gpm): __________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Carbon Absorber**
Manufacturer: __________ Year installed: __________
What do you call this control equipment: __________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other __________
Estimated capture efficiency (%):________ Basis for efficiency: __________
Design control efficiency (%):________ Basis for efficiency: __________
Type: ☐ On-site regenerative ☐ Disposable
Maximum design outlet organic compound concentration (ppmv): ________
Carbon replacement frequency or regeneration cycle time (specify units): ________
Maximum temperature of the carbon bed, after regeneration (including any cooling cycle): ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Dry Scrubber**
Manufacturer: __________ Year installed: __________
What do you call this control equipment: __________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other __________
Estimated capture efficiency (%):________ Basis for efficiency: __________
Design control efficiency (%):________ Basis for efficiency: __________
Reagent(s) used: Type: __________ Injection rate(s): __________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Paint booth filter**
Type: ☐ Paper ☐ Fiberglass ☐ Water curtain ☐ Other __________
Design control efficiency (%):________ Basis for efficiency: __________

☒ **Other**, describe ULTRA LOW NOx BURNERS + SELECTIVE CATALYTIC REDUCTION
Manufacturer: NOT YET SELECTED Year installed: 208
What do you call this control equipment: ULTRA LOW NOx BURNERS + SELECTIVE CATALYTIC REDUCTION
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☒ NOx ☐ CO ☐ Other __________
Estimated capture efficiency (%): 100 Basis for efficiency: ENGINEERING DESIGN
Design control efficiency (%): >88 Basis for efficiency: EPA

Section II - Specific Air Contaminant Source Information

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☒ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

   Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

   - Particulate Matter (PM10): 10 tons per year
   - Sulfur Dioxide (SO2): 25 tons per year
   - Nitrogen Oxides (NOx): 25 tons per year
   - Carbon Monoxide (CO): 100 tons per year
   - Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

   Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information

Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	**Type Code***	**Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)**	**Stack Egress Point Height from the Ground (ft)**	**Stack Temp. at Max. Capacity (F)**	**Stack Flow Rate at Max. Capacity (ACFM)**	**Minimum Distance to the Property Line (ft)**
FISCHER-TROPSCH SYSTEM	A	ROUND 3.28 FT	75	700	36,000	700

*Type codes for stack egress points:

A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

Section II - Specific Air Contaminant Source Information

Table 7-B, Fugitive Egress Point Information					
Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
NA					

*Type codes for fugitive egress point:

D. door or window
E. other opening in the building without a duct
F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Information (Add rows as necessary)			
Company ID or Name for the Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)
FISCHER-TROPSCH SYSTEM	328 (Gasifier)	120 (Gasifier)	1,400 (6 Gasifiers)

8. Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific requirements listed below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?

☐ yes
☒ no
☐ not sure - please contact me if this affects me

If yes, why are you requesting federally enforceable limits? Check all that apply.

a. ☐ to avoid being a major source (see OAC rule 3745-77-01)
b. ☐ to avoid being a major MACT source (see OAC rule 3745-31-01)
c. ☐ to avoid being a major modification (see OAC rule 3745-31-01)
d. ☐ to avoid being a major stationary source (sèe OAC rule 3745-31-01)
e. ☐ to avoid an air dispersion modeling requirement (see Engineering Guide # 69)
f. ☐ to avoid another requirement. Describe: ____________________

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable performance specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
FISCHER-TROPSCH SYSTEM	NONE (ANALYTICAL TESTING OF FUEL GAS)	NONE (162 ppmv [3-hr avg.], 60 ppmv [daily avg], H_2S IN FUEL GAS	H_2S IN FUEL GAS

10. Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03 or OAC rule 3745-31-05?

☐ yes - Note: notification requirements in rules cited above must be followed.
☒ no

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

FOR OHIO EPA USE
FACILITY ID: ____________
EU ID: ________ PTI #: ________

EMISSIONS ACTIVITY CATEGORY FORM
FUEL BURNING OPERATION

This form is to be completed for each fuel burning operation. State/Federal regulations which may apply to fuel burning operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list

1. Reason this form is being submitted (check one)

   ☒ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. B001)________

2. Maximum Operating Schedule: 24 hours per day; 365 days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. ____________

3. Input Capacity (million Btu/hr):

Rated *(Indicate units if other than mmBtu/hr)*	Maximum *(Indicate units if other than mmBtu/hr)*	Normal *(Indicate units if other than mmBtu/hr)*
154.0	154.0	154.0

4. Output Capacity:

Rated *(lb steam/hr)*	Maximum *(lb steam/hr)*	Normal *(lb steam/hr)*

   ☒ Not applicable - operation does not produce steam.

5. Percent of Operating Time Used for:

   Process: 100 %
   Space Heat: ______%

6. Type of Draft (check one):

   ☐ Natural ☐ Induced ☒ Forced

7. Type of combustion monitoring (check one):

   ☐ Fuel/Air Ratio ☐ Oxygen ☐ None
   ☒ Other (describe) TO BE DETERMINED

8. Type of Fuel Fired (complete all that apply):

Fuel*	Fired as...	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup				tons	lbs	lbs
No. 2 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
No. 6 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
Other** Oil	☐ Primary ☐ Backup				gal	gal	gal
Natural Gas	☐ Primary ☒ Backup	950		0.05	1,400 MMSCF	162,000 SCF	222,000 SCF
Wood	☐ Primary ☐ Backup				tons	lbs	lbs
LPG	☐ Primary ☐ Backup				gal	gal	gal
Other**	☒ Primary ☐ Backup	487.5	NIL	0.001	2,800 MMSCF	316,000 SCF	433,000 SCF
Other**	☐ Primary ☐ Backup						

* Please identify all combinations of fuels that are co-fired: ______________________

** Identify other fuel(s): TAILGAS

Coal-Fired Units

9. Type of Coal Firing (check one):

☐ Pulverized-Wet Bottom ☐ Hand-Fired ☐ Chain Grate ☐ Traveling Grate
☐ Pulverized-Dry Bottom ☐ Cyclones ☐ Spreader Stoker ☐ Fluidized Bed
☐ Underfeed Stoker ☐ Other (describe) ______________________

10. Flyash Reinjection:

☐ Yes ☐ No

11. Overfire Air:

☐ Yes ☐ No

Oil-Fired Units

12. Oil Preheater:

☐ Yes - Indicate Temperature________deg. F
☐ No

Section II - Specific Air Contaminant Source Information

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

1. Company identification (name for air contaminant source for which you are applying): PRODUCT UPGRADE SYSTEM

2. List all equipment that are part of this air contaminant source: HYDROCRACKER/PRODUCT FRACTIONATOR WITH PRODUCTION FRACTIONATION FEED HEATER (24 MMBtu/hr), HYDROCRACKER FEED OIL HEATER (21 MMBtu/hr), HYDROCRACKER FEED HYDROGEN HEATER (20 MMBtu/hr), CONTROLLED BY COMMON SCR DEVICE

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

   When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 **OR** after issuance of PTI ______________

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line # 8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	4.7	4.7	20.7	4.7	20.7
PM_{10} (PM < 10 microns in diameter)	4.7	4.7	20.7	4.7	20.7
Sulfur dioxide (SO_2)	0.4	0.4	1.6	0.4	1.6
Nitrogen oxides (NO_x)	140	16.8	73.6	16.8	73.6
Carbon monoxide (CO)	51.9	51.9	227.3	51.9	227.3
Organic compounds (OC)	3.4	3.4	14.9	3.4	14.9
Volatile organic compounds (VOC)	3.4	3.4	14.9	3.4	14.9
Total HAPs	1.2	1.2	5.1	1.2	5.1
Highest single HAP: (hexane)	1.1	1.1	4.9	1.1	4.9
Air Toxics (see instructions):					

Section II - Specific Air Contaminant Source Information

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

5. **Does this air contaminant source employ emissions control equipment?**

☒ **Yes** - fill out the applicable information below.

☐ **No** - proceed to item # 6.

Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = SO_2; Nitrogen oxides = NOx; Carbon monoxide = CO

☐ **Cyclone/Multiclone**

Manufacturer: ____________ Year installed: ____________

What do you call this control equipment: ____________

Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________

Estimated capture efficiency (%): ________ Basis for efficiency: ____________

Design control efficiency (%): ________ Basis for efficiency: ____________

Type: ☐ Cyclone ☐ Multiclone ☐ Rotoclone ☐ Other ____________

☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Fabric Filter/Baghouse**

Manufacturer: ____________ Year installed: ____________

What do you call this control equipment: ____________

Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________

Estimated capture efficiency (%): ________ Basis for efficiency: ____________

Design control efficiency (%): ________ Basis for efficiency: ____________

Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________

Pressure type: ☐ Negative pressure ☐ Positive pressure

Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other ____________

☐ Lime injection or fabric coating agent used: Type: ________ Feed rate: ________

☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Wet Scrubber**

Manufacturer: ____________ Year installed: ____________

What do you call this control equipment: ____________

Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________

Estimated capture efficiency (%): ________ Basis for efficiency: ____________

Design control efficiency (%): ________ Basis for efficiency: ____________

Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other ____________

Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________

pH range for scrubbing liquid: Minimum: ________ Maximum: ________

Scrubbing liquid flow rate (gal/min): ________

Is scrubber liquid recirculated? ☐ Yes ☐ No

Water supply pressure (psig): ________ NOTE: This item for spray chambers only.

☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Electrostatic Precipitator**

Manufacturer: ____________ Year installed: ____________

What do you call this control equipment: ____________

Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________

Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design control efficiency (%):__________ Basis for efficiency: ____________________
Type: ☐ Plate-wire ☐ Flat-plate ☐ Tubular ☐ Wet ☐ Other __________
Number of operating fields: __________

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Concentrator**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design regeneration cycle time (minutes): __________
Minimum desorption air stream temperature (°F): ________
Rotational rate (revolutions/hour): __________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Catalytic Incinerator**

Manufacturer: Year installed:
What do you call this control equipment:
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other
Estimated capture efficiency (%): Basis for efficiency:
Design control efficiency (%): Basis for efficiency:
Minimum inlet gas temperature (°F):
Combustion chamber residence time (seconds):
Minimum temperature difference (°F) across catalyst during air contaminant source operation:
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Thermal Incinerator/Thermal Oxidizer**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design control efficiency (%):__________ Basis for efficiency: ____________________
Minimum operating temperature (°F) and location: ______________________ (See line by line instructions.)
Combustion chamber residence time (seconds): __________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Flare**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design control efficiency (%):__________ Basis for efficiency: ____________________
Type: ☐ Enclosed ☐ Elevated (open)
Ignition device: ☐ Electric arc ☐ Pilot flame
Flame presence sensor: ☐ Yes ☐ No

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Condenser**

Manufacturer: ______________ Year installed: ______________
What do you call this control equipment: ______________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):__________ Basis for efficiency: ______________
Design control efficiency (%):__________ Basis for efficiency: ______________

Type: ☐ Indirect contact ☐ Direct contact
Maximum exhaust gas temperature (°F) during air contaminant source operation: ________
Coolant type: ______________
Design coolant temperature (°F): Minimum __________ Maximum __________
Design coolant flow rate (gpm): ______________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Carbon Absorber**

Manufacturer: ______________ Year installed: ______________
What do you call this control equipment: ______________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):__________ Basis for efficiency: ______________
Design control efficiency (%):__________ Basis for efficiency: ______________
Type: ☐ On-site regenerative ☐ Disposable
Maximum design outlet organic compound concentration (ppmv): ______________
Carbon replacement frequency or regeneration cycle time (specify units): ______________
Maximum temperature of the carbon bed, after regeneration (including any cooling cycle): __________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Dry Scrubber**

Manufacturer: ______________ Year installed: ______________
What do you call this control equipment: ______________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):__________ Basis for efficiency: ______________
Design control efficiency (%):__________ Basis for efficiency: ______________
Reagent(s) used: Type: ______________ Injection rate(s): ______________
Operating pressure drop range (inches of water): Minimum: __________ Maximum: __________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Paint booth filter**

Type: ☐ Paper ☐ Fiberglass ☐ Water curtain ☐ Other ______________
Design control efficiency (%):__________ Basis for efficiency: ______________

☒ **Other,** describe ULTRA LOW NOx BURNERS + SELECTIVE CATALYTIC REDUCTION

Manufacturer: NOT YET SELECTED Year installed: 2008
What do you call this control equipment: ULTRA LOW NOx BURNERS + SELECTIVE CATALYTIC REDUCTION
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☒ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%): 100 Basis for efficiency: ENGINEERING DESIGN
Design control efficiency (%): >88 Basis for efficiency: EPA

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☒ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

---

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

   Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

   - Particulate Matter (PM10): 10 tons per year
   - Sulfur Dioxide (SO2): 25 tons per year
   - Nitrogen Oxides (NOx): 25 tons per year
   - Carbon Monoxide (CO): 100 tons per year
   - Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

   Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information

Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
PRODUCT UPGRADE SYSTEM	A	ROUND 3.28 FT	75	700	36,000	700

*Type codes for stack egress points:

A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

Table 7-B, Fugitive Egress Point Information					
Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
NA					

*Type codes for fugitive egress point:

D. door or window
E. other opening in the building without a duct
F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Information (Add rows as necessary)			
Company ID or Name for the Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)
PRODUCT UPGRADE SYSTEM	328 (Gasifier)	120 (Gasifier)	1,400 (6 Gasifiers)

8. Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific requirements listed below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?

☐ yes
☒ no
☐ not sure - please contact me if this affects me

If yes, why are you requesting federally enforceable limits? Check all that apply.

a. ☐ to avoid being a major source (see OAC rule 3745-77-01)
b. ☐ to avoid being a major MACT source (see OAC rule 3745-31-01)
c. ☐ to avoid being a major modification (see OAC rule 3745-31-01)
d. ☐ to avoid being a major stationary source (see OAC rule 3745-31-01)
e. ☐ to avoid an air dispersion modeling requirement (see Engineering Guide # 69)
f. ☐ to avoid another requirement. Describe: ______________________

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable performance specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
PRODUCT UPGRADE SYSTEM	NONE (ANALYTICAL TESTING OF FUEL GAS)	NONE (162 ppmv [3-hr avg.], 60 ppmv [daily avg], H_2S IN FUEL GAS	H_2S IN FUEL GAS

10. Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03 or OAC rule 3745-31-05?

☐ yes - Note: notification requirements in rules cited above must be followed.
☒ no

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

FOR OHIO EPA USE
FACILITY ID: ______________
EU ID: __________ PTI #: __________

EMISSIONS ACTIVITY CATEGORY FORM
FUEL BURNING OPERATION

This form is to be completed for each fuel burning operation. State/Federal regulations which may apply to fuel burning operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list

1. Reason this form is being submitted (check one)

   ☒ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. B001)________

2. Maximum Operating Schedule: 24 hours per day; 365 days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. ______________________

3. Input Capacity (million Btu/hr):

Rated *(Indicate units if other than mmBtu/hr)*	Maximum *(Indicate units if other than mmBtu/hr)*	Normal *(Indicate units if other than mmBtu/hr)*
24.0	24.0	24.0

4. Output Capacity:

Rated *(lb steam/hr)*	Maximum *(lb steam/hr)*	Normal *(lb steam/hr)*

   ☒ Not applicable - operation does not produce steam.

5. Percent of Operating Time Used for:

   Process: 100 %
   Space Heat: 0 %

6. Type of Draft (check one):

   ☐ Natural ☐ Induced ☒ Forced

7. Type of combustion monitoring (check one):

   ☐ Fuel/Air Ratio ☐ Oxygen ☐ None
   ☒ Other (describe) TO BE DETERMINED

8. Type of Fuel Fired (complete all that apply):

Fuel*	Fired as...	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup				tons	lbs	lbs
No. 2 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
No. 6 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
Other** Oil	☐ Primary ☐ Backup				gal	gal	gal
Natural Gas	☐ Primary ☒ Backup	950		0.05	220 MMSCF	25,300 SCF	35,000 SCF
Wood	☐ Primary ☐ Backup				tons	lbs	lbs
LPG	☐ Primary ☐ Backup				gal	gal	gal
Other**	☒ Primary ☐ Backup	487.5	NIL	0.001	430 MMSCF	49,200 SCF	67,400 SCF
Other**	☐ Primary ☐ Backup						

* Please identify all combinations of fuels that are co-fired: ______________________

** Identify other fuel(s): TAILGAS

Coal-Fired Units

9. Type of Coal Firing (check one):

☐ Pulverized-Wet Bottom ☐ Hand-Fired ☐ Chain Grate ☐ Traveling Grate
☐ Pulverized-Dry Bottom ☐ Cyclones ☐ Spreader Stoker ☐ Fluidized Bed
☐ Underfeed Stoker ☐ Other (describe) ______________________

10. Flyash Reinjection:

☐ Yes ☐ No

11. Overfire Air:

☐ Yes ☐ No

Oil-Fired Units

12. Oil Preheater:

☐ Yes - Indicate Temperature_______deg. F
☐ No

FOR OHIO EPA USE
FACILITY ID: ______________
EU ID: __________ PTI #: __________

EMISSIONS ACTIVITY CATEGORY FORM
FUEL BURNING OPERATION

This form is to be completed for each fuel burning operation. State/Federal regulations which may apply to fuel burning operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list

1. Reason this form is being submitted (check one)

   ☒ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. B001)________

2. Maximum Operating Schedule: 24 hours per day; 365 days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. ______________________

3. Input Capacity (million Btu/hr):

Rated *(Indicate units if other than mmBtu/hr)*	Maximum *(Indicate units if other than mmBtu/hr)*	Normal *(Indicate units if other than mmBtu/hr)*
21.0	21.0	21.0

4. Output Capacity:

Rated *(lb steam/hr)*	Maximum *(lb steam/hr)*	Normal *(lb steam/hr)*

   ☒ Not applicable - operation does not produce steam.

5. Percent of Operating Time Used for:

   Process: 100 %
   Space Heat: _______%

6. Type of Draft (check one):

   ☐ Natural ☐ Induced ☒ Forced

7. Type of combustion monitoring (check one):

   ☐ Fuel/Air Ratio ☐ Oxygen ☐ None
   ☒ Other (describe) TO BE DETERMINED

8. Type of Fuel Fired (complete all that apply):

Fuel*	Fired as...	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup				tons	lbs	lbs
No. 2 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
No. 6 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
Other** Oil	☐ Primary ☐ Backup				gal	gal	gal
Natural Gas	☐ Primary ☒ Backup	950		0.05	195 MMSCF	22,100 SCF	30,300 SCF
Wood	☐ Primary ☐ Backup				tons	lbs	lbs
LPG	☐ Primary ☐ Backup				gal	gal	gal
Other**	☒ Primary ☐ Backup	487.5	NIL	0.001	380 MMSCF	43,000 SCF	59,000 SCF
Other**	☐ Primary ☐ Backup						

* Please identify all combinations of fuels that are co-fired: ____________________

** Identify other fuel(s): TAILGAS

Coal-Fired Units

9. Type of Coal Firing (check one):

☐ Pulverized-Wet Bottom ☐ Hand-Fired ☐ Chain Grate ☐ Traveling Grate
☐ Pulverized-Dry Bottom ☐ Cyclones ☐ Spreader Stoker ☐ Fluidized Bed
☐ Underfeed Stoker ☐ Other (describe) ____________________

10. Flyash Reinjection:

☐ Yes ☐ No

11. Overfire Air:

☐ Yes ☐ No

Oil-Fired Units

12. Oil Preheater:

☐ Yes - Indicate Temperature________deg. F
☐ No

FOR OHIO EPA USE
FACILITY ID: ________________
EU ID: __________ PTI #: __________

EMISSIONS ACTIVITY CATEGORY FORM
FUEL BURNING OPERATION

This form is to be completed for each fuel burning operation. State/Federal regulations which may apply to fuel burning operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list

1. Reason this form is being submitted (check one)

   ☒ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. B001)________

2. Maximum Operating Schedule: 24 hours per day; 365 days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. ____________________

3. Input Capacity (million Btu/hr):

Rated *(Indicate units if other than mmBtu/hr)*	Maximum *(Indicate units if other than mmBtu/hr)*	Normal *(Indicate units if other than mmBtu/hr)*
20.0	20.0	20.0

4. Output Capacity:

Rated *(lb steam/hr)*	Maximum *(lb steam/hr)*	Normal *(lb steam/hr)*

   ☒ Not applicable - operation does not produce steam.

5. Percent of Operating Time Used for:

   Process: 100 %
   Space Heat: _______%

6. Type of Draft (check one):

   ☐ Natural ☐ Induced ☒ Forced

7. Type of combustion monitoring (check one):

   ☐ Fuel/Air Ratio ☐ Oxygen ☐ None
   ☒ Other (describe) TO BE DETERMINED

8. Type of Fuel Fired (complete all that apply):

Fuel*	Fired as...	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup				tons	lbs	lbs
No. 2 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
No. 6 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
Other** Oil	☐ Primary ☐ Backup				gal	gal	gal
Natural Gas	☐ Primary ☒ Backup	950		0.05	185 MMSCF	21,000 SCF	29,000 SCF
Wood	☐ Primary ☐ Backup				tons	lbs	lbs
LPG	☐ Primary ☐ Backup				gal	gal	gal
Other**	☒ Primary ☐ Backup	487.5	NIL	0.001	360 MMSCF	41,000 SCF	56,200 SCF
Other**	☐ Primary ☐ Backup						

* Please identify all combinations of fuels that are co-fired: ______________________

** Identify other fuel(s): TAILGAS

Coal-Fired Units

9. Type of Coal Firing (check one):

☐ Pulverized-Wet Bottom ☐ Hand-Fired ☐ Chain Grate ☐ Traveling Grate
☐ Pulverized-Dry Bottom ☐ Cyclones ☐ Spreader Stoker ☐ Fluidized Bed
☐ Underfeed Stoker ☐ Other (describe) ______________________

10. Flyash Reinjection:

☐ Yes ☐ No

11. Overfire Air:

☐ Yes ☐ No

Oil-Fired Units

12. Oil Preheater:

☐ Yes - Indicate Temperature________deg. F
☐ No

Section II - Specific Air Contaminant Source Information

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

1. Company identification (name for air contaminant source for which you are applying): FISCHER-TROPSCH CATALYST ROTARY DRYER

2. List all equipment that are part of this air contaminant source: ROTARY DRYER WITH NITROGEN HEATER (4 MMBtu/hr) AND HOT OIL HEATER (4 MMBtu/hr)

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

   When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 **OR** after issuance of PTI ____________

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line # 8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	0.18	0.18	0.8	0.18	0.8
PM_{10} (PM < 10 microns in diameter)	0.18	0.18	0.8	0.18	0.8
Sulfur dioxide (SO_2)	0.02	0.02	0.08	0.02	0.08
Nitrogen oxides (NO_x)	2.26	2.26	9.8	2.26	9.8
Carbon monoxide (CO)	1.8	1.8	8.4	1.8	8.4
Organic compounds (OC)	0.12	0.12	0.6	0.12	0.6
Volatile organic compounds (VOC)	0.12	0.12	0.6	0.12	0.6
Total HAPs	0.04	0.04	0.18	0.04	0.18
Highest single HAP: (hexane)	0.04	0.04	0.18	0.04	0.18
Air Toxics (see instructions):	0.04	0.04	0.18	0.04	0.18

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

Section II - Specific Air Contaminant Source Information

5. **Does this air contaminant source employ emissions control equipment?**

☐ **Yes** - fill out the applicable information below.

☒ **No** - proceed to item # 6.

Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = SO_2; Nitrogen oxides = NOx; Carbon monoxide = CO

☐ **Cyclone/Multiclone**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Type: ☐ Cyclone ☐ Multiclone ☐ Rotoclone ☐ Other ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Fabric Filter/Baghouse**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
Pressure type: ☐ Negative pressure ☐ Positive pressure
Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other ____________
☐ Lime injection or fabric coating agent used: Type: ________ Feed rate: ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Wet Scrubber**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other ____________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
pH range for scrubbing liquid: Minimum: ________ Maximum: ________
Scrubbing liquid flow rate (gal/min): ________
Is scrubber liquid recirculated? ☐ Yes ☐ No
Water supply pressure (psig): ________ NOTE: This item for spray chambers only.
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Electrostatic Precipitator**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Type: ☐ Plate-wire ☐ Flat-plate ☐ Tubular ☐ Wet ☐ Other ________

Number of operating fields: ___________

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Concentrator**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design regeneration cycle time (minutes): ________
Minimum desorption air stream temperature (°F): ________
Rotational rate (revolutions/hour): ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Catalytic Incinerator**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________
Minimum inlet gas temperature (°F): ________
Combustion chamber residence time (seconds): ________
Minimum temperature difference (°F) across catalyst during air contaminant source operation: ______
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Thermal Incinerator/Thermal Oxidizer**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________
Minimum operating temperature (°F) and location: ____________ (See line by line instructions.)
Combustion chamber residence time (seconds): ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Flare**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________
Type: ☐ Enclosed ☐ Elevated (open)
Ignition device: ☐ Electric arc ☐ Pilot flame
Flame presence sensor: ☐ Yes ☐ No
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Condenser**
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________

Type: ☐ Indirect contact ☐ Direct contact
Maximum exhaust gas temperature (°F) during air contaminant source operation: ________
Coolant type: ____________
Design coolant temperature (°F): Minimum ________ Maximum ________
Design coolant flow rate (gpm): ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Carbon Absorber**
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________
Type: ☐ On-site regenerative ☐ Disposable
Maximum design outlet organic compound concentration (ppmv): ____________
Carbon replacement frequency or regeneration cycle time (specify units): ____________
Maximum temperature of the carbon bed, after regeneration (including any cooling cycle): ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Dry Scrubber**
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________
Reagent(s) used: Type: ____________ Injection rate(s): ____________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Paint booth filter**
Type: ☐ Paper ☐ Fiberglass ☐ Water curtain ☐ Other ____________
Design control efficiency (%):________ Basis for efficiency: ____________

☐ **Other**, describe ____________
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________

Design control efficiency (%):________ Basis for efficiency: ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

   Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

   - Particulate Matter (PM10): 10 tons per year
   - Sulfur Dioxide (SO2): 25 tons per year
   - Nitrogen Oxides (NOx): 25 tons per year
   - Carbon Monoxide (CO): 100 tons per year
   - Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

   Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information

Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code *	Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
FISCHER-TROPSCH CATALYST ROTARY DRYER	A	ROUND 10-INCH ID	75	650	2,200	700

*Type codes for stack egress points:

A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

Table 7-B, Fugitive Egress Point Information

Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
NA					

*Type codes for fugitive egress point:

D. door or window
E. other opening in the building without a duct
F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Information (Add rows as necessary)

Company ID or Name for the Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)
FISCHER-TROPSCH CATALYST ROTARY DRYER	328 (GASIFIER)	120	1,400

8. Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific requirements listed below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?

☐ yes
☒ no
☐ not sure - please contact me if this affects me

If yes, why are you requesting federally enforceable limits? Check all that apply.

a. ☐ to avoid being a major source (see OAC rule 3745-77-01)
b. ☐ to avoid being a major MACT source (see OAC rule 3745-31-01)
c. ☐ to avoid being a major modification (see OAC rule 3745-31-01)
d. ☐ to avoid being a major stationary source (see OAC rule 3745-31-01)
e. ☐ to avoid an air dispersion modeling requirement (see Engineering Guide # 69)
f. ☐ to avoid another requirement. Describe: ____________________

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable performance specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
NA			

10. Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03 or OAC rule 3745-31-05?

☐ yes - Note: notification requirements in rules cited above must be followed.
☒ no

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

FOR OHIO EPA USE
FACILITY ID: ______________________

EU ID: ____________ PTI #:______________

EMISSIONS ACTIVITY CATEGORY FORM
FUEL BURNING OPERATION

This form is to be completed for each fuel burning operation. State/Federal regulations which may apply to fuel burning operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list

1. Reason this form is being submitted (check one)

☒ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. B001)________

2. Maximum Operating Schedule: 24 hours per day; 365 days per year

If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. ______________________________

3. Input Capacity (million Btu/hr):

Rated *(Indicate units if other than mmBtu/hr)*	Maximum *(Indicate units if other than mmBtu/hr)*	Normal *(Indicate units if other than mmBtu/hr)*
4.0	4.0	4.0

4. Output Capacity:

Rated *(lb steam/hr)*	Maximum *(lb steam/hr)*	Normal *(lb steam/hr)*

☒ Not applicable - operation does not produce steam.

5. Percent of Operating Time Used for:

Process: 100 %
Space Heat: 0 %

6. Type of Draft (check one):

☒ Natural ☐ Induced ☐ Forced

7. Type of combustion monitoring (check one):

☐ Fuel/Air Ratio ☐ Oxygen ☐ None
☒ Other (describe) TO BE DETERMINED

8. Type of Fuel Fired (complete all that apply):

Fuel*	Fired as...	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup				tons	lbs	lbs
No. 2 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
No. 6 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
Other** Oil	☐ Primary ☐ Backup				gal	gal	gal
Natural Gas	☐ Primary ☒ Backup	950		0.05	36.9 MMSCF	4,211 SCF	4,211 SCF
Wood	☐ Primary ☐ Backup				tons	lbs	lbs
LPG	☐ Primary ☐ Backup				gal	gal	gal
Other**	☒ Primary ☐ Backup	487.5	NIL	0.001	71.9 MMSCF	8,205 SCF	8,205 SCF
Other**	☐ Primary ☐ Backup						

* Please identify all combinations of fuels that are co-fired: ______________________

** Identify other fuel(s): TAILGAS OR NATURAL GAS

Coal-Fired Units

9. Type of Coal Firing (check one):

☐ Pulverized-Wet Bottom ☐ Hand-Fired ☐ Chain Grate ☐ Traveling Grate
☐ Pulverized-Dry Bottom ☐ Cyclones ☐ Spreader Stoker ☐ Fluidized Bed
☐ Underfeed Stoker ☐ Other (describe) ______________________

10. Flyash Reinjection:

☐ Yes ☐ No

11. Overfire Air:

☐ Yes ☐ No

Oil-Fired Units

12. Oil Preheater:

☐ Yes - Indicate Temperature_______deg. F
☐ No

FOR OHIO EPA USE
FACILITY ID: ______________
EU ID: __________ PTI #:__________

EMISSIONS ACTIVITY CATEGORY FORM
FUEL BURNING OPERATION

This form is to be completed for each fuel burning operation. State/Federal regulations which may apply to fuel burning operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list

1. Reason this form is being submitted (check one)

☒ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. B001)________

2. Maximum Operating Schedule: 24 hours per day; 365 days per year

If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. ______________________

3. Input Capacity (million Btu/hr):

Rated *(Indicate units if other than mmBtu/hr)*	Maximum *(Indicate units if other than mmBtu/hr)*	Normal *(Indicate units if other than mmBtu/hr)*
4.0	4.0	4.0

4. Output Capacity:

Rated *(lb steam/hr)*	Maximum *(lb steam/hr)*	Normal *(lb steam/hr)*

☒ Not applicable - operation does not produce steam.

5. Percent of Operating Time Used for:

Process: 100 %
Space Heat: 0 %

6. Type of Draft (check one):

☒ Natural ☐ Induced ☐ Forced

7. Type of combustion monitoring (check one):

☐ Fuel/Air Ratio ☐ Oxygen ☐ None
☒ Other (describe) TO BE DETERMINED

8. Type of Fuel Fired (complete all that apply):

Fuel*	Fired as...	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup				tons	lbs	lbs
No. 2 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
No. 6 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
Other** Oil	☐ Primary ☐ Backup				gal	gal	gal
Natural Gas	☐ Primary ☒ Backup	950		0.05	36.9 MMSCF	4,211 SCF	4,211 SCF
Wood	☐ Primary ☐ Backup				tons	lbs	lbs
LPG	☐ Primary ☐ Backup				gal	gal	gal
Other**	☒ Primary ☐ Backup	487.5	NIL	0.001	71.9 MMSCF	8,205 SCF	8,205 SCF
Other**	☐ Primary ☐ Backup						

* Please identify all combinations of fuels that are co-fired: ______________________

** Identify other fuel(s): TAILGAS OR NATURAL GAS

Coal-Fired Units

9. Type of Coal Firing (check one):

☐ Pulverized-Wet Bottom ☐ Hand-Fired ☐ Chain Grate ☐ Traveling Grate
☐ Pulverized-Dry Bottom ☐ Cyclones ☐ Spreader Stoker ☐ Fluidized Bed
☐ Underfeed Stoker ☐ Other (describe) ______________________

10. Flyash Reinjection:

☐ Yes ☐ No

11. Overfire Air:

☐ Yes ☐ No

Oil-Fired Units

12. Oil Preheater:

☐ Yes - Indicate Temperature ________ deg. F
☐ No

Section II - Specific Air Contaminant Source Information

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

1. Company identification (name for air contaminant source for which you are applying): HYDROGEN STRIPPING HEATER (4 MMBtu/hr)

2. List all equipment that are part of this air contaminant source: HYDROGEN STRIPPING HEATER (4 MMBtu/hr)

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

   When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 **OR** after issuance of PTI ____________

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line # 8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	0.09	0.09	0.4	0.09	0.4
PM_{10} (PM < 10 microns in diameter)	0.09	0.09	0.4	0.09	0.4
Sulfur dioxide (SO_2)	0.01	0.01	0.04	0.01	0.04
Nitrogen oxides (NO_x)	1.13	1.13	4.9	1.13	4.9
Carbon monoxide (CO)	0.9	0.9	4.2	0.9	4.2
Organic compounds (OC)	0.06	0.06	0.3	0.06	0.3
Volatile organic compounds (VOC)	0.06	0.06	0.3	0.06	0.3
Total HAPs	0.02	0.02	0.09	0.02	0.09
Highest single HAP: (hexane)	0.02	0.02	0.09	0.02	0.09
Air Toxics (see instructions):	0.02	0.02	0.09	0.02	0.09

Section II - Specific Air Contaminant Source Information

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

5. **Does this air contaminant source employ emissions control equipment?**

☐ **Yes** - fill out the applicable information below.

☒ **No** - proceed to item # 6.

Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = SO_2; Nitrogen oxides = NOx; Carbon monoxide = CO

☐ **Cyclone/Multiclone**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Type: ☐ Cyclone ☐ Multiclone ☐ Rotoclone ☐ Other ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Fabric Filter/Baghouse**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
Pressure type: ☐ Negative pressure ☐ Positive pressure
Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other ____________
☐ Lime injection or fabric coating agent used: Type: ________ Feed rate: ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Wet Scrubber**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other ____________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
pH range for scrubbing liquid: Minimum: ________ Maximum: ________
Scrubbing liquid flow rate (gal/min): ________
Is scrubber liquid recirculated? ☐ Yes ☐ No
Water supply pressure (psig): ________ NOTE: This item for spray chambers only.
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Electrostatic Precipitator**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________

Estimated capture efficiency (%):__________ Basis for efficiency: __________
Design control efficiency (%):__________ Basis for efficiency: __________
Type: ☐ Plate-wire ☐ Flat-plate ☐ Tubular ☐ Wet ☐ Other __________
Number of operating fields: __________

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Concentrator**

Manufacturer: __________ Year installed: __________
What do you call this control equipment: __________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other __________
Estimated capture efficiency (%):__________ Basis for efficiency: __________
Design regeneration cycle time (minutes): __________
Minimum desorption air stream temperature (^oF): __________
Rotational rate (revolutions/hour): __________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Catalytic Incinerator**

Manufacturer: __________ Year installed: __________
What do you call this control equipment: __________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other __________
Estimated capture efficiency (%):__________ Basis for efficiency: __________
Design control efficiency (%):__________ Basis for efficiency: __________
Minimum inlet gas temperature (^oF): __________
Combustion chamber residence time (seconds): __________
Minimum temperature difference (^oF) across catalyst during air contaminant source operation: __________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Thermal Incinerator/Thermal Oxidizer**

Manufacturer: __________ Year installed: __________
What do you call this control equipment: __________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other __________
Estimated capture efficiency (%):__________ Basis for efficiency: __________
Design control efficiency (%):__________ Basis for efficiency: __________
Minimum operating temperature (^oF) and location: __________ (See line by line instructions.)
Combustion chamber residence time (seconds): __________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Flare**

Manufacturer: __________ Year installed: __________
What do you call this control equipment: __________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other __________
Estimated capture efficiency (%):__________ Basis for efficiency: __________
Design control efficiency (%):__________ Basis for efficiency: __________
Type: ☐ Enclosed ☐ Elevated (open)
Ignition device: ☐ Electric arc ☐ Pilot flame
Flame presence sensor: ☐ Yes ☐ No
☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Condenser**
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________

Type: ☐ Indirect contact ☐ Direct contact
Maximum exhaust gas temperature (°F) during air contaminant source operation: ______
Coolant type: ____________
Design coolant temperature (°F): Minimum ________ Maximum ________
Design coolant flow rate (gpm): ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Carbon Absorber**
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________
Type: ☐ On-site regenerative ☐ Disposable
Maximum design outlet organic compound concentration (ppmv): ________
Carbon replacement frequency or regeneration cycle time (specify units): ________
Maximum temperature of the carbon bed, after regeneration (including any cooling cycle): ______
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Dry Scrubber**
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________
Reagent(s) used: Type: ____________ Injection rate(s): ____________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Paint booth filter**
Type: ☐ Paper ☐ Fiberglass ☐ Water curtain ☐ Other ____________
Design control efficiency (%):________ Basis for efficiency: ____________

☐ **Other**, describe ____________
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________

Design control efficiency (%):________ Basis for efficiency: ____________

Section II - Specific Air Contaminant Source Information

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

- Particulate Matter (PM10): 10 tons per year
- Sulfur Dioxide (SO2): 25 tons per year
- Nitrogen Oxides (NOx): 25 tons per year
- Carbon Monoxide (CO): 100 tons per year
- Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information

Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
HYDROGEN STRIPPING HEATER	A	ROUND 10-INCH ID	75	650	2,200	700

*Type codes for stack egress points:

A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

Table 7-B, Fugitive Egress Point Information

Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
NA					

*Type codes for fugitive egress point:

D. door or window
E. other opening in the building without a duct
F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Information (Add rows as necessary)

Company ID or Name for the Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)
HYDROGEN STRIPPING HEATER	328 (GASIFIER)	120	1,400

8. Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific requirements listed below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?

☐ yes
☒ no
☐ not sure - please contact me if this affects me

If yes, why are you requesting federally enforceable limits? Check all that apply.

a. ☐ to avoid being a major source (see OAC rule 3745-77-01)
b. ☐ to avoid being a major MACT source (see OAC rule 3745-31-01)
c. ☐ to avoid being a major modification (see OAC rule 3745-31-01)
d. ☐ to avoid being a major stationary source (see OAC rule 3745-31-01)
e. ☐ to avoid an air dispersion modeling requirement (see Engineering Guide # 69)
f. ☐ to avoid another requirement. Describe: ______________________

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable performance specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
NA			

10. Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03 or OAC rule 3745-31-05?

☐ yes - Note: notification requirements in rules cited above must be followed.
☒ no

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

FOR OHIO EPA USE
FACILITY ID: ______
EU ID: ______ PTI #: ______

EMISSIONS ACTIVITY CATEGORY FORM
FUEL BURNING OPERATION

This form is to be completed for each fuel burning operation. State/Federal regulations which may apply to fuel burning operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list

1. Reason this form is being submitted (check one)

   ☒ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. B001)________

2. Maximum Operating Schedule: 24 hours per day; 365 days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. ______________

3. Input Capacity (million Btu/hr):

Rated *(Indicate units if other than mmBtu/hr)*	Maximum *(Indicate units if other than mmBtu/hr)*	Normal *(Indicate units if other than mmBtu/hr)*
4.0	4.0	4.0

4. Output Capacity:

Rated *(lb steam/hr)*	Maximum *(lb steam/hr)*	Normal *(lb steam/hr)*

   ☒ Not applicable - operation does not produce steam.

5. Percent of Operating Time Used for:

   Process: 100 %
   Space Heat: 0 %

6. Type of Draft (check one):

   ☒ Natural ☐ Induced ☐ Forced

7. Type of combustion monitoring (check one):

   ☐ Fuel/Air Ratio ☐ Oxygen ☐ None
   ☒ Other (describe) TO BE DETERMINED

8. Type of Fuel Fired (complete all that apply):

Fuel*	Fired as...	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup				tons	lbs	lbs
No. 2 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
No. 6 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
Other** Oil	☐ Primary ☐ Backup				gal	gal	gal
Natural Gas	☐ Primary ☒ Backup	950		0.05	36.9 MMSCF	4,211 SCF	4,211 SCF
Wood	☐ Primary ☐ Backup				tons	lbs	lbs
LPG	☐ Primary ☐ Backup				gal	gal	gal
Other**	☒ Primary ☐ Backup	487.5	NIL	0.001	71.9 MMSCF	8,205 SCF	8,205 SCF
Other**	☐ Primary ☐ Backup						

* Please identify all combinations of fuels that are co-fired: ______________________

** Identify other fuel(s): TAILGAS OR NATURAL GAS

Coal-Fired Units

9. Type of Coal Firing (check one):

☐ Pulverized-Wet Bottom ☐ Hand-Fired ☐ Chain Grate ☐ Traveling Grate
☐ Pulverized-Dry Bottom ☐ Cyclones ☐ Spreader Stoker ☐ Fluidized Bed
☐ Underfeed Stoker ☐ Other (describe) ______________________

10. Flyash Reinjection:

☐ Yes ☐ No

11. Overfire Air:

☐ Yes ☐ No

Oil-Fired Units

12. Oil Preheater:

☐ Yes - Indicate Temperature_______deg. F
☐ No

Section II - Specific Air Contaminant Source Information

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

1. Company identification (name for air contaminant source for which you are applying): OXIDATION GAS HEATER (4 MMBtu/hr)

2. List all equipment that are part of this air contaminant source: OXIDATION GAS HEATER (4 MMBtu/hr)

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

   When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 **OR** after issuance of PTI ______________

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line # 8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	0.09	0.09	0.4	0.09	0.4
PM_{10} (PM < 10 microns in diameter)	0.09	0.09	0.4	0.09	0.4
Sulfur dioxide (SO_2)	0.01	0.01	0.04	0.01	0.04
Nitrogen oxides (NO_x)	1.13	1.13	4.9	1.13	4.9
Carbon monoxide (CO)	0.9	0.9	4.2	0.9	4.2
Organic compounds (OC)	0.06	0.06	0.3	0.06	0.3
Volatile organic compounds (VOC)	0.06	0.06	0.3	0.06	0.3
Total HAPs	0.02	0.02	0.09	0.02	0.09
Highest single HAP: (hexane)	0.02	0.02	0.09	0.02	0.09
Air Toxics (see instructions):	0.02	0.02	0.09	0.02	0.09

Section II - Specific Air Contaminant Source Information

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

5. **Does this air contaminant source employ emissions control equipment?**

☐ **Yes** - fill out the applicable information below.

☒ **No** - proceed to item # 6.

Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = SO_2; Nitrogen oxides = NOx; Carbon monoxide = CO

☐ **Cyclone/Multiclone**

Manufacturer: ______________ Year installed: ______________

What do you call this control equipment: ______________

Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________

Estimated capture efficiency (%): ________ Basis for efficiency: ______________

Design control efficiency (%): ________ Basis for efficiency: ______________

Type: ☐ Cyclone ☐ Multiclone ☐ Rotoclone ☐ Other ______________

☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Fabric Filter/Baghouse**

Manufacturer: ______________ Year installed: ______________

What do you call this control equipment: ______________

Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________

Estimated capture efficiency (%): ________ Basis for efficiency: ______________

Design control efficiency (%): ________ Basis for efficiency: ______________

Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________

Pressure type: ☐ Negative pressure ☐ Positive pressure

Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other ______________

☐ Lime injection or fabric coating agent used: Type: ________ Feed rate: ________

☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Wet Scrubber**

Manufacturer: ______________ Year installed: ______________

What do you call this control equipment: ______________

Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________

Estimated capture efficiency (%): ________ Basis for efficiency: ______________

Design control efficiency (%): ________ Basis for efficiency: ______________

Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other ______________

Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________

pH range for scrubbing liquid: Minimum: ________ Maximum: ________

Scrubbing liquid flow rate (gal/min): ________

Is scrubber liquid recirculated? ☐ Yes ☐ No

Water supply pressure (psig): ________ NOTE: This item for spray chambers only.

☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Electrostatic Precipitator**

Manufacturer: ______________ Year installed: ______________

What do you call this control equipment: ______________

Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________

Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design control efficiency (%):__________ Basis for efficiency: ____________________
Type: ☐ Plate-wire ☐ Flat-plate ☐ Tubular ☐ Wet ☐ Other ___________
Number of operating fields: ___________

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Concentrator**

Manufacturer: ______________________ Year installed: ______________________
What do you call this control equipment: ______________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design regeneration cycle time (minutes): ___________
Minimum desorption air stream temperature (°F): ________
Rotational rate (revolutions/hour): ___________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Catalytic Incinerator**

Manufacturer: ______________________ Year installed: ______________________
What do you call this control equipment: ______________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design control efficiency (%):__________ Basis for efficiency: ____________________
Minimum inlet gas temperature (°F): ___________
Combustion chamber residence time (seconds): ___________
Minimum temperature difference (°F) across catalyst during air contaminant source operation: _______
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Thermal Incinerator/Thermal Oxidizer**

Manufacturer: ______________________ Year installed: ______________________
What do you call this control equipment: ______________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design control efficiency (%):__________ Basis for efficiency: ____________________
Minimum operating temperature (°F) and location: _________________________ (See line by line instructions.)
Combustion chamber residence time (seconds): ___________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Flare**

Manufacturer: ______________________ Year installed: ______________________
What do you call this control equipment: ______________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design control efficiency (%):__________ Basis for efficiency: ____________________
Type: ☐ Enclosed ☐ Elevated (open)
Ignition device: ☐ Electric arc ☐ Pilot flame
Flame presence sensor: ☐ Yes ☐ No
☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Condenser**
Manufacturer: _______________ Year installed: _______________
What do you call this control equipment: _______________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other _______________
Estimated capture efficiency (%):_________ Basis for efficiency: _______________
Design control efficiency (%):_________ Basis for efficiency: _______________

Type: ☐ Indirect contact ☐ Direct contact
Maximum exhaust gas temperature (°F) during air contaminant source operation: _______
Coolant type: _______________
Design coolant temperature (°F): Minimum _________ Maximum _________
Design coolant flow rate (gpm): _______________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Carbon Absorber**
Manufacturer: _______________ Year installed: _______________
What do you call this control equipment: _______________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other _______________
Estimated capture efficiency (%):_________ Basis for efficiency: _______________
Design control efficiency (%):_________ Basis for efficiency: _______________
Type: ☐ On-site regenerative ☐ Disposable
Maximum design outlet organic compound concentration (ppmv): _______________
Carbon replacement frequency or regeneration cycle time (specify units): _______________
Maximum temperature of the carbon bed, after regeneration (including any cooling cycle): _________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Dry Scrubber**
Manufacturer: _______________ Year installed: _______________
What do you call this control equipment: _______________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other _______________
Estimated capture efficiency (%):_________ Basis for efficiency: _______________
Design control efficiency (%):_________ Basis for efficiency: _______________
Reagent(s) used: Type: _______________ Injection rate(s): _______________
Operating pressure drop range (inches of water): Minimum: _________ Maximum: _________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Paint booth filter**
Type: ☐ Paper ☐ Fiberglass ☐ Water curtain ☐ Other _______________
Design control efficiency (%):_________ Basis for efficiency: _______________

☐ **Other**, describe _______________
Manufacturer: _______________ Year installed: _______________
What do you call this control equipment: _______________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other _______________
Estimated capture efficiency (%):_________ Basis for efficiency: _______________

Design control efficiency (%):_________ Basis for efficiency: _______________

Section II - Specific Air Contaminant Source Information

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

- Particulate Matter (PM10): 10 tons per year
- Sulfur Dioxide (SO2): 25 tons per year
- Nitrogen Oxides (NOx): 25 tons per year
- Carbon Monoxide (CO): 100 tons per year
- Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information

Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
OXIDATION GAS HEATER	A	ROUND 10-INCH ID	75	650	2,200	700

*Type codes for stack egress points:

A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

Table 7-B, Fugitive Egress Point Information

Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
NA					

*Type codes for fugitive egress point:

D. door or window
E. other opening in the building without a duct
F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Information (Add rows as necessary)

Company ID or Name for the Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)
OXIDATION GAS HEATER	328 (GASIFIER)	120	1,400

8. Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific requirements listed below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?

☐ yes
☒ no
☐ not sure - please contact me if this affects me

If yes, why are you requesting federally enforceable limits? Check all that apply.

a. ☐ to avoid being a major source (see OAC rule 3745-77-01)
b. ☐ to avoid being a major MACT source (see OAC rule 3745-31-01)
c. ☐ to avoid being a major modification (see OAC rule 3745-31-01)
d. ☐ to avoid being a major stationary source (see OAC rule 3745-31-01)
e. ☐ to avoid an air dispersion modeling requirement (see Engineering Guide # 69)
f. ☐ to avoid another requirement. Describe: ____________________

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable performance specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
NA			

10. Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03 or OAC rule 3745-31-05?

☐ yes - Note: notification requirements in rules cited above must be followed.
☒ no

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

FOR OHIO EPA USE
FACILITY ID: ______________
EU ID: ______ PTI #: ______

EMISSIONS ACTIVITY CATEGORY FORM
FUEL BURNING OPERATION

This form is to be completed for each fuel burning operation. State/Federal regulations which may apply to fuel burning operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list

1. Reason this form is being submitted (check one)

   ☒ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. B001)________

2. Maximum Operating Schedule: 24 hours per day; 365 days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. ______________

3. Input Capacity (million Btu/hr):

Rated *(Indicate units if other than mmBtu/hr)*	Maximum *(Indicate units if other than mmBtu/hr)*	Normal *(Indicate units if other than mmBtu/hr)*
4.0	4.0	4.0

4. Output Capacity:

Rated *(lb steam/hr)*	Maximum *(lb steam/hr)*	Normal *(lb steam/hr)*

   ☒ Not applicable - operation does not produce steam.

5. Percent of Operating Time Used for:

   Process: 100 %
   Space Heat: 0 %

6. Type of Draft (check one):

   ☒ Natural ☐ Induced ☐ Forced

7. Type of combustion monitoring (check one):

   ☐ Fuel/Air Ratio ☐ Oxygen ☐ None
   ☒ Other (describe) TO BE DETERMINED

8. Type of Fuel Fired (complete all that apply):

Fuel*	Fired as...	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup				tons	lbs	lbs
No. 2 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
No. 6 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
Other** Oil	☐ Primary ☐ Backup				gal	gal	gal
Natural Gas	☐ Primary ☒ Backup	950		0.05	36.9 MMSCF	4,211 SCF	4,211 SCF
Wood	☐ Primary ☐ Backup				tons	lbs	lbs
LPG	☐ Primary ☐ Backup				gal	gal	gal
Other**	☒ Primary ☐ Backup	487.5	NIL	0.001	71.9 MMSCF	8,205 SCF	8,205 SCF
Other**	☐ Primary ☐ Backup						

* Please identify all combinations of fuels that are co-fired: ______________________________

** Identify other fuel(s): TAILGAS OR NATURAL GAS

Coal-Fired Units

9. Type of Coal Firing (check one):

☐ Pulverized-Wet Bottom ☐ Hand-Fired ☐ Chain Grate ☐ Traveling Grate
☐ Pulverized-Dry Bottom ☐ Cyclones ☐ Spreader Stoker ☐ Fluidized Bed
☐ Underfeed Stoker ☐ Other (describe) ______________________________

10. Flyash Reinjection:

☐ Yes ☐ No

11. Overfire Air:

☐ Yes ☐ No

Oil-Fired Units

12. Oil Preheater:

☐ Yes - Indicate Temperature_______deg. F
☐ No

Section II - Specific Air Contaminant Source Information

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

1. Company identification (name for air contaminant source for which you are applying): REDUCTION GAS HEATER (4 MMBtu/hr)

2. List all equipment that are part of this air contaminant source: REDUCTION GAS HEATER (4 MMBtu/hr)

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

   When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 **OR** after issuance of PTI ______________

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line # 8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	0.09	0.09	0.4	0.09	0.4
PM_{10} (PM < 10 microns in diameter)	0.09	0.09	0.4	0.09	0.4
Sulfur dioxide (SO_2)	0.0	0.0	0.0	0.0	0.0
Nitrogen oxides (NO_x)	1.13	1.13	4.9	1.13	4.9
Carbon monoxide (CO)	0.9	0.9	4.2	0.9	4.2
Organic compounds (OC)	0.06	0.06	0.3	0.06	0.3
Volatile organic compounds (VOC)	0.06	0.06	0.3	0.06	0.3
Total HAPs	0.02	0.02	0.09	0.02	0.09
Highest single HAP: (hexane)	0.02	0.02	0.09	0.02	0.09
Air Toxics (see instructions):	0.02	0.02	0.09	0.02	0.09

Section II - Specific Air Contaminant Source Information

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

5. **Does this air contaminant source employ emissions control equipment?**

☐ **Yes** - fill out the applicable information below.

☒ **No** - proceed to item # 6.

Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = SO_2; Nitrogen oxides = NOx; Carbon monoxide = CO

☐ **Cyclone/Multiclone**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Type: ☐ Cyclone ☐ Multiclone ☐ Rotoclone ☐ Other ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Fabric Filter/Baghouse**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
Pressure type: ☐ Negative pressure ☐ Positive pressure
Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other ________
☐ Lime injection or fabric coating agent used: Type: ________ Feed rate: ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Wet Scrubber**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other ________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
pH range for scrubbing liquid: Minimum: ________ Maximum: ________
Scrubbing liquid flow rate (gal/min): ________
Is scrubber liquid recirculated? ☐ Yes ☐ No
Water supply pressure (psig): ________ NOTE: This item for spray chambers only.
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Electrostatic Precipitator**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________

Estimated capture efficiency (%):__________ Basis for efficiency: ____________________
Design control efficiency (%):__________ Basis for efficiency: ____________________
Type: ☐ Plate-wire ☐ Flat-plate ☐ Tubular ☐ Wet ☐ Other ____________
Number of operating fields: ____________

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Concentrator**

Manufacturer: ______________________ Year installed: ______________________
What do you call this control equipment: ______________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):__________ Basis for efficiency: ____________________
Design regeneration cycle time (minutes): ____________
Minimum desorption air stream temperature (°F): __________
Rotational rate (revolutions/hour): ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Catalytic Incinerator**

Manufacturer: ______________________ Year installed: ______________________
What do you call this control equipment: ______________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):__________ Basis for efficiency: ____________________
Design control efficiency (%):__________ Basis for efficiency: ____________________
Minimum inlet gas temperature (°F): ____________
Combustion chamber residence time (seconds): ____________
Minimum temperature difference (°F) across catalyst during air contaminant source operation: ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Thermal Incinerator/Thermal Oxidizer**

Manufacturer: ______________________ Year installed: ______________________
What do you call this control equipment: ______________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):__________ Basis for efficiency: ____________________
Design control efficiency (%):__________ Basis for efficiency: ____________________
Minimum operating temperature (°F) and location: __________________________ (See line by line instructions.)
Combustion chamber residence time (seconds): ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Flare**

Manufacturer: ______________________ Year installed: ______________________
What do you call this control equipment: ______________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):__________ Basis for efficiency: ____________________
Design control efficiency (%):__________ Basis for efficiency: ____________________
Type: ☐ Enclosed ☐ Elevated (open)
Ignition device: ☐ Electric arc ☐ Pilot flame
Flame presence sensor: ☐ Yes ☐ No
☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Condenser**
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________

Type: ☐ Indirect contact ☐ Direct contact
Maximum exhaust gas temperature (°F) during air contaminant source operation: ________
Coolant type: ____________
Design coolant temperature (°F): Minimum ________ Maximum ________
Design coolant flow rate (gpm): ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Carbon Absorber**
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________
Type: ☐ On-site regenerative ☐ Disposable
Maximum design outlet organic compound concentration (ppmv): ____________
Carbon replacement frequency or regeneration cycle time (specify units): ____________
Maximum temperature of the carbon bed, after regeneration (including any cooling cycle): ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Dry Scrubber**
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________
Reagent(s) used: Type: ____________ Injection rate(s): ____________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Paint booth filter**
Type: ☐ Paper ☐ Fiberglass ☐ Water curtain ☐ Other ____________
Design control efficiency (%):________ Basis for efficiency: ____________

☐ **Other**, describe ____________
Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________

Design control efficiency (%):________ Basis for efficiency: ____________

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

   Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

   - Particulate Matter (PM10): 10 tons per year
   - Sulfur Dioxide (SO2): 25 tons per year
   - Nitrogen Oxides (NOx): 25 tons per year
   - Carbon Monoxide (CO): 100 tons per year
   - Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

   Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information

Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
REDUCTION GAS HEATER	A	ROUND 10-INCH ID	75	650	2,200	700

*Type codes for stack egress points:

A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

Table 7-B, Fugitive Egress Point Information

Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
NA					

*Type codes for fugitive egress point:

D. door or window
E. other opening in the building without a duct
F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Information (Add rows as necessary)

Company ID or Name for the Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)
REDUCTION GAS HEATER	328 (GASIFIER)	120	1,400

8. Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific requirements listed below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?

☐ yes
☒ no
☐ not sure - please contact me if this affects me

If yes, why are you requesting federally enforceable limits? Check all that apply.

a. ☐ to avoid being a major source (see OAC rule 3745-77-01)
b. ☐ to avoid being a major MACT source (see OAC rule 3745-31-01)
c. ☐ to avoid being a major modification (see OAC rule 3745-31-01)
d. ☐ to avoid being a major stationary source (see OAC rule 3745-31-01)
e. ☐ to avoid an air dispersion modeling requirement (see Engineering Guide # 69)
f. ☐ to avoid another requirement. Describe: ______________________

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable performance specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
NA			

10. Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03 or OAC rule 3745-31-05?

☐ yes - Note: notification requirements in rules cited above must be followed.
☒ no

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

FOR OHIO EPA USE
FACILITY ID: ____________
EU ID: ____________ PTI #: ____________

EMISSIONS ACTIVITY CATEGORY FORM
FUEL BURNING OPERATION

This form is to be completed for each fuel burning operation. State/Federal regulations which may apply to fuel burning operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list

1. Reason this form is being submitted (check one)

   ☒ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. B001)________

2. Maximum Operating Schedule: 24 hours per day; 365 days per year

   If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. ____________

3. Input Capacity (million Btu/hr):

Rated *(Indicate units if other than mmBtu/hr)*	Maximum *(Indicate units if other than mmBtu/hr)*	Normal *(Indicate units if other than mmBtu/hr)*
4.0	4.0	4.0

4. Output Capacity:

Rated *(lb steam/hr)*	Maximum *(lb steam/hr)*	Normal *(lb steam/hr)*

   ☒ Not applicable - operation does not produce steam.

5. Percent of Operating Time Used for:

   Process: 100 %
   Space Heat: 0 %

6. Type of Draft (check one):

   ☒ Natural ☐ Induced ☐ Forced

7. Type of combustion monitoring (check one):

   ☐ Fuel/Air Ratio ☐ Oxygen ☐ None
   ☒ Other (describe) TO BE DETERMINED

8. Type of Fuel Fired (complete all that apply):

Fuel*	Fired as...	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup				tons	lbs	lbs
No. 2 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
No. 6 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
Other** Oil	☐ Primary ☐ Backup				gal	gal	gal
Natural Gas	☐ Primary ☒ Backup	950		0.05	36.9 MMSCF	4,211 SCF	4,211 SCF
Wood	☐ Primary ☐ Backup				tons	lbs	lbs
LPG	☐ Primary ☐ Backup				gal	gal	gal
Other**	☒ Primary ☐ Backup	487.5	NIL	0.001	71.9 MMSCF	8,205 SCF	8,205 SCF
Other**	☐ Primary ☐ Backup						

* Please identify all combinations of fuels that are co-fired: ______________________

** Identify other fuel(s): TAILGAS OR NATURAL GAS

Coal-Fired Units

9. Type of Coal Firing (check one):

☐ Pulverized-Wet Bottom ☐ Hand-Fired ☐ Chain Grate ☐ Traveling Grate
☐ Pulverized-Dry Bottom ☐ Cyclones ☐ Spreader Stoker ☐ Fluidized Bed
☐ Underfeed Stoker ☐ Other (describe) ______________________

10. Flyash Reinjection:

☐ Yes ☐ No

11. Overfire Air:

☐ Yes ☐ No

Oil-Fired Units

12. Oil Preheater:

☐ Yes - Indicate Temperature_______deg. F
☐ No

Section II - Specific Air Contaminant Source Information

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

1. Company identification (name for air contaminant source for which you are applying): FISCHER-TROPSCH CATALYST REGEN AND PROCESS VENTS

2. List all equipment that are part of this air contaminant source: ALL F-T AND PRODUCT UPGRADE VENTS CONTROLLED BY 150 MMBtu/hr LOW PRESSURE FLARE

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

   When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 **OR** after issuance of PTI ______________

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line # 8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	2.3	2.3	10.0	2.3	10.0
PM_{10} (PM < 10 microns in diameter)	2.3	2.3	10.0	2.3	10.0
Sulfur dioxide (SO_2)	0.2	0.2	0.8	0.2	0.8
Nitrogen oxides (NO_x)	30.0	30.0	131.4	30.0	131.4
Carbon monoxide (CO)	25.2	25.2	110.3	25.2	110.3
Organic compounds (OC)	1.6	0.03	0.1	0.03	0.1
Volatile organic compounds (VOC)	1.6	0.03	0.1	0.03	0.1
Total HAPs	0.6	0.02	0.07	0.02	0.07
Highest single HAP (hexane):	0.5	0.01	0.06	0.01	0.06
Air Toxics (see instructions):	0.6	0.02	0.07	0.02	0.07

Section II - Specific Air Contaminant Source Information

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

5. **Does this air contaminant source employ emissions control equipment?**

☒ **Yes** - fill out the applicable information below.

☐ **No** - proceed to item # 6.

Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = SO_2; Nitrogen oxides = NOx; Carbon monoxide = CO

☐ **Cyclone/Multiclone**

Manufacturer: ____________ Year installed: ____________

What do you call this control equipment: ____________

Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________

Estimated capture efficiency (%): ________ Basis for efficiency: ____________

Design control efficiency (%):________ Basis for efficiency: ____________

Type: ☐ Cyclone ☐ Multiclone ☐ Rotoclone ☐ Other ____________

☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Fabric Filter/Baghouse**

Manufacturer: ____________ Year installed: ____________

What do you call this control equipment: ____________

Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________

Estimated capture efficiency (%):________ Basis for efficiency: ____________

Design control efficiency (%):________ Basis for efficiency: ____________

Operating pressure drop range (inches of water): Minimum: ________Maximum: ________

Pressure type: ☐ Negative pressure ☐ Positive pressure

Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other ____________

☐ Lime injection or fabric coating agent used: Type: ________ Feed rate: ________

☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Wet Scrubber**

Manufacturer: ____________ Year installed: ____________

What do you call this control equipment: ____________

Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________

Estimated capture efficiency (%):________ Basis for efficiency: ____________

Design control efficiency (%):________ Basis for efficiency: ____________

Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other ____________

Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________

pH range for scrubbing liquid: Minimum: ________ Maximum: ________

Scrubbing liquid flow rate (gal/min): ____________

Is scrubber liquid recirculated? ☐ Yes ☐ No

Water supply pressure (psig): ____________ NOTE: This item for spray chambers only.

☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel

List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Electrostatic Precipitator**

Manufacturer: ____________ Year installed: ____________

What do you call this control equipment: ____________

Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________

Section II - Specific Air Contaminant Source Information

Estimated capture efficiency (%):__________ Basis for efficiency: ____________________
Design control efficiency (%):__________ Basis for efficiency: ____________________
Type: ☐ Plate-wire ☐ Flat-plate ☐ Tubular ☐ Wet ☐ Other ____________
Number of operating fields: ____________

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Concentrator**

Manufacturer: ________________________ Year installed: ________________________
What do you call this control equipment: ________________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):__________ Basis for efficiency: ____________________
Design regeneration cycle time (minutes): ____________
Minimum desorption air stream temperature (°F): _________
Rotational rate (revolutions/hour): ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Catalytic Incinerator**

Manufacturer: ________________________ Year installed: ________________________
What do you call this control equipment: ________________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):__________ Basis for efficiency: ____________________
Design control efficiency (%):__________ Basis for efficiency: ____________________
Minimum inlet gas temperature (°F): ____________
Combustion chamber residence time (seconds): ____________
Minimum temperature difference (°F) across catalyst during air contaminant source operation: _______
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Thermal Incinerator/Thermal Oxidizer**

Manufacturer: ________________________ Year installed: ________________________
What do you call this control equipment: ________________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______________
Estimated capture efficiency (%):__________ Basis for efficiency: ____________________
Design control efficiency (%):__________ Basis for efficiency: ____________________
Minimum operating temperature (°F) and location: ___________________________ (See line by line instructions.)
Combustion chamber residence time (seconds): ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☒ **Flare**

Manufacturer: TO BE DETERMINED Year installed: 2008
What do you call this control equipment: LOW PRESSURE FLARE
Pollutant(s) controlled: ☐ PE ☒ OC ☐ SO_2 ☐ NOx ☐ CO ☒ Other VOC
Estimated capture efficiency (%): 100 Basis for efficiency: ENGINEERING DESIGN
Design control efficiency (%): 98 Basis for efficiency: EPA
Type: ☐ Enclosed ☒ Elevated (open)
Ignition device: ☐ Electric arc ☒ Pilot flame
Flame presence sensor: ☒ Yes ☐ No
☒ This is the only control equipment on this air contaminant source

If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Condenser**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________

Type: ☐ Indirect contact ☐ Direct contact
Maximum exhaust gas temperature (°F) during air contaminant source operation: ________
Coolant type: ____________
Design coolant temperature (°F): Minimum ________ Maximum ________
Design coolant flow rate (gpm): ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Carbon Absorber**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________
Type: ☐ On-site regenerative ☐ Disposable
Maximum design outlet organic compound concentration (ppmv): ________
Carbon replacement frequency or regeneration cycle time (specify units): ________
Maximum temperature of the carbon bed, after regeneration (including any cooling cycle): ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Dry Scrubber**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ________
Estimated capture efficiency (%):________ Basis for efficiency: ____________
Design control efficiency (%):________ Basis for efficiency: ____________
Reagent(s) used: Type: ____________ Injection rate(s): ____________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

____

☐ **Paint booth filter**

Type: ☐ Paper ☐ Fiberglass ☐ Water curtain ☐ Other ____________
Design control efficiency (%):________ Basis for efficiency: ____________

☐ **Other**, describe ____________

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ________
Estimated capture efficiency (%):________ Basis for efficiency: ____________

Design control efficiency (%):________ Basis for efficiency: ____________

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

- Particulate Matter (PM10): 10 tons per year
- Sulfur Dioxide (SO2): 25 tons per year
- Nitrogen Oxides (NOx): 25 tons per year
- Carbon Monoxide (CO): 100 tons per year
- Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information

Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
CATALYST REGEN AND PROCESS VENTS	A	ROUND (9-FT ID)	193	1,000 to 2,000	248,000	600

*Type codes for stack egress points:

A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

Table 7-B, Fugitive Egress Point Information

Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
NA					

*Type codes for fugitive egress point:

D. door or window
E. other opening in the building without a duct
F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Information (Add rows as necessary)

Company ID or Name for the Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)
CATALYST REGEN AND PROCESS VENTS	580 (COOLING TOWER)	240	240

8. Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific requirements listed below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?

☐ yes
☒ no
☐ not sure - please contact me if this affects me

If yes, why are you requesting federally enforceable limits? Check all that apply.

a. ☐ to avoid being a major source (see OAC rule 3745-77-01)
b. ☐ to avoid being a major MACT source (see OAC rule 3745-31-01)
c. ☐ to avoid being a major modification (see OAC rule 3745-31-01)
d. ☐ to avoid being a major stationary source (see OAC rule 3745-31-01)
e. ☐ to avoid an air dispersion modeling requirement (see Engineering Guide # 69)
f. ☐ to avoid another requirement. Describe: ____________________

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable performance specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
NA			

10. Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03 or OAC rule 3745-31-05?

☐ yes - Note: notification requirements in rules cited above must be followed.
☒ no

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

FOR OHIO EPA USE
FACILITY ID: ____________
EU ID: ________ PTI #:________

EMISSIONS ACTIVITY CATEGORY FORM
FUEL BURNING OPERATION

This form is to be completed for each fuel burning operation. State/Federal regulations which may apply to fuel burning operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list

1. Reason this form is being submitted (check one)

☒ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. B001)
LOW PRESSURE FLARE

2. Maximum Operating Schedule: __24______hours per day; ___365_____days per year

If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. ____________________

3. Input Capacity (million Btu/hr):

Rated *(Indicate units if other than mmBtu/hr)*	Maximum *(Indicate units if other than mmBtu/hr)*	Normal *(Indicate units if other than mmBtu/hr)*
TO BE DETERMINED	150	150

4. Output Capacity:

Rated *(lb steam/hr)*	Maximum *(lb steam/hr)*	Normal *(lb steam/hr)*

☒ Not applicable - operation does not produce steam.

5. Percent of Operating Time Used for:

Process: 100 %
Space Heat: 0 %

6. Type of Draft (check one):

☐ Natural ☐ Induced ☒ Forced

7. Type of combustion monitoring (check one):

☐ Fuel/Air Ratio ☐ Oxygen ☐ None
☒ Other (describe) FLAME

8. Type of Fuel Fired (complete all that apply):

Fuel*	Fired as...	Min. Heat Content (Btu/unit)	Max. % Ash	Max. % Sulfur	Max. Annual Fuel Use	Average Hourly Fuel Use	Maximum Hourly Fuel Use
Coal	☐ Primary ☐ Backup				tons	lbs	lbs
No. 2 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
No. 6 Fuel Oil	☐ Primary ☐ Backup				gal	gal	gal
Other** Oil	☐ Primary ☐ Backup				gal	gal	gal
Natural Gas	☐ Primary ☒ Backup	950/SCF		NIL	5.1 MM ft^3	580 ft^3	580 ft^3
Wood	☐ Primary ☐ Backup				tons	lbs	lbs
LPG	☐ Primary ☐ Backup				gal	gal	gal
Other** TAILGAS	☒ Primary ☐ Backup	487.5/SCF		NIL	9.9 MMSCF	1,130 SCF	1,130 SCF
Other**	☐ Primary ☐ Backup						

* Please identify all combinations of fuels that are co-fired: ____________________

** Identify other fuel(s): TAILGAS

Coal-Fired Units

9. Type of Coal Firing (check one):

☐ Pulverized-Wet Bottom ☐ Hand-Fired ☐ Chain Grate ☐ Traveling Grate
☐ Pulverized-Dry Bottom ☐ Cyclones ☐ Spreader Stoker ☐ Fluidized Bed
☐ Underfeed Stoker ☐ Other (describe) ____________________

10. Flyash Reinjection:

☐ Yes ☐ No

11. Overfire Air:

☐ Yes ☐ No

Oil-Fired Units

12. Oil Preheater:

☐ Yes - Indicate Temperature_______deg. F
☐ No

Section II - Specific Air Contaminant Source Information

NOTE: One copy of this section should be filled out for each air contaminant source covered by this PTI application. See the line by line PTI instructions for additional information.

1. Company identification (name for air contaminant source for which you are applying): EQUIPMENT LEAKS FROM MISCELLANEOUS VALVES, PUMPS, FLANGES, AND COMPRESSOR SEALS

2. List all equipment that are part of this air contaminant source: CURRENT ESTIMATES INCLUDE 20 PUMPS, 250 PROCESS VALVES, 540 FLANGES, AND 13 COMPRESSOR SEALS.

3. Air Contaminant Source Installation or Modification Schedule (must be completed regardless of date of installation or modification):

   When did/will you begin to install or modify the air contaminant source? (month/year) SECOND QUARTER 2008

   When did/will you begin to operate the air contaminant source? (month/year) THIRD QUARTER 2011 **OR** after issuance of PTI ______________

4. Emissions Information: The following table requests information needed to determine the applicable requirements and the compliance status of this air contaminant source with those requirements. Suggestions for how to estimate emissions may be found in the instructions to the Emissions Activity Category (EAC) forms required with this application. If you need further assistance, contact your Ohio EPA permit representative.

   - If total potential emissions of HAPs or any Air Toxic is greater than 1 ton/yr, fill in the table for that (those) pollutant(s). For all other pollutants, if "Emissions before controls (max), lb/hr" multiplied by 24 hours/day is greater than 10 lb/day, fill in the table for that pollutant.
   - If you have no add-on control equipment, "Emissions before controls= will be the same as "Actual emissions"
   - Annual emissions should be based on operating 8760 hr/yr unless you are requesting operating restrictions to limit emissions in line # 8 or have described inherent limitations below.
   - If you use units other than lb/hr or ton/yr, specify the units used (e.g., gr/dscf, lb/ton charged, lb/MMBtu, ton/12-months).
   - Requested Allowable (ton/yr) is often equivalent to Potential to Emit (PTE) as defined in OAC rule 3745-31-01 and OAC rule 3745-77-01.

Pollutant	Emissions before controls (max) (lb/hr)	Actual emissions (lb/hr)	Actual emissions (ton/year)	Requested Allowable (lb/hr)	Requested Allowable (ton/year)
Particulate emissions (PE) (formerly particulate matter, PM)	0	0	0	0	0
PM_{10} (PM < 10 microns in diameter)	0	0	0	0	0
Sulfur dioxide (SO_2)	0	0	0	0	0
Nitrogen oxides (NO_x)	0	0	0	0	0
Carbon monoxide (CO)	0	0	0	0	0
Organic compounds (OC)	29.7	0.4	1.7	0.4	1.7
Volatile organic compounds (VOC)	29.7	0.4	1.7	0.4	1.7
Total HAPs	3.3	<0.1	0.2	<0.1	0.2
Highest single HAP:	3.3	<0.1	0.2	<0.1	0.2
Air Toxics (see instructions):	3.3	<0.1	0.2	<0.1	0.2

Provide your calculations as an attachment and explain how all process variables and emission factors were selected. Note the emissions factor(s) employed and document the origin. Example: AP-42, Table 4.4-3 (8/97); stack test, Method 5, 4/96; mass balance based on MSDS; etc.

5. **Does this air contaminant source employ emissions control equipment?**

☒ **Yes** - fill out the applicable information below.

☐ **No** - proceed to item # 6.

Note: Pollutant abbreviations used below: Particulates = PE; Organic compounds = OC; Sulfur dioxide = SO_2; Nitrogen oxides = NOx; Carbon monoxide = CO

☐ **Cyclone/Multiclone**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Type: ☐ Cyclone ☐ Multiclone ☐ Rotoclone ☐ Other ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Fabric Filter/Baghouse**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
Pressure type: ☐ Negative pressure ☐ Positive pressure
Fabric cleaning mechanism: ☐ Reverse air ☐ Pulse jet ☐ Shaker ☐ Other ____________
☐ Lime injection or fabric coating agent used: Type: ________ Feed rate: ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Wet Scrubber**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%): ________ Basis for efficiency: ____________
Design control efficiency (%): ________ Basis for efficiency: ____________
Type: ☐ Spray chamber ☐ Packed bed ☐ Impingement ☐ Venturi ☐ Other ____________
Operating pressure drop range (inches of water): Minimum: ________ Maximum: ________
pH range for scrubbing liquid: Minimum: ________ Maximum: ________
Scrubbing liquid flow rate (gal/min): ________
Is scrubber liquid recirculated? ☐ Yes ☐ No
Water supply pressure (psig): ________ NOTE: This item for spray chambers only.
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Electrostatic Precipitator**

Manufacturer: ____________ Year installed: ____________
What do you call this control equipment: ____________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________

Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design control efficiency (%):________ Basis for efficiency: ____________________
Type: ☐ Plate-wire ☐ Flat-plate ☐ Tubular ☐ Wet ☐ Other ____________
Number of operating fields: ____________

☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Concentrator**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design regeneration cycle time (minutes): ____________
Minimum desorption air stream temperature (°F): ________
Rotational rate (revolutions/hour): ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Catalytic Incinerator**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design control efficiency (%):________ Basis for efficiency: ____________________
Minimum inlet gas temperature (°F): ____________
Combustion chamber residence time (seconds): ____________
Minimum temperature difference (°F) across catalyst during air contaminant source operation: ________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Thermal Incinerator/Thermal Oxidizer**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design control efficiency (%):________ Basis for efficiency: ____________________
Minimum operating temperature (°F) and location: ____________________ (See line by line instructions.)
Combustion chamber residence time (seconds): ____________
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
____

☐ **Flare**

Manufacturer: ____________________ Year installed: ____________________
What do you call this control equipment: ____________________
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ____________
Estimated capture efficiency (%):________ Basis for efficiency: ____________________
Design control efficiency (%):________ Basis for efficiency: ____________________
Type: ☐ Enclosed ☐ Elevated (open)
Ignition device: ☐ Electric arc ☐ Pilot flame
Flame presence sensor: ☐ Yes ☐ No
☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
______

☐ **Condenser**
Manufacturer: ______ Year installed: ______
What do you call this control equipment: ______
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______
Estimated capture efficiency (%):______ Basis for efficiency: ______
Design control efficiency (%):______ Basis for efficiency: ______

Type: ☐ Indirect contact ☐ Direct contact
Maximum exhaust gas temperature (^oF) during air contaminant source operation: ______
Coolant type: ______
Design coolant temperature (^oF): Minimum ______ Maximum ______
Design coolant flow rate (gpm): ______
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
______

☐ **Carbon Absorber**
Manufacturer: ______ Year installed: ______
What do you call this control equipment: ______
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______
Estimated capture efficiency (%):______ Basis for efficiency: ______
Design control efficiency (%):______ Basis for efficiency: ______
Type: ☐ On-site regenerative ☐ Disposable
Maximum design outlet organic compound concentration (ppmv): ______
Carbon replacement frequency or regeneration cycle time (specify units): ______
Maximum temperature of the carbon bed, after regeneration (including any cooling cycle): ______
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
______

☐ **Dry Scrubber**
Manufacturer: ______ Year installed: ______
What do you call this control equipment: ______
Pollutant(s) controlled: ☐ PE ☐ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______
Estimated capture efficiency (%):______ Basis for efficiency: ______
Design control efficiency (%):______ Basis for efficiency: ______
Reagent(s) used: Type: ______ Injection rate(s): ______
Operating pressure drop range (inches of water): Minimum: ______ Maximum: ______
☐ This is the only control equipment on this air contaminant source
If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:
______

☐ **Paint booth filter**
Type: ☐ Paper ☐ Fiberglass ☐ Water curtain ☐ Other ______
Design control efficiency (%):______ Basis for efficiency: ______

☒ **Other**, describe Leakless/sealless or low-emission pumps, valves, & compressors
Manufacturer: TBD Year installed: 2008
What do you call this control equipment: Low-emission Equipment
Pollutant(s) controlled: ☐ PE ☒ OC ☐ SO_2 ☐ NOx ☐ CO ☐ Other ______
Estimated capture efficiency (%):100 Basis for efficiency: Engineering estimate
Design control efficiency (%):>99 Basis for efficiency: EPA Guidance
☐ This is the only control equipment on this air contaminant source

If no, this control equipment is: ☐ Primary ☐ Secondary ☐ Parallel
List any other air contaminant sources that are also vented to this control equipment:

6. Attach a Process or Activity Flow Diagram to this application for each air contaminant source included in the application. The diagram should indicate their relationships to one another. See the line by line PTI instructions for additional information.

7. Emissions egress point(s) information: PTIs which allow total emissions in excess of the thresholds listed below will be subject to an air quality modeling analysis. This analysis is to assure that the impact from the requested project will not exceed Ohio=s Acceptable Incremental Impacts for criteria pollutants and/or Maximum Allowable Ground Level Concentrations (MAGLC) for air toxics. Permit requests that would have unacceptable impacts can not be approved as proposed. See the line by line PTI instructions for additional information.

   Complete the tables below if the requested allowable annual emission rate for this PTI exceeds any of the following:

   - Particulate Matter (PM10): 10 tons per year
   - Sulfur Dioxide (SO2): 25 tons per year
   - Nitrogen Oxides (NOx): 25 tons per year
   - Carbon Monoxide (CO): 100 tons per year
   - Air Toxic: 1 ton per year. An air toxic is any air pollutant for which the American Council of Governmental Industrial Hygienists (ACGIH) has established a Threshold Limit Value (TLV).

   Complete Table 7-A below for each stack emissions egress point. An egress point is a point at which emissions from an air contaminant source are released into the ambient (outside) air. List each individual egress point on a separate line.

Table 7-A, Stack Egress Point Information

Company Name or ID for the Egress Point (examples: Stack A; Boiler Stack; etc.)	Type Code*	Stack Egress Point Shape and Dimensions (in)(examples: round 10 inch ID; rectangular 14 X 16 inches; etc.)	Stack Egress Point Height from the Ground (ft)	Stack Temp. at Max. Capacity (F)	Stack Flow Rate at Max. Capacity (ACFM)	Minimum Distance to the Property Line (ft)
NA						

*Type codes for stack egress points:

A. vertical stack (unobstructed): There are no obstructions to upward flow in or on the stack such as a rain cap.
B. vertical stack (obstructed): There are obstructions to the upward flow, such as a rain cap, which prevents or inhibits the air flow in a vertical direction.
C. non-vertical stack: The stack directs the air flow in a direction which is not directly upward.

Complete Table 7-B below for each fugitive emissions egress point. List each individual egress point on a separate line. Refer to the description of the fugitive egress point type codes below the table for use in completing the type code column of the table. For air contaminant sources like roadways and storage piles, only the first 5 columns need to be completed. For an air contaminant source with multiple fugitive emissions egress points, include only the primary egress points.

Table 7-B, Fugitive Egress Point Information

Company ID for the Egress Point (examples; Garage Door B, Building C; Roof Monitor; etc.)	Type Code*	Egress Point Description (examples: garage door, 12 X 30 feet, west wall; outside gravel storage piles; etc.)	Fugitive Egress Point Height from the Ground (ft)	Minimum Distance to the Property Line (ft)	Exit Gas Temp. (F)
EQUIPMENT LEAKS	F	COMPONENT CONNECTIONS IN CONTACT WITH GASEOUS OR LIGHT LIQUID	VARIES	VARIES	VARIES

*Type codes for fugitive egress point:

D. door or window
E. other opening in the building without a duct
F. no stack and no building enclosing the air contaminant source (e.g., roadways)

Complete Table 7-C below for each Stack Egress Point identified in Table 7-A above. In each case, use the dimensions of the largest nearby building, building segment or structure. List each individual egress point on a separate line. Use the same Company Name or ID for the Egress Point in Table 7-C that was used in Table 7-A. See the line by line PTI instructions for additional information.

Table 7-C, Egress Point Additional Information (Add rows as necessary)

Company ID or Name for the Egress Point	Building Height (ft)	Building Width (ft)	Building Length (ft)
NA			

8. Request for Federally Enforceable Limits

As part of this permit application, do you wish to propose voluntary restrictions to limit emissions in order to avoid specific requirements listed below, (i.e., are you requesting federally enforceable limits to obtain synthetic minor status)?

☐ yes
☒ no
☐ not sure - please contact me if this affects me

If yes, why are you requesting federally enforceable limits? Check all that apply.

a. ☐ to avoid being a major source (see OAC rule 3745-77-01)
b. ☐ to avoid being a major MACT source (see OAC rule 3745-31-01)
c. ☐ to avoid being a major modification (see OAC rule 3745-31-01)
d. ☐ to avoid being a major stationary source (see OAC rule 3745-31-01)
e. ☐ to avoid an air dispersion modeling requirement (see Engineering Guide # 69)
f. ☐ to avoid another requirement. Describe: ____________________

If you checked a., b. or d., please attach a facility-wide potential to emit (PTE) analysis (for each pollutant) and synthetic minor strategy to this application. (See line by line instructions for definition of PTE.) If you checked c., please attach a net emission change analysis to this application.

9. If this air contaminant source utilizes any continuous emissions monitoring equipment for indicating or demonstrating compliance, complete the following table. This does not include continuous parametric monitoring systems.

Company ID for Egress Point	Type of Monitor	Applicable performance specification (40 CFR 60, Appendix B)	Pollutant(s) Monitored
NA			

10. Do you wish to permit this air contaminant source as a portable source, allowing relocation within the state in accordance with OAC rule 3745-31-03 or OAC rule 3745-31-05?

☐ yes - Note: notification requirements in rules cited above must be followed.
☒ no

11. The appropriate Emissions Activity Category (EAC) form(s) must be completed and attached for each air contaminant source. At least one complete EAC form must be submitted for each air contaminant source for the application to be considered complete. Refer to the list attached to the PTI instructions.

FOR OHIO EPA USE
FACILITY ID:________________________

EU ID: ____________ PTI #:________________

EMISSIONS ACTIVITY CATEGORY FORM
GENERAL PROCESS OPERATION

This form is to be completed for each process operation when there is no specific emissions activity category (EAC) form applicable. If there is more than one end product for this process, copy and complete this form for each additional product (see instructions). Several State/Federal regulations which may apply to process operations are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

1. Reason this form is being submitted (Check one)

☒ New Permit ☐ Renewal or Modification of Air Permit Number(s) (e.g. P001)________________

2. Maximum Operating Schedule: __24________hours per day ;______7_____days per year

If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. ________________________________

3. End product of this process: ___PRODUCT FUELS____________________________

4. Hourly production rates (indicate appropriate units). Please see the instructions for clarification of "Maximum" and "Average" for new versus existing operations:

Hourly	Rate	Units (e.g., widgets)
Average production	2,083.3	BARRELS
Maximum production	2,083.3	BARRELS

5. Annual production rates (indicate appropriate units) Please see the instructions for clarification of "Maximum" and "Actual" for new versus existing operations:

Annual	Rate	Units (e.g., widgets)
Actual production	18.25	MILLION BARRELS
Maximum production	18.25	MILLION BARRELS

6. Type of operation (please check one):

☒ Continuous
☐ Batch (please complete items below)

Minimum cycle* time (minutes): ________
Minimum time between cycles (minutes): ________
Maximum number of cycles per daily 24 hour period: ________
(Note: include cycle time and set up/clean up time.)

*"Cycle" refers to the time the equipment is in operation.

7. Materials used in process at maximum hourly production rate (add rows/pages as needed):

Material	Physical State at Standard Conditions	Principle Use	Amount**
SYNGAS	GAS	RAW MATERIAL FOR PRODUCTION OF FUEL PRODUCTS	49 TO 65 MMscf/hr

** Please indicate the amount **and** rate (e.g., lbs/hr, gallons/hr, lbs/cycle, etc.).

8. Please provide a narrative description of the process below (e.g., coating of metal parts using high VOC content coatings for the manufacture of widgets; emissions controlled by thermal oxidizer...):

Refer to application Section 2.6 for Process Description information about Module 6: F-T and Product Upgrade.