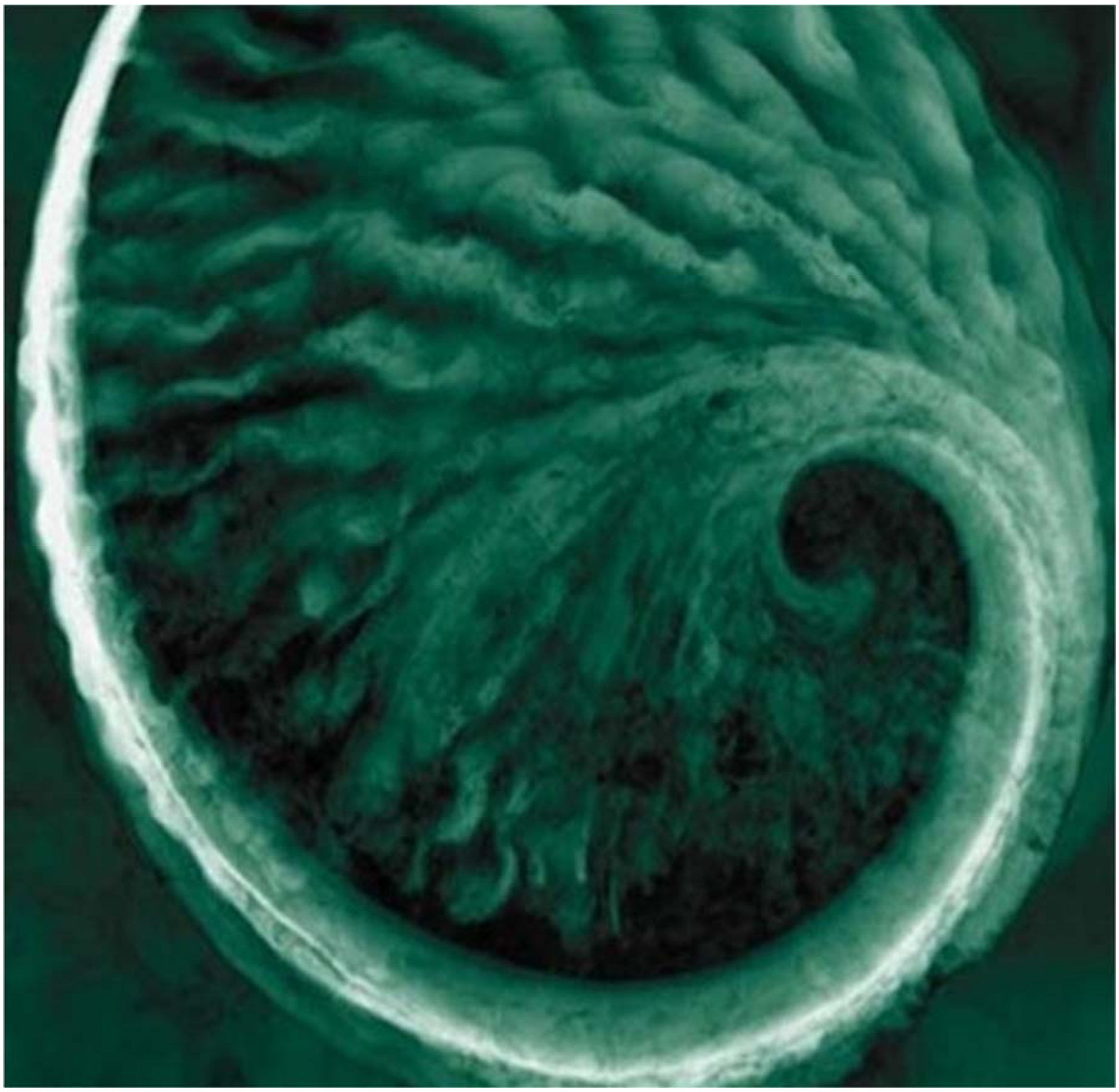

Application for Minor Source Permit to Construct a Direct Liquefaction Coal to Liquids Facility

Domestic Synthetic Fuels I, LLC

Mason County, West Virginia

10 May 2019

Project No.: 0465059

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CONTENTS

List of Tables

List of Figures

Acronyms and Abbreviations

Name	Description
CAA	Clean Air Act
CFR	Code of Federal Regulations
CO	carbon monoxide
CSR	Code of State Regulations
DCL	Direct Coal Liquefaction
DSF	Domestic Synthetic Fuels I, LLC
GRU	Gas Recovery Unit
HAP	Hazardous air pollutants
H_2S	Hydrogen sulfide
HP	High pressure
KO	Knockout
kPa	Kilopascals
kW	Kilowatts
LDAR	Leak detection and repair program
LPG	Liquefied petroleum gas
MACT	Maximum Achievable Control Technology
MMBtu/hr	Million British Thermal Units per Hour
MP	Mid-pressure
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_x	Oxides of nitrogen
NSPS	New Source Performance Standards
PM	Particulate matter
PSD	Prevention of significant deterioration
PTE	Potential to emit
RICE	Reciprocating Internal Combustion Engines
SO_2	Sulfur dioxide
SRU	Sulfur Recovery Unit
tpy	Tons per year
VOC	Volatile organic compound
WV	West Virginia
WVDAQ	West Virginia Division of Air Quality

1. INTRODUCTION

1.1 Background

Domestic Synthetic Fuels I, LLC (DSF) submits this Minor Source air permit application to the West Virginia Department of Environmental Protection (WVDEP), Division of Air Quality (WVDAQ) to authorize the construction of a direct liquefaction coal to liquids facility in Mason County, WV. The proposed facility will be located on a 221-acre site north of Point Pleasant, Mason County, WV. This parcel of land sits within the Mason County Industrial Park and is on the western side of State Route 62. The facility will produce ultra-low sulfur diesel fuel, gasoline, liquefied petroleum gases (LPGs), elemental sulfur, and flake product for sale to market.

1.2 Application Overview

The proposed project will require the construction of a new facility subject to the requirements of WV 45 Code of State Regulations (CSR) 13—"Permit for Construction, Modification, Relocation And Operation of Stationary Sources of Air Pollutants …". This permit application narrative is provided to add clarification and/or further detail to the permit application forms being provided to the WVDAQ for this project.

Concurrent with the submittal of this air quality application, other required environmental permits and approvals are being pursued with the appropriate regulatory agencies.

This section (Section 1) contains introductory information. Section 2 presents an overview of the proposed process and equipment. A Prevention of Significant Deterioration review is provided as Section 3. Section 4 provides a review of federal regulatory requirements. A review of state regulatory requirements is provided as Section 5.

The WVDAQ permit application forms, emission calculations, process flow diagrams, and other pertinent information is provided as Appendix A: Permit Application Documents.

2. PROCESS OVERVIEW

2.1 General Process Overview

DSF proposes to construct a Direct Coal Liquefaction (DCL) facility. DCL involves contacting coal directly with a catalyst at elevated temperatures and pressures with added hydrogen, in the presence of a solvent, to form a raw liquid product. The raw liquid product is then further refined into high quality liquid fuels. In the DCL process, coal is transformed into liquid without first being gasified to form syngas. The coal to syngas to liquids route is termed indirect coal liquefaction, which is the typical coal to liquids process. The DCL process is simpler and more efficient than indirect coal liquefaction. Natural gas from the local shale formations in WV and Ohio provide the source for the production of hydrogen for DCL and enhances the DCL process efficiency.

The DSF DCL facility will include the following major process units: Unit 100—Coal Preparation, Unit 200—H-Coal, Unit 300—Product Upgrading, Unit 400—Product Treating, Unit 500—Utilities, Unit 600—Off-sites, and Unit 700—Hydrogen Plant. A simplified block flow diagram (Figure 2-1) and accompanying description is provided below.

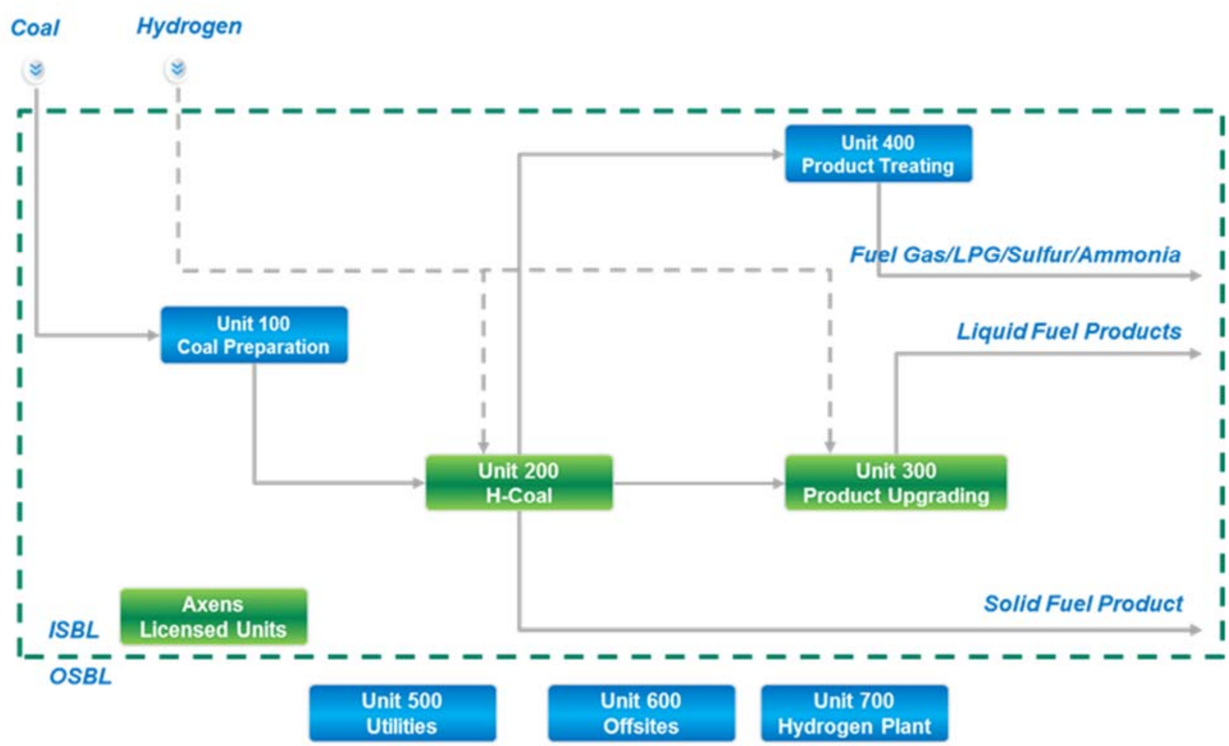


Figure 2-1: DCL Facility—Simplified Block Flow Diagram

In Unit 100—Coal Preparation, the coal is received via rail, barge, and truck, stockpiled, crushed, and dried, and stored in silos before being delivered to Unit 200. In Unit 200—H-Coal, the coal is mixed with process-derived recycle oil, pumped, and contacted with hydrogen and a catalyst at high temperature and pressure for conversion to liquid fuels. During this reaction, gases, liquids, and a solid stream are recovered to other facility process units. The liquid fuels are then sent to Unit 300 for product upgrading. In Unit 300—Product Upgrading, the distillate liquid products are processed in Unit 310 via a hydrotreater, hydrocracker, and fractionator to form stabilized naphtha, heavy naphtha, diesel fuel, and vacuum gas oil (lighter end fuels such as propane and butane) product streams. The stabilized naphtha is then reformed in Unit 320 via a catalyst to form a reformate naphtha product stream. In Unit 400—Product Treating, flash gases, purge gases, and sour water streams from Unit 200 and Unit 300 are processed to produce fuel gas for use in the facility, LPG products, stripped water for reuse in the facility, and ammonia and sulfur byproducts. Unit 500—Utilities includes all facility utilities, including boilers, emergency electric generators, etc. Unit 600—Off-sites includes facility storage tanks, liquid loadout systems for rail and truck loading, emergency flares, and site roads. Unit 700 – Hydrogen Plant uses natural gas as a feedstock to produce the necessary Hydrogen for the DCL Process.

An outline of the facility maximum production rates, per product, is outlined below:

- Coal - 2,500 tons per day (tpd)
- Diesel Fuel - 6,551 barrels per day (bbl/d)
- Raw Gasoline - 3,401 bbl/d - Final gasoline product makeup comes from the stream information below with 15% ethanol added
  - Heavy Naptha (reformate) from Unit 320 at 1,986 bbl/d;
  - Light Naptha from Unit 410 at a rate of 1,415 bbl/d
- LPG - 1,494 bbl/d
- Recycle "Sour" Water - 4500 bbl/d
- Flake Residue - 620 tpd
- Elemental Sulfur - 60 tpd
- Liquid Ammonia - 325 tpd

Each process unit is described in further detail below in the permit application process descriptions. These process descriptions accompany the process flow diagrams submitted as Attachment F of the WVDAQ Permit Application Forms.

2.2 Unit 100—Coal Preparation

Coal is delivered to the DSF facility via barge and truck. Coal barges are unloaded by crane to a receiver hopper (100-TH-1). From the hopper, coal is conveyed via two coal transfer conveyors (100-TC-1 and 100-TC-2) to a radial stacker, consisting of a hopper (100-TH-2) and transfer conveyor (100-TC-3). From the radial stacker, coal is deposited in either the active coal storage pile or backup coal storage pile (100-CSP-1). The active storage pile maintains 4 days of coal throughput while the backup storage pile maintains 24 days of coal throughput. The coal storage piles will minimize fugitive emissions (100-CSP-2, 100-CSP-3, 100-CSP-4) by leveraging wind guards in accordance with the fugitive dust control plan requirements of WV 45 CSR 5. A truck dump storage pile (100-CSP-3) is estimated based upon delivery of coal to the site via truck. Coal from the dump pile is transferred by a front-end loader to the active or backup storage piles.

From the storage piles, coal is transferred by a front-end loader to a coal surge hopper (100-TH-3). Coal is conveyed via coal milling transfer conveyor 1 (100-TC-4) to coal milling hopper 1 (100-TH-4). The coal mill crushes and dries coal to the specifications required for the input to the direct liquefaction process. The coal milling dryer (100-CMD-1) is a natural gas-fired indirect heat exchanger that exchanges heat with nitrogen to dry the raw coal. Coal exits the mill via coal milling hopper 2 (100-TH-5) and along the coal milling transfer conveyor (100-TC-5) for storage in coal storage silos (100-CS-1, 100-CS-2). From the storage silos, crushed and dried coal is transferred through one of two hoppers (100-TH-6, 100-TH-7) along two transfer conveyors (100-TC-6, 100-TC-7) to Unit 200.

2.3 Unit 200—H—Coal

2.3.1 Coal Slurry Mixing Section

Crushed and dried coal is received from Unit 100 via an enclosed conveyor and stored in a Feed Coal Bin (200-D-110). Coal flows from the Feed Coal Bin to the Feed Coal Conveyor (200-S-105), a screw feeder used to control the coal feed rate to the Coal Slurry Mixing Drum (200-D-111).

In the Coal Slurry Mixing Drum, an agitator is used to provide sufficient energy to mix the coal and recycle oils. The slurry oils, or process-derived recycle oils, (hot solvent, cold solvent, and bottoms recycle) are mixed with the coal feed in the Coal Slurry Mixing Drum. A cold recycle solvent is utilized as wash oil to process the gas stream. A hot solvent is fed directly to the top of the Coal Slurry Mixing Drum to reduce entrainment of coal feed solids in the overhead vent gas. Finally, the hot atmospheric bottoms recycle stream is fed to the Coal Slurry Mixing Drum containing vacuum gas oil, residual oil, unconverted coal, and flake.

Overhead vapors from the Coal Slurry Mixing Drum are routed to the Vent Scrubber (200-T-102) to remove entrained solids. Cold solvent (process light vacuum gas oil) is used as a wash oil in the Vent Scrubber, which is then recovered and routed to the Coal Slurry Mixing Drum. Vaporized oil and water in the Vent Scrubber is routed to the Scrubber Vent Gas Trim Cooler (200-E-106) to be condensed, and the condensed liquid stream is then routed to the Vent Gas Separator (200-D-112). The Vent Gas Separator is a three-phase separator. Oil from the Vent Gas Separator is routed back to the Coal Slurry Mixing Drum. A slurry condensate and water mixture is routed from the Vent Gas Separator and combined with sour water from the Sour Water Flash Drum (200-D-107). This mixture is then sent to Unit 430—Sour Water Stripping. Gas from the Vent Gas Separator is routed to the Scrubber Vent Gas Ejector System (200-S-101) to be condensed and the condensed liquid stream flows to the Condensate Ejector Separator (200-D-113). The Condensate Ejector Separator is a two-phase separator with the liquid stream routed back to the Vent Gas Separator and the gas stream routed to Unit 410—Gas Recovery Unit.

2.3.2 Feed and Preheat Section

The coal slurry feed from the Coal Slurry Mixing Drum is mixed with feed hydrogen from the Hydrogen Reformer (700-HR-1) and fed to the Slurry Feed Heater (200-H-102) for heating to the desired feed temperature. The coal slurry feed is then mixed with another feed of hydrogen from the Hydrogen Heater (200-H-101) before entering the Catalytic Reactors (200-R-101 and 200-R-102).

2.3.3 Reaction and Product Separation Section

The coal liquefaction reactions occur in this section. In the first reactor (200-R-101), reactions occur to improve the recycle solvent quality and coal liquids are formed, hydrogenated, and stabilized. The second reactor (200-R-102) completes the conversion of coal and residuum to distillate liquids. Effluent from the reactors is fed to Separator 200-D-101 for product separation. The reactor effluent is fed through Separator 200-D-101 and Separator 200-D-105 to the Atmospheric Tower (200-T-301). The reactor effluent vapor from Separator 200-D-101 is routed through a series of separators (Separator 200-D-103 and Separator 200-D-104) and is sent to the high pressure (HP) Amine Absorber (200-T-101) for acid gas removal, and is subsequently purged back to the Hydrogen Plant. A lean methyldiethanolamine solution is used in the Amine Absorber and routed to the Rich Amine Flash Drum (200-D-108) for degassing.

From the Rich Amine Flash Drum, the rich amine stream is routed to Unit 420—Amine Regeneration. The vapor from the Rich Amine Flash Drum is sent to Unit 410—Gas Recovery Unit.

The vapor effluent from Separator 200-D-105 is combined with the liquid stream out of Separators 200-D-103/104 and is routed through Separators 200-D-106/107. Sour water from these separators is sent to Unit 430—Sour Water Stripping for water recovery and reuse. Hydrocarbons, the separators, are routed to Unit 410—Gas Recovery Unit.

2.3.4 Atmospheric Fractionation Section

Hot coal slurry from Separator 200-D-205 is fed to the Atmospheric Tower (200-T-301). The Atmospheric Tower overhead vapor is fed through the Atmospheric Tower Overhead Condenser (200-E-301) to the Atmospheric Tower Overhead Drum (200-D-301), which is a three-phase separator. An unstabilized naphtha product is recovered from the Atmospheric Tower Overhead Drum and sent to Unit 310—Hydrocracker. The water condensate from the Atmospheric Tower Overhead Drum is discharged to Unit 430—Sour Water Stripping. The vapor stream from the Atmospheric Tower Overhead Drum is sent to Unit 410—Gas Recovery Unit. Diesel product is routed from a side draw of the Atmospheric Tower to the Diesel Stripper (200-T-302). The Diesel Stripper acts as a two-phase separator with the liquid stream going to Diesel Coalescer (200-D-303) and the vapor stream recycled back to the Atmospheric Tower. The Diesel Coalescer separates the liquid stream from the Diesel Stripper into a diesel product stream that is routed to Unit 310—Hydrocraker and a recycle water stream that is discharged to Unit 430—Sour Water Stripping.

A slurry bottoms stream is pumped from the Atmospheric Tower and split into two streams. A portion of the atmospheric bottoms slurry stream is recycled back to the Coal Slurry Drum (200-D-111) and the rest of the slurry bottoms stream is fed to the Vacuum Tower Feed Heater (200-H-301) before entering the Vacuum Tower (200-T-303) for recovery of vacuum distillate as recycle solvent and final Unit 200—H-Coal products.

2.3.5 Vacuum Fractionation Section

There are four output streams from the Vacuum Tower (200-T-303): an overhead gas stream, upper side stream, lower side stream, and a vacuum bottoms stream. The overhead gas stream is cooled and condensed at the Vacuum Tower Overhead Condenser (200-E-305) and sent to the Vacuum Tower Hotwell (200-D-302). The Vacuum Tower Hotwell serves as a three-phase separator with the recovered oil stream sent to Unit 310—Hydrocracking, the water condensate sent to Unit 430—Sour Water Stripping, and an overhead gas stream, which is sent to Unit 410—Gas Recovery Unit.

The upper side stream off the Vacuum Tower contains a light vacuum gas oil which is sent back into the Vacuum Tower with a split stream that is sent to Unit 310—Hydrocracking. The lower side stream off the Vacuum Tower contains a heavy vacuum gas oil which is sent back into the Vacuum Tower with a split stream that is sent to Unit 310—Hydrocracking. The vacuum bottoms stream is pumped to Unit 600—Off-sites where the flake product it is stored before off-site delivery.

2.3.6 Catalyst Handling

During the Unit 200—H-Coal operation, fresh catalyst is added daily to the Catalyst Reactors (200-R-101 and 200-R-102) and an equivalent amount of spent catalyst is withdrawn to maintain constant catalyst activity. Feed catalyst from trucks or super sacks are fed to the Fresh Catalyst Storage Hopper (200-D-204), which is sized to hold approximately a 10-day supply of fresh catalyst. A 1-day batch of catalyst flows by gravity to the Catalyst Measuring Hopper (200-D-205) and then finally to the Catalyst Addition/Withdrawal Drum (200-D-206) before the catalyst is fed to the Catalyst Reactors. The airflow in the feed catalyst storage and addition system described above is controlled via Feed Catalyst Bin Filter

(200-D-206) before being discharged to the atmosphere. During the catalyst withdrawal from the Catalyst Reactors, the spent catalyst is first sent to the Addition/Withdrawal Drum from the reactors. From the Addition/Withdrawal Drum the catalyst is sent to the Spent Catalyst Cooling Drum (200-D-207) where it is eventually gravity-drained to the Spent Catalyst Hopper (200-D-208). The Spent Catalyst Hopper is designed to hold approximately 10-days inventory of spent catalyst. The spent catalyst is then transferred into drums (200-D-209) for eventual delivery off-site.

2.4 Unit 300—Product Upgrading

In Unit 300—Product Upgrading, the liquid naphtha, diesel, and vacuum gas oil products from Unit 200—H-Coal are processed in Unit 310 via a hydrotreater, hydrocracker, and fractionator to form stabilized naphtha and diesel fuel product streams. The stabilized naphtha is then reformed in Unit 320 via a catalyst to form a reformate naphtha product stream. Various overhead gas streams from Unit 310 and Unit 320 and a wild naphtha stream from Unit 310 are sent to Unit 410—Gas Recovery Unit for further treatment. Water streams from Unit 310 are sent for treatment to Unit 430—Sour Water Stripper.

2.4.1 Unit 310—Hydrocracker

Unit 310—Hydrocracker consists of two sections: a reaction section, including the Hydrotreater/Hydrocracker Reactor (310-R-101) and liquid separation, and a product fractionation section, including the H_2S Stripper (310-C-103) and Fractionator (310-C-201).

2.4.1.1 Reaction Section

The liquid product stream from Unit 200—H-Coal containing gas oil, diesel, and naphtha is routed through the Feed Surge Drum (310-D-101) and mixed with a hydrogen gas feed. This mixture is the preheated in the Reaction Heater (310-H-101) before entering the Hydrotreater/Hydrocracker Reactor (310-R-101). The reactor effluent is routed to the Hot HP Separator (310-D-106A).

The vapor from the Hot HP Separator is condensed in the Hot HP Vapor Air Cooler (310-A-101A) and sent to the Cold HP Separator (310-D-107A). The vapor from the Cold HP Separator is recycled back to 310-R-101 and the liquid is routed to the Cold Mid-Pressure (MP) Separator (310-D-107B).

The product effluent from the Hot HP Separator is sent to the Hot MP Separator for further separation with the liquid product effluent sent to the H_2S Stripper (310-C-103). The vapor from the Hot MP Separator is routed through the Hot MP Vapor Air Cooler (310-A-101B) to be condensed before being sent to the Cold MP Separator. The Cold MP Separator is a three-phase separator with the liquid product stream sent to the H_2S Stripper, the sour water stream sent to Unit 430—Sour Water Stripper, and the sour gas stream sent to the MP Amine Absorber in Unit 200—H-Coal for treatment.

2.4.1.2 Liquid Separation and Product Fractionation

The liquid product streams from the Hot and Cold Separators are fed to the H_2S Stripper. The H_2S Stripper overhead vapor stream is routed through the Stripper Air Condenser (310-A-102) and the condensed stream is sent to the Stripper Reflux Drum (310-D-111). The Stripper Reflux Drum is a three-phase separator with the wild naphtha, a light liquid hydrocarbon, stream sent to Unit 410—Gas Recovery Unit, the sour water stream sent to Unit 430—Sour Water Stripper, and the sour gas sent to Unit 410—Gas Recovery Unit. The H_2S Stripper bottom product stream is then sent to the Fractionator (310-C-201).

From the Fractionator column, heavy naphtha is recovered from the Fractionator overhead stream while the Fractionator bottom is a diesel product stream sent to Unit 630—Liquid Product Storage. The Fractionator overhead stream is routed through the Fractionator Condenser (310-A-201) and the condensed stream is sent to the Fractionator Reflux Drum (310-D-201). The Fractionator Reflux Drum is a three-phase separator with the Reflux Drum flash gas sent to Unit 410—Gas Recovery Unit, sour water sent to Unit 430—Sour Water Stripping, and the heavy naphtha sent to Unit 320—Catalytic Reformer with a slip stream of the heavy naphtha is sent back to the Fractionator column. The diesel product stream is sent through the Fractionator Reboiler (310-H-103) and recycled back to the Fractionator column before exiting the bottom of the Fractionator and being sent to Unit 600—Storage and Load-out.

2.4.2 Unit 320—Hydrotreating

In Unit 320, the heavy naphtha stream from Unit 310 is routed through a series of Reaction Heaters (320-H-201, 320-H-202, 320-H-203, and 320-H-204) and Catalytic Reactors (320-R-201, 320-R-202, 320-R-203, and 320-R-204). The Catalytic Reactor product stream is then routed to Reactor Separator 320-D-201. Reactor Separator 320-D-201 is a two-phase separator with the separator flash gas sent to Unit 410—Gas Recovery Unit and the naphtha product stream routed to the Reformer Contactor Tower (320-C-201). The Contactor Tower overhead is routed to the Contactor Tower Condenser (320-A-202) and sent to the Contactor Tower Reflux Drum (320-D-204). The Contactor Tower Reflux Drum is a two-phase separator with the flash gas routed to Unit 410—Gas Recovery Unit and the liquid stream sent back to the Reformer Contactor Tower. A side stream of the LPG being sent back to the Reformer Contactor Tower is routed to Unit 630—Liquid Product Storage. The reformate naphtha product stream exiting the bottom of the Reformer Contactor Tower is routed to Unit 630—Liquid Product Storage

2.5 Unit 400—Product Treating

Unit 400—Product Treating has multiple process sections that treat gas, water, and amine streams from Unit 200—H-Coal and Unit 300—Product Upgrading. The process sections in Unit 400 include Unit 410—Gas Recovery Unit, Unit 420—Amine Regeneration, Unit 430—Sour Water Stripping, and Unit 440—Sulfur Recovery.

2.5.1 Unit 410—Gas Recovery Unit

Gas streams from the other process units are processed in a conventional saturated gas plant that recovers light naphtha for blending to gasoline, LPG (mixed C3/C4) and fuel gas that is used in fired heaters in the process units.

Incoming gas streams to Unit 410—Gas Recovery Unit are routed to a common header, which feeds to the Compressor Knockout (KO) Drum (410-D-101). The Compressor KO Drum is a two-phase separator with the flash gas routed to Gas Recovery Unit (GRU) Compressor 1 and the LPG stream is sent to Unit 630—Liquid Product Storage. The gas stream is compressed by GRU Compressor 1 and sent to the Compressor Air Cooler (410-A-101). The Compressor Air Cooler condenses the compressed gas stream from GRU Compressor 1 and the condensed gas stream is routed to the Recontacting Drum (410-D-102). The Recontacting Drum is a three-phase separator with the sour water routed to Unit 430—Sour Water Stripping, the liquid hydrocarbon stream routed to the GRU Stripper (410-C-102) column, and the Recontacting Drum flash gas routed to the bottom of the LPG Absorber (410-C-101).

The LPG Absorber recovers most of the propane (C_3) and butane (C_4) compounds from the Recontacting Drum flash gas by washing the gas with a mix of the wild naphtha from Unit 310 and recycle light naphtha from the Debutanizer (410-C-103). The overhead vapor from the LPG Absorber is used as fuel gas in fired sources throughout the facility and the LPG Absorber bottom liquid is sent back to the Recontacting Drum.

The GRU Stripper column allows for partial stripping of water, H_2S, and ethane (C_2) compounds from the LPG and gasoline mixture that comes into the top tray of the GRU Stripper column from the Recontacting Drum. The GRU Stripper column is reboiled with HP steam by the GRU Stripper Reboiler (410-H-101). The GRU Stripper overhead gas is recycled back into the gas feed stream feeding the Compressor Air

Cooler to be condensed and routed to the Recontacting Drum. The GRU Stripper bottom liquid stream feeds the Debutanizer.

The Debutanizer produces a light naphtha stream to be blended with the reformate naphtha stream from Unit 320—Catalytic Reformer in order to form the gasoline product for the DSF facility. LPG product is also recovered from the Debutanizer overhead stream. The Debutanizer overhead gas stream is condensed by the Debutanizer Air Condenser (410-A-102) and sent to the Debutanizer Reflux Drum (410-D-103). The Debutanizer Reflux Drum is a three-phase separator with the sour water routed to Unit 430—Sour Water Stripping, the LPG product stream routed to Unit 630—Liquid Product Storage, and the flash gas routed to the fuel gas line from the LPG Absorber to be used as fuel gas in fired sources throughout the facility. A slip stream of the LPG product stream is recycled back to the Debutanizer to ensure that the pentane (C_5) specification in the LPG product is met.

The Debutanizer is reboiled with HP steam by the Debutanizer Reboiler (410-H-102). The Debutanizer Reboiler duty is set to ensure that the C_4 specification of the light naphtha stream is met. The reboiler duty is controlled by the HP steam flowrate to the reboiler.

The light naphtha product from the bottom of the Debutanizer is sent to Unit 630—Liquid Product Storage. A slip stream of the light naphtha product is mixed with the wild naphtha from Unit 310—Hydrocracking and fed to the top of the LPG Absorber to be used as an absorption medium.

2.5.2 Unit 420—Amine Regeneration

The rich amine streams from Unit 200—H-Coal and Unit 440—Sulfur Recovery Unit are combined in a common header and directed to the Amine Flash Drum (420-D-101) where hydrogen and light hydrocarbons are flashed at low pressure and sent to Unit 410—Gas Recovery Unit.

The rich amine from Amine Flash Drum is pumped to the Amine Regenerator (420-R-101). Acid gases are stripped off the rich amine stream in this column. The Amine Regenerator overhead stream is partially condensed by the Amine Regenerator Overhead Air Cooler (420-A-101) before being routed to the Amine Regenerator Reflux Drum (420-D-102) where the vapor and liquid phases are separated. Acid gas from the Amine Regenerator Reflux Drum is routed to Unit 440—Sulfur Recovery. The liquid stream from the Amine Regenerator Reflux Drum is recycled back to the top of the Amine Regenerator column.

The Amine Regenerator is reboiled with MP steam by the Amine Regenerator Reboiler (420-H-101). The Amine Regenerator bottoms product, which is lean amine, is air-cooled and then passes through a set of filters to remove particulates and amine degradation products formed in the regenerator reboiler before being sent back to the H-Coal Unit. A slip stream of Lean Amine is routed to the Sulfur Recovery Unit (SRU) Amine Absorber (440-R-104) in Unit 440—Sulfur Recovery.

2.5.3 Unit 430—Sour Water Stripping

Sour water streams from other process units are collected into one common header and sent to the Sour Water Feed Flash Drum (430-D-101). The Sour Water Feed Flash Drum is a three-phase separator that operates at a low pressure to flash any light end hydrocarbons, which are then sent to Unit 410—Gas Recovery Unit. Entrained condensates are separated in the Sour Water Feed Flash Drum and sent to Unit 630—Liquid Product Storage. Sour water from the Sour Water Feed Flash Drum is cooled and sent to the Sour Water Storage Tank (430-TK-1). A pressure controller on the tank vents vapors to Unit 440—Sulfur Recovery Unit. The Sour Water Storage Tank is provided with an oil skimmer in order to remove condensates and inhibit H_2S evolution. Condensates from the Sour Water Storage Tank recycled back into the process.

Sour water from Sour Water Storage Tank is pumped to the H_2S Stripper (430-C-101). The H_2S Stripper is a trayed column where H_2S is separated from the sour water. The H_2S Stripper is reboiled via the H_2S Stripper Reboiler (430-H-101) with MP steam to strip H_2S from the sour water.

The H_2S Stripper overhead vapor is sent to the H_2S Stripper Overhead Air Cooler (430-A-101) to condense the vapor and then to the H_2S Stripper Overhead KO Drum (430-D-102) to remove entrained liquids. Liquids from the knockout drum are returned to the Sour Water Feed Flash Drum. The acid gas from the H_2S Stripper Overhead KO Drum is sent to Unit 440—Sulfur Recovery.

The H_2S Stripper bottom stream is sent to the top tray of the H_2S-NH_3 Stripper (430-C-102). The H_2S-NH_3 Stripper is a trayed column where ammonia and any remaining H_2S are removed from the sour water. The H_2S-NH_3 Stripper is reboiled with MP steam via the H_2S-NH_3 Stripper Reboiler (430-H-102).

The stripped sour water from the H_2S-NH_3 Stripper is routed to other process units for use as wash water or discharged from the facility to a Publically Owned Treatment Work.

The overhead vapor from the H_2S-NH_3 Stripper is sent to the bottom of the H_2S Absorber, which is a trayed column. In this tower, the ammonia product is scrubbed free of H_2S using a portion of the stripped water from the H_2S-NH_3 Stripper bottoms. The overhead vapor from the H_2S Absorber is cooled and partially condensed by the H_2S Absorber Air Cooler (430-A-102). The condensed liquid is separated from the NH_3 rich vapor in the H_2S Absorber Overhead Drum (430-D-103) and then pumped to the column top tray as reflux. The bottom liquid from the H_2S Absorber, which contains H_2S and NH_3, is mixed with the sour water feed to the H_2S Stripper.

The vapor from the H_2S Absorber Overhead Drum is compressed by a three-stage reciprocating Ammonia Product Compressor. The compressed ammonia product is totally condensed by cooling water before entering the Ammonia Product Drum (430-D-106) from which it is pumped to storage.

2.5.4 Unit 440—Sulfur Recovery

The Sulfur Recovery Unit utilizes the Claus process to recover elemental sulfur. In the Claus sulfur recovery section, H_2S in the acid gas feed is converted to elemental sulfur. The H_2S is partially combusted with air to make SO_2, which reacts with the H_2S in the furnace and catalytic stages to form sulfur.

The acid gas feed to the Claus sulfur recovery section is comprised of sour gas from Unit 430—Sour Water Stripping and acid gas from Unit 420—Amine Regeneration. The sour and acid gases enter the sulfur recovery section through the Acid Gas Wash Drum (440-D-101) where traces of ammonia and entrained water are removed. In the upper section of the acid gas wash drum, the acid gas is contacted with wash water from Unit 430—Sour Water Stripping to remove traces of ammonia from the gas. The wash water is then returned to Unit 430—Sour Water Stripping for treatment.

The combustion reaction is carried out in the burner of the Reaction Furnace. Sulfur is formed thermally in the SRU Reaction Furnace (440-H-101) and the products from the exothermic reactions are cooled in the Waste Heat Boiler (440-H-102) by generating high-pressure steam and then further cooled by generating low-pressure steam in the SRU Condenser 1 (440-D-102). The condensed sulfur is separated from the gas and the sulfur drains from the condenser to the Sulfur Pit.

The outlet gas from SRU Condenser 1 is heated and then enters SRU Converter 1 (440-R-101), which contains an alumina catalyst. Sulfur is formed by an exothermic reaction. SRU Converter 1 effluent is then cooled in the SRU Condenser 2 (440-D-103) and the condensed sulfur is drained to the Sulfur Pit. Similarly, the gas from SRU Condenser 2 is reheated with steam and enters SRU Converter 2 (440-R-102) where sulfur is formed. The converter effluent is cooled again in SRU Condenser 3 (440-D-104) and the condensed sulfur is drained to the sulfur pit. Tail gas from SRU Condenser 3 is routed to the tail gas treatment section of Unit 440—Sulfur Recovery.

In the hydrogenation section of tail gas treatment, sulfur compounds are catalytically converted to H_2S, which is then removed in the amine treating section of Unit 440—Sulfur Recovery. The tail gas from the final condensers of the Claus sulfur recovery section enters the hydrogenation section through the Reducing Gas Generator (440-H-103). The Reducing Gas Generator heats the tail gas to permit the desired hydrogenation and hydrolysis reactions to proceed in the reactor. Hot combustion products are mixed with the tail gas, and the resulting stream flows to the Hydrogenation Reactor (440-R-103). In the Hydrogenation Reactor, sulfur compounds are converted to H_2S by hydrogenation and hydrolysis. These reactions are exothermic and the gas exiting the Hydrogenation Reactor is then sent to the Desuperheater Contact Condenser (440-C-101) to be cooled.

In the Desuperheater Contact Condenser, the gas is cooled and condensed into a water stream. This is a two-stage column in which the gas is first de-superheated by contact with a circulating water stream in the lower section of the column and then further cooled, condensing most of the water in the gas, by contact with a second circulating stream of cooled water in a packed bed in the upper section. The cooled hydrogenated tail gas proceeds to the SRU Amine Absorber (440-R-104).

In the SRU Amine Absorber, tail gas from the De-superheater/Contact Condenser flows into the SRU Amine Absorber where H_2S is absorbed by the lean amine solution from Unit 420—Amine Regeneration. Rich amine is pumped from the bottom of the SRU Amine Absorber to Unit 420—Amine Regeneration.

Overhead gas from the SRU Amine Absorber flows to the SRU Incinerator (440-SRI-1) for destruction.

2.6 Unit 500—Utilities

Unit 500—Utilities includes facility utilities necessary to operate the facility. Regulated sources within Unit 500 includes the facility boiler, emergency electric generator, and cooling towers.

The facility will operate a natural gas-fired boiler (500-SB-1) to generate steam. During normal operations, the facility will produce excess steam, which will allow the boiler to be operated at partial load. During facility startup, the boiler will operate at full rated capacity of 24.3 Million British Thermal Units per hour (MMBtu/hr). During normal facility operations, the boiler will operate at 4.9 MMBtu/hr.

An emergency electric generator (500-EG-1) will be a diesel-fired source operated during power failure to supply power to critical equipment. The necessary generator rating to supply critical power is identified as 500 kilowatts (kW).

The facility will also operate a cooling water tower (500-CT-1) with an estimated flow rate of 5,565 gallons per minute. The cooling water tower will operate as an induced flow system and is not estimated in the facility PTE to include a drift eliminator. The supply source pressure and temperature are estimated to be 80 psig and 80 degrees Fahrenheit. The return pressure and temperature are estimated to be 55 psig and 100 degrees Fahrenheit.

2.7 Unit 600—Product Storage and Loading

Unit 600—Product Storage and Loading has multiple process sections that store and load-out solid and liquid products. The process sections in Unit 600 include Unit 610—Solid Product Handling, Unit 620—Emergency Flare System, Unit 630—Liquid Product Storage, and Unit 640—Liquid Product Load-out.

2.7.1 Unit 610—Solid Product Handling

2.7.1.1 Flake Product

Slurry reside from the bottom of the Unit 200 vacuum fractionator is flaked and transferred off-site as a saleable product. From Unit 200, slurry residue to pumped onto a flake transfer conveyor system (610-TC-1) that allows the material to cool and solidify as flake product. From the conveyor system, flake product is stored in the surge flake storage silo (610-SS-1) before transfer via a pipe conveyor (610-TC-2) to product storage domes (610-DS-1, 610-DS-2). Each of the flake product storage domes is controlled with a fan filter. Within the storage domes, stack conveyors (6100-TC-4, 610-TC-5) are used to create storage piles (610-SP-1, 610-SP-2). From the storage piles, flake is gravity fed to loading hoppers (610-TH-1, 610-TH-2) before conveyance along two conveyors (610-TC-6, 610-TC-7) prior to loading into the truck loading hopper (610-TH-3). Flake product is loaded from the loading hopper into trucks (610-TR-1) for delivery off-site.

2.7.1.2 Sulfur Product

Sulfur recovered from Unit 440—Sulfur Recovery is stockpiled for eventual transport via truck off-site. From Unit 440, sulfur enters via a hopper (610-TH-4) and transported along a conveyor (610-TC-8) for deposition on the sulfur storage pile (610-SP-3). From the storage sulfur storage pile, sulfur product is transferred from a front-end load into sulfur loading hopper (610-TH-5). From the hopper, sulfur product is conveyed (610-TC-9) to the truck loading hopper (610-TH-6) for loading into truck (610-TR-2) for off-site delivery.

2.7.2 Unit 620—Emergency Flare System

The flare system collects the discharges from unplanned pressure safety valve discharges and overpressure control valves, as well as for depressurization during facility shutdown, for safe destruction in an elevated flare. The emergency flare (620-FL-1) will be operated with two flare tips, one in hydrocarbon service and one in acid gas service. Flare sizing is based upon maximum relieving rate estimates, which is expected to occur during facility shutdown. DSF conservatively estimates four plant shutdowns per year, as the nature of the process promotes minimizing shutdowns and turnarounds.

Loading to the emergency flare will occur for 30 minutes from each refining process unit during facility shutdown to purge process gases. Flowrates and waste stream compositions from Units 200, 310, 320, and 420 are included in the facility potential to emit (PTE) estimation.

2.7.3 Unit 630—Liquid Product Storage

2.7.3.1 Diesel Storage

Diesel produced from Unit 310 – Hydrocracking is fed to two finished product storage tanks (630-TK-8, 630-TK-9) until ready to load transports for sale.

2.7.3.2 Gasoline Semi-Finished Storage

Reformate (Heavy Naptha) from Unit 320 - Catalytic Reformer is fed to two semi-finished storage tanks (630-TK-4, 630-TK-5). Light Naptha from Unit 410 – Gas Recovery Unit is fed to two semi-finished storage tanks (630-TK-2, 630-TK-3). Reformate and Light Naptha are blended into two Gasoline storage tanks (630-TK6, 630-TK-7). Ethanol from two tanks (630-TK-10, 630-TK-11) is stored in Unit 630 awaiting blending into the gasoline to make finished product gasoline in for shipment in Unit 640 – Liquid Product Loadout. Vapors from the gasoline area are captured and sent to flare 640-FL-1 for destruction.

2.7.3.3 LPG Storage

LPG is produced from Unit 320 – Catalytic Reformer and Unit 410 – Gas Recovery and stored in nine pressurized tanks (630-TK-1A-I) until ready for loading and shipping.

2.7.3.4 Emergency Dump Tanks (Process Vessels)

There are four process vessels that can be used to hold in-process materials during maintenance outages, unexpected process interruptions, off-spec material to be reworked in the process, etc. The HYK Heavy Feed Tank (630-TK-12) and HYK Light Feed Tank (630-TK-13) can be used to handle in-process materials from Unit 200. The Heavy Slop Oil Tank (630-TK-14) and Light Slop Oil Tank (630-TK-15) can be used to handle in-process materials from Unit 430.

2.7.4 Unit 640—Liquid Product Loadout

2.7.4.1 Diesel Loading

Diesel from two storage tanks (630-TK-8, 630-TK-9) is loaded into transport containers by one of the separate loading racks for diesel trucks (6 truck spots), diesel railcars (1 spot), or barge (1 spot). Material is metered through a loading skid which measures the amount of product loaded into the transport container.

2.7.4.2 Gasoline

Gasoline in two storage tanks (630-TK6, 630-TK-7) is blended with ethanol from two storage tanks (630-TK-10, 630-TK-11) to fill transports with finished gasoline (15% ethanol blend). The blending operation and measurement of material loaded is accomplished through a metering/blending skid in the loading area. There are separate loading racks for gasoline trucks (4 truck spots), gasoline railcars (1 spot) or barge (1 spot). Vapors are captured and sent to control device 640-FL-1.

2.7.4.3 LPG

LPG stored in nine pressurized tanks (630-TK1 A-I) is loaded into tank trucks (2 spots) in a dedicated LPG loading area.

2.7.4.4 Enclosed Ground Flare

Control device 640-FL-1 is an enclosed ground flare system of total nominal capacity 27.6 MMBTU/hr. This unit is sized to control the potential captured vapor flows from loading gasoline to trucks, rail and barge spots at maximum instantaneous loading rates.

2.7.4.5 Paved Haul Roads

The DSF facility will transport materials and products on paved facility haul roads. Paved roads will be maintained with a street sweeper to minimize the accumulation of materials along haul roads that could contribute to fugitive dust.

Materials receiving and product offloading operations by truck will be conducted during the day to minimize truck traffic during the evening and overnight. Materials transported on facility paved haul roads are detailed in the emission calculations of this permit application

Materials and products will also be transported by barge and rail. It is estimated that 50 percent of coal will be received via truck with the remaining by barge. Flake product, LPG, Sulfur, Ammonia, and catalyst materials will be loaded by truck. Diesel and gasoline product will be loaded by truck, barge, and rail.

2.8 Unit 700 – Hydrogen Plant

The DSF facility will require a Hydrogen plant to provide the necessary hydrogen feed to Unit 200. The Hydrogen Plant will leverage a process of Steam Methane Reforming natural gas to produce the necessary hydrogen. The main steps in the process are as follows:

- Gas compression and treating purification – Natural gas is compressed, preheated, and impurities are removed;
- Reforming furnace – Feed gas is converted to hydrogen, CO, and CO_2;
- CO shift and gas cooling – CO is exothermically reacted to promote the formation of CO_2; and
- PSA Hydrogen Purification – Adsorption vessels maximize hydrogen recovery at a high purity.

The Steam Methane Reforming furnace duty is estimate to be 537 MMBtu/hr. Total hydrogen production will be 75 MMSCFD. The estimated natural gas import is 28 MMSCFD.

3. PREVENTION OF SIGNIFICANT DETERIORATION

WV regulations in WV 45 CSR 14 establish and adopt a preconstruction permit program in accordance with the policy of §101(b)(1) of the Clean Air Act (CAA), the purposes of §160 of the CAA, and the prevention of significant deterioration (PSD) of air quality requirements of 40 Code of Federal Regulations (CFR) §51.166. The PSD program applies to a new major stationary source or major modification that is located in an area formally designated as attainment or unclassifiable for any pollutant for which a National Ambient Air Quality Standard exists (criteria pollutants). Mason County, WV is designated as attainment or unclassifiable for all criteria pollutants.

The DSF facility will qualify as a fuel conversion plant as it converts a solid coal input into a liquid product output through the direct liquefaction process. Fuel conversion plants are specially regulated as one of the 28 stationary source types under the CAA that are subject to a 100 ton per year major stationary source applicability threshold. This is codified under WV 45 CSR 14 Section 2.43a.

As shown in Table 3-1, the proposed facility will not exceed the PSD threshold of 100 tons per year. As such, the DSF facility will qualify as a minor source regulated under WV 45 CSR 13. DSF will monitor future construction and modification activities at the site closely and will compare future increases in emissions with the New Source Review thresholds to ensure these activities will not trigger this program.

Table 3-1: Summary of PSD Non-Applicability

Regulated NSR Pollutant	Project Potential Emissions (ton/year)	PSD Applicability	PSD Review Required?
NO_x	82.27	100	No
CO	71.35	100	No
VOC	86.35	100	No
SO_2	27.03	100	No
PM_{10}	56.11	100	No
$PM_{2.5}$	32.65	100	No

4. FEDERAL REGULATORY REQUIREMENTS

4.1 Applicable NSPS Standards

New Source Performance Standards (NSPS) are established for specific industrial categories in 40 CFR Part 60. WV regulations in WV 45 CSR 16 incorporate the federal NSPS by reference. A review of the potentially applicable and non-applicable NSPS categories has been performed and is presented below.

4.1.1 NSPS Subpart Dc—Small Industrial Steam Generating Units

NSPS Subpart Dc applies to each steam-generating unit that is capable of combusting between 10 and 100 MMBtu/hr (2,930–29,300 kW) of fuel and for which construction, modification, or reconstruction is commenced after 9 June 1989. The DSF facility will operate affected units under NSPS Dc.

The Steam Boiler (500-SB-1) and Coal Milling Dryer (100-CMD-1) are subject to NSPS Subpart Dc as steam generating units with a maximum rated heat input capacity between 10 and 100 MMBtu/hr. Steam generating units are defined as combustion devices that produce steam, heat water, or heat any heat transfer medium. Note that per 60.40c(h), affected facilities that also meet the applicability requirements under subpart J or subpart Ja of this part are subject to the particulate matter (PM) and NO_X standards under this subpart and the SO_2 standards under subpart J or subpart Ja of this part, as applicable.

Additional indirect-fired sources at the facility will qualify as process heaters that are used to heat a material to initiate or promote a chemical reaction, and as such, are not subject to the requirements of Dc. These process heaters are identified as the Slurry Feed Heater (200-H-102), Hydrogen Heater (200-H-101), Vacuum Tower Feed Heater (200-H-301), Fractionator Reboiler (310-H-103), and Reaction Heaters (320-H-201 through 320-H-204).

The Claus Furnace (440-CF-1) and Sulfur Recovery Incinerator (440-SRI-1) are direct fired-sources that are not subject to Dc.

4.1.2 NSPS Subpart Kb—Volatile Organic Liquid Storage Vessels

NSPS Subpart Kb applies to each storage tank containing a volatile organic liquid that is greater than 19,813 gallons (75 m^3) in capacity and that has been constructed, reconstructed, or modified after 23 July 1984. This subpart does not apply to storage vessels with a capacity greater than or equal to 39,890 gallons (151 m^3) storing a liquid with a maximum true vapor pressure less than 3.5 kilopascals (kPa) or with a capacity greater than or equal to 75 m^3 but less than 151 m^3 storing a liquid with a maximum true vapor pressure less than 15.0 kPa.

The following table lists tanks that store volatile organic liquids at the DSF facility and provides their regulatory applicability status per NSPS Subpart Kb:

Table 4-1: List of Tanks Containing Volatile Organic Liquids at the DSF Facility

Tank ID	Tank Contents	Approx. Tank Volume (m^3)	Max. vapor pressure (kPa) @ 80 degF	Subpart Kb Key Applicable Requirements for VOC Control
630-TK-1 (A – I)	LPG	227.12 m3	>204.9	Exempt—pressure tank [1]
630-TK-2	Light Naphtha Tank 1	476.96	—	Exempt—process vessel

Tank ID	Tank Contents	Approx. Tank Volume (m^3)	Max. vapor pressure (kPa) @ 80 degF	Subpart Kb Key Applicable Requirements for VOC Control
				**Regulated under NESHAP BBBBBB
630-TK-3	Light Naptha Tank 2	476.96	—	Exempt—process vessel **Regulated under NESHAP BBBBBB
630-TK-4	Reformate (Heavy Naphtha) Tank 1	635.95	—	Exempt—process vessel & vapor pressure
630-TK-5	Reformate (Heavy Naphtha) Tank 2	635.95	—	Exempt—process vessel & vapor pressure
630-TK-6	Gasoline Tank 1	3,179.75	80	Fixed roof with internal floating roof and closed vent system routed to 95% control device
630-TK-7	Gasoline Tank 2	3,179.75	80	Fixed roof with internal floating roof and closed vent system routed to 95% control device
630-TK-8	Diesel Tank 1	4,531	0.083	Exempt based on vapor pressure
630-TK-9	Diesel Tank 2	4,531	0.083	Exempt based on vapor pressure
630-TK-10	Ethanol Tank 1	635.95	8.4	Fixed roof with internal floating roof and closed vent system routed to 95% control device
630-TK-11	Ethanol Tank 2	635.95	8.4	Fixed roof with internal floating roof and closed vent system routed to 95% control device

Tank ID	Tank Contents	Approx. Tank Volume (m^3)	Max. vapor pressure (kPa) @ 80 degF	Subpart Kb Key Applicable Requirements for VOC Control
630-TK-12	HYK Heavy Feed Tank	476.96	—	Exempt—process vessel
630-TK-13	HYK Light Feed Storage Tank	476.96	—	Exempt—process vessel
630-TK-14	Heavy Slop Oil Tank	2,536.23	—	Exempt—process vessel **Regulated under NSPS QQQ
630-TK-15	Light Slop Oil Tank	2,536.23	—	Exempt—process vessel **Regulated under NSPS QQQ
430-TK-1	Sour Water Tank	794.94	—	Exempt—process vessel **Regulated under NSPS QQQ

1 Pressure vessels designed to operate in excess of 204.9 kPa and without emissions to the atmosphere are not subject to Subpart Kb, per 60.110b.(d)(2).

DSF will maintain records of the design of each storage tank, liquids stored, and maximum vapor pressure, and will notify the agency of any changes from the original tank design.

4.1.3 NSPS Subpart Y—Standards of Performance for Coal Preparation and Processing Plants

NSPS Subpart Y applies to affected facilities in coal preparation and processing plants that process more than 200 tons of coal per day. Coal preparation and processing plant means any facility (excluding underground mining operations) which prepares coal by one or more of the following processes: breaking, crushing, screening, wet or dry cleaning, and thermal drying. The DSF facility will dry, crush, and handle coal at a rate that exceeds the applicability threshold of 200 tons per day and therefore is subject to NSPS Subpart Y.

Specific emission sources within Unit 100—Coal Handling that are subject to Subpart Y include coal processing and conveying equipment, storage piles and the Coal Milling Dryer (100-CMD-1), an indirect-fired coal thermal dryer. Subject coal processing and conveying equipment will comply with the opacity limit of 10% and PM discharge concentration limit of 0.010 gr/dscf. As outlined in 40 CFR 60.252(c), the coal milling dryer qualifies as a thermal dryer that receives all of its thermal input from an affected facility covered under 40 CFR 60 Subpart Dc. As such, the thermal dryer will comply with the NSPS Dc limits and is not subject to the Subpart Y limits. The open storage piles will require the submission of a fugitive dust plan that identifies control measures to minimize fugitive coal dust. DSF proposes to use a wind barrier for the active storage pile (100-SP-1) and backup storage pile (100-SP-2) as a method of compliance.

4.1.4 NSPS Subpart Ja—Petroleum refineries constructed after May 14, 2007

NSPS Subpart Ja applies to the following affected facilities in petroleum refineries: fluid catalytic cracking units (FCCU), fluid coking units (FCU), delayed coking units, fuel gas combustion devices (including process heaters), flares, and sulfur recovery plants, which either commence construction, modification, or reconstruction after May 14, 2007.

The subpart defines petroleum refinery as "any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, asphalt (bitumen) or other products through distillation of petroleum or through redistillation, cracking or reforming of unfinished petroleum derivatives." Petroleum means "the crude oil removed from the earth and the oils derived from tar sands, shale, and coal." Process heater is defined as "an enclosed combustion device used to transfer heat indirectly to process stream materials (liquids, gases, or solids) or to a heat transfer material for use in a process unit instead of steam." Sulfur recovery plant means "all process units which recover sulfur from H_2S and/or SO_2 from a common source of sour gas produced at a petroleum refinery."

The DSF facility will not qualify as a fluid catalytic cracking unit or fluid coking unit as the direct liquefaction process does not burn or produce coke. DSF proposes to operate fuel gas combustion devices (including process heaters), flares, and a sulfur recovery plant at the facility.

The Slurry Feed Heater (200-H-102), Hydrogen Heater (200-H-101), Vacuum Tower Feed Heater (200-H-301), Reaction Heater (310-H-101), Reaction Heater 1 (320-H-201), Reaction Heater 2 (320-H-202), Reaction Heater 3 (320-H-203), and Reaction Heater 4 (320-H-204) are subject to NSPS Subpart Ja because they meet the definition of process heater and fuel gas combustion unit. The SO_2 limits from 40 CFR 60.102a(g)(1)(i) states that fuel gas combustion units shall not cause the discharge of SO_2 in excess of 20 ppmv on a 3-hour rolling basis and in excess of 8 ppmv on an annual basis. The fuel gas recovered from Unit 410—Gas Recovery Unit is expected to have a total sulfur content of less than 1 ppmv. As a conservative measure, the emission calculations utilize the EPA AP-42 Section 1.4 emission factor for external natural gas combustion, which equates to 3.5 ppmv SO_2 outlet. The less than 8 ppmv total sulfur in the fuel gas comply with the H_2S requirement of 40 CFR 60.102a(g)(1)(ii). Note that per Subpart Dc at 60.40c(h), affected facilities that also meet the applicability requirements under subpart J or subpart Ja of this part are subject to the PM and NOX standards under this subpart (Dc) and the SO_2 standards under subpart J or subpart Ja of this part, as applicable.

The Slurry Feed Heater (200-H-102) is proposed as a 74.02 MMBtu/hr natural-draft heater and will comply with the NSPS Ja limit of 0.040 pounds per MMBtu emission limitation for oxides of nitrogen (NO_x).

The sulfur recovery unit will have a design production capacity greater than 20 long tons per day and will be designed with a reduction control system followed by incineration. As such, DSF will comply with the requirements of 60.102(a)(f)(1)(i) and maintain an SO_2 emission limit less than or equal to 250 ppm_v.

The flare (620-FL-1) will qualify as an affected emergency flare under this subpart. As such, DSF will comply with the work practice standards outlined in 40 CFR §60.103a.

4.1.5 NSPS Subpart XX—Bulk Gasoline Terminals

The NSPS Subpart XX–affected facility is all of the loading racks at a bulk gasoline terminal which deliver liquid product into gasoline tank trucks that commence construction or modification after December 17, 1980. As defined in Subpart XX, bulk gasoline terminal means "any gasoline facility which receives gasoline by pipeline, ship or barge, and has a gasoline throughput greater than 75,700 liters per day".

Gasoline is defined as "any petroleum distillate or petroleum distillate/alcohol blend having a Reid vapor pressure of 27.6 kilopascals or greater which is used as a fuel for internal combustion engines". Loading rack means “the loading arms, pumps, meters, shutoff valves, relief valves, and other piping and valves necessary to fill delivery tank trucks.”

DSF proposes to have a gasoline throughput greater than 75,700 liters per day, and therefore its gasoline loading racks will be affected sources per Subpart XX.

The DSF facility will also be subject to National Emission Standards for Hazardous Air Pollutants (NESHAP) BBBBBB, which presents more stringent requirements for gasoline loading racks. NESHAP BBBBBB is discussed further in section 4.3.2.

4.1.6 NSPS GGGa—Equipment leaks of Volatile Organic Compounds in Petroleum Refineries Constructed after November 7, 2006

NSPS Subpart GGGa applies to each owner or operator of a petroleum refinery that commences construction, modification, or reconstruction after 7 November 2006. This subpart requires implementation of a leak detection and repair program (LDAR) for the equipment within a petroleum refinery in accordance with NSPS Subpart VVa. Exceptions to the provisions of Subpart VVa are listed in §60.593a.

Subpart GGGa provides the following key definitions:

- Equipment means each valve, pump, pressure relief device, sampling connection system, open-ended valve or line, and flange or other connector in volatile organic compound (VOC) service. For the purposes of recordkeeping and reporting only, compressors are considered equipment.
- Process unit means components assembled to produce intermediate or final products from petroleum, unfinished petroleum derivatives, or other intermediates; a process unit can operate independently if supplied with sufficient feed or raw materials and sufficient storage facilities for the product.
- Petroleum refinery means any facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuel oils, lubricants, or other products through the distillation of petroleum, or through the redistillation, cracking, or reforming of unfinished petroleum derivatives.
- Petroleum means the crude oil removed from the earth and the oils derived from tar sands, shale, and coal.

DSF proposes to construct and operate a petroleum refinery, and therefore will be subject to the applicable requirements of Subpart GGGa.

DSF has included an estimation of VOC and HAP emissions from fugitive components within this permit application. Detailed explanations and notes of the calculation methodologies and percent control effectiveness are provided in Appendix A – Permit Application Documents – Attachment N – Emission Calculations. DSF commits to implementing the GGGa LDAR program, which includes a 500 ppm leak definition and includes monitoring frequencies comparable to the HON MACT LDAR Requirements. Given the similarities between these LDAR programs, emission calculations leverage the same percent control effectiveness as is provided by in the November 1996 “US EPA Preferred and Alternative Methods for Estimating Fugitive Emissions from Equipment Leaks”. In addition, DSF commits to operating leakless pumps and compressors throughout the facility.

4.1.7 NSPS Subpart QQQ—Petroleum Refinery Wastewater Systems

NSPS Subpart QQQ sets standards to reduce VOC emissions from individual drain systems, oil-water separators, and aggregate facilities. The DSF facility will not operate a wastewater treatment facility that will discharge to the Ohio River. Wastewater generated at the facility will be discharged to the Publically

Owned Treatment Works. Prior to this discharge, process waters will contain oily waters subject to the provisions of this rule.

Drains, junction boxes, sewer lines, and other conveyance systems for oily water will be constructed, operated, and maintained in accordance with the Rule. The Oil-water separator in Unit 430—Sour Water Stripping will qualify as an affected unit under QQQ. The oil-water separator will be equipped and operated with a closed vent system the routes vapors to the Sulfur Recovery Incinerator (440-SRI-1). The slop oil tanks (440-LSO-1, 440-HSO-1) will operate in an enclosed system and oils will be recycled to the process.

4.1.8 NSPS Subpart IIII—Stationary Compression Ignition Internal Combustion Engines

Federal NSPS regulations for stationary compression ignition internal combustion engines are found at 40 CFR Part 60, Subpart IIII ("NSPS Subpart IIII") and include emission limits and operating requirements for emergency CI engines that commenced construction after April 1, 2006. At the DSF facility, one emergency generator engine (600-EG-1) is subject to this subpart.

Pursuant to 40 CFR §60.4205(b), the emergency generator engine will be certified to meet the emission standards listed in 40 CFR §89.112 and 89.113, as referenced by 60.4202.

4.2 Non-Applicable NSPS Standards

The following NSPS subparts are not applicable to the DSF facility based on the rationale set forth below.

4.2.1 NSPS Subpart Db—Industrial-Commercial-Institutional Steam Generating Units

NSPS Db regulates steam-generating units with a rating greater than 100 MMBtu/hr. The Hydrogen Reformer (600-HR-1) is rated at 537 MMBtu/hr, but is not subject to the requirements of Db as the reformer heats a material to initiate or promote a chemical reaction.

4.2.2 4.2.2 NSPS Subpart E—Standard of Performance for Incinerators

The DSF facility will operate a Sulfur Recovery Incinerator (440-SRI-1) as a part of Unit 440. This incinerator does not burn solid waste and therefore is not subject to the requirements of this Rule.

4.3 Applicable Part 61 (NESHAP) and Part 63 (MACT) Standards

NESHAP standards are established for specific pollutants and source categories in 40 CFR Part 61 and Part 63 (Maximum Achievable Control Technology [MACT]) in accordance with the CAA Amendments of 1990, which required development standards for sources of hazardous air pollutants (HAPs). WV regulations in WV 45 CSR 34 incorporate the federal NESHAP standards by reference. A review of the potentially applicable and non-applicable NESHAP and MACT categories has been performed and is presented below.

Potential HAP emissions from the DSF facility are less than the major source thresholds of 10 tons per year (tpy) of an individual HAP or 25 tpy of total HAP emissions. Thus, DSF is an area (minor) source of HAP and is not subject to any major source MACT standards.

Sources of HAPs from the DSF facility are generated from on-site combustion and the storage and loading of fuels. HAPs of concern include formaldehyde, benzene, ethylbenzene, n-hexane, toluene, xylenes, carbonyl sulfide, nickel oxide, and cobalt oxide. Heavy metals, such as mercury, do not have the potential to be emitted from the DSF facility since coal is not combusted as a part of the direct liquefaction process. Without combustion of coal, the trace metals elements are not extracted from the coal feed and will remain in the coal slurry. As such, there is no potential to emit heavy metals to the atmosphere from the direct liquefaction process.

There are no NESHAP standards under 40 CFR Part 61 that are applicable to the DSF facility.

A review of the area source MACT regulations under 40 CFR Part 63 has been performed for applicability to the DSF facility and is presented below.

4.3.1 NESHAP Subpart ZZZZ—Stationary RICE

Federal NESHAP regulations for stationary Reciprocating Internal Combustion Engines (RICE) are found at 40 CFR Part 63, Subpart ZZZZ ("RICE MACT"). For the emergency generator engine (600-EG-1), as a new compression ignition stationary RICE located at an area source of HAP, the requirements of NESHAP Subpart ZZZZ are satisfied by meeting the requirements of NSPS Subpart IIII (per §63.6590(c)(1)). No further requirements apply for such engines under this part. As discussed in Section 4.1.8, the emergency generator complies with NSPS Subpart IIII.

4.3.2 NESHAP Subpart BBBBBB—Gasoline Distribution Bulk Terminals, Bulk Plants, and Pipeline Facilities

Subpart BBBBBB applies to each area source bulk gasoline terminal, pipeline breakout station, pipeline pumping station, and bulk gasoline plant that commenced construction after November 9, 2006. "Bulk gasoline terminal" means any gasoline facility that receives gasoline by pipeline and has a gasoline throughput greater than 20,000 gallons per day. The DSF facility will qualify as an affected source for a bulk gasoline terminal located at an area source of HAPs.

The requirements of NESHAP Subpart BBBBBB apply to the gasoline storage tanks, gasoline loading racks, vapor collection-equipped gasoline cargo tanks, and equipment components in vapor or liquid gasoline service. "Gasoline cargo tank" means a delivery tank truck or railcar that is loading gasoline or that has loaded gasoline on the immediately previous load. The loading of gasoline into marine tank vessels at bulk facilities is not subject to this subpart.

The Subpart BBBBBB affected sources that meet the criteria specified in Tables 1 through 3 to this subpart at DSF will be:

1. Gasoline, light naphtha and ethanol storage tanks;
2. Gasoline loading racks;
3. Vapor collection-equipped gasoline cargo tanks; and
4. Equipment components in vapor or liquid gasoline service.

Subpart BBBBBB also specifies that flares, if used as a control device, must be designed and monitored in accordance with §63.11(b).

Per §63.11088(f): If your gasoline storage tank is subject to, and complies with, the control requirements of 40 CFR part 60, subpart Kb of this chapter, your storage tank will be deemed in compliance with this section. The gasoline and ethanol storage tanks will be subject to both NSPS Kb and NESHAP BBBBBB, and will comply with the requirements of Kb. The light naptha tank, as a process vessel, will not be subject to Kb. A similar process vessel exemption does not exist under NESHAP BBBBBB, such that the light naptha tank will be subject based upon reid vapor pressure of tank contents. The heavy naptha, HYK feed tanks, slop oil tanks, and sour water tank will not be subject based upon reid vapor pressure.

4.4 Non-Applicable Part 61 (NESHAP) and Part 63 (MACT) Standards

Potential HAP emissions from the DSF facility are less than the major source thresholds of 10 tpy of an individual HAP or 25 tpy of total HAP emissions. Thus, DSF is an area (minor) source of HAP and is not subject to any major source MACT standards.

There are no NESHAP standards under 40 CFR Part 61 that are applicable to the DSF facility.

A review of the area source MACT regulations under 40 CFR Part 63 has been performed for applicability to the DSF facility and is presented below.

4.4.1 NESHAP Subpart Q—Industrial Process Cooling Towers

NESHAP Subpart Q regulates new and existing industrial cooling towers operated with chromium-based water treatment chemicals located at or supporting major sources of HAPs. As a minor source of HAPs, the DSF facility is not subject to the requirements of Subpart Q.

4.4.2 NESHAP Subpart CC—Petroleum Refineries

NESHAP Subpart CC regulates petroleum process units and related emission points located at a major source of HAPs and contain/emit certain HAP pollutants. As a minor source of HAPs, the DSF facility is not subject to the requirements of Subpart CC.

4.4.3 NEHSAP UUU—Petroleum Refineries; Catalytic Cracking Units, Catalytic Reforming Units, and Sulfur Recovery Units

NESHAP Subpart UUU regulates petroleum refineries that qualify as a major source of HAPS. As a minor source of HAPs, the DSF facility is not subject to the requirements of Subpart UUU.

4.4.4 NESHAP Subpart JJJJJJ—Area Source Industrial, Commercial, and Institutional Boilers MACT

Federal NESHAP regulations for industrial, commercial, and institutional boilers and process heaters that are located at area sources of HAP are found at 40 CFR Part 63, Subpart JJJJJJ (“Area Source Boiler MACT”). The Steam Boiler (600-SB-1) is not subject to this subpart and to any requirements in this subpart because it is a gas-fired boiler.

5. STATE REGULATORY REQUIREMENTS

5.1 Applicable State Regulatory Requirements

This section outlines the WV state air quality rules that could be reasonably expected to apply to DSF and makes an applicability determination for each rule based on activities conducted at the site and the emissions of regulated air pollutants.

5.1.1 45 CSR 1—Alternative Emission Limits During Startup, Shutdown, and Maintenance Operations

This rule sets forth the criteria for establishing an alternative emission limitation during periods of startup, shutdown, or maintenance (SSM). An alternative emission limitation may be a numerical limitation, a technological control requirement, or a work practice requirement that would apply during periods of startups, shutdowns, or maintenance as a component of the continuous allowable emission limitation.

The DSF facility will operate with continuous operations such that startups, shutdowns, and maintenance operations will be infrequent. The facility is expected to operate with four startup and shutdowns per year, with maintenance activities occurring during these turnaround periods. With the submittal of this permit application, DSF has evaluated SSM operations, and included an estimation of these activities in the facility PTE.

5.1.1.1 Facility Startup

During facility startup, the refining process will require additional steam production for the boiler (500-SB-1) that would normally be provided by additional heat exchangers associated with various heaters at the facility. In order to provide the necessary steam for facility startup, the full boiler rating capacity of 24.3 MMBtu/hr is estimated for 60 hours per year. During normal facility operations, the boiler is expected to fire at 4.9 MMbtu/hr.

Facility heaters will startup at a lower load or heat rating (MMBtu/hr) and therefore will utilize less fuel during startup operations. These heaters will be operated without traditional add-on control devices that may require a ramp-up time period to promote emission reductions. Although an increase to the lb/MMBtu emission factor during startup is expected, the offset of lower load results in a decreased impact on a lb/hr basis when compared to normal operations.

The Hydrogen Reformer (700-HR-1) will utilize Selective Catalytic Reduction (SCR) to further reduce NO_x. The temperature of the exhaust stream is critical to promote the reaction of NO_x with the catalyst material. During facility startup, minimum temperatures to promote NO_x reduction are not expected until proper heating from the exhaust gases has occurred. As such, DSF has included startup NO_x emissions that take no emission reduction credit from SCR in the facility PTE.

5.1.1.2 Facility Shutdown

During facility shutdown, a number of transient events are expected to occur that will contribute to a regulated source of emissions. These events include process unit purging and flaring and the collection of in-process fluids for eventual reintroduction to the process feed. The estimated impact on the facility PTE has been included in this permit application.

During facility shutdown, depressurization of gas streams will be routed to the flare (620-FL-1) for destruction. The estimated loading to the flare during facility shutdown is based upon maximum relieving rate estimates and leverages conservative waste stream compositions from Units 200, 310, 320, and 420. DSF conservatively estimates four plant shutdowns per year, as the nature of the process promotes minimizing shutdowns and turnarounds.

Liquid streams that have been formed prior to or during facility shutdown will be routed to intermediate process tanks for temporary storage until facility operations restart. The HYK Heavy Feed Storage Tank (630-TK-12), HYK Light Feed Storage Tank (630-TK-13), Heavy Slop Oil Tank (630-TK-14), and Light Slop Oil Tank (630-TK-15) will receive and store these liquids for eventual refeed into Unit 200. In order to provide a conservative PTE, DSF has estimated that these tanks will store liquids for 1 month and has not utilized emission control reductions for these intermediate tanks.

5.1.1.3 Maintenance Activities

As a refining operation, the DSF process is inherently a steady-state process that limits the need for extensive ongoing maintenance. Most maintenance activities will occur during facility shutdown, such that there is not an expected increased contribution to the facility PTE. Some routine maintenance activities are expected to contribute to the facility PTE and have been included in this application. These maintenance activities include catalyst replacement and the associated loading and unloading of catalyst materials. Contributions to the facility PTE from catalyst operations are discussed in the process description and quantified in the emission calculations.

5.1.2 45 CSR 2—To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers

This rule establishes emission limitations for smoke and particulate matter (filterable) discharged from fuel-burning units. A fuel-burning unit is defined as any unit that burns fuel to provide heat or power by indirect heat transfer.

DSF will operate numerous combustion sources, some of which will be subject to the requirements of 45 CSR 2. The Steam Boiler (500-SB-1) and Coal Milling Dryer (100-CMD-1) are indirect heat exchangers with design heat input greater than 10 MMBtu/hr. Each of these units will qualify as a 'Type B' fuel-burning unit and will comply with the opacity and weight standards of Rule 2.

The Vacuum Tower Feed Heater (200-H-301), Fractionator Reboiler (310-H-103), Slurry Feed Heater (200-H-102), Hydrogen Heater (200-H-101), Reaction Heaters (320-H-201 through 320-H-204), and Hydrogen Reformer (600-HR-1) qualify as process heaters that are not regulated under Rule 2. The Claus Furnace (440-CF-1) and Sulfur Recovery Incinerator (440-SRI-1) are direct fired-sources that are not subject to Rule 2.

5.1.3 45 CSR 4—To Prevent and Control the Discharge of Air Pollutants into the Air Which Causes or Contributes to an Objectionable Odor

Operations conducted at the facility are subject to this requirement, which states: "No person shall cause, suffer, allow or permit the discharge of air pollutants which causes or contribute to an objectionable odor at any location occupied by the public." DSF will comply with the requirements of this Rule.

5.1.4 45 CSR 5—To Prevent and Control Air Pollution from the Operation of Coal Preparation Plants, Coal Handling Operations and Coal Refuse Disposal Areas

The coal handling operations, identified as Unit 100 in the application, will be subject to the requirements of Rule 5. Unit 100 operations will also be subject to the provisions of 40 CFR 60 Subpart Y. Compliance with the Subpart Y will demonstrate compliance with Rule 5. In addition, fugitive dust emissions will be minimized with the use of fugitive control dust systems, such as the implementation of street sweepers on paved facility haul roads.

Operations subject to Rule 5 are exempt from Rule 17.

5.1.5 45 CSR 6—Control of Air Pollution from the Combustion of Refuse

Refuse is defined as "the useless, unwanted or discarded solid, liquid or gaseous waste materials resulting from community, commercial, industrial or citizen activities." DSF will trigger applicability to this Rule for the combustion of gaseous exhaust streams through the use of the Sulfur Recovery Incinerator (440-SRI-1), Emergency Flare (620-FL-1), and the Liquid Product Load-out Flare (640-FL-1). Per 45 CSR 6-4.3, opacity of emissions from the afterburner shall not exceed 20 percent, except as provided by 4.4. PM emissions from this unit will not exceed the levels calculated in accordance with 6-4.1.

5.1.6 45 CSR 7—To Prevent and Control Particulate Air Pollution from Manufacturing Processes and Associated Operations

45 CSR 7 regulates the emissions of filterable PM from source operations within manufacturing processes. Manufacturing processes are defined as any industrial or manufacturing actions or processes that emit smoke, particulate matter, or gaseous matter. DSF operations identified as Units 200–Units 600 will qualify as manufacturing process source operation type d, with a throughput of 208,333 lbs/hr. Table

45-7A indicates a lb/hr PMFilterable limit of 21.2 lb/hr from each manufacturing source operation. The summation of filterable PM from all facility manufacturing source operations is 18 lb/hr. Compliance with the Rule 7 individual stack limit is met.

The facility shall not emit filterable PM into the open air from any process source operation that is greater than 20 percent opacity.

Per 45 CSR 7-5, DSF will also have to limit fugitive emissions by equipping manufacturing processes with a system to minimize fugitive PM emissions. DSF will utilize a combination of good housekeeping practices, wind shields/enclosures, baghouses, and various filters throughout the facility to minimize fugitive PM emissions. All haul roads will be paved and maintained using a street sweeper to minimize fugitive PM emissions.

As discussed in 5.1.4, Unit 100 operations are subject to the provisions of Rule 5.Operations subject to Rule 7 are exempt for the requirements of Rule 17 and Rule 5.

5.1.7 45 CSR 10—To Prevent and Control Air Pollution from the Emission of Sulfur Oxides

Rule 10 controls air pollution from the emission of sulfur oxides through the regulation of fuel-burning units and manufacturing process source operations.

DSF will operate numerous combustion sources, some of which will be subject to the requirements of 45 CSR 10. The Steam Boiler (500-SB-1) and Coal Milling Dryer (100-CMD-1) are indirect heat exchangers with design heat input greater than 10 MMBtu/hr. Each of these units will qualify as a 'Type B' fuel-burning unit and will comply with the weight standards of Rule 10.

The Vacuum Tower Feed Heater (200-H-301), Fractionator Reboiler (310-H-103), Slurry Feed Heater (200-H-102), Hydrogen Heater (200-H-101), Reaction Heaters (320-H-201 through 320-H-204), and Hydrogen Reformer (600-HR-1) qualify as process heaters that are not regulated under Rule 10. The Claus Furnace (440-CF-1) and Sulfur Recovery Incinerator (440-SRI-1) are direct fired-sources that are not subject to Rule 10.

DSF will operate a small indirect heat exchangers, Hydrocracker Reaction Heater (310-H-101), which will qualify for the exemption noted in 45 CSR 10 Section 10.1: Any fuel burning units having a design heat input under 10 MMBtu/hr will be exempt from Section 3 and Sections 6 through 8.

Section 3.1 of Rule 10 places weight emission standards on fuel-burning units. Subject units will qualify as 'Type B' fuel-burning units. DSF fuel-fired sources will comply with this concentration requirement by firing natural gas during facility startup operations and process gas with a total sulfur content of <1 ppmv during normal facility operations.

Section 4.1 of Rule 10 places an in-stack sulfur dioxide concentration limit of 2,000 ppmv on existing source operations. The manufacturing process source operations of Unit 440—Sulfur Recovery Unit will comply with the requirements of the Rule. The Sulfur Recovery Unit Incinerator (440-SRI-1) will be subject to the sulfur dioxide concentration limit of NSPS Ja of 250 ppmv, which will demonstrate compliance with this section of Rule 10.

Section 4.1.b of Rule 10 limits sulfur dioxide emissions from a sulfur recovery plant to no greater than 0.06 pounds per pound of sulfur processed. Unit 440—Sulfur Recovery Unit will process 4,565 pounds per hour of sulfur and is proposed with a sulfur dioxide emission limit of 5.64 pounds per hour, which will demonstrate compliance with this section of Rule 10.

Section 5.1 of Rule 10 prohibits combustion of any refinery process gas stream or any other process gas stream that contains hydrogen sulfide in a concentration greater than 50 grains per 100 cubic feet of gas.

The estimated H_2S concentration of gas routed from the SRU Amine Absorber (440-R-104) to the SRU Incinerator (440-SRI-1) is approximately 10 ppmv or 0.04 grains per 100 cubic feet of gas, as calculated based upon the pound per hour SRU Incinerator loading and expected gas density included on page 391 of this submittal.

5.1.8 45 CSR 13—Permits for Construction, Modification, Relocation, and Operation of Stationary Sources

The purpose of this rule is to set forth the procedures for stationary source reporting, and the criteria for obtaining a permit to construct and operate a new stationary source which is not a major stationary source, to modify a non-major stationary source, to make modifications which are not major modifications to an existing major stationary source, to relocate non-major stationary sources within the state of West Virginia, and to set forth procedures to allow facilities to commence construction in advance of permit issuance.

DSF will be subject to this regulation because 45 CSR 13 applies to non-major (minor) stationary sources. Potential annual air emissions at the facility will be less than 10 tpy of a single HAP, less than 25 tpy of any combination of HAP, and less than 100 tpy of each criteria air pollutant.

5.1.9 45 CSR 16—Standards of Performance for New Stationary Sources (NSPS)

45 CSR 16 applies to new stationary sources that are subject to 40 CFR 60 Standards of Performance for New Source Stationary Sources (NSPS). A discussion of applicable and non-applicable NSPS are provided in Section 4 of this application.

5.1.10 45 CSR 31—Confidential information

This rule establishes the requirements for claiming information submitted to the Director as confidential and the procedures for determinations of confidentiality in accordance with the provisions of WV Code 22-5-10. No confidential information is included in the submittal of this application.

5.1.11 45 CSR 34—National Emission Standards for Hazardous Air Pollutants (NESHAP)

45 CSR 34 applies to registrants that are subject to NESHAP requirements promulgated in 40 CFR 61 and 40 CFR 63. A discussion of applicable and non-applicable NESHAPs are provided in Section 4 of this application.

5.2 Non-Applicable State Regulatory Requirements

This section outlines the WV state air quality rules that could be reasonably expected to not apply to DSF and presents rationale for a non-applicability determination for each rule based on activities conducted at the site.

5.2.1 45 CSR 14—Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration

Federal construction permitting programs regulate new and modified sources of attainment pollutants under Prevention of Significant Deterioration (PSD). The facility is exempt from Rule 14 major source air permitting. Further discussion of PSD applicability is discussed in Section 3 of this application.

5.2.2 45 CSR 17—To Prevent and Control Particulate Matter Air Pollution from Materials Handling, Preparation, Storage, and Other Sources of Fugitive Particulate Matter

The facility will not be subject to this rule because sources that are subject to the fugitive PM emission requirements of either WV 45 CSR 7 or WV 45 CSR 5 are exempt from the provisions of WV 45 CSR 17.

5.2.3 45 CSR 19—Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contributed to Non-attainment

The preconstruction permit program requirements of this rule do not apply to the facility because it will be a new minor stationary source, and because it will be located in Mason County, an area designated as attainment for each National Ambient Air Quality Standard pollutant.

5.2.4 45 CSR 21—Prevent and Control Air Pollution From the Emission of Volatile Organic Compounds

DSF will not be subject to this regulation because 45 CSR 21 applies to sources located in Putnam County, Kanawha County, Cabell County, Wayne County, and Wood County for control of the emission of VOCs through the application of reasonably available control technology. The facility will be located in Mason County and, therefore, will not be subject to the rule.

5.2.5 45 CSR 27—Prevent and Control the Emissions of Toxic Air Pollutants

DSF will not be subject to this regulation because it is not a "Chemical Processing Unit" as defined in 45 CSR 27-2.4, which explicitly states that "… the term chemical processing unit … does not include equipment used in the production and distribution of petroleum products providing that such equipment does not produce or contact materials containing more than 5% benzene by weight." None of the process streams at the facility will produce or contact materials containing more than 5 percent benzene by weight. In addition, the facility will not discharge a toxic air pollutant into the open air in excess of the amount shown in 45 CSR 27 Table A.

5.2.6 45 CSR 29—Rules Requiring the Submission of Emission Statements for Volatile Organic Compound (VOC) Emissions and Oxides of Nitrogen (NO_x) Emissions

45 CSR 29 requires the submission of an emission statement from stationary sources located in Putnam County, Kanawha County, Cabell County, Wayne County, Wood County, and Greenbrier County, which have plant-wide VOC and/or NO_x emissions of greater than or equal to 25 tpy. The facility will be located in Mason County and, therefore, will not be subject to the rule.

5.2.7 45 CSR 30—Requirements for Operating Permits

DSF will not be subject to this regulation because 45 CSR 30 and the federal Title V operating permit program (40 CFR 70), which Rule 30 implements, apply to Title V major sources. The major source thresholds with respect to the WV Title V operating permit program are 10 tpy (9.07 MT/year) of a single HAP, 25 tpy (22.7 MT/year) of any combination of HAP, and 100 tpy (90.7 MT/year) of other regulated pollutants.

Since the facility's potential air emissions, including fugitive emissions, will be less than each Title V major source threshold, DSF will not require a Title V Operating Permit.

5.2.8 45 CSR 33—Acid Rain Provisions and Permits

The facility is not subject to 45 CSR 33 because the facility does not meet the definition of an affected source (power plants) under the Acid Rain Program under Title IV of the CAA.

5.2.9 45 CSR 40—Control of Ozone Season Nitrogen Oxides Emissions

DSF will not be subject to this regulation because the facility will not operate a unit with a maximum design heat input capacity greater than 250 MMBtu/hr (73,270 kW), a large NO_x SIP Call engine, or a kiln.

APPENDIX A PERMIT APPLICATION DOCUMENTS

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION **DIVISION OF AIR QUALITY** 601 57th Street, SE Charleston, WV 25304 (304) 926-0475 www.dep.wv.gov/daq	***APPLICATION FOR NSR PERMIT AND TITLE V PERMIT REVISION (OPTIONAL)***
PLEASE CHECK ALL THAT APPLY TO **NSR (45CSR13)** (IF KNOWN): ☒ **CONSTRUCTION** ☐ **MODIFICATION** ☐ **RELOCATION** ☐ **CLASS I ADMINISTRATIVE UPDATE** ☐ **TEMPORARY** ☐ **CLASS II ADMINISTRATIVE UPDATE** ☐ **AFTER-THE-FACT**	PLEASE CHECK TYPE OF **45CSR30 (TITLE V)** REVISION (IF ANY): ☐ **ADMINISTRATIVE AMENDMENT** ☐ **MINOR MODIFICATION** ☐ **SIGNIFICANT MODIFICATION** IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS **ATTACHMENT S** TO THIS APPLICATION

FOR TITLE V FACILITIES ONLY: Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

Section I. General

1. Name of applicant *(as registered with the WV Secretary of State's Office):* **Domestic Synthetic Fuels I, LLC**	2. Federal Employer ID No. ***(FEIN):*** **208025171**
3. Name of facility *(if different from above):* **Same as above**	4. The applicant is the: ☒ **OWNER** ☐**OPERATOR** ☐ **BOTH**
5A. Applicant's mailing address: **PO Box 292** **Point Pleasant, WV 25550**	5B. Facility's present physical address: **N/A**

6. **West Virginia Business Registration.** Is the applicant a resident of the State of West Virginia? ☒ **YES** ☐ **NO**

- If **YES,** provide a copy of the **Certificate of Incorporation/Organization/Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A.**
- If **NO,** provide a copy of the **Certificate of Authority/Authority of L.L.C./Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A.**

7. If applicant is a subsidiary corporation, please provide the name of parent corporation: **America First, Inc**[1]

8. Does the applicant own, lease, have an option to buy or otherwise have control of the *proposed site?* ☒ **YES** ☐ **NO**

- If **YES,** please explain: **Domestic Synthetic Fuels I will own the proposed site.**
- If **NO,** you are not eligible for a permit for this source.

9. Type of plant or facility (stationary source) to be **constructed, modified, relocated, administratively updated** or **temporarily permitted** (e.g., coal preparation plant, primary crusher, etc.): **Direct Coal Liquefaction Facility**	10. North American Industry Classification System **(NAICS)** code for the facility: **324110**
11A. DAQ Plant ID No. (for existing facilities only): **N/A**	11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only): **N/A**

[1] Domestic Synthetic Fuels I, LLC is an entirely separate entity from America First, Inc. At the time of submittal, America First, Inc. is the sole member of Domestic Synthetic Fuels I, LLC, and as such, is considered the parent entity.

12A.

- For **Modifications, Administrative Updates** or **Temporary permits** at an existing facility, please provide directions to the *present location* of the facility from the nearest state road;
- For **Construction** or **Relocation permits,** please provide directions to the *proposed new site location* from the nearest state road. Include a **MAP** as **Attachment B**.

Take WV-62N out of Point Pleasant, WV for about 5.0 miles and take a left at the access road. The Domestic Synthetic Fuels I site will be on the right-hand side of the access road.

12.B. New site address (if applicable): **N/A**	12C. Nearest city or town: **Point Pleasant**	12D. County: **Mason**
12.E. UTM Northing (KM): **4309.098**	12F. UTM Easting (KM): **403.948**	12G. UTM Zone: **17N**

13. Briefly describe the proposed change(s) at the facility:

New construction of facility.

14A. Provide the date of anticipated installation or change: **4/11/2019 or ASAP**

- If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen: / /

14B. Date of anticipated Start-Up if a permit is granted: **10/01/2021**

14C. Provide a **Schedule** of the planned **Installation** of/**Change** to and **Start-Up** of each of the units proposed in this permit application as **Attachment C** (if more than one unit is involved).

15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application:
Hours Per Day **24** Days Per Week **7** Weeks Per Year **52**

16. Is demolition or physical renovation at an existing facility involved? ☐ **YES** ☒ **NO**

17**. Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your **Risk Management Plan (RMP)** to U. S. EPA Region III.

18**. Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process *(if known).* A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance *(if known).* Provide this information as **Attachment D.**

Section II. Additional attachments and supporting documents.

19. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

20. Include a **Table of Contents** as the first page of your application package.

21. Provide a **Plot Plan,** e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as **Attachment E** (Refer to ***Plot Plan Guidance***) **.**

- Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).

22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as **Attachment F.**

23. Provide a **Process Description** as **Attachment G.**
    - Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H.**

– For chemical processes, provide a MSDS for each compound emitted to the air.

25. Fill out the **Emission Units Table** and provide it as **Attachment I.**

26. Fill out the **Emission Points Data Summary Sheet (Table 1 and Table 2)** and provide it as **Attachment J.**

27. Fill out the **Fugitive Emissions Data Summary Sheet** and provide it as **Attachment K.**

28. Check all applicable **Emissions Unit Data Sheets** listed below:

☒ Bulk Liquid Transfer Operations
☐ Chemical Processes
☐ Concrete Batch Plant
☐ Grey Iron and Steel Foundry
☒ General Emission Unit, specify
☒ Haul Road Emissions
☐ Hot Mix Asphalt Plant
☒ Incinerator
☒ Indirect Heat Exchanger
☐ Quarry
☒ Solid Materials Sizing, Handling and Storage Facilities
☒ Storage Tanks

Fill out and provide the **Emissions Unit Data Sheet(s)** as **Attachment L.**

29. Check all applicable **Air Pollution Control Device Sheets** listed below:

☐ Absorption Systems
☐ Adsorption Systems
☐ Afterburner
☒ Baghouse
☐ Condenser
☐ Electrostatic Precipitator
☒ Flare
☐ Mechanical Collector
☐ Wet Collecting System

☐ Other Collectors, specify

Fill out and provide the **Air Pollution Control Device Sheet(s)** as **Attachment M.**

30. Provide all **Supporting Emissions Calculations** as **Attachment N,** or attach the calculations directly to the forms listed in Items 28 through 31.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as **Attachment O.**

➢ Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and ***Example Legal Advertisement*** for details). Please submit the **Affidavit of Publication** as **Attachment P** immediately upon receipt.

33**. Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?

☐ **YES** ☒ **NO**

➢ If **YES,** identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's ***"Precautionary Notice – Claims of Confidentiality"*** guidance found in the ***General Instructions*** as **Attachment Q.**

Section III. Certification of Information

34. **Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable **Authority Form** below:

☐ Authority of Corporation or Other Business Entity
☐ Authority of Partnership
☐ Authority of Governmental Agency
☐ Authority of Limited Partnership

Submit completed and signed **Authority Form** as **Attachment R.**

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

Certification of Truth, Accuracy, and Completeness

I, the undersigned ☒ **Responsible Official** / ☐ **Authorized Representative,** hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

Compliance Certification

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

SIGNATURE Kevin Whited DATE: 05-10-2019

(Please use blue ink) *(Please use blue ink)*

35B. Printed name of signee: **Kevin Whited**		35C. Title: **President**
35D. E-mail: **kwhited@americaleading.com**	36E. Phone: **304 – 268 - 7515**	36F. FAX:
36A. Printed name of contact person (if different from above): **Grant Morgan**		36B. Title: **Project Manager**
36C. E-mail: **Grant.morgan@erm.com**	36D. Phone: **304 – 757 - 4777**	36E. FAX: **304 – 757 - 4799**

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

- ☒ **Attachment A: Business Certificate**
- ☒ **Attachment B: Map(s)**
- ☒ **Attachment C: Installation and Start Up Schedule**
- ☒ **Attachment D: Regulatory Discussion**
- ☒ **Attachment E: Plot Plan**
- ☒ **Attachment F: Detailed Process Flow Diagram(s)**
- ☒ **Attachment G: Process Description**
- ☒ **Attachment H: Material Safety Data Sheets (MSDS)**
- ☒ **Attachment I: Emission Units Table**
- ☒ **Attachment J: Emission Points Data Summary Sheet**
- ☒ **Attachment K: Fugitive Emissions Data Summary Sheet**
- ☒ **Attachment L: Emissions Unit Data Sheet(s)**
- ☒ **Attachment M: Air Pollution Control Device Sheet(s)**
- ☒ **Attachment N: Supporting Emissions Calculations**
- ☒ **Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans**
- ☒ **Attachment P: Public Notice**
- ☐ **Attachment Q: Business Confidential Claims**
- ☐ **Attachment R: Authority Forms**
- ☐ **Attachment S: Title V Permit Revision Information**
- ☒ **Application Fee**

Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.

FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:

- ☐ ***Forward 1 copy of the application to the Title V Permitting Group and:***
- ☐ ***For Title V Administrative Amendments:***
  - ☐ ***NSR permit writer should notify Title V permit writer of draft permit,***
- ☐ ***For Title V Minor Modifications:***
  - ☐ ***Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,***
  - ☐ ***NSR permit writer should notify Title V permit writer of draft permit.***
- ☐ ***For Title V Significant Modifications processed in parallel with NSR Permit revision:***
  - ☐ ***NSR permit writer should notify a Title V permit writer of draft permit,***
  - ☐ ***Public notice should reference both 45CSR13 and Title V permits,***
  - ☐ ***EPA has 45 day review period of a draft permit.***

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

Table of Contents

Attachment A

State of West Virginia

Certificate

I, Mac Warner, Secretary of State of the State of West Virginia, hereby certify that

DOMESTIC SYNTHETIC FUELS I, LLC

Control Number: 9AOW4

has filed its "Articles of Organization" in my office according to the provisions of West Virginia Code §§31B-2-203 and 206. I hereby declare the organization to be registered as a limited liability company from its effective date of December 26, 2018 until the expiration of the term or termination of the company.

Therefore, I hereby issue this

CERTIFICATE OF A LIMITED LIABILITY COMPANY

Given under my hand and the Great Seal of the State of West Virginia on this day of December 26, 2018

Mac Warner

Secretary of State

CTRL # 9A0W4

FILED

DEC 26 2018

IN THE OFFICE OF SECRETARY OF STATE

ARTICLES OF ORGANIZATION

of

DOMESTIC SYNTHETIC FUELS I, LLC

The undersigned, acting as Organizer of a West Virginia limited liability company pursuant to the provisions of Chapter 31B, Article 2, Section 202, of the West Virginia Code, does hereby adopt the following Articles of Organization for such limited liability company:

1. **NAME:** The name of the limited liability company shall be:

   DOMESTIC SYNTHETIC FUELS I, LLC

2. **INITIAL DESIGNATED OFFICE/PRINCIPAL OFFICE:** The mailing address and the physical address of the initial designated office and the principal office of the limited liability company shall be:

   19 Gemini Way
   Summit Point, WV 25446

   in the County of: Jefferson

3. **AGENT FOR SERVICE OF PROCESS:** The name and address of the initial agent for service of process on the limited liability company shall be:

   Kevin R. Whited
   19 Gemini Way
   Summit Point, WV 25446

4. **ORGANIZER:** The name and address of the sole Organizer of the limited liability company are as follow:

   Michael J. Funk
   1250 Edwin Miller Boulevard, Suite 300
   Martinsburg, WV 25442

5. **PERIOD OF DURATION:** The limited liability company shall be an At-Will Company (within the meaning of Chapter 31B of the West Virginia Code) with an indefinite period of duration, and shall NOT be a Term Company.

6. **MANAGEMENT:** The limited liability company shall be a Manager-Managed Company (within the meaning of Chapter 31B of the West Virginia Code), and the name and address of the initial manager are as follow:

   Kevin R. Whited
   19 Gemini Way

RECEIVED
DEC 26 2018
BY: 481454

MA8280327

Summit Point, WV 25446

Provided that, that no manager or managers shall have authority to execute and deliver any instrument transferring the limited liability company's interest in real estate unless such instrument is executed by members owning at least 66% of the membership interests in the limited liability company.

7. **LIABILITY OF MEMBERS FOR DEBTS:** No member of the limited liability company shall be liable for the debts, obligations, and liabilities of the limited liability company under Chapter 31B, Article 3, Section 303(c) of the West Virginia Code.

8. **PURPOSES:** The purpose or purposes for which the limited liability company is organized are as follow: To engage in the development, construction, and operation of facilities for the production of synthetic fuels; and the transaction of and engagement in any or all other lawful business and activities incident thereto for which limited liability companies may be organized under the laws of West Virginia.

9. **EFFECTIVE DATE:** The requested effective date of these Articles of Organization is the date and time of filing.

10. **E-MAIL ADDRESS:** The E-mail address where business correspondence from the Office of Secretary of State may be received is: kwhited@americaleading.com.

11. **CONTACT INFORMATION:** The name, telephone number, and e-mail address of the limited liability company's contact person in case of any problems or questions with regard to filing is:

Michael J. Funk
304-262-3522
michael.funk@steptoe-johnson.com

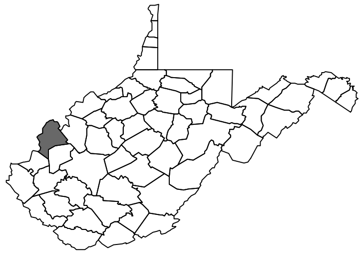
IN WITNESS WHEREOF, the undersigned Organizer of the limited liability company, for the purpose of organizing the limited liability company under the laws of the State of West Virginia, does execute, make, and deliver these Articles of Organization this 26th day of December, 2018.

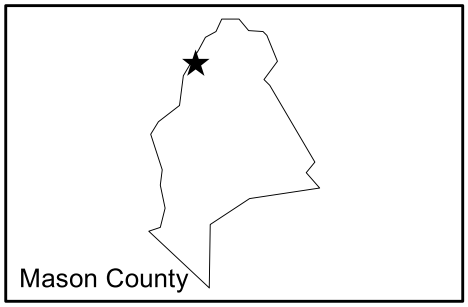
MICHAEL J. FUNK, Organizer

Prepared by: Michael J. Funk, 1250 Edwin Miller Boulevard, Suite 300, Martinsburg, WV 25404.

MA8280327

Attachment B

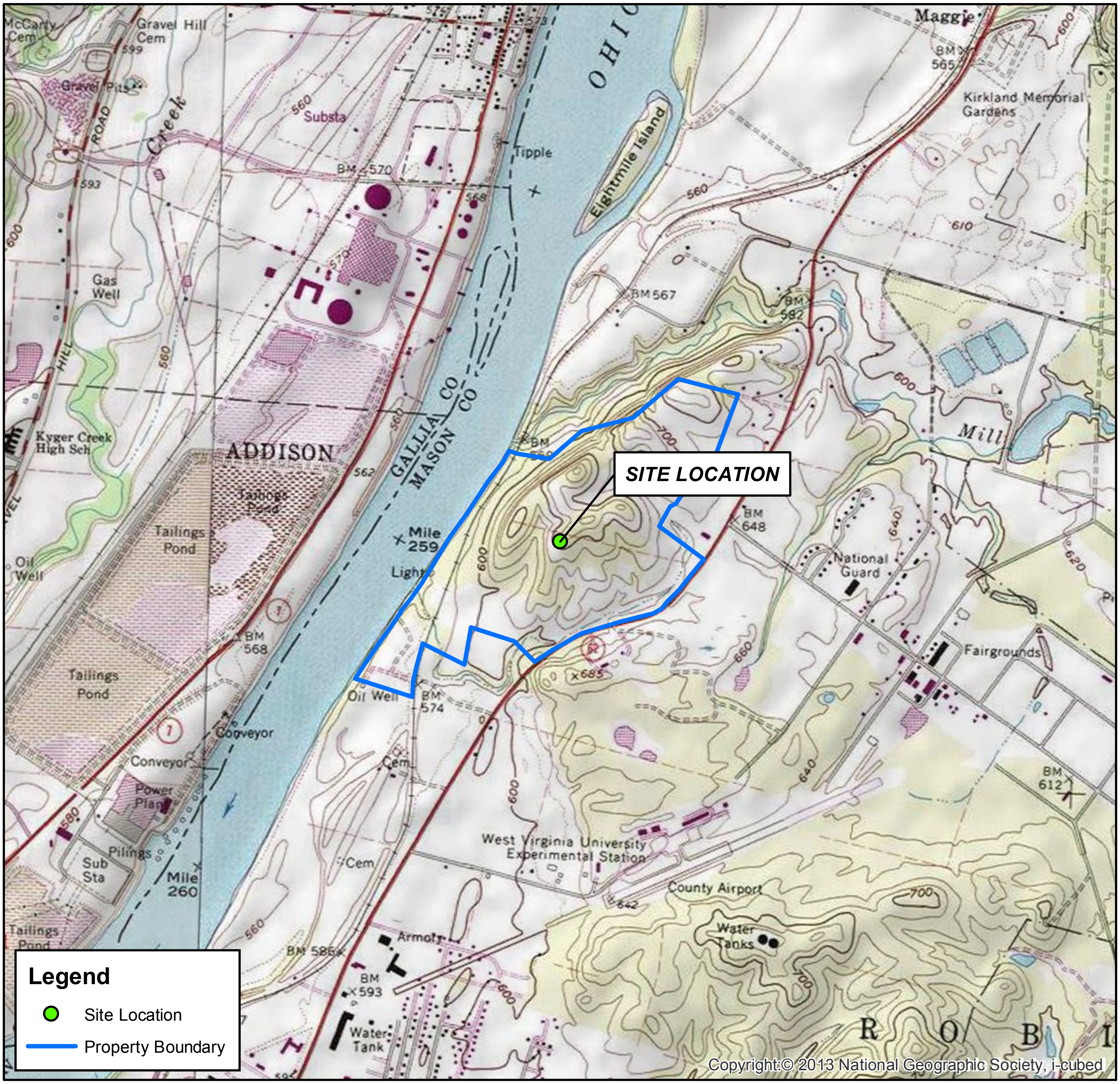




0 1,000 2,000 4,000 Feet

N

LAT. 38.92554 LON. -82.10807
MASON COUNTY
WEST VIRGINIA



USGS 1:24K 7.5' Quadrangle:
Cheshire, WV

SITE LOCATION MAP

ERM	**Domestic Synthetic Fuels I Facility** Mason County West Virginia	GIS Review: GM CHK'D: GM 0465059
Drawn By: SRV-1/2/2019	**Environmental Resources Management**	ATTACHMENT B

J:\Projects\SiteLocationMaps\America First Inc_MXD\AttachmentB-SiteLocationMapAmericaLeadingDCL_20190102.mxd - 1/2/2019|SRV

Attachment C

Attachment C

Construction Schedule

Construction is expected to start on the DSF facility in April 2019. DSF facility operations are expected to start in October 2021.

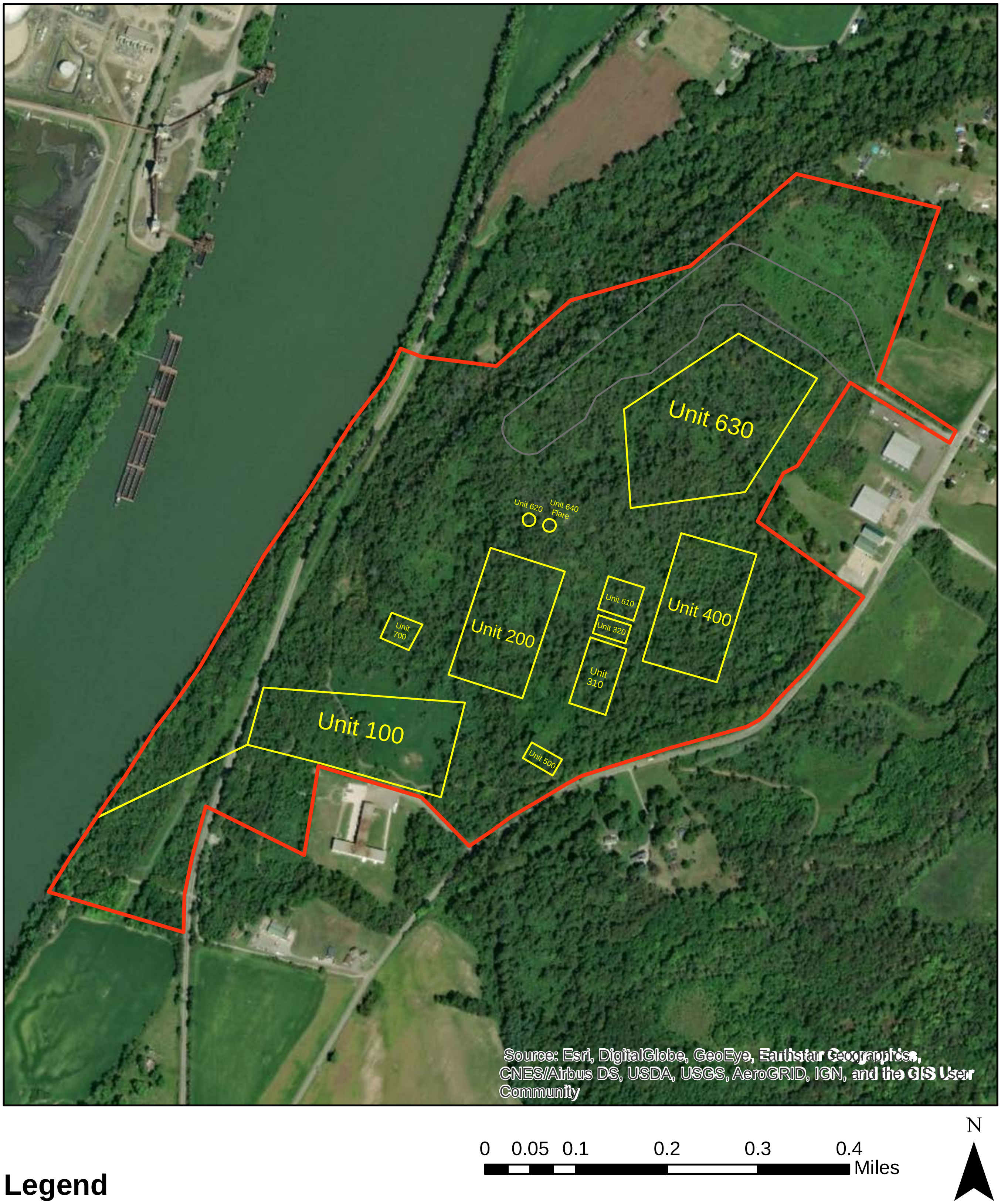
Attachment D

Attachment D

Regulatory Discussion

Please see the regulatory discussion in Section 4 and Section 5 of the Introduction of this permit application for the federal and state regulatory discussions, respectively.

Attachment E



Legend

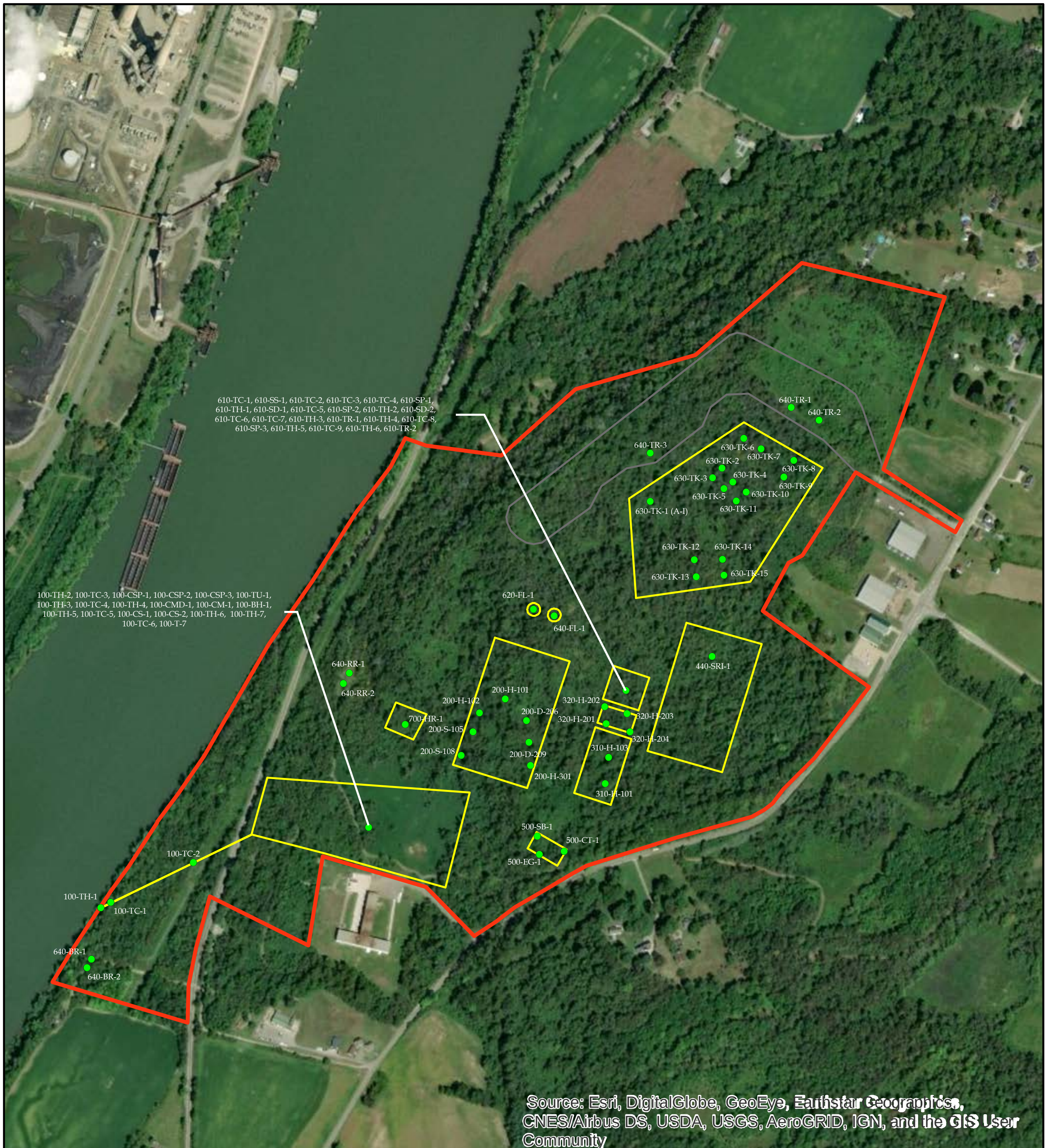
Project Boundary

Unit Boundary

Access Road

Domestic Synthetic Fuels I, LLC
Point Pleasant, WV

ERM



Legend

- Emission Sources
- Project Boundary
- Unit Boundary
- Access Road

0 0.05 0.1 0.2 0.3 0.4 Miles

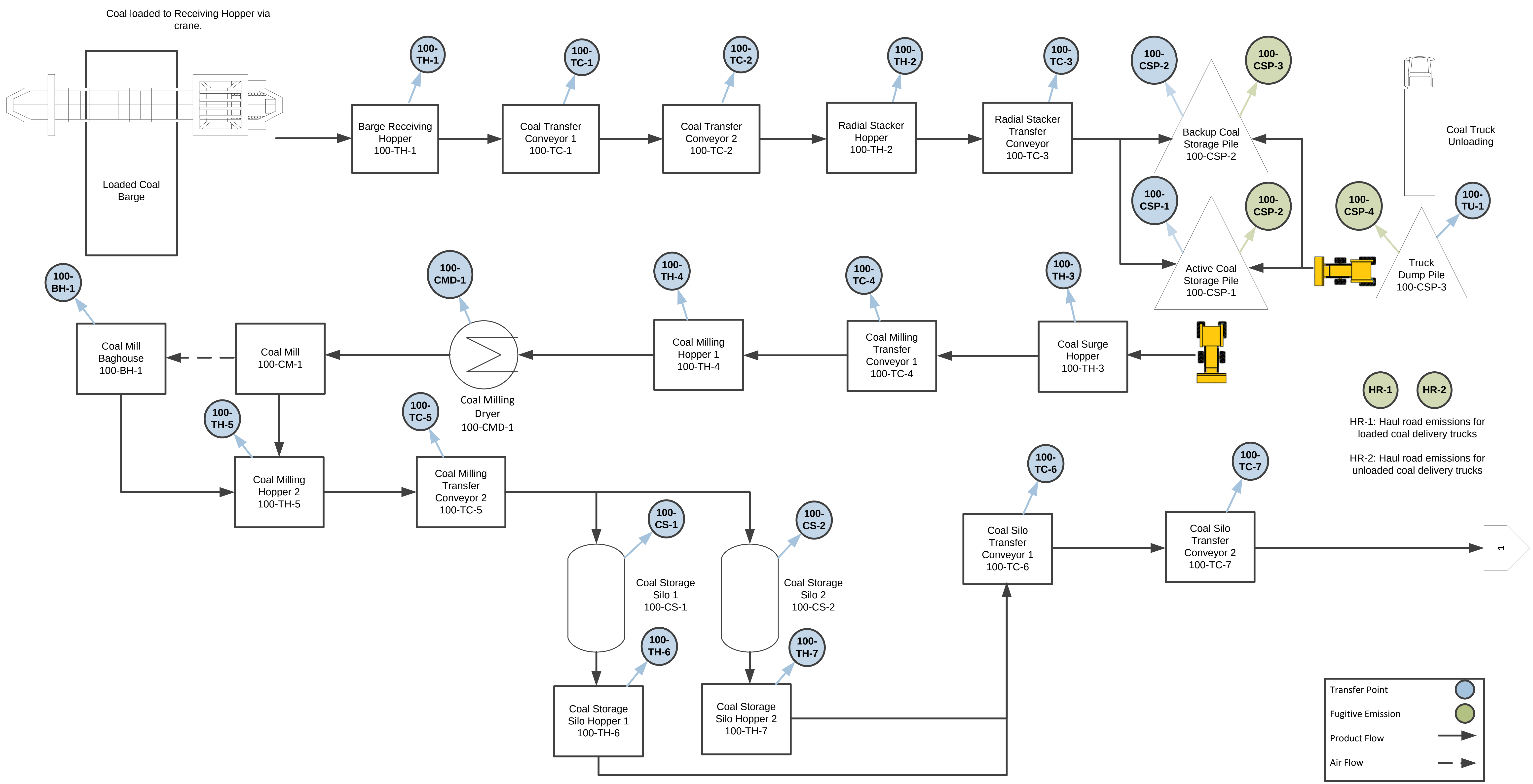
N

Domestic Synthetic Fuels I, LLC
Point Pleasant, WV

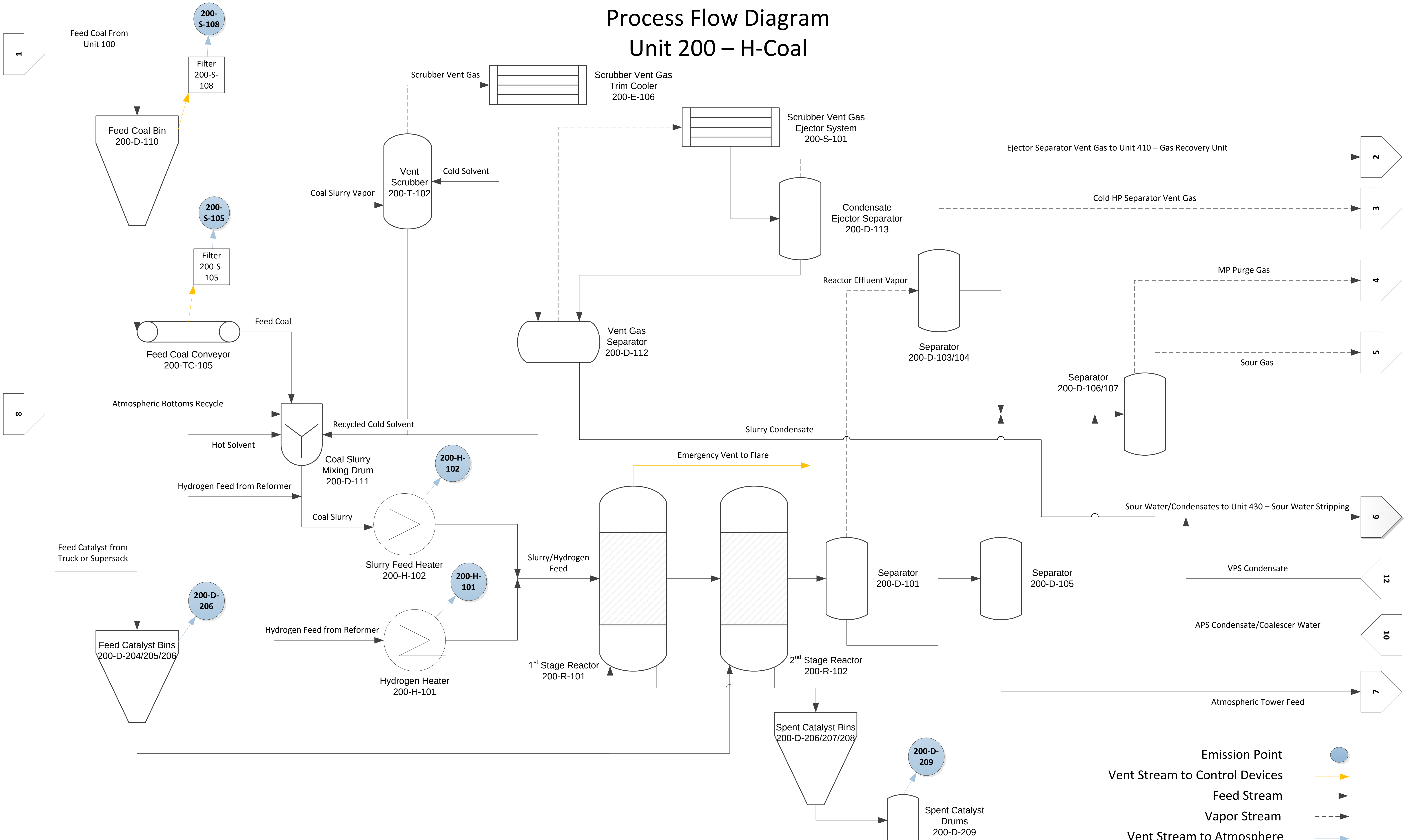
ERM

Attachment F

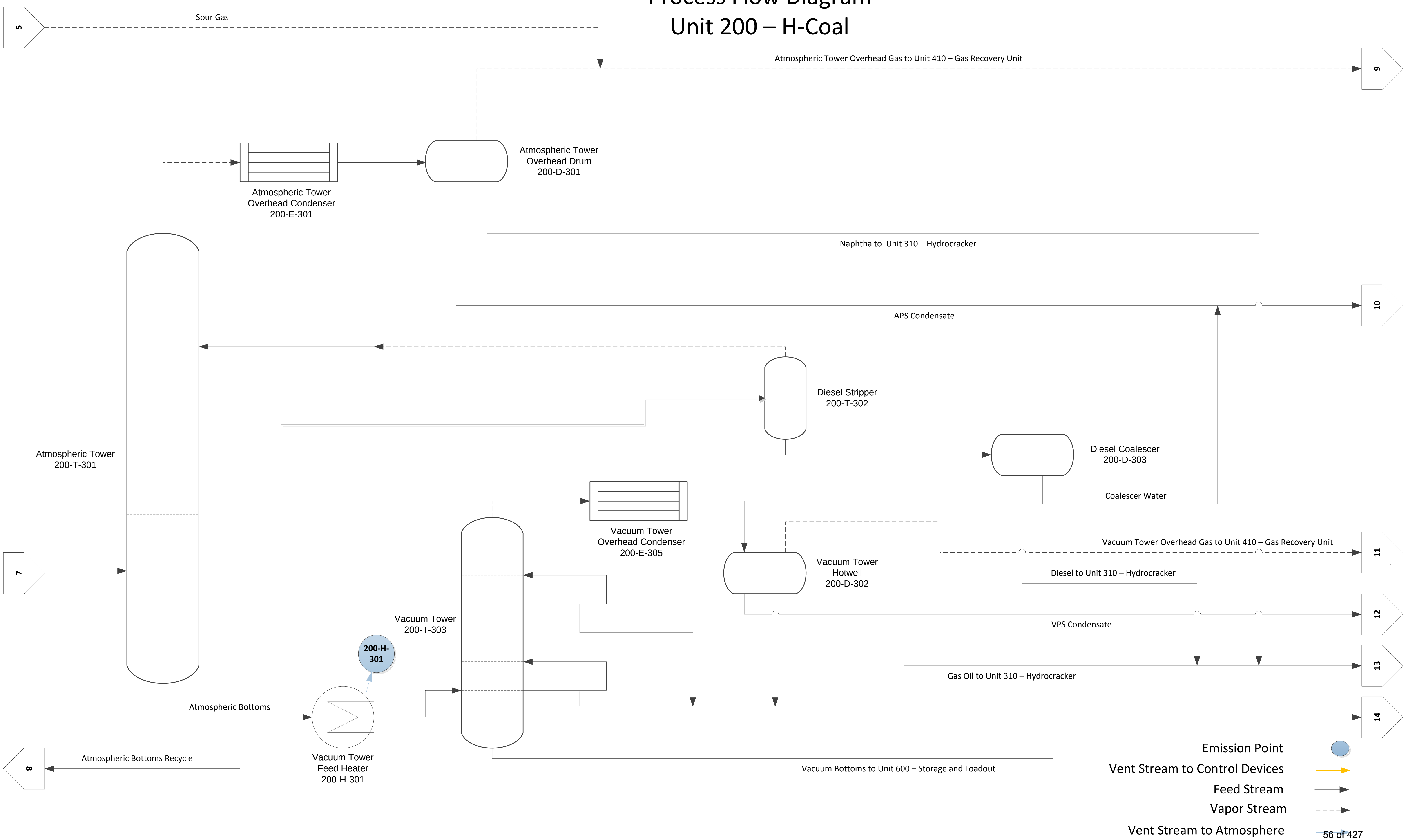
Domestic Synthetic Fuels I
Process Flow Diagram
Unit 100 – Coal Handling



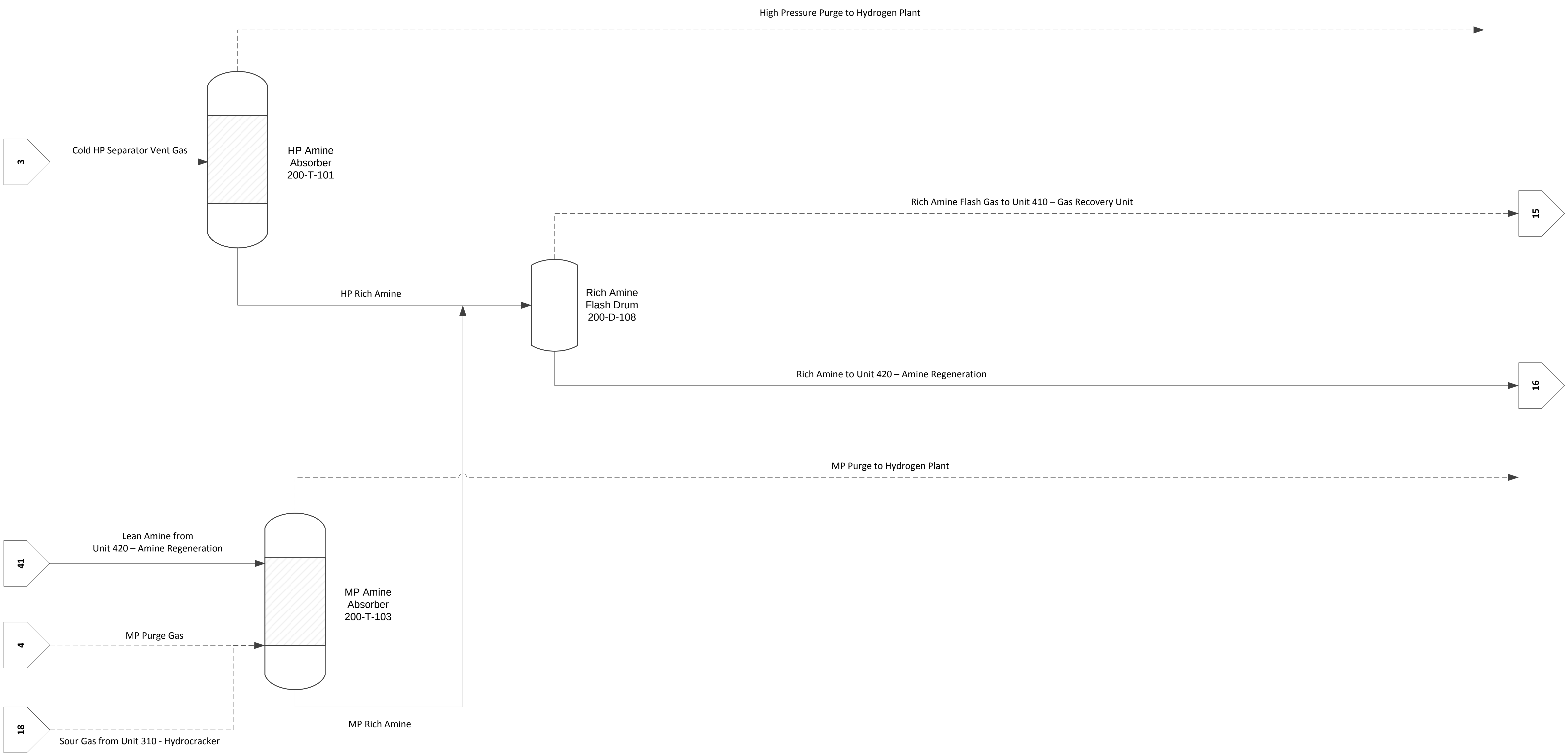
Domestic Synthetic Fuels I
Process Flow Diagram
Unit 200 – H-Coal



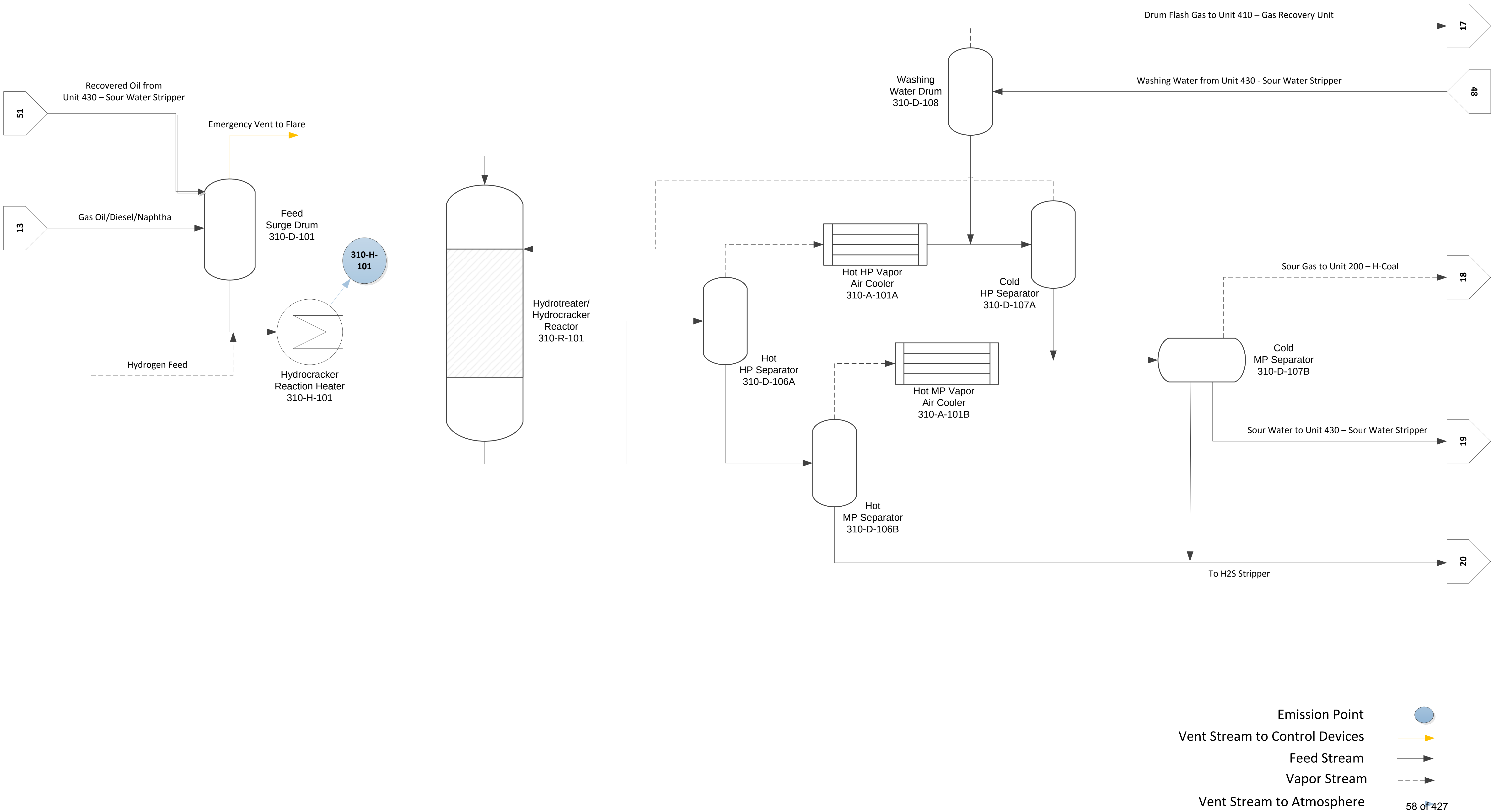
Domestic Synthetic Fuels I
Process Flow Diagram
Unit 200 – H-Coal



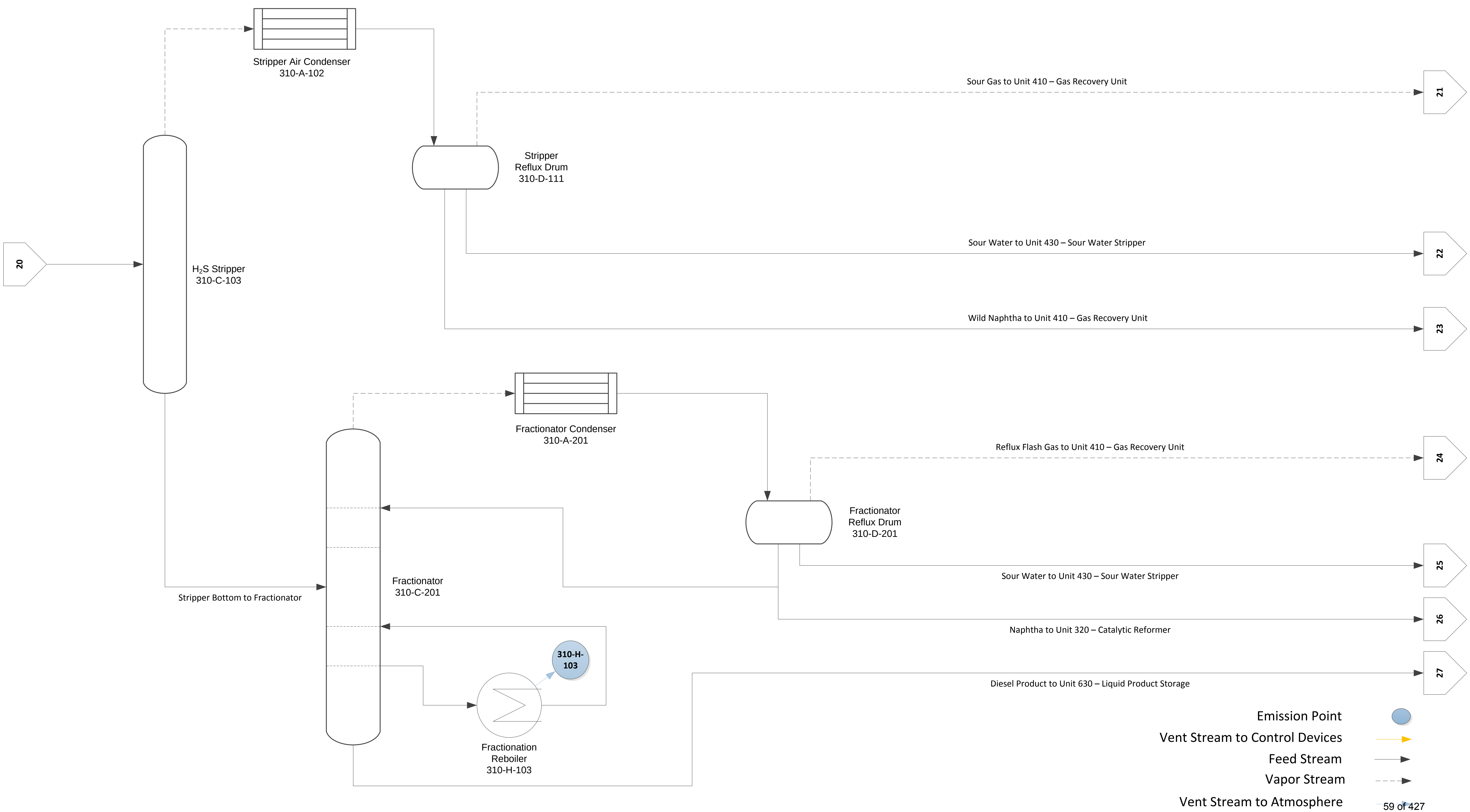
Domestic Synthetic Fuels I
Process Flow Diagram
Unit 200 – H-Coal



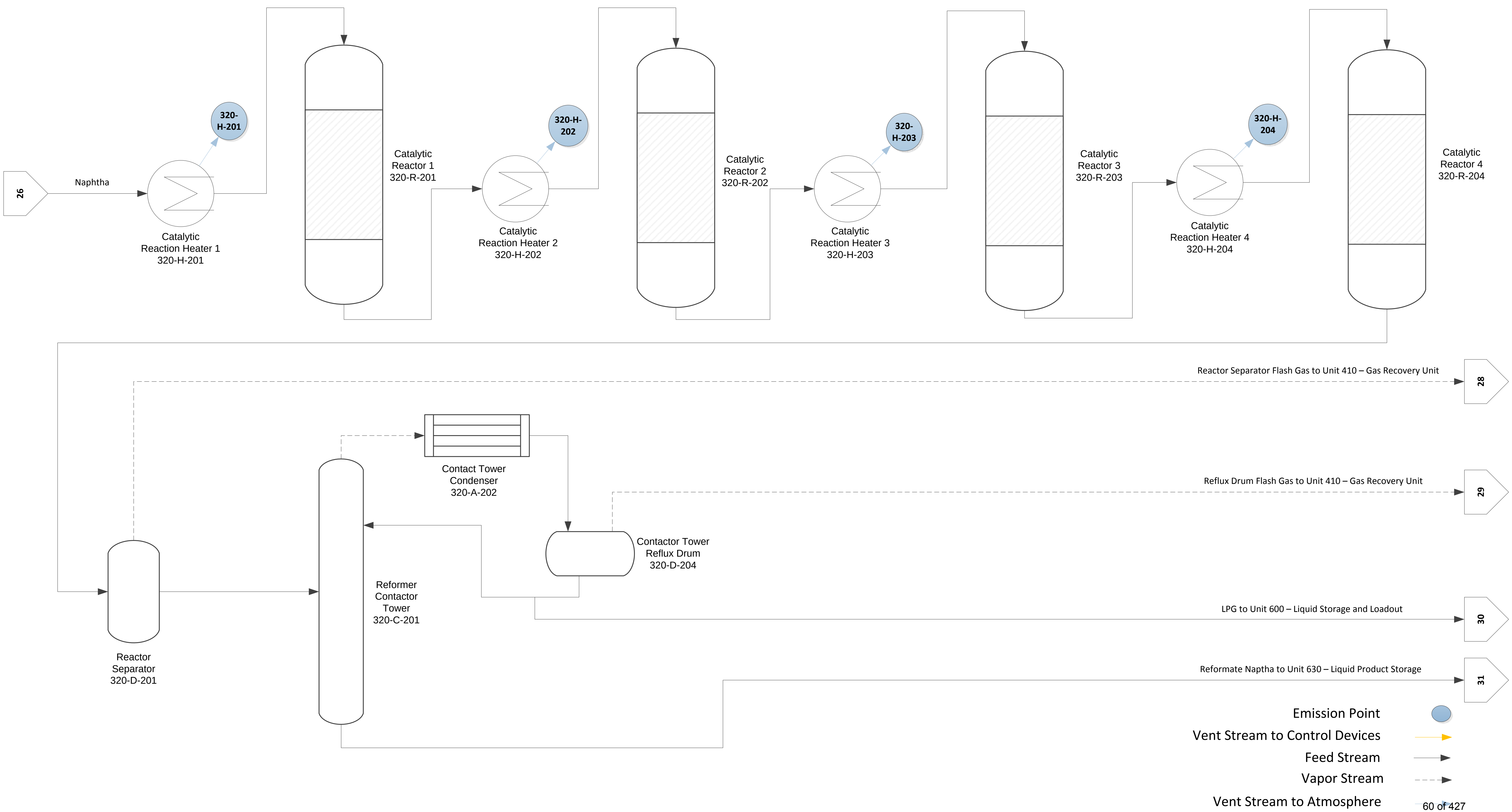
Domestic Synthetic Fuels I
Process Flow Diagram
Unit 310 – Hydrocracker



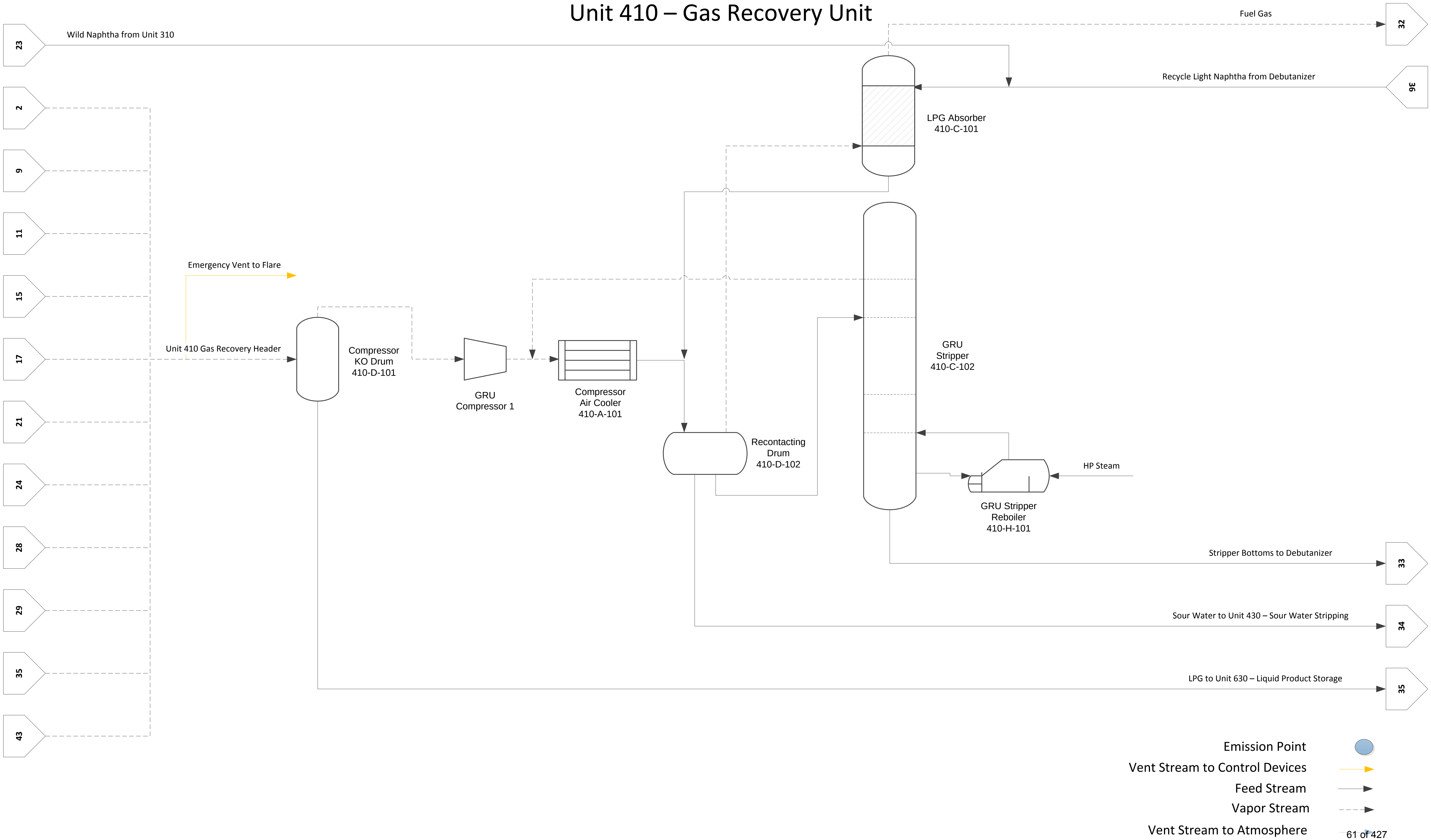
Domestic Synthetic Fuels I
Process Flow Diagram
Unit 310 – Hydrocracking



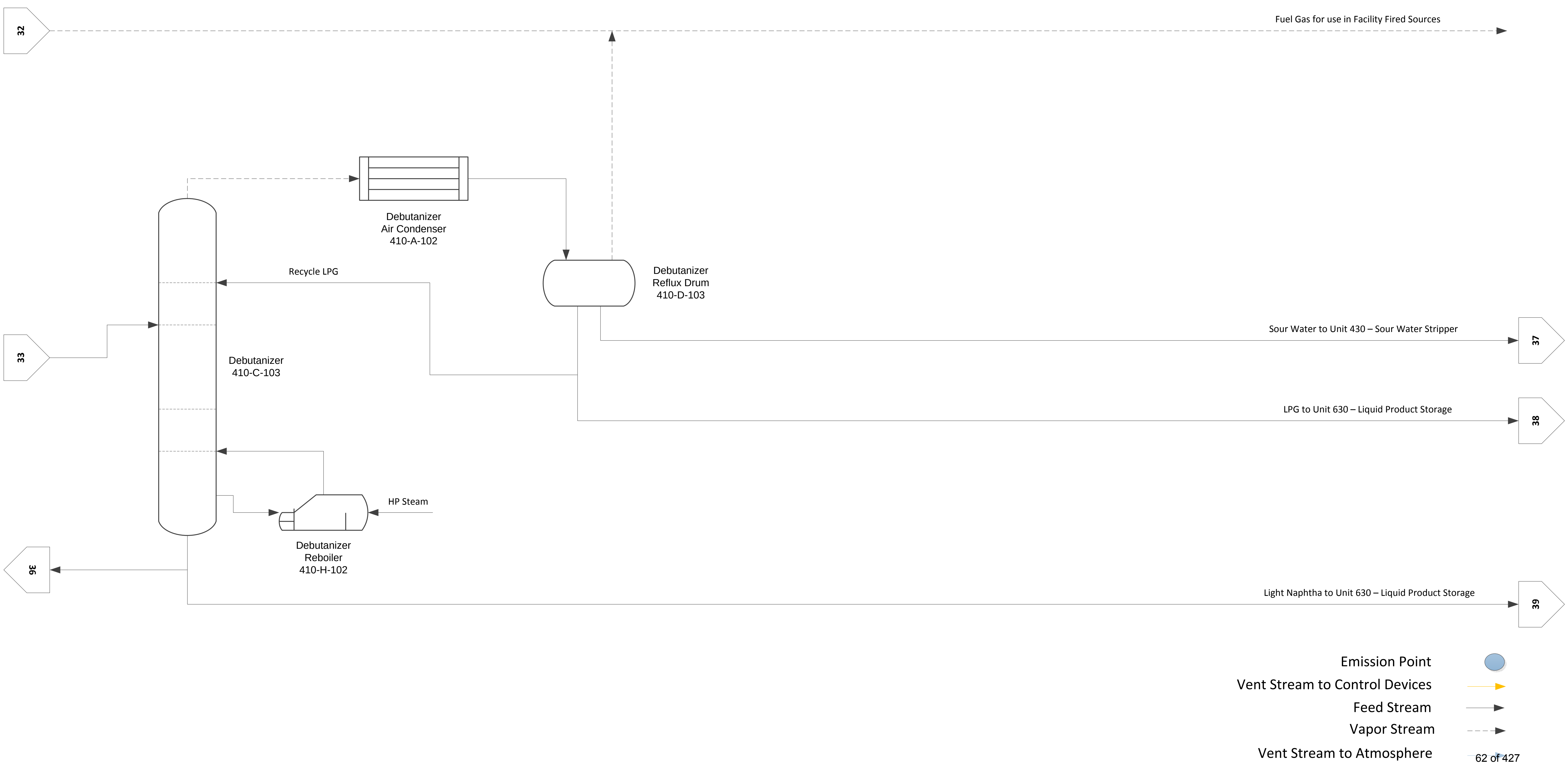
Domestic Synthetic Fuels I
Process Flow Diagram
Unit 320 – Catalytic Reformer



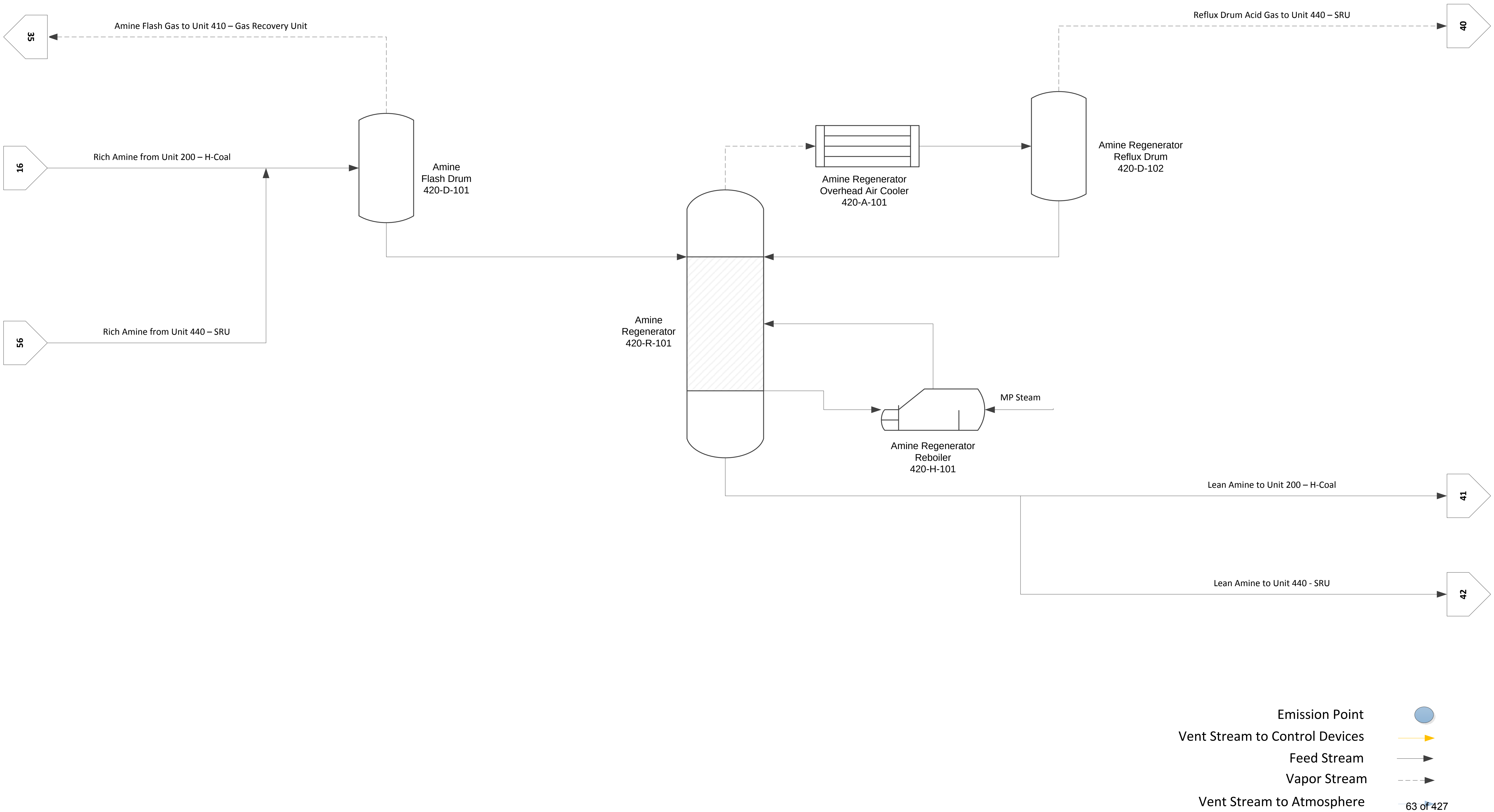
Domestic Synthetic Fuels I
Process Flow Diagram
Unit 410 – Gas Recovery Unit



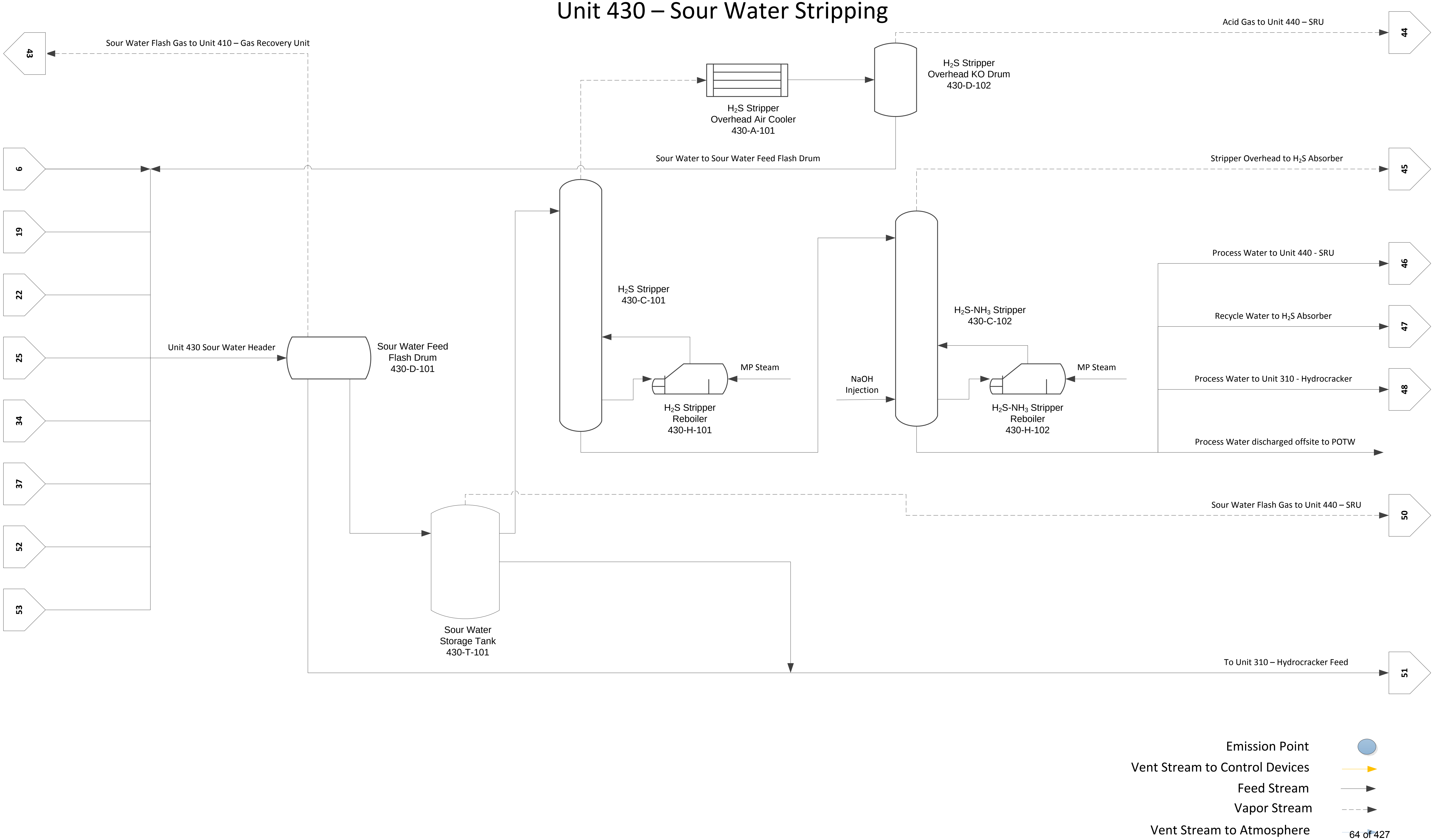
Domestic Synthetic Fuels I
Process Flow Diagram
Unit 410 – Gas Recovery Unit



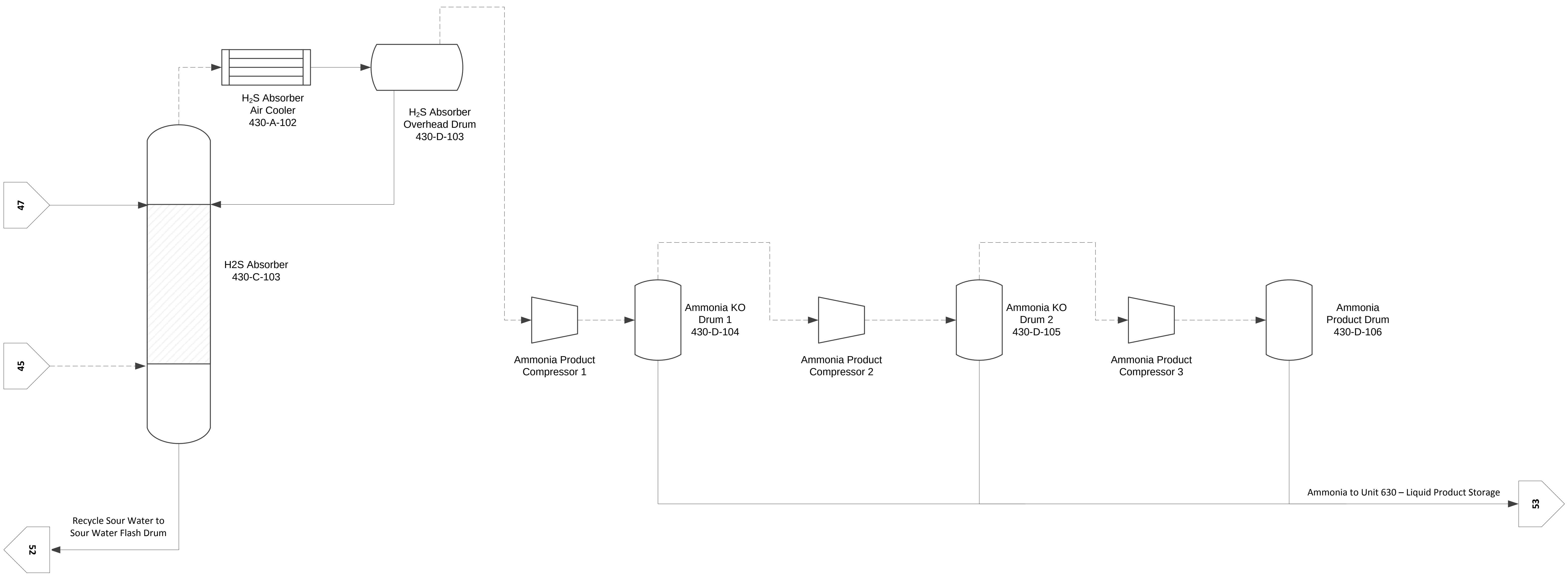
Domestic Synthetic Fuels I
Process Flow Diagram
Unit 420 – Amine Regeneration



Domestic Synthetic Fuels I
Process Flow Diagram
Unit 430 – Sour Water Stripping

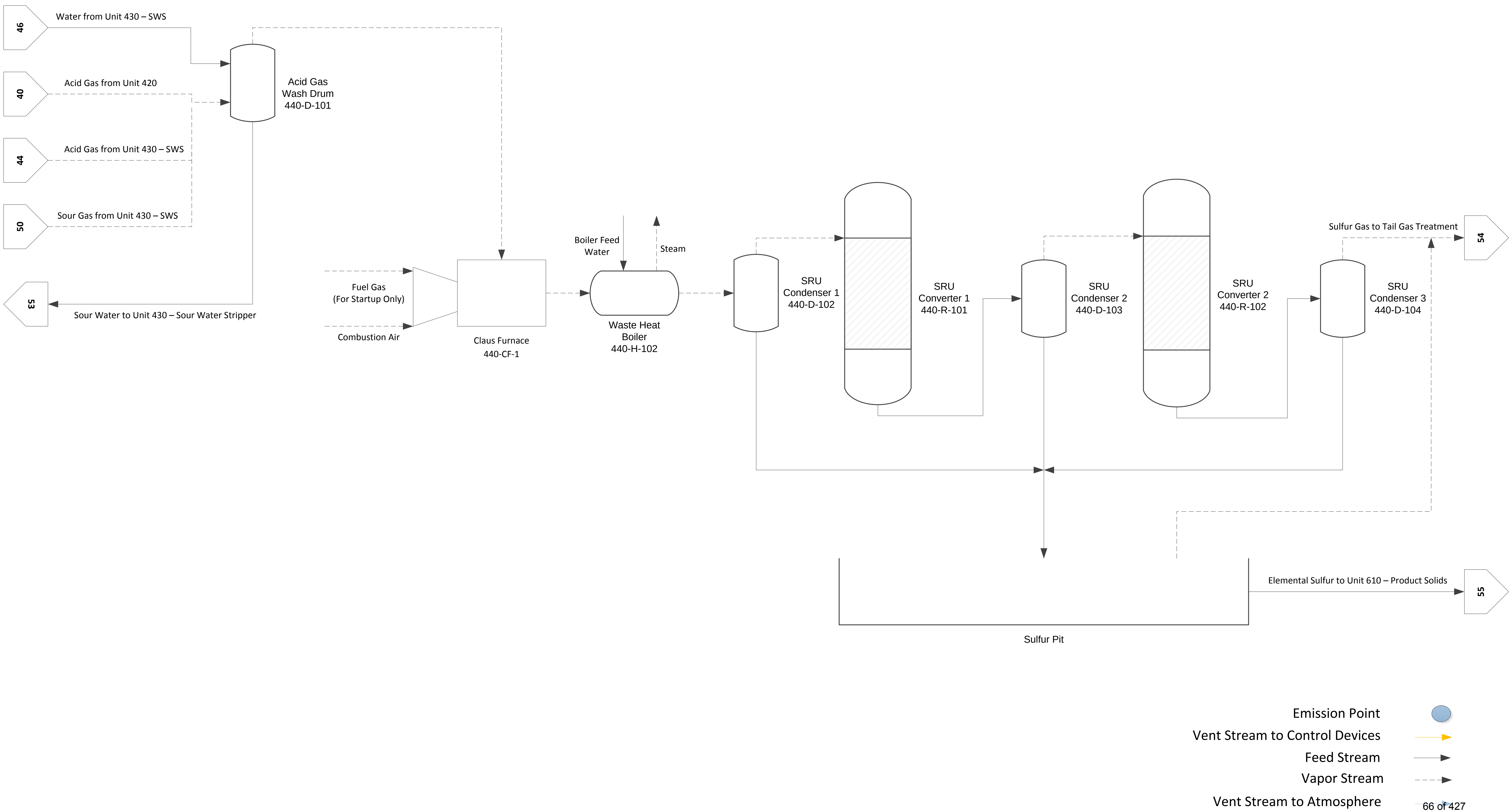


Domestic Synthetic Fuels I
Process Flow Diagram
Unit 430 – Sour Water Stripping

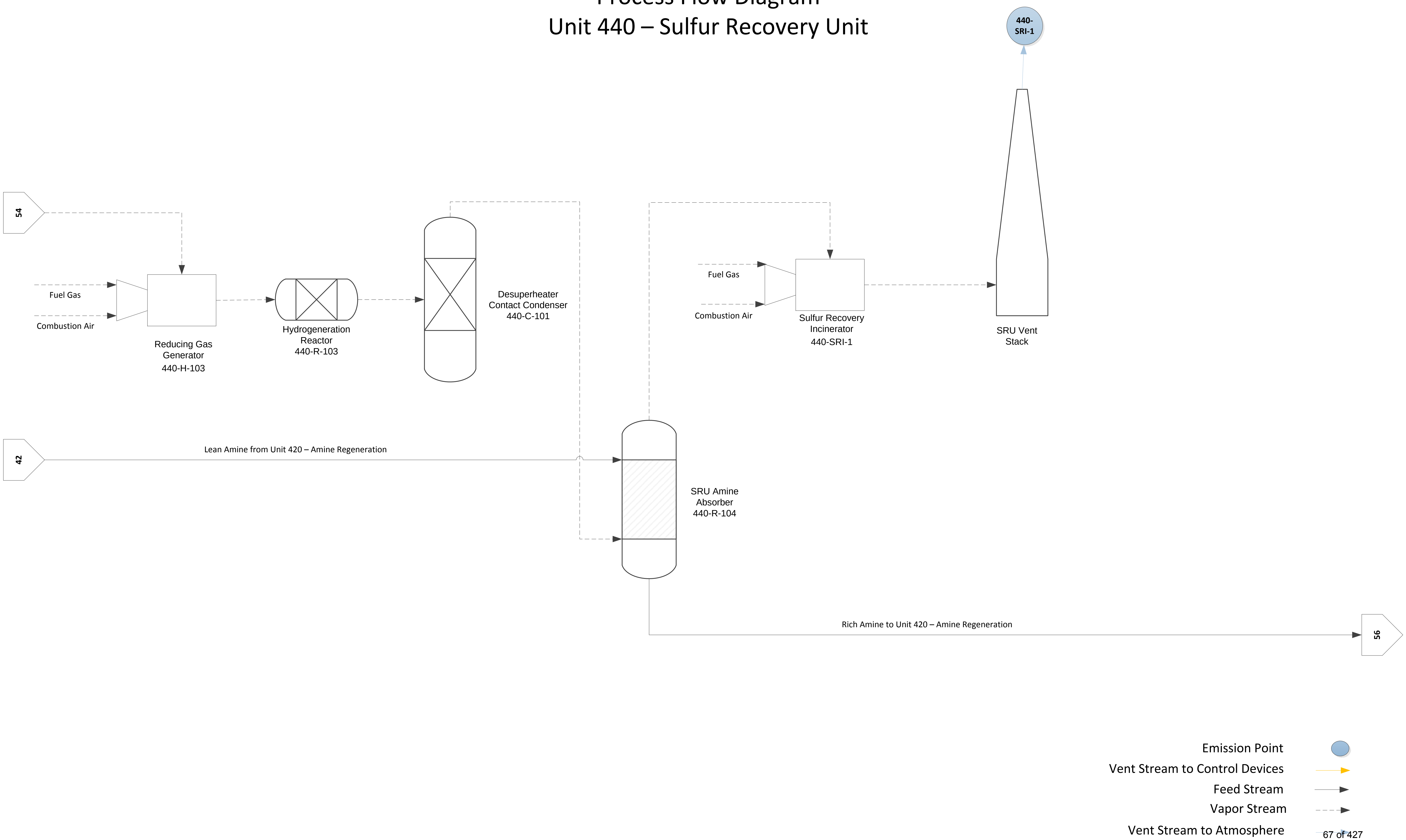


Emission Point
Vent Stream to Control Devices
Feed Stream
Vapor Stream
Vent Stream to Atmosphere

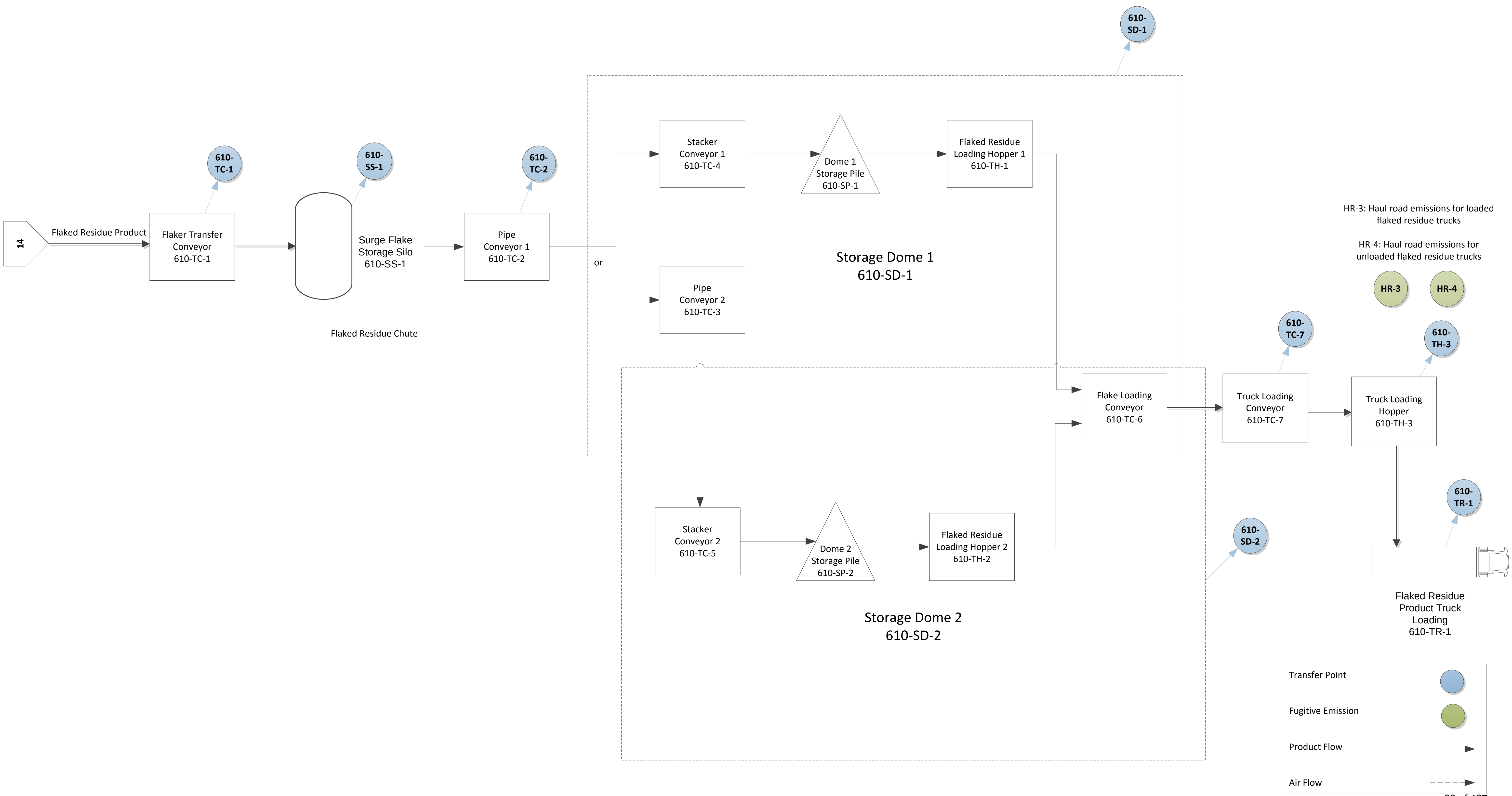
Domestic Synthetic Fuels I
Process Flow Diagram
Unit 440 – Sulfur Recovery Unit



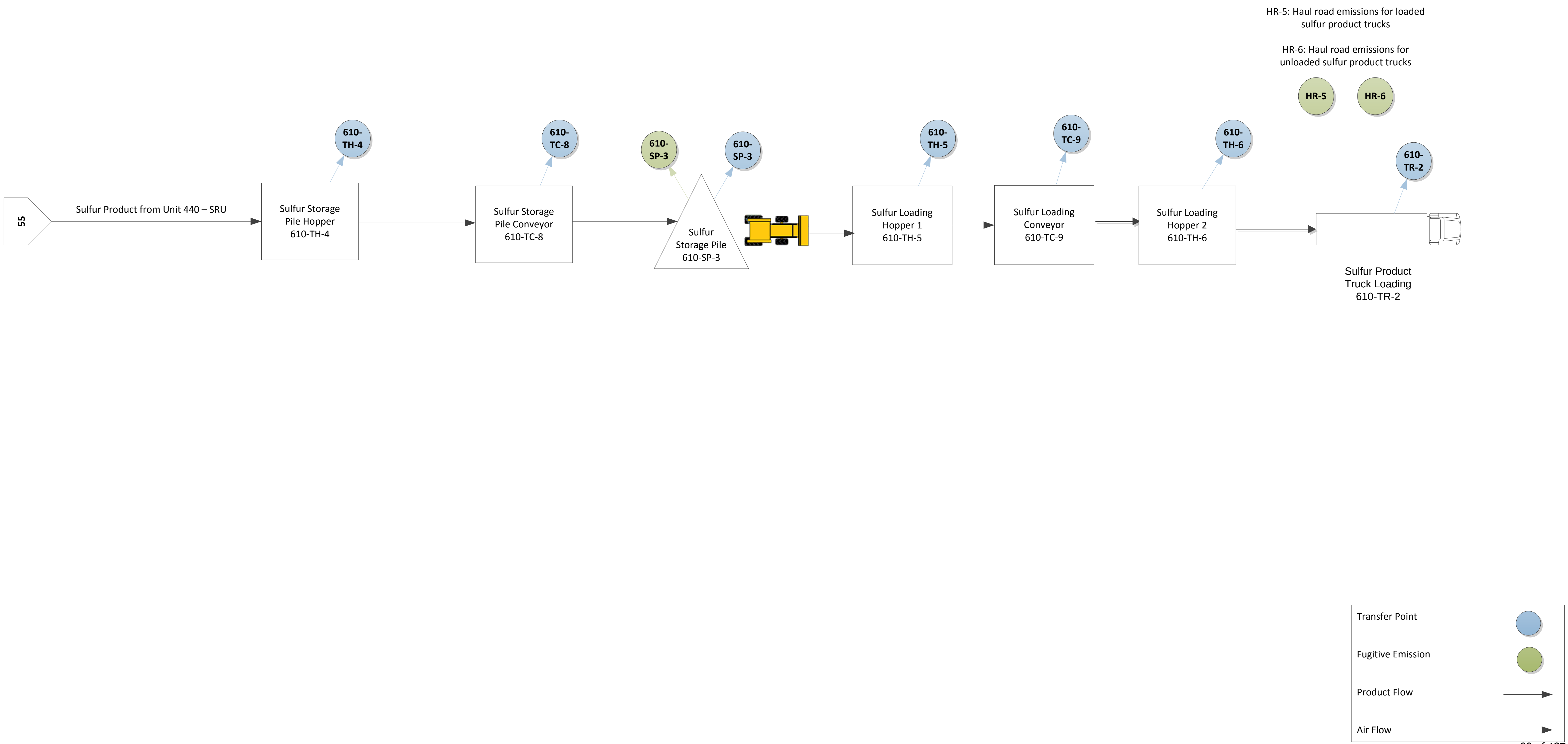
Domestic Synthetic Fuels I
Process Flow Diagram
Unit 440 – Sulfur Recovery Unit



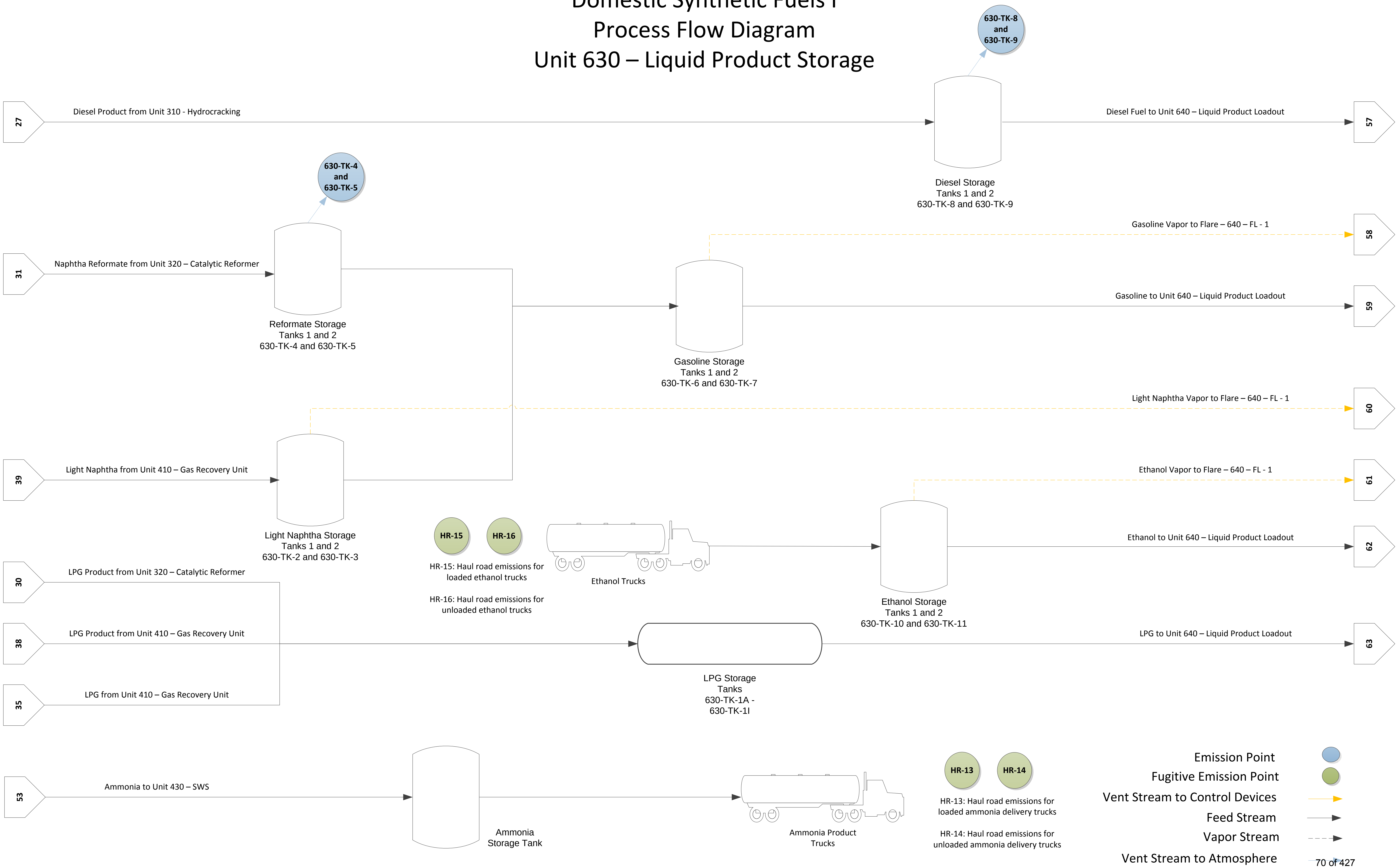
Domestic Synthetic Fuels I
Process Flow Diagram
Unit 610 – Product Solids Handling



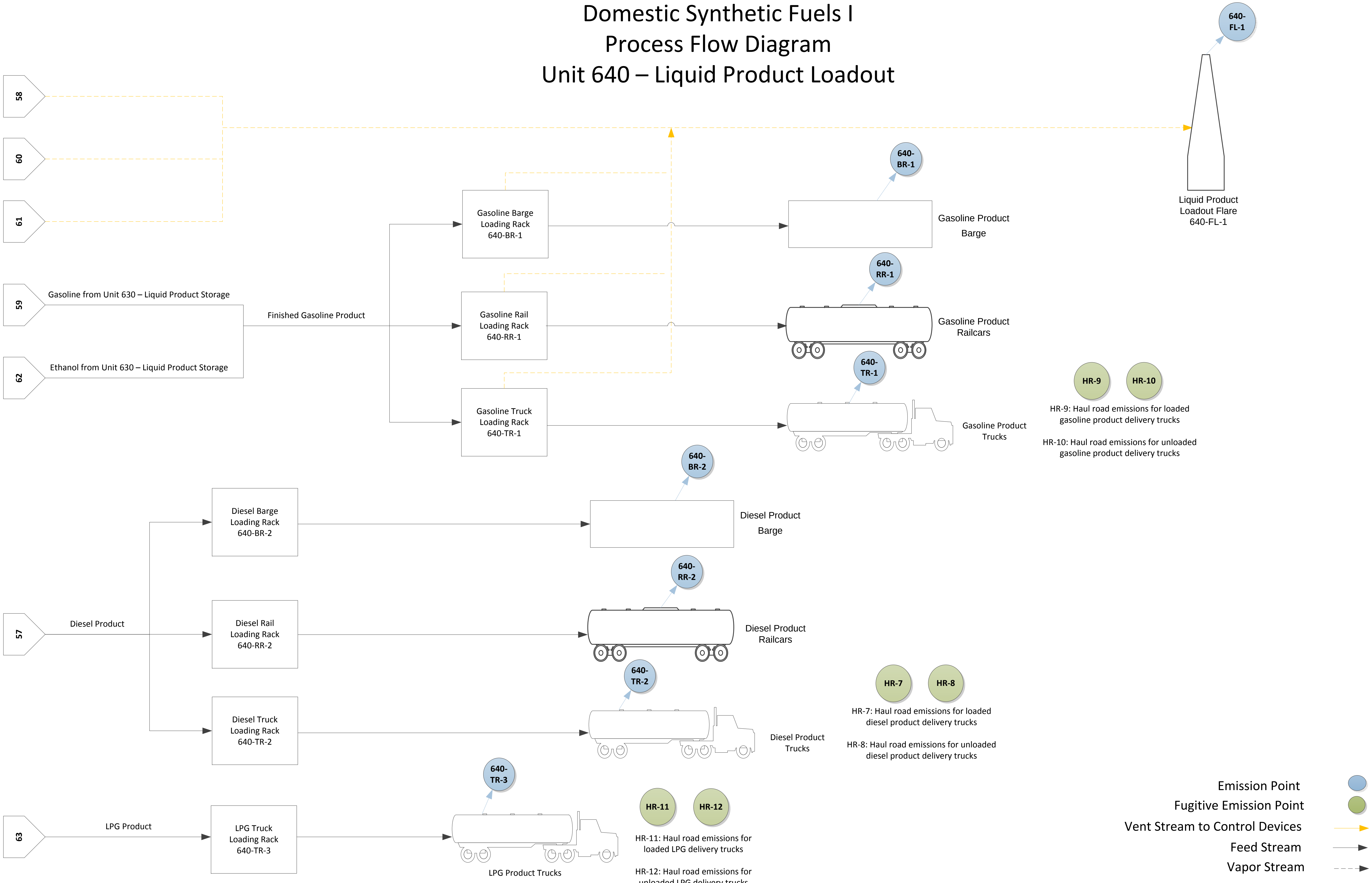
Domestic Synthetic Fuels I
Process Flow Diagram
Unit 610 – Product Solids Handling



Domestic Synthetic Fuels I
Process Flow Diagram
Unit 630 – Liquid Product Storage



Domestic Synthetic Fuels I
Process Flow Diagram
Unit 640 – Liquid Product Loadout



Attachment G

Attachment G

Process Description

Please see the process description for the DSF facility as Section 2.0 in the Introduction of this permit application.

Attachment H

SAFETY DATA SHEET

1. Identification

Product identifier PR 156

Other means of identification

Product code 31224

Recommended use Catalyst.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Supplier Axens

Headquarters Axens SA

Address 89, boulevard Franklin Roosevelt
92508 Rueil-Malmaison
France

Telephone +33 1 47 14 21 00

Fax +33 1 47 14 25 00

SDS contact e-mail sds@axens.net

Emergency Telephone Number

Europe +1 760 476 3961

Asia Pacific +1 760 476 3960

Americas +1 760 476 3962

Middle East / Africa +1 760 476 3959

Information on operation hours 24/7/365

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Not classified.

Environmental hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Hazard symbol None.

Signal word None.

Hazard statement The mixture does not meet the criteria for classification.

Precautionary statement

Prevention Observe good industrial hygiene practices.

Response Wash hands after handling.

Storage Store away from incompatible materials.

Disposal Dispose of waste and residues in accordance with local authority requirements.

Hazard(s) not otherwise classified (HNOC) None known

Supplemental information None.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Aluminium Oxide (Non Fibrous Form)		1344-28-1	90 - 100
Dialuminium Chloride Pentahydroxide		12042-91-0	5 - < 10
Platinum Dioxide		1314-15-4	< 1
Rhenium Dioxide		12036-09-8	< 1
TRADE SECRET*		Proprietary*	< 1

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation	Move to fresh air. Call a physician if symptoms develop or persist.
Skin contact	Wash off with soap and water. Get medical attention if irritation develops and persists.
Eye contact	Rinse with water. Get medical attention if irritation develops and persists.
Ingestion	Rinse mouth. Get medical attention if symptoms occur.
Most important symptoms/effects, acute and delayed	Direct contact with eyes may cause temporary irritation.
Indication of immediate medical attention and special treatment needed	Treat symptomatically.
General information	Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO_2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	The product is immiscible with water and will spread on the water surface. Stop the flow of material, if this is without risk. Following product recovery, flush area with water. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Avoid prolonged exposure. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Aluminium Oxide (Non Fibrous Form) (CAS 1344-28-1)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Aluminium Oxide (Non Fibrous Form) (CAS 1344-28-1)	TWA	1 mg/m3	Respirable fraction.
Dialuminium Chloride Pentahydroxide (CAS 12042-91-0)	TWA	1 mg/m3	Respirable fraction.
TRADE SECRET	TWA	0.1 mg/m3	

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Dialuminium Chloride Pentahydroxide (CAS 12042-91-0)	TWA	2 mg/m3
TRADE SECRET	TWA	0.1 mg/m3

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.

Other Wear suitable protective clothing.

Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance Extrudates

Physical state Solid.

Form Solid.

Color Pale yellow

Odor threshold Not available.

pH Not available.

Melting point/freezing point	3632 °F (2000 °C)
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Insoluble
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Density	< 1.00
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Avoid spread of dust. Contact with incompatible materials.
Incompatible materials	Acids. Bases. Strong oxidizing agents. Chlorine.
Hazardous decomposition products	Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapors.

11. Toxicological information

Information on likely routes of exposure	
Inhalation	Prolonged inhalation may be harmful.
Skin contact	No adverse effects due to skin contact are expected.
Eye contact	Direct contact with eyes may cause temporary irritation.
Ingestion	Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics	Direct contact with eyes may cause temporary irritation.

Information on toxicological effects

Acute toxicity

Components	Species	Test Results
Aluminium Oxide (Non Fibrous Form) (CAS 1344-28-1)		
Acute		
Inhalation		
Aerosol		
LC50	Rat	> 0.888 mg/l, 4 Hours
		7.6 mg/l, 1 Hours
Oral		
LD50	Rat	> 2000 mg/kg
Dialuminium Chloride Pentahydroxide (CAS 12042-91-0)		
Acute		
Dermal		
LD50	Rat	> 2000 mg/kg, 21 Days
		> 2000 mg/kg, 24 Hours
Oral		
LD50	Rat	> 2000 mg/kg

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation Prolonged skin contact may cause temporary irritation.

Serious eye damage/eye irritation Direct contact with eyes may cause temporary irritation.

Respiratory or skin sensitization

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Not an aspiration hazard.

Chronic effects Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential No data available.

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions). The exhausted catalysts may have different risks and properties compared to the original product. This safety data sheet is not applicable to exhausted catalysts.
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

US federal regulations This product is not known to be a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories

Immediate Hazard - No
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
ALUMINUM OXIDE (FIBROUS FORMS)	1344-28-1	90 - 100

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

US. Massachusetts RTK - Substance List

Aluminium Oxide (Non Fibrous Form) (CAS 1344-28-1)

US. New Jersey Worker and Community Right-to-Know Act

Aluminium Oxide (Non Fibrous Form) (CAS 1344-28-1)

US. Pennsylvania Worker and Community Right-to-Know Law

Aluminium Oxide (Non Fibrous Form) (CAS 1344-28-1)
Dialuminium Chloride Pentahydroxide (CAS 12042-91-0)

US. Rhode Island RTK

Aluminium Oxide (Non Fibrous Form) (CAS 1344-28-1)

US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	No

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 05-28-2015

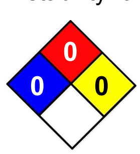
Revision date 10-27-2017

Version # 4.0

HMIS® ratings
Health: 0
Flammability: 0
Physical hazard: 0
Personal protection: B

NFPA ratings
Health: 0
Flammability: 0
Instability: 0

NFPA ratings



Disclaimer
Axens cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

Revision information
Regulatory Information: Regulatory Information

SAFETY DATA SHEET

1. Identification

Product identifier **HF 858**

Other means of identification

Product code 13302

Recommended use Catalyst.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Supplier Axens

Headquarters Axens SA

Address 89, boulevard Franklin Roosevelt
92508 Rueil-Malmaison
France

Telephone +33 1 47 14 21 00

Fax +33 1 47 14 25 00

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SDS contact e-mail sds@axens.net

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Emergency Telephone Number

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Asia Pacific +1 760 476 3960

Americas +1 760 476 3962

Middle East / Africa +1 760 476 3959

Information on operation hours 24/7/365

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 1
	Sensitization, skin	Category 1
	Carcinogenicity	Category 1A
	Specific target organ toxicity, repeated exposure	Category 2
Environmental hazards	Hazardous to the aquatic environment, acute hazard	Category 2
	Hazardous to the aquatic environment, long-term hazard	Category 2
OSHA defined hazards	Not classified.	

Label elements

Signal word Danger

Hazard statement

H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H350 May cause cancer.

H373	May cause damage to organs through prolonged or repeated exposure.
H401	Toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statement

Prevention

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/fume/gas/mist/vapors/spray.
P264	Wash thoroughly after handling.
P272	Contaminated work clothing must not be allowed out of the workplace.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Response

P302 + P350	If on skin: Wash with plenty of water.
P305 + P351 + P338	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a poison center/doctor.
P333 + P313	If skin irritation or rash occurs: Get medical advice/attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.

Storage

P405	Store locked up.

Disposal

P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information 98.3% of the mixture consists of component(s) of unknown acute hazards to the aquatic environment. 93.8% of the mixture consists of component(s) of unknown long-term hazards to the aquatic environment.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Aluminium Oxide		1344-28-1	80 - < 90
Molybdenum Trioxide		1313-27-5	5 - < 10
Aluminium Orthophosphate		7784-30-7	3 - < 5
Cobalt Oxide		1307-96-6	1 - < 3
Nickel Monoxide		1313-99-1	< 1
Other components below reportable levels			3 - < 5

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact Remove contaminated clothing immediately and wash skin with soap and water. In case of eczema or other skin disorders: Seek medical attention and take along these instructions. Wash contaminated clothing before reuse.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention immediately.

Ingestion Rinse mouth. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Skin irritation. May cause redness and pain. May cause an allergic skin reaction. Dermatitis. Rash. Prolonged exposure may cause chronic effects.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

General information	IF exposed or concerned: Get medical advice/attention. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO_2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Use water spray to cool unopened containers.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	The product is immiscible with water and will spread on the water surface. Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Prevent product from entering drains. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid release to the environment. Prevent further leakage or spillage if safe to do so. Avoid discharge into drains, water courses or onto the ground. Inform appropriate managerial or supervisory personnel of all environmental releases.

7. Handling and storage

Precautions for safe handling	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Provide adequate ventilation. Do not get this material in contact with eyes. Avoid breathing dust/fume/gas/mist/vapors/spray. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. Should be handled in closed systems, if possible. Wear appropriate personal protective equipment. Avoid release to the environment. Observe good industrial hygiene practices.
Conditions for safe storage, including any incompatibilities	Store locked up. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Aluminium Oxide (CAS 1344-28-1)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
Molybdenum Trioxide (CAS 1313-27-5)	PEL	5 mg/m3	
Nickel Monoxide (CAS 1313-99-1)	PEL	1 mg/m3	

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Aluminium Orthophosphate (CAS 7784-30-7)	TWA	1 mg/m3	Respirable fraction.
Aluminium Oxide (CAS 1344-28-1)	TWA	1 mg/m3	Respirable fraction.
Cobalt Oxide (CAS 1307-96-6)	TWA	0.02 mg/m3	
Molybdenum Trioxide (CAS 1313-27-5)	TWA	0.5 mg/m3	Respirable fraction.
Nickel Monoxide (CAS 1313-99-1)	TWA	0.2 mg/m3	Inhalable fraction.

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Nickel Monoxide (CAS 1313-99-1)	TWA	0.015 mg/m3

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection

Hand protection Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.

Other Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Contaminated work clothing should not be allowed out of the workplace.

9. Physical and chemical properties

Appearance Extrudates

Physical state Solid.

Form Solid.

Color Blue

Odor Not available.

Odor threshold Not available.

pH Not available.

Melting point/freezing point 3632 °F (2000 °C)

Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Insoluble
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Density	< 1.00
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Contact with incompatible materials. Minimize dust generation and accumulation.
Incompatible materials	Acids. Chlorine. Bases. Strong oxidizing agents.
Hazardous decomposition products	Under certain conditions, it reacts with carbon monoxide, forming nickel carbonyl Ni(CO)4, which is a very toxic gas. Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapors.

11. Toxicological information

Information on likely routes of exposure	
Inhalation	Prolonged inhalation may be harmful.
Skin contact	Causes skin irritation. May cause an allergic skin reaction.
Eye contact	Causes serious eye damage.
Ingestion	Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics	Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Skin irritation. May cause redness and pain. May cause an allergic skin reaction. Dermatitis. Rash.
Information on toxicological effects	
Acute toxicity	May cause an allergic skin reaction.

Components	Species	Test Results
Aluminium Orthophosphate (CAS 7784-30-7)		
Acute		
Inhalation		
Dust		
LC50	Rat	> 5.1 mg/l, 4 Hours
Aluminium Oxide (CAS 1344-28-1)		
Acute		
Inhalation		
Aerosol		
LC50	Rat	> 0.888 mg/l, 4 Hours
		7.6 mg/l, 1 Hours
Oral		
LD50	Rat	> 2000 mg/kg
Cobalt Oxide (CAS 1307-96-6)		
Acute		
Dermal		
LD50	Rat	> 2000 mg/kg, 24 Hours
Inhalation		
Dust		
LC50	Rat	0.06 mg/l, 4 Hours
Oral		
LD50	Rat	159 mg/kg
Molybdenum Trioxide (CAS 1313-27-5)		
Acute		
Dermal		
LD50	Rat	> 2000 mg/kg, 24 Hours
Inhalation		
Dust		
LC50	Rat	> 1.93 mg/l, 4 Hours
Oral		
LD50	Rat	3883 mg/kg
Nickel Monoxide (CAS 1313-99-1)		
Acute		
Inhalation		
Aerosol		
LC50	Rat	> 5.08 mg/l, 4 Hours
LD50	Rat	38.2 mg/kg
Oral		
LD50	Rat	> 5000 mg/kg

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation Causes skin irritation.

Serious eye damage/eye irritation Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization Not a respiratory sensitizer.

Skin sensitization May cause an allergic skin reaction.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity May cause cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Cobalt Oxide (CAS 1307-96-6)	2B Possibly carcinogenic to humans.
Nickel Monoxide (CAS 1313-99-1)	1 Carcinogenic to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

US. National Toxicology Program (NTP) Report on Carcinogens

Nickel Monoxide (CAS 1313-99-1)	Known To Be Human Carcinogen.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard Not an aspiration hazard.

Chronic effects May cause damage to organs through prolonged or repeated exposure. Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects.

12. Ecological information

Ecotoxicity Toxic to aquatic life with long lasting effects.

Components		Species	Test Results
Molybdenum Trioxide (CAS 1313-27-5)			
Aquatic			
Fish	LC50	Fathead minnow (Pimephales promelas)	70 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential No data available.

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions). The exhausted catalysts may have different risks and properties compared to the original product. This safety data sheet is not applicable to exhausted catalysts.

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

UN number UN3077

UN proper shipping name Environmentally hazardous substance, solid, n.o.s (Cobalt oxide)

Transport hazard class(es)

Class 9

Subsidiary risk -

Label(s) 9

Packing group III

Environmental hazards No.

Special precautions for user Read safety instructions, SDS and emergency procedures before handling.

Other information

Passenger and cargo aircraft	Forbidden.
Cargo aircraft only	Forbidden.

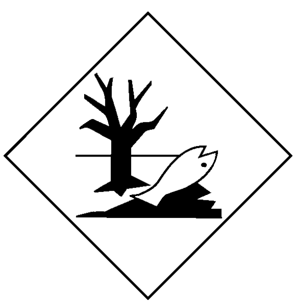
IMDG

UN number	UN3077
UN proper shipping name	Environmentally hazardous substance, solid, n.o.s (Cobalt oxide)
Transport hazard class(es)	
Class	9
Subsidiary risk	-
Label(s)	9
Packing group	III
Environmental hazards	
Marine pollutant	Yes
EmS	Not available.
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

IATA; IMDG

Marine pollutant



15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Cobalt Oxide (CAS 1307-96-6)	Listed.
Nickel Monoxide (CAS 1313-99-1)	Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
ALUMINUM OXIDE (FIBROUS FORMS)	1344-28-1	80 - < 90
MOLYBDENUM TRIOXIDE	1313-27-5	5 - < 10
NICKEL COMPOUNDS	1313-99-1	< 1

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Cobalt Oxide (CAS 1307-96-6)
Nickel Monoxide (CAS 1313-99-1)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Cobalt Oxide (CAS 1307-96-6)
Nickel Monoxide (CAS 1313-99-1)

US. Massachusetts RTK - Substance List

Aluminium Oxide (CAS 1344-28-1)
Molybdenum Trioxide (CAS 1313-27-5)
Nickel Monoxide (CAS 1313-99-1)

US. New Jersey Worker and Community Right-to-Know Act

Aluminium Orthophosphate (CAS 7784-30-7)
Aluminium Oxide (CAS 1344-28-1)
Cobalt Oxide (CAS 1307-96-6)
Molybdenum Trioxide (CAS 1313-27-5)
Nickel Monoxide (CAS 1313-99-1)

US. Pennsylvania Worker and Community Right-to-Know Law

Aluminium Oxide (CAS 1344-28-1)
Molybdenum Trioxide (CAS 1313-27-5)
Nickel Monoxide (CAS 1313-99-1)

US. Rhode Island RTK

Aluminium Oxide (CAS 1344-28-1)
Cobalt Oxide (CAS 1307-96-6)
Molybdenum Trioxide (CAS 1313-27-5)
Nickel Monoxide (CAS 1313-99-1)

US. California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Cobalt Oxide (CAS 1307-96-6)	Listed: July 1, 1992
Nickel Monoxide (CAS 1313-99-1)	Listed: October 1, 1989

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes

Country(s) or region	Inventory name	On inventory (yes/no)*
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 12-08-2015

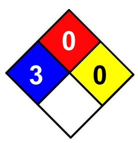
Revision date 12-08-2015

Version # 1.0

HMIS® ratings
Health: 3*
Flammability: 0
Physical hazard: 0

NFPA ratings
Health: 3
Flammability: 0
Instability: 0

NFPA ratings



Disclaimer
Axens cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user’s responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

SAFETY DATA SHEET

1. Identification

Product identifier HDK 786

Other means of identification

Product code 24425

Recommended use Catalyst.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Supplier Axens

Headquarters Axens SA

Address 89, boulevard Franklin Roosevelt
92508 Rueil-Malmaison
France

Telephone +33 1 47 14 21 00

Fax +33 1 47 14 25 00

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SDS contact e-mail sds@axens.net

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Emergency Telephone Number

Europe +1 760 476 3961

Asia Pacific +1 760 476 3960

Americas +1 760 476 3962

Middle East / Africa +1 760 476 3959

Information on operation hours 24/7/365

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2A
	Sensitization, skin	Category 1
	Carcinogenicity	Category 1A
	Specific target organ toxicity, repeated exposure	Category 1

Environmental hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement

H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H350	May cause cancer.
H372	Causes damage to organs through prolonged or repeated exposure.

Precautionary statement

Prevention

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/fume/gas/mist/vapors/spray.
P264	Wash thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P272	Contaminated work clothing must not be allowed out of the workplace.
P280	Wear protective gloves/protective clothing/eye protection/face protection.

Response

P302 + P350	If on skin: Wash with plenty of water.
P305 + P351 + P338	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	If exposed or concerned: Get medical advice/attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/attention.
P337 + P313	If eye irritation persists: Get medical advice/attention.
P362	Take off contaminated clothing and wash before reuse.

Storage

P405	Store locked up.

Disposal

P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Aluminium Oxide		1344-28-1	50 - < 60
Silicon Dioxide - Amorphous		7631-86-9	20 - < 30
Tungsten Trioxide		1314-35-8	20 - < 30
Molybdenum Trioxide		1313-27-5	3 - < 5
Aluminium Orthophosphate		7784-30-7	1 - < 3
Nickel Monoxide		1313-99-1	1 - < 3

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact Remove contaminated clothing immediately and wash skin with soap and water. In case of eczema or other skin disorders: Seek medical attention and take along these instructions. Wash contaminated clothing before reuse.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.

Ingestion Rinse mouth. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Skin irritation. May cause redness and pain. May cause an allergic skin reaction. Dermatitis. Rash. Prolonged exposure may cause chronic effects.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Keep victim under observation. Symptoms may be delayed.

General information IF exposed or concerned: Get medical advice/attention. If you feel unwell, seek medical advice (show the label where possible). Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Wash contaminated clothing before reuse.

5. Fire-fighting measures

Suitable extinguishing media Water fog. Foam. Dry chemical powder. Carbon dioxide (CO_2).

Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Use water spray to cool unopened containers.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

The product is immiscible with water and will spread on the water surface.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental precautions

Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Provide adequate ventilation. Avoid breathing dust/fume/gas/mist/vapors/spray. Avoid contact with eyes, skin, and clothing. Avoid prolonged exposure. When using, do not eat, drink or smoke. Should be handled in closed systems, if possible. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Store locked up. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Aluminium Oxide (CAS 1344-28-1)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.
Molybdenum Trioxide (CAS 1313-27-5)	PEL	5 mg/m3	
Nickel Monoxide (CAS 1313-99-1)	PEL	1 mg/m3	

US. OSHA Table Z-3 (29 CFR 1910.1000)

Components	Type	Value
Silicon Dioxide - Amorphous (CAS 7631-86-9)	TWA	0.8 mg/m3
		20 mppcf

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Aluminium Orthophosphate (CAS 7784-30-7)	TWA	1 mg/m3	Respirable fraction.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Aluminium Oxide (CAS 1344-28-1)	TWA	1 mg/m3	Respirable fraction.
Molybdenum Trioxide (CAS 1313-27-5)	TWA	0.5 mg/m3	Respirable fraction.
Nickel Monoxide (CAS 1313-99-1)	TWA	0.2 mg/m3	Inhalable fraction.
Tungsten Trioxide (CAS 1314-35-8)	STEL	10 mg/m3	
	TWA	5 mg/m3	

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Nickel Monoxide (CAS 1313-99-1)	TWA	0.015 mg/m3
Silicon Dioxide - Amorphous (CAS 7631-86-9)	TWA	6 mg/m3
Tungsten Trioxide (CAS 1314-35-8)	STEL	10 mg/m3
	TWA	5 mg/m3

Biological limit values No biological exposure limits noted for the ingredient(s).

Appropriate engineering controls Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.

Other Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Contaminated work clothing should not be allowed out of the workplace.

9. Physical and chemical properties

Appearance Extrudates

Physical state Solid.

Form Solid.

Color Brown.

Odor	Not available.
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	3632 °F (2000 °C)
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Insoluble
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Density	< 1.00
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Contact with incompatible materials. Minimize dust generation and accumulation.
Incompatible materials	Acids. Fluorine. Chlorine. Strong oxidizing agents. Bases.
Hazardous decomposition products	Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapors.

11. Toxicological information

Information on likely routes of exposure	
Inhalation	Prolonged inhalation may be harmful.
Skin contact	Causes skin irritation. May cause an allergic skin reaction.
Eye contact	Causes serious eye irritation.
Ingestion	Expected to be a low ingestion hazard.
Symptoms related to the physical, chemical and toxicological characteristics	Severe eye irritation. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Skin irritation. May cause redness and pain. May cause an allergic skin reaction. Dermatitis. Rash.
Information on toxicological effects	
Acute toxicity	May cause an allergic skin reaction.

Components	Species	Test Results
Aluminium Orthophosphate (CAS 7784-30-7)		
Acute		
Inhalation		
Dust		
LC50	Rat	> 5.1 mg/l, 4 Hours
Aluminium Oxide (CAS 1344-28-1)		
Acute		
Inhalation		
Aerosol		
LC50	Rat	> 0.888 mg/l, 4 Hours
		7.6 mg/l, 1 Hours
Oral		
LD50	Rat	> 2000 mg/kg
Molybdenum Trioxide (CAS 1313-27-5)		
Acute		
Dermal		
LD50	Rat	> 2000 mg/kg, 24 Hours
Inhalation		
Dust		
LC50	Rat	> 1.93 mg/l, 4 Hours
Oral		
LD50	Rat	3883 mg/kg
Nickel Monoxide (CAS 1313-99-1)		
Acute		
Inhalation		
Aerosol		
LC50	Rat	> 5.08 mg/l, 4 Hours
LD50	Rat	38.2 mg/kg
Oral		
LD50	Rat	> 5000 mg/kg
Silicon Dioxide - Amorphous (CAS 7631-86-9)		
Acute		
Dermal		
LD50	Rabbit	> 2000 mg/kg, 24 Hours
Inhalation		
Dust		
LC50	Rat	> 2.08 mg/l, 4 Hours
Oral		
LD50	Mouse	> 3160 mg/kg
	Rat	> 5000 mg/kg
Tungsten Trioxide (CAS 1314-35-8)		
Acute		
Dermal		
LD50	Rat	> 2000 mg/kg, 24 Hours
Inhalation		
Dust		
LC50	Rat	> 5.36 mg/l, 4 Hours
Oral		
LD50	Rat	> 2000 mg/kg

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation	Causes skin irritation.
Serious eye damage/eye irritation	Causes serious eye irritation.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	May cause an allergic skin reaction.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	May cause cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Nickel Monoxide (CAS 1313-99-1)	1 Carcinogenic to humans.
Silicon Dioxide - Amorphous (CAS 7631-86-9)	3 Not classifiable as to carcinogenicity to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

US. National Toxicology Program (NTP) Report on Carcinogens

Nickel Monoxide (CAS 1313-99-1)	Known To Be Human Carcinogen.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Causes damage to organs through prolonged or repeated exposure.
Aspiration hazard	Not an aspiration hazard.
Chronic effects	Causes damage to organs through prolonged or repeated exposure. Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Components		Species	Test Results
Molybdenum Trioxide (CAS 1313-27-5)			
Aquatic			
Fish	LC50	Fathead minnow (Pimephales promelas)	70 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability	No data is available on the degradability of this product.
Bioaccumulative potential	No data available.
Mobility in soil	No data available.
Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.
Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions). The exhausted catalysts may have different risks and properties compared to the original product. This safety data sheet is not applicable to exhausted catalysts.
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Nickel Monoxide (CAS 1313-99-1) Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
ALUMINUM OXIDE (FIBROUS FORMS)	1344-28-1	50 - < 60
MOLYBDENUM TRIOXIDE	1313-27-5	3 - < 5
NICKEL COMPOUNDS	1313-99-1	1 - < 3

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Nickel Monoxide (CAS 1313-99-1)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Nickel Monoxide (CAS 1313-99-1)

US. Massachusetts RTK - Substance List

Aluminium Oxide (CAS 1344-28-1)
Molybdenum Trioxide (CAS 1313-27-5)
Nickel Monoxide (CAS 1313-99-1)
Silicon Dioxide - Amorphous (CAS 7631-86-9)

US. New Jersey Worker and Community Right-to-Know Act

Aluminium Orthophosphate (CAS 7784-30-7)
Aluminium Oxide (CAS 1344-28-1)
Molybdenum Trioxide (CAS 1313-27-5)

Nickel Monoxide (CAS 1313-99-1)
Silicon Dioxide - Amorphous (CAS 7631-86-9)

US. Pennsylvania Worker and Community Right-to-Know Law

Aluminium Oxide (CAS 1344-28-1)
Molybdenum Trioxide (CAS 1313-27-5)
Nickel Monoxide (CAS 1313-99-1)
Silicon Dioxide - Amorphous (CAS 7631-86-9)

US. Rhode Island RTK

Aluminium Oxide (CAS 1344-28-1)
Molybdenum Trioxide (CAS 1313-27-5)
Nickel Monoxide (CAS 1313-99-1)

US. California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Nickel Monoxide (CAS 1313-99-1)	Listed: October 1, 1989

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 12-15-2015

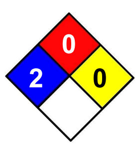
Revision date 12-15-2015

Version # 1.0

HMIS® ratings
Health: 2*
Flammability: 0
Physical hazard: 0

NFPA ratings
Health: 2
Flammability: 0
Instability: 0

NFPA ratings



Disclaimer Axens cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

SAFETY DATA SHEET

1. Identification

Product identifier AxTrap 867

Other means of identification

Product code 11622

Recommended use Industrial applications, Adsorbent for gases and liquids (including dessicant), air separation, catalysts, reaction modification.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Supplier Axens

Headquarters Axens SA

Address 89, boulevard Franklin Roosevelt
92508 Rueil-Malmaison
France

Telephone +33 1 47 14 21 00

Fax +33 1 47 14 25 00

SDS contact e-mail sds@axens.net

Emergency Telephone Number

Europe +1 760 476 3961

Asia Pacific +1 760 476 3960

Americas +1 760 476 3962

Middle East / Africa +1 760 476 3959

Information on operation hours 24/7/365

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards Skin corrosion/irritation Category 1
Serious eye damage/eye irritation Category 1

Environmental hazards Not classified.

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement

H314 Causes severe skin burns and eye damage.
H318 Causes serious eye damage.

Precautionary statement

Prevention

P264 Wash thoroughly after handling.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response

P301 + P330 + P331	If swallowed: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340	If inhaled: Remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338	If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a poison center/doctor.
P363	Wash contaminated clothing before reuse.

Storage

P405	Store locked up.

Disposal

P501	Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Aluminium Oxide (Non Fibrous Form)		1344-28-1	82
Disodium Oxide		1313-59-3	10
Other components below reportable levels			8

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician or poison control center immediately. Chemical burns must be treated by a physician. Wash contaminated clothing before reuse.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately.

Ingestion Call a physician or poison control center immediately. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.

Most important symptoms/effects, acute and delayed Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim under observation. Symptoms may be delayed.

General information Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media Water fog. Foam. Dry chemical powder. Carbon dioxide (CO_2).

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire fighting equipment/instructions Move containers from fire area if you can do so without risk.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	The product is immiscible with water and will spread on the water surface. Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Following product recovery, flush area with water. Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination. Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.
Environmental precautions	Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling	Do not get in eyes, on skin, or on clothing. Avoid prolonged exposure. Provide adequate ventilation. Wear appropriate personal protective equipment.
Conditions for safe storage, including any incompatibilities	Store locked up. Store in original tightly closed container. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value	Form
Aluminium Oxide (Non Fibrous Form) (CAS 1344-28-1)	PEL	5 mg/m3	Respirable fraction.
		15 mg/m3	Total dust.

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Aluminium Oxide (Non Fibrous Form) (CAS 1344-28-1)	TWA	1 mg/m3	Respirable fraction.

Biological limit values	No biological exposure limits noted for the ingredient(s).
Appropriate engineering controls	Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles) and a face shield.

Skin protection

Hand protection Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier.

Other Wear appropriate chemical resistant clothing.

Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment.

Thermal hazards	Wear appropriate thermal protective clothing, when necessary.
General hygiene considerations	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance	Spheres
Physical state	Solid.
Form	Solid.
Color	White
Odor threshold	Not available.
pH	Not available.
Melting point/freezing point	3632 °F (2000 °C)
Initial boiling point and boiling range	Not available.
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Insoluble
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Density	< 1.00
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Acids. Bases. Strong oxidizing agents. Chlorine.
Hazardous decomposition products	At thermal decomposition temperatures, carbon monoxide and carbon dioxide.

11. Toxicological information

Information on likely routes of exposure

Inhalation	May cause irritation to the respiratory system. Prolonged inhalation may be harmful.

Skin contact	Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Causes digestive tract burns.
Symptoms related to the physical, chemical and toxicological characteristics	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result.

Information on toxicological effects

Acute toxicity

Components	Species	Test Results
Aluminium Oxide (Non Fibrous Form) (CAS 1344-28-1)		
Acute		
Inhalation		
Aerosol		
LC50	Rat	> 0.888 mg/l, 4 Hours
		7.6 mg/l, 1 Hours
Oral		
LD50	Rat	> 2000 mg/kg

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation	Causes severe skin burns and eye damage.
Serious eye damage/eye irritation	Causes serious eye damage.
Respiratory or skin sensitization	
Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	This product is not considered to be a carcinogen by IARC, ACGIH, NTP, or OSHA.

IARC Monographs. Overall Evaluation of Carcinogenicity

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity	This product is not expected to cause reproductive or developmental effects.
Specific target organ toxicity - single exposure	Not classified.
Specific target organ toxicity - repeated exposure	Not classified.
Aspiration hazard	Not an aspiration hazard.
Chronic effects	Prolonged inhalation may be harmful.

12. Ecological information

Ecotoxicity	The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.
Persistence and degradability	No data is available on the degradability of this product.
Bioaccumulative potential	No data available.
Mobility in soil	No data available.
Other adverse effects	No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions	Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations	Dispose in accordance with all applicable regulations.
Hazardous waste code	The waste code should be assigned in discussion between the user, the producer and the waste disposal company.
Waste from residues / unused products	Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).
Contaminated packaging	Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

IMDG

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - No
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
ALUMINUM OXIDE	1344-28-1	82

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not regulated.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. California Controlled Substances. CA Department of Justice (California Health and Safety Code Section 11100)

Not listed.

US. Massachusetts RTK - Substance List

Aluminium Oxide (Non Fibrous Form) (CAS 1344-28-1)

US. New Jersey Worker and Community Right-to-Know Act

Aluminium Oxide (Non Fibrous Form) (CAS 1344-28-1)

US. Pennsylvania Worker and Community Right-to-Know Law

Aluminium Oxide (Non Fibrous Form) (CAS 1344-28-1)

US. Rhode Island RTK

Aluminium Oxide (Non Fibrous Form) (CAS 1344-28-1)

US. California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins.

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 07-18-2015

Revision date 02-03-2017

Version # 2.0

HMIS® ratings
Health: 3
Flammability: 0
Physical hazard: 0
Personal protection: B

NFPA ratings
Health: 3
Flammability: 0
Instability: 0

NFPA ratings

Disclaimer Axens cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.

Revision information This document has undergone significant changes and should be reviewed in its entirety.

Attachment I

Attachment I
Emission Units Table
(includes all emission units and air pollution control devices that will be part of this permit application review, regardless of permitting status)

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device [4]
Unit 100 – Coal Handling						
100-TH-1	100-TH-1	Barge Receiving Hopper	2020	912,500 ton/yr	New	None
100-TC-1	100-TC-1	Coal Transfer Conveyor 1	2020	912,500 ton/yr	New	100-TC-1-FF
100-TC-2	100-TC-2	Coal Transfer Conveyor 2	2020	912,500 ton/yr	New	100-TC-2-FF
100-TH-2	100-TH-2	Radial Stacker Hopper	2020	912,500 ton/yr	New	100-TH-2-FF
100-TC-3	100-TC-3	Radial Stacker Transfer Conveyor	2020	912,500 ton/yr	New	100-TC-3-FF
100-CSP-1	100-CSP-1	Active Coal Storage Pile	2020	0.60 acres	New	Wind Shield
100-CSP-2	100-CSP-2	Backup Coal Storage Pile	2020	2.02 acres	New	Wind Shield
100-CSP-3	100-CSP-3	Truck Dump Coal Storage Pile	2020	0.01 acres	New	None
100-TU-1	100-TU-1	Coal Truck Unloading	2020	912,500 ton/yr	New	None
100-TH-3	100-TH-3	Coal Surge Hopper	2020	912,500 ton/yr	New	None
100-TC-4	100-TC-4	Coal Milling Transfer Conveyor 1	2020	912,500 ton/yr	New	100-TC-4-FF
100-TH-4	100-TH-4	Coal Milling Hopper 1	2020	912,500 ton/yr	New	100-TH-4-FF
100-CMD-1	100-CMD-1	Coal Milling Dryer	2020	13.45 MMBtu/hr	New	None
100-CM-1	100-BH-1	Coal Mill	2020	912,500 ton/yr	New	100-BH-1
100-BH-1	100-BH-1	Coal Mill Baghouse	2020	21,500 scf/min	New	100-BH-1
100-TH-5	100-TH-5	Coal Milling Hopper 2	2020	912,500 ton/yr	New	100-TH-5-FF
100-TC-5	100-TC-5	Coal Milling Transfer Conveyor 2	2020	912,500 ton/yr	New	100-TC-5-FF
100-CS-1	100-CS-1	Coal Storage Silo 1	2020	912,500 ton/yr	New	100-CS-1-FF
100-CS-2	100-CS-2	Coal Storage Silo 2	2020	912,500 ton/yr	New	100-CS-2-FF
100-TH-6	100-TH-6	Coal Storage Silo 1 Hopper	2020	912,500 ton/yr	New	100-TH-6-FF
100-TH-7	100-TH-7	Coal Storage Silo 2 Hopper	2020	912,500 ton/yr	New	100-TH-7-FF

Attachment I

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Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device [4]
100-TC-6	100-TC-6	Coal Silo Transfer Conveyor 1	2020	912,500 ton/yr	New	100-TC-6-FF
100-TC-7	100-TC-7	Coal Silo Transfer Conveyor 2	2020	912,500 ton/yr	New	100-TC-7-FF
Unit 200 – H-Coal						
200-D-110	200-S-108	Feed Coal Bin	2020	912,500 ton/yr	New	200-S-108-FF
200-S-105	200-S-105	Feed Coal Conveyor	2020	912,500 ton/yr	New	200-S-105-FF
200-H-102	200-H-102	Slurry Feed Heater	2020	74.02 MMBtu/hr	New	None
200-H-101	200-H-101	Hydrogen Heater	2020	15.34 MMBtu/hr	New	None
200-D-204 /205/206	200-D-206	Feed Catalyst Bins	2020	803 ton/yr	New	200-D-206-FF
200-D-206	200-D-206	Spent Catalyst Withdrawal Bin	2020	1,285 ton/yr	New	None
200-D-207	200-D-207	Spent Catalyst Cooling Bin	2020	1,285 ton/yr	New	None
200-D-208	200-D-208	Spent Catalyst Loading Hopper	2020	1,285 ton/yr	New	None
200-D-209	200-D-209	Spent Catalyst Drums	2020	1,285 ton/yr	New	None
200-H-301	200-H-301	Vacuum Tower Feed Heater	2020	24.79 MMBtu/hr	New	None
200-FUG	200-FUG	Unit 200 Fugitive Emission Sources	2020	--	New	None
Unit 310 – Hydrocracker						
310-H-101	310-H-101	Hydrocracker Reaction Heater	2020	8.37 MMBtu/hr	New	None
310-H-103	310-H-103	Fractionation Reboiler	2020	10.78 MMBtu/hr	New	None
310-FUG	310-FUG	Unit 310 Fugitive Emission Sources	2020	--	New	None
Unit 320 – Catalytic Reformer						
320-H-201	320-H-201	Catalytic Reaction Heater 1	2020	11.89 MMBtu/hr	New	None

Attachment I

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Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
320-H-202	320-H-202	Catalytic Reaction Heater 2	2020	11.89 MMBtu/hr	New	None
320-H-203	320-H-203	Catalytic Reaction Heater 3	2020	11.89 MMBtu/hr	New	None
320-H-204	320-H-204	Catalytic Reaction Heater 4	2020	11.89 MMBtu/hr	New	None
320-FUG	320-FUG	Unit 320 Fugitive Emission Sources	2020	--	New	None
Unit 410 – Gas Recovery Unit						
410-FUG	410-FUG	Unit 410 Fugitive Emission Sources	2020	--	New	None
Unit 420 – Amine Regeneration						
420-FUG	420-FUG	Unit 420 Fugitive Emission Sources	2020	--	New	None
Unit 430 – Sour Water Stripping						
430-TK-1	440-SRI-1	Sour Water Storage Tank	2020	5,000 BBL	New	440-SRI-1
430-FUG	430-FUG	Unit 430 Fugitive Emission Sources	2020	--	New	None
Unit 440 – Sulfur Recovery Unit						
440-CF-1	440-SRI-1	Claus Furnace	2020	4.4 MMBtu/hr	New	None
440-SRI-1	440-SRI-1	Sulfur Recovery Incinerator	2020	10.6 MMBtu/hr	New	440-SRI-1
440-FUG	440-FUG	Unit 440 Fugitive Emission Sources	2020	--	New	None
Unit 500 – Utilities						
500-SB-1	500-SB-1	Steam Boiler	2020	Startup: 24.3 MMBtu/hr Normal Op: 4.9 MMBtu/hr	New	None
500-EG-1	500-EG-1	Emergency Generator	2020	500 kW	New	None
500-CT-1	500-CT-1	Cooling Towers	2020	5,565 gal/min	New	None
500-FUG	500-FUG	Unit 500 Fugitive Emission Sources	2020	--	New	None

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Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
Unit 610 – Solid Products Handling						
610-TC-1	610-TC-1	Flaker Transfer Conveyor	2020	223,599 ton/yr	New	None
610-SS-1	610-SS-1	Surge Flake Storage Silo	2020	223,599 ton/yr	New	610-SS-1-FF
610-TC-2	610-TC-2	Pipe Conveyor 1	2020	223,599 ton/yr	New	610-TC-2-FF
610-TC-3	610-SD-1	Pipe Conveyor 2	2020	223,599 ton/yr	New	None
610-TC-4	610-SD-1	Stacker Conveyor 1	2020	223,599 ton/yr	New	None
610-SP-1	610-SD-1	Dome 1 Storage Pile	2020	0.50 acre	New	None
610-TH-1	610-SD-1	Flaked Residue Loading Hopper 1	2020	223,599 ton/yr	New	None
610-SD-1	610-SD-1	Flaked Residue Storage Dome 1	2020	223,599 ton/yr	New	610-SD-1-FF
610-TC-5	610-SD-2	Stacker Conveyor 2	2020	223,599 ton/yr	New	None
610-SP-2	610-SD-2	Dome 2 Storage Pile	2020	0.50 acre	New	None
610-TH-2	610-SD-2	Flaked Residue Loading Hopper 2	2020	223,599 ton/yr	New	None
610-SD-2	610-SD-2	Flaked Residue Storage Dome 2	2020	223,599 ton/yr	New	610-SD-2-FF
610-TC-6	610-SD-1 610-SD-2	Flake Loading Conveyor	2020	223,599 ton/yr	New	None
610-TC-7	610-TC-7	Truck Loading Conveyor	2020	223,599 ton/yr	New	None
610-TH-3	610-TH-3	Truck Loading Hopper	2020	223,599 ton/yr	New	None
610-TR-1	610-TR-1	Flaked Residue Product Trucks	2020	223,599 ton/yr	New	None
610-TH-4	610-TH-4	Sulfur Storage Pile Hopper	2020	19,995 ton/yr	New	None
610-TC-8	610-TC-8	Sulfur Storage Pile Conveyor	2020	19,995 ton/yr	New	None
610-SP-3	610-SP-3	Sulfur Storage Pile	2020	0.01 acres	New	None
610-TH-5	610-TH-5	Sulfur Loading Hopper 1	2020	19,995 ton/yr	New	None
610-TC-9	610-TC-9	Sulfur Loading Conveyor	2020	19,995 ton/yr	New	None

Attachment I

Emission Units Table

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Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
610-TH-6	610-TH-6	Sulfur Loading Hopper 2	2020	19,995 ton/yr	New	None
610-TR-2	610-TR-2	Sulfur Product Trucks	2020	19,995 ton/yr	New	None
Unit 620 – Flare System						
620-FL-1	620-FL-1	Emergency Flare	2020	6.2 MMSCF/H	New	620-FL-1
620-FUG	620-FUG	Unit 620 Fugitive Emission Sources	2020	--	New	None
Unit 630 – Liquid Products and Intermediates Storage						
630-TK-1A 630-TK-1I	N/A	LPG Storage Tanks	2020	60,000 gal /tank 9 tanks total	New	N/A
630-TK-2	640-FL-1	Light Naphtha Storage Tank 1	2020	3,000 BBL	New	640-FL-1
630-TK-3	640-FL-1	Light Naphtha Storage Tank 2	2020	3,000 BBL	New	640-FL-1
630-TK-4	630-TK-4	Reformate Storage Tank 1	2020	4,000 BBL	New	None
630-TK-5	630-TK-5	Reformate Storage Tank 2	2020	4,000 BBL	New	None
630-TK-6	640-FL-1	Gasoline Storage Tank 1	2020	20,000 BBL	New	640-FL-1
630-TK-7	640-FL-1	Gasoline Storage Tank 2	2020	20,000 BBL	New	640-FL-1
630-TK-8	630-TK-8	Diesel Storage Tank 1	2020	28,500 BBL	New	None
630-TK-9	630-TK-9	Diesel Storage Tank 2	2020	28,500 BBL	New	None
630-TK-10	640-FL-1	Ethanol Storage Tank 1	2020	4,000 BBL	New	640-FL-1
630-TK-11	640-FL-1	Ethanol Storage Tank 2	2020	4,000 BBL	New	640-FL-1
630-TK-12	630-TK-12	HYK Heavy Feed Storage Tank	2020	3,000 BBL	New	None
630-TK-13	630-TK-13	HYK Light Feed Storage Tank	2020	16,000 BBL	New	None
630-TK-14	630-TK-14	Heavy Slop Oil Storage Tank	2020	16,000 BBL	New	None

Attachment I

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Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
630-TK-15	630-TK-15	Light Slop Oil Storage Tank	2020	16,000 BBL	New	None
630-FUG	630-FUG	Unit 630 Fugitive Emission Sources	2020	--	New	None
Unit 640 – Liquid Product Loadout						
640-FL-1	640-FL-1	Liquid Product Loadout Flare	2020	4.99 MSCF/H	New	640-FL-1
640-TR-1	640-TR-1; 640-FL-1	Gasoline Truck Loading Rack	2020	2400 gpm	New	640-FL-1
640-TR-2	640-TR-2	Diesel Truck Loading Rack	2020	3,600 gpm	New	None
640-TR-3	640-TR-3	LPG Truck Loading Rack	2020	600 gpm	New	None
640-RR-1	640-RR-1; 640-FL-1	Gasoline Rail Loading Rack	2020	800 gpm	New	640-FL-1
640-RR-2	640-RR-2	Diesel Rail Loading Rack	2020	800 gpm	New	None
640-BR-1	640-BR-1; 640-FL-1	Gasoline Barge Loading Rack	2020	1,800 gpm	New	640-FL-1
640-BR-2	640-BR-2	Diesel Barge Loading Rack	2020	1,800 gpm	New	None
640-FUG	640-FUG	Unit 640 Fugitive Emission Sources	2020	--	New	None
Unit 700 – Hydrogen Plant						
700-HR-1	700-HR-1	Hydrogen Reformer	2020	537 MMBtu/hr	New	SCR

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.

Attachment J

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data															
Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions [4]		Maximum Potential Controlled Emissions [5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used [6]	Emission Conc [7] (ppmv or mg/m[4])
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
Unit 100 – Coal Handling															
100-TH-1	Vent	100-TH-1	Point			C	8760	PM_{Total}	0.79	0.36			Solid	O – EPA	
								PM_{10}	0.37	0.17					
								$PM_{2.5}$	0.06	0.03					
100-TC-1	Vent	100-TC-1	Point	100-TC-1-FF	FF	C	8760	PM_{Total}			0.10	0.15	Solid	EE	0.01 grain/ dscf
								PM_{10}			0.10	0.15			
								$PM_{2.5}$			0.05	0.08			
100-TC-2	Vent	100-TC-2	Point	100-TC-2-FF	FF	C	8760	PM_{Total}			0.10	0.15	Solid	EE	0.01 grain/ dscf
								PM_{10}			0.10	0.15			
								$PM_{2.5}$			0.05	0.08			
100-TH-2	Vent	100-TH-2	Point	100-TH-2-FF	FF	C	8760	PM_{Total}			0.10	0.15	Solid	EE	0.01 grain/ dscf
								PM_{10}			0.10	0.15			
								$PM_{2.5}$			0.05	0.08			
100-TC-3	Vent	100-TC-3	Point	100-TC-3-FF	FF	C	8760	PM_{Total}			0.10	0.15	Solid	EE	0.01 grain/ dscf
								PM_{10}			0.10	0.15			
								$PM_{2.5}$			0.05	0.08			
100-CSP-1 100-CSP-2		100-CSP-1	Point			C	8760	PM_{Total}	0.79	0.36			Solid	O – EPA	
		100-CSP-2						PM_{10}	0.37	0.17					
								$PM_{2.5}$	0.06	0.03					

100-TU-1		100-TU-1	Point			C	8760	PM_{Total}	0.79	0.36			Solid	O – EPA	
								PM_{10}	0.37	0.17					
								$PM_{2.5}$	0.06	0.03					
100-TH-3	Vent	100-TH-3	Point			C	8760	PM_{Total}	0.08	0.36			Solid	O – EPA	
								PM_{10}	0.04	0.17					
								$PM_{2.5}$	<0.01	0.03					
100-TC-4	Vent	100-TC-4	Point	100-TC-4-FF	FF	C	8760	PM_{Total}			0.10	0.45	Solid	EE	0.01 grain/ dscf
								PM_{10}			0.10	0.45			
								$PM_{2.5}$			0.05	0.23			
100-TH-4	Vent	100-TH-4	Point	100-TH-4-FF	FF	C	8760	PM_{Total}			0.10	0.45	Solid	EE	0.01 grain/ dscf
								PM_{10}			0.10	0.45			
								$PM_{2.5}$			0.05	0.23			
100-CMD-1	Vertical Upward Stack	100-CMD-1	Point			C	8760	CO	1.23	5.39			Gas/ Vapor, Solid	EE	
								NO_x	1.47	6.42					
								SO_2	<0.01	0.04					
								PM_{Total}	0.11	0.49					
								$PM_{10/2.5}$	0.03	0.12					
								PM_{Con}	0.08	0.37					
								Pb	<0.01	<0.01					
								VOC	0.08	0.35					
								Total HAPs	0.03	0.12					
								n-Hexane	0.03	0.12					
								Formaldehyde	<0.01	<0.01					
								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					
100-BH-1	Vent	100-BH-1 100-CM-1	Point	100-BH-1	BH	C	8760	PM_{Total}			1.84	8.07	Solid	EE	0.01 grain/ dscf
								PM_{10}			1.84	8.07			
								$PM_{2.5}$			0.92	4.04			

100-TH-5	Vent	100-TH-5	Point	100-TH-5-FF	FF	C	8760	PM_{Total}			0.10	0.45	Solid	EE	0.01 grain/dscf
								PM_{10}			0.10	0.45			
								$PM_{2.5}$			0.05	0.23			
100-TC-5	Vent	100-TC-5	Point	100-TC-5-FF	FF	C	8760	PM_{Total}			0.10	0.45	Solid	EE	0.01 grain/dscf
								PM_{10}			0.10	0.45			
								$PM_{2.5}$			0.05	0.23			
100-CS-1	Vent	100-CS-1	Point	100-CS-1-FF	FF	C	8760	PM_{Total}			0.07	0.30	Solid	EE	0.01 grain/dscf
								PM_{10}			0.07	0.30			
								$PM_{2.5}$			0.03	0.15			
100-CS-2	Vent	100-CS-2	Point	100-CS-2-FF	FF	C	8760	PM_{Total}			0.07	0.30	Solid	EE	0.01 grain/dscf
								PM_{10}			0.07	0.30			
								$PM_{2.5}$			0.03	0.15			
100-TH-6	Vent	100-TH-6	Point	100-TH-6-FF	FF	C	8760	PM_{Total}			0.10	0.45	Solid	EE	0.01 grain/dscf
								PM_{10}			0.10	0.45			
								$PM_{2.5}$			0.05	0.23			
100-TH-7	Vent	100-TH-7	Point	100-TH-7-FF	FF	C	8760	PM_{Total}			0.10	0.45	Solid	EE	0.01 grain/dscf
								PM_{10}			0.10	0.45			
								$PM_{2.5}$			0.05	0.23			
100-TC-6	Vent	100-TC-6	Point	100-TC-6-FF	FF	C	8760	PM_{Total}			0.10	0.45	Solid	EE	0.01 grain/dscf
								PM_{10}			0.10	0.45			
								$PM_{2.5}$			0.05	0.23			
100-TC-7	Vent	100-TC-7	Point	100-TC-7-FF	FF	C	8760	PM_{Total}			0.10	0.45	Solid	EE	0.01 grain/dscf
								PM_{10}			0.10	0.45			
								$PM_{2.5}$			0.05	0.23			
Unit 200 – H-Coal															
200-S-108	Vent	200-D-110	Point	200-S-108-FF	FF	C	8760	PM_{Total}			0.10	0.45	Solid	EE	0.01 grain/dscf
								PM_{10}			0.10	0.45			
								$PM_{2.5}$			0.05	0.23			

200-S-105	Vent	200-S-105	Point	200-S-105-FF	FF	C	8760	PM_{Total}			0.10	0.45	Solid	EE	0.01 grain/ dscf
								PM_{10}			0.10	0.45			
								$PM_{2.5}$			0.05	0.23			
200-H-102	Upward Vertical Stack	200-H-102	Point			C	8760	CO	2.28	9.98			Gas/ Vapor, Solid	EE	
								NO_x	2.96	12.97					
								SO_2	0.06	0.27					
								PM_{Total}	1.00	4.38					
								$PM_{10/2.5}$	0.41	1.78					
								PM_{Con}	0.59	2.60					
								Pb	<0.01	<0.01					
								VOC	0.56	2.43					
								Total HAPs	0.20	0.86					
								n-Hexane	0.19	0.82					
								Formaldehyde	<0.01	0.03					
								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					
200-H-101	Upward Vertical Stack	200-H-101	Point			C	8760	CO	0.47	2.07			Gas/ Vapor, Solid	EE	
								NO_x	0.71	3.10					
								SO_2	0.01	0.06					
								PM_{Total}	0.21	0.91					
								$PM_{10/2.5}$	0.08	0.37					
								PM_{Con}	0.12	0.54					
								Pb	<0.01	<0.01					
								VOC	0.13	0.55					
								Total HAPs	0.04	0.18					
								n-Hexane	0.04	0.17					

								Formaldehyde	<0.01	<0.01					
								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					
200-D-206	Vent	200-D-204, 200-D-205, 200-D-206	Point	200-D-206-FF	FF	C	8760	PM_{Total}			0.10	0.45	Solids	EE	
								PM_{10}			0.10	0.45			
								$PM_{2.5}$			0.05	0.23			
								HAP_{Metals}			<0.01	0.02			
200-D-206	Vent	200-D-206	Point			1 transfer/ day	365 event / yr	PM_{Total}	<0.01	<0.01			Solid	O – EPA	
								PM_{10}	<0.01	<0.01					
								$PM_{2.5}$	<0.01	<0.01					
								HAP_{Metals}	<0.01	<0.01					
200-D-207	Vent	200-D-207	Point			1 transfer/ day	365 event / yr	PM_{Total}	<0.01	<0.01			Solid	O – EPA	
								PM_{10}	<0.01	<0.01					
								$PM_{2.5}$	<0.01	<0.01					
								HAP_{Metals}	<0.01	<0.01					
200-D-208	Vent	200-D-208	Point			1 transfer/ day	365 event / yr	PM_{Total}	<0.01	<0.01			Solid	O – EPA	
								PM_{10}	<0.01	<0.01					
								$PM_{2.5}$	<0.01	<0.01					
								HAP_{Metals}	<0.01	<0.01					
200-D-209	Vent	200-D-209	Point			1 transfer/ day	365 event / yr	PM_{Total}	<0.01	<0.01			Solid	O – EPA	
								PM_{10}	<0.01	<0.01					
								$PM_{2.5}$	<0.01	<0.01					
								HAP_{Metals}	<0.01	<0.01					
200-H-301	Upward Vertical Stack	200-H-301	Point			C	8760	CO	0.76	3.34			Gas/ Vapor, Solid	EE	
								NO_x	1.15	5.02					
								SO_2	0.02	0.09					
								PM_{Total}	0.34	1.47					

								$PM_{10/2.5}$	0.14	0.60					
								PM_{Con}	0.20	0.87					
								Pb	<0.01	<0.01					
								VOC	0.21	0.90					
								Total HAPs	0.07	0.29					
								n-Hexane	0.06	0.27					
								Formaldehyde	<0.01	0.01					
								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					
Unit 310 – Hydrocracker															
310-H-101	Upward Vertical Stack	310-H-101	Point			C	8760	CO	0.26	1.13			Gas/ Vapor, Solid	EE	
								NO_x	0.39	1.69					
								SO_2	<0.01	0.03					
								PM_{Total}	0.11	0.49					
								$PM_{10/2.5}$	0.05	0.20					
								PM_{Con}	0.07	0.29					
								Pb	<0.01	<0.01					
								VOC	0.07	0.30					
								Total HAPs	0.02	0.10					
								n-Hexane	0.02	0.09					
								Formaldehyde	<0.01	<0.01					
								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					
310-H-103	Upward Vertical Stack	310-H-103	Point			C	8760	CO	0.33	1.45			Gas/ Vapor, Solid	EE	
								NO_x	0.50	2.18					
								SO_2	<0.01	0.04					
								PM_{Total}	0.15	0.64					
								$PM_{10/2.5}$	0.06	0.26					

								PM_{Con}	0.09	0.38					
								Pb	<0.01	<0.01					
								VOC	0.09	0.39					
								Total HAPs	0.03	0.12					
								n-Hexane	0.03	0.12					
								Formaldehyde	<0.01	<0.01					
								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					
Unit 320 - Catalytic Reformer															
320-H-201 320-H-202 320-H-203 320-H-204	Upward Vertical Stacks	320-H-201 320-H-202 320-H-203 320-H-204	Point			C	8760	CO	0.37	1.61			Gas/ Vapor, Solid	EE	
								NO_x	0.55	2.41					
								SO_2	0.01	0.04					
								PM_{Total}	0.16	0.70					
								$PM_{10/2.5}$	0.07	0.29					
								PM_{Con}	0.10	0.42					
								Pb	<0.01	<0.01					
								VOC	0.10	0.43					
								Total HAPs	0.03	0.14					
								n-Hexane	0.03	0.13					
								Formaldehyde	<0.01	<0.01					
								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					
Unit 440 – Sulfur Recovery Unit															
440-SRI-1	Upward Vertical Stack	430-TK-1 440-CF-2	Point	440-SRI-1		C	8760	CO	2.17	9.50	1.70	7.43	Gas/ Vapor, Solid	EE	SO_2 – 250 ppm_v
								NO_x			4.22	18.48			
								SO_2			5.64	24.71			
								PM_{Total}			0.16	0.70			
								$PM_{10/2.5}$			0.04	0.18			

								PM_{Con}			0.12	0.53			
								H_2S	0.09	0.41	<0.01	<0.01			
								VOC	1.19	5.19	0.14	0.60			
								Total HAPs	1.10	4.84	0.06	0.27			
								n-Hexane	0.05	0.21	0.04	0.17			
								Benzene	<0.01	<0.01	<0.01	<0.01			
								Toluene	<0.01	0.03	<0.01	<0.01			
								Ethylbenzene	<0.01	0.01	<0.01	<0.01			
								Xylene	0.01	0.05	<0.01	<0.01			
								COS	1.03	4.52	0.02	0.09			
Unit 500 – Utilities															
500-SB-1 (Startup)	Upward Vertical Vent	500-SB-1	Point			Facility Startup	60	CO	2.22	0.07			Gas/ Vapor, Solid	O - EPA	
								NO_x	0.85	0.03					
								SO_2	0.02	<0.01					
								PM_{Total}	0.20	<0.01					
								$PM_{10/2.5}$	0.05	<0.01					
								PM_{Con}	0.15	<0.01					
								Pb	<0.01	<0.01					
								VOC	0.13	<0.01					
								Total HAPs	0.05	<0.01					
								n-Hexane	0.05	<0.01					
								Formaldehyde	<0.01	<0.01					
								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					
500-SB-1 (Normal Operation)	Upward Vertical Vent	500-SB-1	Point			C	8700	CO	0.58	2.51			Gas/ Vapor, Solid	O - EPA	
								NO_x	0.22	0.96					
								SO_2	<0.01	0.02					
								PM_{Total}	0.05	0.23					

								$PM_{10/2.5}$	0.01	0.06					
								PM_{Con}	0.04	0.17					
								Pb	<0.01	<0.01					
								VOC	0.03	0.12					
								Total HAPs	0.01	0.06					
								n-Hexane	0.01	0.05					
								Formaldehyde	<0.01	<0.01					
								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					
500-EG-1	Upward Vertical Stack	500-EG-1	Point			Critical Power Supply Events	100	CO	4.06	0.20			Gas/ Vapor, Solid	O - EPA	
								NO_x	18.85	0.94					
								SO_2	1.24	0.06					
								PM_{Total}	1.33	0.07					
								$PM_{10/2.5}$	<0.01	<0.01					
								PM_{Con}	<0.01	<0.01					
								VOC	1.54	0.08					
								Total HAPs	0.01	<0.01					
								Formaldehyde	<0.01	<0.01					
								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					
								Ethylbenzene	<0.01	<0.01					
								Xylene	<0.01	<0.01					
500-CT-1	Upward Vertical Stack	500-CT-1	Point			C	8760	PM_{Total}	6.34	27.79			Solid	EE	
								PM_{10}	6.34	27.79					
								$PM_{2.5}$	3.17	13.89					
Unit 610 – Solid Products Handling															
610-TC-1	Vent	610-TC-1	Point			C	8760	PM_{Total}	0.05	0.23			Solid	EE	
								PM_{10}	0.03	0.11					

								$PM_{2.5}$	<0.01	0.02					
610-SS-1	Vent	610-SS-1	Point	610-SS-1-FF	FF	C	8760	PM_{Total}			0.07	0.30	Solid	EE	0.01 grain/dscf
								PM_{10}			0.07	0.30			
								$PM_{2.5}$			0.03	0.15			
610-TC-2	Vent	610-TC-2	Point	610-TC-2-FF	FF	C	8760	PM_{Total}			0.10	0.45	Solid	EE	0.01 grain/dscf
								PM_{10}			0.10	0.45			
								$PM_{2.5}$			0.05	0.23			
610-SD-1	Vent	610-TC-3	Point	610-SD-1-FF	FF	C	8760	PM_{Total}			0.10	0.45	Solid	EE	0.01 grain/dscf
		610-TC-4						PM_{10}			0.10	0.45			
		610-SP-1													
		610-TH-1						$PM_{2.5}$			0.05	0.23			
		610-TC-6													
610-SD-2	Vent	610-TC-5	Point	610-SD-2-FF	FF	C	8760	PM_{Total}			0.10	0.45	Solid	EE	0.01 grain/dscf
		610-SP-2						PM_{10}			0.10	0.45			
		610-TH-2						$PM_{2.5}$			0.05	0.23			
		610-TC-6													
610-TC-7	Vent	610-TC-7	Point			C	8760	PM_{Total}	1.11	0.23			Solid	O - EPA	
								PM_{10}	0.53	0.11					
								$PM_{2.5}$	0.08	0.02					
610-TH-3	Vent	610-TH-3	Point			C	8760	PM_{Total}	1.11	0.23			Solid	O - EPA	
								PM_{10}	0.53	0.11					
								$PM_{2.5}$	0.08	0.02					
610-TR-1		610-TR-1	Point			C	8760	PM_{Total}	1.11	0.23			Solid	O - EPA	

								PM_{10}	0.53	0.11					
								$PM_{2.5}$	0.08	0.02					
610-TH-4		610-TH-4	Point			C	8760	PM_{Total}	0.04	0.16			Solid	O - EPA	
								PM_{10}	0.02	0.08					
								$PM_{2.5}$	<0.01	0.01					
610-TC-8		610-TC-8	Point			C	8760	PM_{Total}	0.04	0.16			Solid	O - EPA	
								PM_{10}	0.02	0.08					
								$PM_{2.5}$	<0.01	0.01					
610-SP-3		610-SP-3	Point			C	8760	PM_{Total}	0.04	0.16			Solid	O - EPA	
								PM_{10}	0.02	0.08					
								$PM_{2.5}$	<0.01	0.01					
610-TH-5		610-TH-5	Point			C	8760	PM_{Total}	0.76	0.16			Solid	O - EPA	
								PM_{10}	0.36	0.08					
								$PM_{2.5}$	0.05	0.01					
610-TC-9		610-TC-9	Point			C	8760	PM_{Total}	0.76	0.16			Solid	O - EPA	
								PM_{10}	0.36	0.08					
								$PM_{2.5}$	0.05	0.01					
610-TH-6		610-TH-6	Point			C	8760	PM_{Total}	0.76	0.16			Solid	O - EPA	
								PM_{10}	0.36	0.08					
								$PM_{2.5}$	0.05	0.01					
610-TR-2		610-TR-2	Point			C	8760	PM_{Total}	0.76	0.16			Solid	O - EPA	
								PM_{10}	0.36	0.08					
								$PM_{2.5}$	0.05	0.01					
Unit 620 – Flare System															
620-FL-1	Upward Vertical Stack	620-FL-1	Point	620-FL-1	FL	Facility Emergency Events (30 min/event)	8	CO	1,543.19	2.47	331.63	1.25	Gas/ Vapor, Solid	MB, EE	

								NO_x			67.32	0.27			
								SO_2			165.99	0.17			
								PM_{Total}			10.57	0.04			
								$PM_{10/2.5}$			2.64	0.01			
								PM_{Con}			7.93	0.03			
								H_2S	89.70	0.09	1.79	<0.01			
								VOC	55,017.01	55.04	1,107.83	1.13			
								Total HAPs	16,849.32	16.86	339.54	0.35			
								n-Hexane			2.50	0.01			
								Formaldehyde			0.10	<0.01			
								Benzene	255.25	0.26	5.11	<0.01			
								Toluene	3,828.80	3.83	76.58	0.08			
								Ethylbenzene	6,381.33	6.38	127.63	0.13			
								Xylene	6,381.33	6.38	127.63	0.13			
Unit 630 – Liquid Products and Intermediates Storage															
630-TK-4 630-TK-5	Vent	630-TK-4 630-TK-5	Point			C	8760	VOC	0.06	0.28			Gas/ Vapor	O – EPA, EE	
								Total HAPs	0.04	0.18					
								n-Hexane	<0.01	0.01					
								Benzene	<0.01	<0.01					
								Toluene	0.01	0.04					
								Ethylbenzene	0.02	0.07					
								Xylene	0.02	0.07					
630-TK-8 630-TK-9	Vent	630-TK-8 630-TK-9	Point			C	8760	VOC	0.29	1.28			Gas/ Vapor	O – EPA, EE	
								Total HAPs	0.02	0.07					
								n-Hexane	<0.01	<0.01					
								Benzene	<0.01	<0.01					

								Toluene	<0.01	<0.01					
								Ethylbenzene	<0.01	0.01					
								Xylene	<0.01	0.01					
630-TK-12	Vent	630-TK-12	Point			Plant Shutdown (1 month/yr)	720	VOC	0.01	<0.01			Gas/ Vapor	O – EPA, EE	
								Total HAPs	<0.01	<0.01					
								n-Hexane	<0.01	<0.01					
								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					
								Ethylbenzene	<0.01	<0.01					
								Xylene	<0.01	<0.01					
630-TK-13	Vent	630-TK-13	Point			Plant Shutdown (1 month/yr)	720	VOC	0.04	0.01			Gas/ Vapor	O – EPA, EE	
								Total HAPs	<0.01	<0.01					
								n-Hexane	<0.01	<0.01					
								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					
								Ethylbenzene	<0.01	<0.01					
								Xylene	<0.01	<0.01					
630-TK-14	Vent	630-TK-14	Point			Plant Shutdown (1 month/yr)	720	VOC	0.08	0.03			Gas/ Vapor	O – EPA, EE	
								Total HAPs	<0.01	<0.01					
								n-Hexane	<0.01	<0.01					
								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					
								Ethylbenzene	<0.01	<0.01					
								Xylene	<0.01	<0.01					
630-TK-15	Vent	630-TK-15	Point			Plant Shutdown (1 month/yr)	720	VOC	0.04	0.01			Gas/ Vapor	O – EPA, EE	

								Total HAPs	<0.01	<0.01					
								n-Hexane	<0.01	<0.01					
								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					
								Ethylbenzene	<0.01	<0.01					
								Xylene	<0.01	<0.01					
Unit 640 – Liquid Product Loadout															
640-FL-1	Vertical Upward Stack	630-TK-2	Point	640-FL-1	FL	C	8760	CO			8.56	1.17	Gas/ Vapor	O – EPA, EE	
								NO_x			1.88	0.26			
		630-TK-3						SO_2			<0.01	<0.01			
		630-TK-6						PM_{Total}			0.04	<0.01			
		630-TK-7						$PM_{10/2.5}$			<0.01	<0.01			
								PM_{Con}			0.03	<0.01			
		630-TK-10						VOC	1,345.58	192.06	26.91	3.84			
		630-TK-11						Total HAPs	466.72	70.31	9.34	1.41			
								n-Hexane	0.07	0.26	0.01	<0.01			
		640-TR-1						Formaldehyde			<0.01	<0.01			
								Benzene	8.34	1.17	<0.01	<0.01			
		640-RR-1						Toluene	201.77	28.52	4.04	0.57			
		640-BR-1						Ethylbenzene	54.43	10.33	1.09	0.21			
								Xylene	202.12	30.04	4.04	0.60			
640-TR-1	Vent	640-TR-1	Point			C	8760	VOC			4.06	1.18	Gas/ Vapor	EE	
								Total HAPs			1.40	0.41			
								Benzene			0.03	<0.01			
								Toluene			0.61	0.18			
								Ethylbenzene			0.16	0.05			
								Xylene			0.61	0.18			

640-TR-2	Vent	640-TR-2	Point			C	8760	VOC	1.31	0.13			Gas/ Vapor	EE	
								Total HAPs	0.10	<0.01					
								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					
								Ethylbenzene	0.02	<0.01					
								Xylene	0.02	<0.01					
640-TR-3	Vent	640-TR-3	Point			C	8760	VOC	4.08	3.80			Gas/ Vapor	EE	
640-RR-1	Vent	640-RR-1	Point			C	8760	VOC			1.70	0.15	Gas/ Vapor	EE	
								Total HAPs			0.59	0.05			
								Benzene			0.01	<0.01			
								Toluene			0.25	0.02			
								Ethylbenzene			0.07	<0.01			
								Xylene			0.25	0.02			
640-RR-2	Vent	640-RR-2	Point			C	8760	VOC	0.37	0.06			Gas/ Vapor	EE	
								Total HAPs	0.03	<0.01					
								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					
								Ethylbenzene	<0.01	<0.01					
								Xylene	<0.01	<0.01					
640-BR-1	Vent	640-BR-1	Point			C	8760	VOC			5.07	0.12	Gas/ Vapor	EE	
								Total HAPs			1.76	0.04			
								Benzene			0.03	<0.01			
								Toluene			0.76	0.02			
								Ethylbenzene			0.20	<0.01			
								Xylene			0.76	0.02			
640-BR-2	Vent	640-BR-2	Point			C	8760	VOC	1.09	0.35			Gas/ Vapor	EE	
								Total HAPs	0.08	0.03					

								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					
								Ethylbenzene	0.02	<0.01					
								Xylene	0.02	<0.01					
Unit 700 – Hydrogen Plant															
700-HR-1 (Normal Operation)	Vertical Upward Stack	700-HR-1	Point		SCR	C	8700	CO	6.60	28.70			Gas/ Vapor, Solid	EE	
								NO_x	4.13	17.95					
								SO_2	0.35	1.53					
								PM_{Total}	4.45	19.34					
								$PM_{10/2.5}$	1.11	4.83					
								PM_{Con}	3.33	14.50					
								Pb	<0.01	<0.01					
								VOC	3.23	14.04					
								Total HAPs	0.87	3.77					
								n-Hexane	0.82	3.56					
								Formaldehyde	0.04	0.19					
								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					
700-HR-1 (Startup)	Vertical Upward Stack	700-HR-1	Point			Facility Startup	60	CO	6.60	0.20			Gas/ Vapor, Solid	EE	
								NO_x	34.37	1.03					
								SO_2	0.35	0.01					
								PM_{Total}	4.45	0.13					
								$PM_{10/2.5}$	1.11	0.03					
								PM_{Con}	3.33	0.10					
								Pb	<0.01	<0.01					
								VOC	3.23	0.10					
								Total HAPs	0.87	0.03					
								n-Hexane	0.82	0.02					

								Formaldehyde	0.04	<0.01					
								Benzene	<0.01	<0.01					
								Toluene	<0.01	<0.01					

The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

[1] Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.

[2] Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).

[3] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. **DO NOT LIST** H_2, H_2O, N_2, O_2, and Noble Gases.

[4] Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[5] Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[6] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

[7] Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m^3) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO_2, use units of ppmv (See 45CSR10).

Control Device Type Key:
BH - Baghouse
FF – Fabric Filter
FL – Flare
SCR – Selective Catalytic Reduction

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data								
Emission Point ID No. *(Must match Emission Units Table)*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (ºF)	Volumetric Flow [1] (acfm) *at operating conditions*	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height [2] *(Release height of emissions above ground level)*	Northing	Easting
Unit 100 – Coal Handling								
100-TH-1	--	68.0	--	--	560	5.0	4308.6456	403.1929
100-TC-1	0.62	68.0	1,200.00	66.25	560	3.0	4308.6550	403.2102
100-TC-2	0.62	68.0	1,200.00	66.25	580	3.0	4308.7255	403.3562
100-TH-2	0.62	68.0	1,200.00	66.25	610	5.0	4308.7875	403.6650
100-TC-3	0.62	68.0	1,200.00	66.25	610	10.0	4308.7875	403.6650
100-CSP-1	--	68.0	--	--	610	30.0	4308.7875	403.6650
100-CSP-2	--	68.0	--	--	610	30.0	4308.7875	403.6650
100-TU-1	--	68.0	--	--	610	0.0	4308.7875	403.6650
100-TH-3	--	68.0	--	--	610	5.0	4308.7875	403.6650
100-TC-4	0.62	68.0	1,200.00	66.25	610	3.0	4308.7875	403.6650
100-TH-4	0.62	68.0	1,200.00	66.25	610	5.0	4308.7875	403.6650
100-CMD-1	1.05	900.0	21,500.00	413.83	610	120.0	4308.7875	403.6650
100-BH-1	1.05	180.0	21,500.00	413.83	610	30.0	4308.7875	403.6650

100-TH-5	0.62	68.0	1,200.00	66.25	610	5.0	4308.7875	403.6650
100-TC-5	0.62	68.0	1,200.00	66.25	610	3.0	4308.7875	403.6650
100-CS-1	1.31	68.0	800.00	9.89	610	70.0	4308.7875	403.6650
100-CS-2	1.31	68.0	800.00	9.89	610	70.0	4308.7875	403.6650
100-TH-6	0.62	68.0	1,200.00	66.25	610	5.0	4308.7875	403.6650
100-TH-7	0.62	68.0	1,200.00	66.25	610	5.0	4308.7875	403.6650
100-TC-6	0.62	68.0	1,200.00	66.25	610	3.0	4308.7875	403.6650
100-TC-7	0.62	68.0	1,200.00	66.25	610	3.0	4308.7875	403.6650
Unit 200 – H-Coal								
200-S-105	0.62	68.0	1,200.00	66.25	620	5.0	4308.9554	403.8497
200-S-105	0.62	68.0	1,200.00	66.25	620	3.0	4308.9554	403.8497
200-H-102	4.91	490.0	2,8024.17	24.67	620	150.0	4308.9894	403.8606
200-H-101	2.58	811.0	7,741.67	24.68	620	120.0	4309.0142	403.9066
200-D-206	0.62	811.0	1,200.00	66.25	620	15.0	4308.9757	403.9434
200-D-207	--	200.0	--	--	620	10.0	4308.9373	403.9481
200-D-208	--	68.0	--	--	620	10.0	4308.9373	403.9481
200-D-209	--	68.0	--	--	620	10.0	4308.9373	403.9481
200-H-301	3.22	760.0	12,112.90	24.79	620	120.0	4308.8962	403.9503
Unit 310 - Hydrocracker								
310-H-101	1.91	813.0	4,371.26	25.43	630	120.0	4308.8650	404.0824
310-H-103	2.08	709.0	5,103.13	25.03	630	120.0	4308.9112	404.0883

Unit 320 – Catalytic Reformer								
320-H-201	3.85	450.0	4,392.28	6.29	630	120.0	4308.9707	404.0843
320-H-202	3.85	450.0	4,392.28	6.29	630	120.0	4309.0001	404.0816
320-H-203	3.85	450.0	4,392.28	6.29	630	120.0	4308.9880	404.1211
320-H-204	3.85	450.0	4,392.28	6.29	630	120.0	4308.9561	404.1262
Unit 440 – Sulfur Recovery Unit								
440-SRI-1	2.0	600	3,779.34	20.05	630	150.0	4309.0889	404.2711
Unit 500 - Utilities								
500-SB-1	2.0	134.3	441.18	2.34	630	50.0	4308.7715	403.9626
500-EG-1	0.42	1,022.00	3,400.00	409.01	630	23.6	4308.7402	403.9661
500-CT-1	1.31	68.0	0.24	0.003	630	82.0	4308.7452	404.0102
Unit 610 – Solid Products Handling								
610-TC-1	--	68.0	--	--	630	3.0	4309.0292	404.1193
610-SS-1	0.62	68.0	800.00	44.16	630	70.0	4309.0292	404.1193
610-TC-2	0.62	68.0	1,200.00	66.25	630	10.0	4309.0292	404.1193
610-SD-1	0.62	68.0	1,200.00	66.25	630	40.0	4309.0292	404.1193
610-SD-2	0.62	68.0	1,200.00	66.25	630	40.0	4309.0292	404.1193
610-TC-7	--	68.0	--	--	630	15.0	4309.0292	404.1193
610-TH-3	--	68.0	--	--	630	12.0	4309.0292	404.1193
610-TR-1	--	68.0	--	--	630	10.0	4309.0292	404.1193
610-TH-4	--	68.0	--	--	630	5.0	4309.0292	404.1193
610-TC-8	--	68.0	--	--	630	3.0	4309.0292	404.1193

610-SP-3	--	68.0	--	--	630	30.0	4309.0292	404.1193
610-TH-5	--	68.0	--	--	630	5.0	4309.0292	404.1193
610-TC-9	--	68.0	--	--	630	3.0	4309.0292	404.1193
610-TH-6	--	68.0	--	--	630	12.0	4309.0292	404.1193
610-TR-2	--	68.0	--	--	630	10.0	4309.0292	404.1193
Unit 620 – Flare System								
620-FL-1	0.41	1,832.0	33,643.55	4,247.10	660	150.0	4309.1721	403.9562
Unit 630 – Liquid Products and Intermediates Storage								
630-TK-4	30.00	68.0	--	--	660	32.0	4309.3964	404.3081
630-TK-5	30.00	68.0	--	--	660	32.0	4309.3850	404.2916
630-TK-8	80.00	68.0	--	--	660	32.0	4309.4347	404.4152
630-TK-9	80.00	68.0	--	--	660	32.0	4309.4053	404.3977
630-TK-12	30.00	68.0	--	--	660	32.0	4309.2593	404.2397
630-TK-13	67.00	68.0	--	--	660	32.0	4309.2296	404.2430
630-TK-14	67.00	68.0	--	--	660	32.0	4309.2601	404.2890
630-TK-15	67.00	68.0	--	--	660	32.0	4309.2326	404.2918
Unit 640 – Liquid Product Transfer								
640-FL-1	5.83	1,832.0	83.13	0.05	660	24.0	4309.1610	403.9926
640-TR-1	0.25	68.0	0.25	0.08	660	20.0	4309.5283	404.4110
640-TR-2	0.25	68.0	0.06	0.02	660	20.0	4309.5051	404.4600
640-TR-3	0.25	68.0	0.51	0.17	660	20.0	4309.4482	404.1616
640-RR-1	0.25	68.0	0.10	0.03	590	20.0	4309.0563	403.6279

640-RR-2	0.25	68.0	0.02	0.01	590	20.0	4309.0451	403.6233
640-BR-1	0.25	68.0	0.31	0.11	560	20.0	4308.5522	403.1740
640-BR-2	0.25	68.0	0.05	0.02	560	20.0	4308.5443	403.6279
Unit 700 – Hydrogen Reformer								
700-HR-1	7.50	300.00	52,743.94	19.90	630	100.0	4308.9743	403.7298

[1] Give at operating conditions. Include inerts.
[2] Release height of emissions above ground level.

Attachment K

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not typically considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS
1.) Will there be haul road activities? ☒ Yes ☐ No ☒ If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.
2.) Will there be Storage Piles? ☒ Yes ☐ No ☒ If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATA SHEET.
3.) Will there be Liquid Loading/Unloading Operations? ☒ Yes ☐ No ☒ If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.
4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
5.) Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)? ☒ Yes ☐ No ☒ If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.
6.) Will there be General Clean-up VOC Operations? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
7.) Will there be any other activities that generate fugitive emissions? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.
If you answered “NO” to all of the items above, it is not necessary to complete the following table, “Fugitive Emissions Summary.”

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants - Chemical Name/CAS [1]	Maximum Potential Uncontrolled Emissions [2]		Maximum Potential Controlled Emissions [3]		Est. Method Used [4]
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads	PM	36.94	15.06	9.24	3.77	O-EPA
	PM_{10}	7.39	3.01	1.85	0.75	
	$PM_{2.5}$	1.81	0.81	0.45	0.20	
Unpaved Haul Roads	N/A	N/A	N/A	N/A	N/A	N/A
Coal Storage Pile Emissions	PM	0.32	1.41	0.16	0.71	O-EPA
	PM_{10}	0.15	0.66	0.08	0.33	
	$PM_{2.5}$	0.08	0.33	0.04	0.17	
Sulfur Storage Pile Emissions	PM	0.05	0.23	0.05	0.23	O-EPA
	PM_{10}	0.02	0.11	0.02	0.11	
	$PM_{2.5}$	0.01	0.05	0.01	0.05	
Loading/Unloading Operations**	See Attachment J					
Wastewater Treatment Evaporation & Operations	N/A	N/A	N/A	N/A	N/A	N/A
Equipment Leaks	VOC	Does not apply	52.15	Does not apply	52.15	O-EPA
General Clean-up VOC Emissions	N/A	N/A	N/A	N/A	N/A	N/A
Other	N/A	N/A	N/A	N/A	N/A	N/A

[1] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. DO NOT LIST H_2, H_2O, N_2, O_2, and Noble Gases.

[2] Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[3] Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[4] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

LEAK SOURCE DATA SHEET

Source Category	Pollutant	Number of Source Components[1]	Number of Components Monitored by Frequency[2]	Average Time to Repair (days)[3]	Estimated Annual Emission Rate[4]
Pumps[5]	Light liquid VOC[6,7]	All pumps will have seal-less design	N/A	N/A	N/A
	Heavy liquid VOC[8]		N/A	N/A	N/A
	Non-VOC[9]		N/A	N/A	N/A
Valves[10]	Gas VOC	1,057	Monthly – Per NSPS GGGa	5 days - Per NSPS GGGa	10.94 tpy VOC - EPA
	Light Liquid VOC	2,111	Monthly – Per NSPS GGGa	5 days - Per NSPS GGGa	11.11 tpy VOC – EPA
	Heavy Liquid VOC	1,028	Monthly – Per NSPS GGGa	5 days - Per NSPS GGGa	2.28 tpy VOC – EPA
	Non-VOC		N/A	N/A	N/A
Safety Relief Valves[11]	Gas VOC	44	Routed to Control Device	N/A	N/A
	Non VOC		Routed to Control Device	N/A	N/A
Open-ended Lines[12]	VOC	156	N/A	N/A	N/A
	Non-VOC		N/A	N/A	N/A
Sampling Connections[13]	VOC	33			4.78 tpy VOC - EPA
	Non-VOC		N/A	N/A	N/A
Compressors	VOC	All compressors will have seal-less design	N/A	N/A	N/A
	Non-VOC		N/A	N/A	N/A
Connectors	Gas VOC	3,436	N/A	N/A	8.30 tpy VOC - EPA
	Light Liquid VOC	3,631	N/A	N/A	8.77 tpy VOC - EPA
	Heavy Liquid VOC	2,468	N/A	N/A	5.96 tpy VOC - EPA
	Non-VOC		N/A	N/A	N/A

[1 - 13] See notes on the following page.

Notes for Leak Source Data Sheet

1. For VOC sources include components on streams and equipment that contain greater than 10% w/w VOC, including feed streams, reaction/separation facilities, and product/by-product delivery lines. Do not include certain leakless equipment as defined below by category.

2. By monitoring frequency, give the number of sources routinely monitored for leaks, using a portable detection device that measures concentration in ppm. Do not include monitoring by visual or soap-bubble leak detection methods. "M/Q(M)/Q/SA/A/O" means the time period between inspections as follows:

   Monthly/Quarterly, with Monthly follow-up of repaired leakers/Quarterly/Semi-annual/Annually/Other (specify time period)

   If source category is not monitored, a single zero in the space will suffice. For example, if 50 gas-service valves are monitored quarterly, with monthly follow-up of those repaired, 75 are monitored semi-annually, and 50 are checked bimonthly (alternate months), with non checked at any other frequency, you would put in the category “valves, gas service:” 0/50/0/75/0/50 (bimonthly).

3. Give the average number of days, after a leak is discovered, that an attempt will be made to repair the leak.

4. Note the method used: MB - material balance; EE - engineering estimate; EPA - emission factors established by EPA (cite document used); O - other method, such as in-house emission factor (specify).

5. Do not include in the equipment count sealless pumps (canned motor or diaphragm) or those with enclosed venting to a control device. (Emissions from vented equipment should be included in the estimates given in the Emission Points Data Sheet.)

6. Volatile organic compounds (VOC) means the term as defined in 40 CFR §51.100 (s).

7. A light liquid is defined as a fluid with vapor pressure equal to or greater than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if 20% w/w or more of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20 °C, then the fluid is defined as a light liquid.

8. A heavy liquid is defined as a fluid with a vapor pressure less than 0.04 psi (0.3 Kpa) at 20°C. For mixtures, if less than 20% w/w of the stream is composed of fluids with vapor pressures greater than 0.04 psi (0.3 Kpa) at 20 °C, then the fluid is defined as a heavy liquid.

9. LIST CO, H_2S, mineral acids, NO, NO_2, SO_3, etc. DO NOT LIST CO_2, H_2, H_2O, N_2, O_2, and Noble Gases.

10. Include all process valves whether in-line or on an open-ended line such as sample, drain and purge valves. Do not include safety-relief valves, or leakless valves such as check, diaphragm, and bellows seal valves.

11. Do not include a safety-relief valve if there is a rupture disk in place upstream of the valve, or if the valve vents to a control device.

12 Open-ended lines include purge, drain and vent lines. Do not include sampling connections, or lines sealed by plugs, caps, blinds or second valves.

13. Do not include closed-purge sampling connections.

Attachment L

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

Unit 200 – H-Coal Process Equipment

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): **N/A**

1. Name or type and model of proposed affected source: **Unit 200 – H-Coal Process Equipment**
2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.
3. Name(s) and maximum amount of incoming process material(s) per hour: **Coal - 213,411 lb/hr;** **Wash water - 66,193 lb/hr;** **Hydrogen (H_2) gas - 13,997 lb/hr;** **Lean amine - 7,970 lb/hr;** **Nitrogen (N_2) gas - 1,800 lb/hr;** **Steam - 39, 545 lb/hr; and** **Supplied air - 540 lb/hr**
4. Name(s) and maximum amount of outgoing process material(s) produced per hour: **Diesel intermediate - 82,500 lb/hr;** **Vacuum gas oil - 19,549 lb/hr;** **Wild naphtha - 15,000 lb/hr;** **Vacuum bottom residue - 51,050 lb/hr;** **Sour water - 132,657 lb/hr;** **Rich amine - 8,106 lb/hr; and** **Process off gases to Unit 410 - 34,561 lb/hr**
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form.*

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	**24**	Days/Week	**7**	Weeks/Year	**52**

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ °F and psia

a. **SEE ATTACHMENT J**		
b.		
c.		
d.		
e.		
f.		
g.		
h. Specify other(s)		
	lb/hr	grains/ACF
	lb/hr	grains/ACF
	lb/hr	grains/ACF
	lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
SEE ATTACHMENT O	**SEE ATTACHMENT O**
REPORTING	TESTING
SEE ATTACHMENT O	**SEE ATTACHMENT O**

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

Unit 310 – Hydrocracker Process Equipment

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.
Identification Number (as assigned on *Equipment List Form*): **N/A**

1. Name or type and model of proposed affected source: **Unit 310 – Hydrocracker Process Equipment**
2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.
3. Name(s) and maximum amount of incoming process material(s) per hour: **Diesel intermediate - 82,500 lb/hr;** **Vacuum gas oil - 19,549 lb/hr;** **Wild naphtha - 15,000 lb/hr;** **Hydrogen (H_2) gas - 3,745 lb/hr; and** **Wash water - 2,372 lb/hr**
4. Name(s) and maximum amount of outgoing process material(s) produced per hour: **Diesel product - 83,088 lb/hr;** **Reformate (heavy naphtha) intermediate - 26,761 lb/hr;** **Sour water - 3,741 lb/hr; and** **Process offgas to Unit 410 - 9,575 lb/hr**
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	**24**	Days/Week	**7**	Weeks/Year	**52**

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:			
@		°F and	psia
a.	**SEE ATTACHMENT J**	lb/hr	grains/ACF
b.		lb/hr	grains/ACF
c.		lb/hr	grains/ACF
d.		lb/hr	grains/ACF
e.		lb/hr	grains/ACF
f.		lb/hr	grains/ACF
g.		lb/hr	grains/ACF
h.	Specify other(s)		
		lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
SEE ATTACHMENT O	**SEE ATTACHMENT O**
REPORTING	TESTING
SEE ATTACHMENT O	**SEE ATTACHMENT O**

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

Unit 320 – Catalytic Reformer Process Equipment

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): **N/A**

1. Name or type and model of proposed affected source: **Unit 320 – Catalytic Reformer Process Equipment**
2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.
3. Name(s) and maximum amount of incoming process material(s) per hour: **Reformate (heavy naphtha) intermediate - 26,761 lb/hr**
4. Name(s) and maximum amount of outgoing process material(s) produced per hour: **Reformate (heavy naphtha) product - 23,912 lb/hr;** **Fuel gas - 109 lb/hr;** **LPG - 270 lb/hr; and** **Process offgas to Unit 410 - 2,470 lb/hr**
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	**24**	Days/Week	**7**	Weeks/Year	**52**

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ °F and psia

a.	**SEE ATTACHMENT J**	lb/hr	grains/ACF
b.		lb/hr	grains/ACF
c.		lb/hr	grains/ACF
d.		lb/hr	grains/ACF
e.		lb/hr	grains/ACF
f.		lb/hr	grains/ACF
g.		lb/hr	grains/ACF
h.	Specify other(s)		
		lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing

Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
SEE ATTACHMENT O	**SEE ATTACHMENT O**
REPORTING	TESTING
SEE ATTACHMENT O	**SEE ATTACHMENT O**

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

Unit 410 – Gas Recovery Unit Process Equipment

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.
Identification Number (as assigned on *Equipment List Form*): **N/A**

1. Name or type and model of proposed affected source: **Unit 410 – Gas Recovery Unit Process Equipment**
2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.
3. Name(s) and maximum amount of incoming process material(s) per hour: **Unit 200, 310, and 420 process offgas - 41,550 lb/hr; and** **Wash water - 6,135 lb/hr**
4. Name(s) and maximum amount of outgoing process material(s) produced per hour: **Fuel gas - 14,880 lb/hr;** **LPG - 11,581 lb/hr;** **Light naphtha - 13,915 lb/hr; and** **Sour water - 7,304 lb/hr**
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	**24**	Days/Week	**7**	Weeks/Year	**52**

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ °F and psia

a.	**SEE ATTACHMENT J**	lb/hr	grains/ACF
b.		lb/hr	grains/ACF
c.		lb/hr	grains/ACF
d.		lb/hr	grains/ACF
e.		lb/hr	grains/ACF
f.		lb/hr	grains/ACF
g.		lb/hr	grains/ACF
h.	Specify other(s)		
		lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING **SEE ATTACHMENT O**	RECORDKEEPING **SEE ATTACHMENT O**
REPORTING **SEE ATTACHMENT O**	TESTING **SEE ATTACHMENT O**

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

Unit 420 – Amine Regeneration Process Equipment

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): **N/A**

1. Name or type and model of proposed affected source: **Unit 420 – Amine Regeneration Process Equipment**
2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.
3. Name(s) and maximum amount of incoming process material(s) per hour: **Rich amine from Unit 200 - 8,106 lb/hr;** **Rich amine from Unit 440 - 36,020 lb/hr; and** **Wash water - 75 lb/hr**
4. Name(s) and maximum amount of outgoing process material(s) produced per hour: **Lean amine to Unit 200 - 7,970 lb/hr;** **Lean amine to Unit 440 - 35,809 lb/hr;** **Process offgas to Unit 440 - 416 lb/hr; and** **Process offgas to Unit 410 - 5 lb/hr**
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	**24**	Days/Week	**7**	Weeks/Year	**52**

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ °F and psia

a.	**SEE ATTACHMENT J**	lb/hr	grains/ACF
b.		lb/hr	grains/ACF
c.		lb/hr	grains/ACF
d.		lb/hr	grains/ACF
e.		lb/hr	grains/ACF
f.		lb/hr	grains/ACF
g.		lb/hr	grains/ACF
h.	Specify other(s)		
		lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
SEE ATTACHMENT O	**SEE ATTACHMENT O**
REPORTING **SEE ATTACHMENT O**	TESTING **SEE ATTACHMENT O**

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

Unit 430 – Sour Water Stripping Process Equipment

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): **N/A**

1. Name or type and model of proposed affected source: **Unit 430 – Sour Water Stripping Process Equipment**
2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.
3. Name(s) and maximum amount of incoming process material(s) per hour: **Sour water from Unit 200, 310, 410, and 440 - 147,002 lb/hr**
4. Name(s) and maximum amount of outgoing process material(s) produced per hour: **Ammonia - 2,823 lb/hr;** **Stripped water - 139,507 lb/hr; and** **Process offgas to Unit 440 - 4,672 lb/hr**
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	**24**	Days/Week	**7**	Weeks/Year	**52**

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ °F and psia

a.	**SEE ATTACHMENT J**	lb/hr	grains/ACF
b.		lb/hr	grains/ACF
c.		lb/hr	grains/ACF
d.		lb/hr	grains/ACF
e.		lb/hr	grains/ACF
f.		lb/hr	grains/ACF
g.		lb/hr	grains/ACF
h.	Specify other(s)		
		lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
SEE ATTACHMENT O	**SEE ATTACHMENT O**
REPORTING	TESTING
SEE ATTACHMENT O	**SEE ATTACHMENT O**

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

Unit 440 – Sulfur Recovery Unit Process Equipment

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): **N/A**

1. Name or type and model of proposed affected source:

Unit 440 – Sulfur Recovery Unit Process Equipment

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of incoming process material(s) per hour:

Lean amine - 35,809 lb/hr;
Process water - 571 lb/hr;
Combustion air - 11,767 lb/hr;
Process offgas from Unit 420 - 416 lb/hr; and
Process offgas from Unit 430 - 4,672 lb/hr

4. Name(s) and maximum amount of outgoing process material(s) produced per hour:

Elemental sulfur - 4,565 lb/hr;
Sour water - 3,300 lb/hr;
Rich amine - 36,020 lb/hr; and
Process gas to incinerator - 9,351 lb/hr

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	**24**	Days/Week	**7**	Weeks/Year	**52**

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ °F and psia

a.	**SEE ATTACHMENT J**	lb/hr	grains/ACF
b.		lb/hr	grains/ACF
c.		lb/hr	grains/ACF
d.		lb/hr	grains/ACF
e.		lb/hr	grains/ACF
f.		lb/hr	grains/ACF
g.		lb/hr	grains/ACF
h.	Specify other(s)		
		lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF
		lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING **SEE ATTACHMENT O**	RECORDKEEPING **SEE ATTACHMENT O**
REPORTING **SEE ATTACHMENT O**	TESTING **SEE ATTACHMENT O**

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Attachment L
Emission Unit Data Sheet
(NONMETALLIC MINERALS PROCESSING)

Control Device ID No. (must match List Form):

Equipment Information

1. Plant Type:
   - ☐ Hot-mix asphalt facility that reduces the size of nonmetallic minerals embedded in recycled asphalt pavement
   - ☐ Plant without crushers or grinding mills and containing a stand-alone screening operation
   - ☐ Sand and gravel plant ☐ Common clay plant
   - ☐ Crushed stone plant ☐ Pumice plant
   - ☒ Other, specify **Direct Coal Liquefaction Facility**

2. Plant Style: ☒ Fixed Plant ☐ Portable Plant

3. Plant Capacity: tons/hr

4. Underground mine: ☐ Yes ☒ No

5. Storage: ☒ Open ☒ Enclosed

6.

Emission Facility Type	Equipment Type Used	ID Number of Emission Unit	Manufacturer	Model Number/ Serial Number	Date of Manufacture
Transfer Conveyors	Coal Handling Transfer Conveyors with Mechanical Vents	100-TC-1			2020
		100-TC-2			2020
		100-TC-3			2020
		100-TC-4			2020
		100-TC-5			2020
		100-TC-6			2020
		100-TC-7			2020
		200-S-105			2020
	Flaked Residue Transfer Conveyors (with Mechanical Vents*)	610-TC-1			2020
		610-TC-2*			2020
		610-TC-3*			2020
		610-TC-4*			2020
		610-TC-5*			2020
		610-TC-6*			2020
		610-TC-7			2020
	Sulfur Handling Transfer Conveyors	610-TC-8			2020
		610-TC-9			2020
Crusher	Fixed Coal Mill	100-CM-1			2020
Secondary Crushers					
Tertiary Crushers					
Grinder					
Hoppers	Coal Handling Hoppers (with Mechanical Vents*)	100-TH-1			2020
		100-TH-2*			2020
		100-TH-3			2020
		100-TH-4*			2020
		100-TH-5*			2020
		100-TH-6*			2020

Hoppers (continued)	Coal Handling Hoppers (with Mechanical Vents*)	100-TH-7*			2020
		200-D-110*			2020
	Catalyst Handling Hoppers	200-D-204			2020
		200-D-205			2020
		200-D-206			2020
		200-D-207			2020
		200-D-208			2020
	Flaked Residue Hoppers (with Mechanical Vents*)	610-TH-1*			2020
		610-TH-2*			2020
		610-TH-3			2020
	Sulfur Handling Hoppers	610-TH-4			2020
		610-TH-5			2020
		610-TH-6			2020
Rock Drills					
Screens					
Enclosed Storage	Storage Piles in Storage Domes	610-SP-1			2020
		610-SP-2			2020
Outdoor Storage	Storage Piles	100-CSP-1			2020
		100-CSP-2			2020
		100-CSP-3			2020
		610-SP-3			2020
Other	Coal Storage Silos	100-CS-1			2020
		100-CS-2			2020
Other	Flake Storage Silo	610-SS-1			2020

Emission Facility Type	**ID Number of Emission Unit**	**Max Hourly Operation Rate** ton/hr	**Max Annual Operation Rate** tons/year	**Number of Units**	**Air Pollution Control Device Used**
Transfer Conveyors	100-TC-1	1,000	912,500		FF
	100-TC-2	1,000	912,500		FF
	100-TC-3	1,000	912,500		FF
	100-TC-4	104.17	912,500		FF
	100-TC-5	104.17	912,500		FF
	100-TC-6	416.67	912,500		FF
	100-TC-7	416.67	912,500		FF
	200-S-105	416.67	912,500		FF
	610-TC-1	25.53	223,599		None
	610-TC-2	25.53	223,599		None
	610-TC-3	25.53	223,599		None
	610-TC-4	25.53	223,599		None
	610-TC-5	25.53	223,599		None
	610-TC-6	536.03	223,599		None

Transfer Conveyors	610-TC-7	536.03	223,599		None
	610-TC-8	2.28	19,995		None
	610-TC-9	47.93	19,995		None
Crusher	100-CM-1	104.17	912,500		Baghouse
Secondary Crushers					
Tertiary Crushers					
Grinder					
Hoppers	100-TH-1	1,000	912,500		None
	100-TH-2	1,000	912,500		FF
	100-TH-3	104.17	912,500		None
	100-TH-4	104.17	912,500		FF
	100-TH-5	104.17	912,500		None
	100-TH-6	416.67	912,500		None
	100-TH-7	416.67	912,500		None
	200-D-110	416.67	912,500		None
	200-D-204	2.20	803		FF
	200-D-205	2.20	803		FF
	200-D-206	3.52	1,284.8		FF
	200-D-207	3.52	1,284.8		FF
	200-D-208	3.52	1,284.8		FF
	610-TH-1	536.03	223,599		None
	610-TH-2	536.03	223,599		None
	610-TH-3	536.03	223,599		None
	610-TH-4	2.28	19,995		None
	610-TH-5	47.93	19,995		None
	610-TH-6	47.93	19,995		None
Rock Drills					
Screens					
Enclosed Storage	610-SP-1	--	223,599		FF
	610-SP-2	--	223,599		FF
Outdoor Storage	100-CSP-1	--	912,500		Wind Shield
	100-CSP-2	--	912,500		Wind Shield
	100-CSP-3	--	912,500		None
	610-SP-3	--	19,995		None
Coal Storage Silos	100-CS-1	--	912,500		FF
	100-CS-2	--	912,500		FF
Flake Storage Silo	610-SS-1	--	223,599		FF

7.	Provide a diagram and/or schematic that shows the proposed process of the operation or plant. The diagram and/or schematic is to show all sources, components and facets of the operation or plant in an understandable line sequence of the operation. The diagram should include all the equipment involved in the operation; such as conveyors, transfer points, stockpiles, crushers, facilities, vents, screens, truck dump bins, truck, barge and railcar loading and unloading, etc. Appropriate sizing and specifications of equipment should be included in the diagram. The diagram shall logical follow the entire process load-in to load-out.

8. Roads	Paved Miles of Road	Unpaved Miles of Road	Watered		Other Control (Specify)
			Miles	**Frequency**	
Plant Yard	**See Haul Roads Emission Unit Data Sheet**				
Access Roads					

9. Vehicle Type

Vehicle Type	Mean Vehicle Speed in mph	Mean Vehicle Weight in Tons		Number of Wheels	Distance Traveled per Round Trip	
		Empty	**Full**		**Paved** Feet or Miles	**Unpaved** Feet or Miles
Raw Aggregate	**See Haul Roads Emission Unit Data Sheet**					
Loaders						
Product Trucks						

10. Describe all proposed materials storage facilities associated with the **Emission Units** listed.

Storage Activity

ID of Emission Unit	610-SP-1	610-SP-2	100-CSP-1	100-CSP-2	100-CSP-3	610-SP-3
Type Storage	SB	SB	OS	OS	OS	OS
Material Stored	Flaked Residue	Flaked Residue	Coal	Coal	Coal	Sulfur
Typical Moisture Content (%)	0.92	0.92	6	6	6	0.70
Avg % of material passing through 200 mesh sieve						
Maximum Total Yearly Throughput in storage (tons)	223,599	223,599	912,500	912,500	912,500	19,995
Maximum Stockpile Base Area (ft^2)	13,500	13,500	26,000	88,000	530	511
Maximum Stockpile height (ft)	30	30	30	40	8	20
Dust control method applied to storage			Other – Wind Shield	Other – Wind Shield		
Method of material load-in to bin or stockpile						
Dust control method applied during load-in						
Method of material load-out to bin or stockpile						
Dust control method applied during load-out						

Storage Piles	Estimated Annual Tons	Turnover Rate (Ton/Month)	Wetted as Piled	Number of Sides Enclosed	Other Dust Control	Loading Method (Loader, Conveyor) IN/OUT
Coarse: over 1”						
Fine: 1” to ¼“						
¼” and less						
MFG. Sand						
Other, specify						

Conveying and Transfer

Describe the conveying system including transfer points associated with proposed Emission Units (crushers, etc…).

Describe any methods of emission control to be used with these proposed conveying systems:

ID of Emission Unit	Type Conveyor or Transfer Point	Material Handled [Note nominal size of material transferred (e.g. ¾" × 0)]	Material Conveying or Transfer Rate		Dust Control Measures Applied	Approximate Material Moisture Content (%)
			Max. TPH	Maximum TPY		
100-TC-1	BC		1,000	912,500	EM	6
100-TC-2	BC		1,000	912,500	EM	6
100-TC-3	BC		1,000	912,500	EM	6
100-TC-4	BC		104.17	912,500	EM	6
100-TC-5	BC		104.17	912,500	EM	3
100-TC-6	BC		416.67	912,500	EM	3
100-TC-7	BC		416.67	912,500	EM	3
200-S-105	SC		416.67	912,500	EM	3
610-TC-1	BC		25.53	223,599	N	0.92
610-TC-2	BC		25.53	223,599	EM	0.92
610-TC-3	BC		25.53	223,599	EM	0.92
610-TC-4	BC		25.53	223,599	EM	0.92
610-TC-5	BC		25.53	223,599	EM	0.92
610-TC-6	BC		536.03	223,599	EM	0.92
610-TC-7	BC		536.03	223,599	N	0.92
610-TC-8	BC		2.28	19,995	N	0.70
610-TC-9	BC		47.93	19,995	N	0.70

Crushing and Screening

ID of Emission Unit	100-CM-1					
Type Crusher or Screen						
Material Sized						
Material Sized Throughput:						
Tons/hr	104.17					
Tons/yr	912,500					
Material sized from/to	2 mesh/in to 50 mesh/in					
Typical moisture content as crushed or screened (%)	6%					
Dust control methods applied	EB					
Stack Parameters:						
Height (ft)						
Diameter (ft)						
Volume (ACFM)	20,304					
Temp (°F)	180					
Maximum operating schedule:						
Hour/day	24					
Day/year	365					
Hour/year	8760					
Approximate Percentage of Operation from:						
Jan – Mar	25					
April – June	25					
July – Sept	25					
Oct – Dec	25					
Maximum Particulate Emissions:						
LB/HR	1.84					
Ton/Year	8.07					

List emission sources with request information:

ID of Emission Unit	**Type of Emission Unit and Use**	**Operating Schedule**		**Max. Amount of Stone Input to Emission** (lb/hr)	**Crushed or Screened From/To** (size)	**Date of Emission Unit was Manufacture**
		Actual (hrs/yr)	Design (hrs/yr)			

List emission sources with request information:

ID of Emission Unit	Maximum expected emissions from Emission Unit without Air Pollution Control Equipment				
	PM_{10} (lbs/hr)	**SO_2** (lbs/hr)	**CO** (lbs/hr)	**NO_x** (lbs/hr)	**VOC** (lbs/hr)

ID of Emission Unit	Maximum expected emissions from Emission Unit without Air Pollution Control Equipment				
	PM_{10} (tons/yr)	**SO_2** (tons/yr)	**CO** (tons/yr)	**NO_x** (tons/yr)	**VOC** (tons/yr)

Please fill out a separate Air Pollution Control Device Sheet for each Emission Unit equipped with an air pollution control system.

What type of stone will be quarried at this site?

How will it be quarried?

- ☐ Sawing
- ☐ Blasting
- ☐ Other, Specify:

If blasting is checked, complete the following:

- ☐ Frequency of blasting:
- ☐ What method of air pollution control will be employed during drilling and blasting?

Attachment L
Emission Unit Data Sheet
(INDIRECT HEAT EXCHANGER)

Emission Unit ID No. (must match List Form): **100-CMD-1**
Control Device ID No. (must match List Form):

Equipment Information

1. Manufacturer: **Williams Patent Crusher and Pulverizer Company, Inc.**	2. Model No. Serial No.
3. Number of units: **1**	4. Use: **Coal Milling Dryer – Heat coal to specific moisture content for use in process before entering the Coal Mill 100-CM-1.**
5. Rated Boiler Horsepower: hp	6. Boiler Serial No.:
7. Date constructed: **2020**	8. Date of last modification and explain: **N/A**
9. Maximum design heat input per unit: **13.45** $\times 10^6$ BTU/hr	10. Peak heat input per unit: $\times 10^6$ BTU/hr
11. Steam produced at maximum design output: LB/hr psig	12. Projected Operating Schedule: Hours/Day **24** Days/Week **7** Weeks/Year **52**
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☒ Natural Gas Burner ☐ Others, specify	14. Proposed type of burners and orientation: ☒ Vertical ☐ Front Wall ☐ Opposed ☐ Tangential ☐ Others, specify
15. Type of draft: ☐ Forced ☐ Induced	16. Percent of ash retained in furnace: %
17. Will flyash be reinjected? ☐ Yes ☐ No	18. Percent of carbon in flyash: %

Stack or Vent Data

19. Inside diameter or dimensions: ft.	20. Gas exit temperature: °F
21. Height: ft.	22. Stack serves: ☐ This equipment only ☐ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: ft^3/min	
24. Estimated percent of moisture: %	

Fuel Requirements

25. Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
Quantity (at Design Output)	gph@60°F	**14,651.4** ft^3/hr	ft^3/hr	TPH	
Annually	$\times 10^3$ gal	**128.3** $\times 10^6$ ft^3/yr	$\times 10^6$ ft^3/yr	tons	
Sulfur	Maximum: wt. % Average: wt. %	**0** ppm_v	ppm_v	Maximum: wt. %	
Ash (%)				Maximum	
BTU Content	BTU/Gal. Lbs/Gal.@60°F	**918** BTU/ft^3	BTU/ft^3	BTU/lb	
Source					
Supplier					
Halogens (Yes/No)					
List and Identify Metals					

26. Gas burner mode of control:
☐ Manual ☐ Automatic hi-low
☐ Automatic full modulation ☐ Automatic on-off

27. Gas burner manufacture:

28. Oil burner manufacture:

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air ☐ Rotary Cup ☐ Other, specify

30. Fuel oil preheated: ☐ Yes ☐ No

31. If yes, indicate temperature: °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:
@ °F, PSIA, % moisture

33. Emission rate at rated capacity: lb/hr

34. Percent excess air actually required for combustion of the fuel described: %

Coal Characteristics

35. Seams:

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur:
% of Moisture: % of Volatile Matter:
% of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the heat exchanger before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
SEE ATTACHMENT J				

38. What quantities of pollutants will be emitted from the heat exchanger after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
SEE ATTACHMENT J				

39. How will waste material from the process and control equipment be disposed of?

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit.

41. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet?

42. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.
SEE ATTACHMENT O

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.
SEE ATTACHMENT O

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.
SEE ATTACHMENT O

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.
SEE ATTACHMENT O

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment L
Emission Unit Data Sheet
(INDIRECT HEAT EXCHANGER)

Emission Unit ID No. (must match List Form): **200-H-301**
Control Device ID No. (must match List Form):

Equipment Information

1. Manufacturer: **Heurtey Petrochem**	2. Model No. Serial No.
3. Number of units: **1**	4. Use: **Vacuum Tower Feed Heater – To heat atmospheric bottoms feed from the Atmospheric Tower 200-T-301 to promote hydrocarbon separation in Vacuum Tower 200-T-303.**
5. Rated Boiler Horsepower: hp	6. Boiler Serial No.:
7. Date constructed: **2020**	8. Date of last modification and explain: **N/A**
9. Maximum design heat input per unit: **24.79** $\times 10^6$ BTU/hr	10. Peak heat input per unit: $\times 10^6$ BTU/hr
11. Steam produced at maximum design output: LB/hr psig	12. Projected Operating Schedule: Hours/Day **24** Days/Week **7** Weeks/Year **52**
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☐ Natural Gas Burner ☒ Others, specify **Fuel Gas Burner**	14. Proposed type of burners and orientation: ☐ Vertical ☐ Front Wall ☐ Opposed ☐ Tangential ☐ Others, specify
15. Type of draft: ☐ Forced ☐ Induced	16. Percent of ash retained in furnace: %
17. Will flyash be reinjected? ☐ Yes ☐ No	18. Percent of carbon in flyash: %

Stack or Vent Data

19. Inside diameter or dimensions: ft.	20. Gas exit temperature: °F
21. Height: ft.	22. Stack serves: ☐ This equipment only ☐ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: ft^3/min	
24. Estimated percent of moisture: %	

Fuel Requirements

25. Type	Fuel Oil No.	Natural Gas	Gas (**Fuel Gas**)	Coal, Type:	Other:
Quantity (at Design Output)	gph@60°F	ft^3/hr	**34,817** ft^3/hr	TPH	
Annually	×10^3 gal	×10^6 ft^3/hr	**305.0** ×10^6 ft^3/yr	tons	
Sulfur	Maximum: wt. % Average: wt. %	gr/100 ft^3	**0** ppm_v	Maximum: wt. %	
Ash (%)				Maximum	
BTU Content	BTU/Gal. Lbs/Gal.@60°F	BTU/ft^3	**712** BTU/ft^3	BTU/lb	
Source			**Unit 410 – Gas Recovery Unit**		
Supplier					
Halogens (Yes/No)					
List and Identify Metals					

26. Gas burner mode of control:
☐ Manual ☐ Automatic hi-low
☐ Automatic full modulation ☐ Automatic on-off

27. Gas burner manufacture:

28. Oil burner manufacture:

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air ☐ Rotary Cup ☐ Other, specify

30. Fuel oil preheated: ☐ Yes ☐ No

31. If yes, indicate temperature: °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:
@ °F, PSIA, % moisture

33. Emission rate at rated capacity: lb/hr

34. Percent excess air actually required for combustion of the fuel described: %

Coal Characteristics

35. Seams:

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur:
% of Moisture: % of Volatile Matter:
% of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the heat exchanger before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
SEE ATTACHMENT J				

38. What quantities of pollutants will be emitted from the heat exchanger after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
SEE ATTACHMENT J				

39. How will waste material from the process and control equipment be disposed of?

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit.

41. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet?

42. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.
SEE ATTACHMENT O

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.
SEE ATTACHMENT O

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.
SEE ATTACHMENT O

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.
SEE ATTACHMENT O

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment L
Emission Unit Data Sheet
(INDIRECT HEAT EXCHANGER)

Emission Unit ID No. (must match List Form): **320-H-201/202/203/204**
Control Device ID No. (must match List Form):

Equipment Information

1. Manufacturer: **Heurtey Petrochem**	2. Model No. Serial No.
3. Number of units: **4**	4. Use: **Catalytic Reaction Heaters – To heat the naphtha feed from Unit 310 - Hydrocracker to desired feed temperature before entering the Unit 320 Catalytic Reactors.**
5. Rated Boiler Horsepower: hp	6. Boiler Serial No.:
7. Date constructed: **2020**	8. Date of last modification and explain:
9. Maximum design heat input per unit: **11.89** $\times 10^6$ BTU/hr	10. Peak heat input per unit: $\times 10^6$ BTU/hr
11. Steam produced at maximum design output: LB/hr psig	12. Projected Operating Schedule: Hours/Day **24** Days/Week **7** Weeks/Year **52**
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☐ Natural Gas Burner ☒ Others, specify **Fuel Gas Burner**	14. Proposed type of burners and orientation: ☐ Vertical ☐ Front Wall ☐ Opposed ☐ Tangential ☐ Others, specify
15. Type of draft: ☐ Forced ☐ Induced	16. Percent of ash retained in furnace: %
17. Will flyash be reinjected? ☐ Yes ☐ No	18. Percent of carbon in flyash: %

Stack or Vent Data

19. Inside diameter or dimensions: ft.	20. Gas exit temperature: °F
21. Height: ft.	22. Stack serves: ☐ This equipment only ☐ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: ft^3/min	
24. Estimated percent of moisture: %	

Fuel Requirements

25. Type	Fuel Oil No.	Natural Gas	Gas (**Fuel Gas**)	Coal, Type:	Other:
Quantity (at Design Output)	gph@60°F	ft^3/hr	**16,699** ft^3/hr	TPH	
Annually	$\times 10^3$ gal	$\times 10^6$ ft^3/hr	**146.3** $\times 10^6$ ft^3/yr	tons	
Sulfur	Maximum: wt. % Average: wt. %	gr/100 ft^3	**0** ppm_v	Maximum: wt. %	
Ash (%)				Maximum	
BTU Content	BTU/Gal. Lbs/Gal.@60°F	BTU/ft^3	**712** BTU/ft^3	BTU/lb	
Source			**Unit 410 – Gas Recovery Unit**		
Supplier					
Halogens (Yes/No)					
List and Identify Metals					

26. Gas burner mode of control:
☐ Manual ☐ Automatic hi-low
☐ Automatic full modulation ☐ Automatic on-off

27. Gas burner manufacture:

28. Oil burner manufacture:

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air ☐ Rotary Cup ☐ Other, specify

30. Fuel oil preheated: ☐ Yes ☐ No

31. If yes, indicate temperature: °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:
@ °F, PSIA, % moisture

33. Emission rate at rated capacity: lb/hr

34. Percent excess air actually required for combustion of the fuel described: %

Coal Characteristics

35. Seams:

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur:
% of Moisture: % of Volatile Matter:
% of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the heat exchanger before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
SEE ATTACHMENT J				

38. What quantities of pollutants will be emitted from the heat exchanger after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
SEE ATTACHMENT J				

39. How will waste material from the process and control equipment be disposed of?

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit.

41. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet?

42. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.
SEE ATTACHMENT O

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.
SEE ATTACHMENT O

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.
SEE ATTACHMENT O

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.
SEE ATTACHMENT O

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment L

Emission Unit Data Sheet

(INDIRECT HEAT EXCHANGER)

Emission Unit ID No. (must match List Form): **200-H-102**
Control Device ID No. (must match List Form):

Equipment Information

1. Manufacturer: **Heurtey Petrochem**	2. Model No. Serial No.
3. Number of units: **1**	4. Use: **Slurry Feed Heater – To heat the slurry feed from the Coal Slurry Mixing Drum 200-D-111 to desired feed temperature before entering Catalytic Reactor 200-R-101.**
5. Rated Boiler Horsepower: hp	6. Boiler Serial No.:
7. Date constructed: **2020**	8. Date of last modification and explain: **N/A**
9. Maximum design heat input per unit: **74.02** $\times 10^6$ BTU/hr	10. Peak heat input per unit: $\times 10^6$ BTU/hr
11. Steam produced at maximum design output: LB/hr psig	12. Projected Operating Schedule: Hours/Day **24** Days/Week **7** Weeks/Year **52**
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☐ Natural Gas Burner ☒ Others, specify **Fuel Gas Burner**	14. Proposed type of burners and orientation: ☐ Vertical ☐ Front Wall ☐ Opposed ☐ Tangential ☐ Others, specify
15. Type of draft: ☐ Forced ☐ Induced	16. Percent of ash retained in furnace: %
17. Will flyash be reinjected? ☐ Yes ☐ No	18. Percent of carbon in flyash: %

Stack or Vent Data

19. Inside diameter or dimensions: ft.	20. Gas exit temperature: °F
21. Height: ft.	22. Stack serves: ☐ This equipment only ☐ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: ft^3/min	
24. Estimated percent of moisture: %	

Fuel Requirements

25. Type	Fuel Oil No.	Natural Gas	Gas (**Fuel Gas**)	Coal, Type:	Other:
Quantity (at Design Output)	gph@60°F	ft^3/hr	**103,961** ft^3/hr	TPH	
Annually	×10^3 gal	×10^6 ft^3/hr	**910.70** ×10^6 ft^3/yr	tons	
Sulfur	Maximum: wt. % Average: wt. %	gr/100 ft^3	**0** ppm_v	Maximum: wt. %	
Ash (%)				Maximum	
BTU Content	BTU/Gal. Lbs/Gal.@60°F	BTU/ft^3	**712** BTU/ft^3	BTU/lb	
Source			**Unit 410 – Gas Recovery Unit**		
Supplier					
Halogens (Yes/No)					
List and Identify Metals					

26. Gas burner mode of control:
☐ Manual ☐ Automatic hi-low
☐ Automatic full modulation ☐ Automatic on-off

27. Gas burner manufacture:

28. Oil burner manufacture:

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air ☐ Rotary Cup ☐ Other, specify

30. Fuel oil preheated: ☐ Yes ☐ No

31. If yes, indicate temperature: °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:
@ °F, PSIA, % moisture

33. Emission rate at rated capacity: lb/hr

34. Percent excess air actually required for combustion of the fuel described: %

Coal Characteristics

35. Seams:

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur:
% of Moisture: % of Volatile Matter:
% of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the heat exchanger before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
SEE ATTACHMENT J				

38. What quantities of pollutants will be emitted from the heat exchanger after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
SEE ATTACHMENT J				

39. How will waste material from the process and control equipment be disposed of?

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit.

41. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet?

42. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.
SEE ATTACHMENT O

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.
SEE ATTACHMENT O

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.
SEE ATTACHMENT O

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.
SEE ATTACHMENT O

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment L
Emission Unit Data Sheet
(INDIRECT HEAT EXCHANGER)

Emission Unit ID No. (must match List Form): **200-H-301**
Control Device ID No. (must match List Form):

Equipment Information

1. Manufacturer: **Heurtey Petrochem**	2. Model No. Serial No.
3. Number of units: **1**	4. Use: **Hydrocracker Reaction Heater – To heat Unit 310 feed stream from the Feed Surge Drum 310-D-101 to desired feed temperature before entering Hydrotreater/Hydrocracker Reactor 310-R-101.**
5. Rated Boiler Horsepower: hp	6. Boiler Serial No.:
7. Date constructed: **2020**	8. Date of last modification and explain: **N/A**
9. Maximum design heat input per unit: **8.37** $\times 10^6$ BTU/hr	10. Peak heat input per unit: $\times 10^6$ BTU/hr
11. Steam produced at maximum design output: LB/hr psig	12. Projected Operating Schedule: Hours/Day **24** Days/Week **7** Weeks/Year **52**
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☐ Natural Gas Burner ☒ Others, specify **Fuel Gas Burner**	14. Proposed type of burners and orientation: ☐ Vertical ☐ Front Wall ☐ Opposed ☐ Tangential ☐ Others, specify
15. Type of draft: ☐ Forced ☐ Induced	16. Percent of ash retained in furnace: %
17. Will flyash be reinjected? ☐ Yes ☐ No	18. Percent of carbon in flyash: %

Stack or Vent Data

19. Inside diameter or dimensions: ft.	20. Gas exit temperature: °F
21. Height: ft.	22. Stack serves: ☐ This equipment only ☐ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: ft^3/min	
24. Estimated percent of moisture: %	

Fuel Requirements

25. Type	Fuel Oil No.	Natural Gas	Gas (**Fuel Gas**)	Coal, Type:	Other:
Quantity (at Design Output)	gph@60°F	ft^3/hr	**11,756** ft^3/hr	TPH	
Annually	$\times 10^3$ gal	$\times 10^6$ ft^3/hr	**103.0** $\times 10^6$ ft^3/yr	tons	
Sulfur	Maximum: wt. % Average: wt. %	gr/100 ft^3	**0** ppm_v	Maximum: wt. %	
Ash (%)				Maximum	
BTU Content	BTU/Gal. Lbs/Gal.@60°F	BTU/ft^3	**712** BTU/ft^3	BTU/lb	
Source			**Unit 410 – Gas Recovery Unit**		
Supplier					
Halogens (Yes/No)					
List and Identify Metals					

26. Gas burner mode of control:
☐ Manual ☐ Automatic hi-low
☐ Automatic full modulation ☐ Automatic on-off

27. Gas burner manufacture:

28. Oil burner manufacture:

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air ☐ Rotary Cup ☐ Other, specify

30. Fuel oil preheated: ☐ Yes ☐ No

31. If yes, indicate temperature: °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:
@ °F, PSIA, % moisture

33. Emission rate at rated capacity: lb/hr

34. Percent excess air actually required for combustion of the fuel described: %

Coal Characteristics

35. Seams:

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur: % of Moisture: % of Volatile Matter: % of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the heat exchanger before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
SEE ATTACHMENT J				

38. What quantities of pollutants will be emitted from the heat exchanger after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
SEE ATTACHMENT J				

39. How will waste material from the process and control equipment be disposed of?

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit

41. Have you included the *air pollution rates* on the Emissions Points Data Summary Sheet?

42. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.
SEE ATTACHMENT O

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.
SEE ATTACHMENT O

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.
SEE ATTACHMENT O

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.
SEE ATTACHMENT O

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment L
Emission Unit Data Sheet
(INDIRECT HEAT EXCHANGER)

Emission Unit ID No. (must match List Form): **200-H-101**
Control Device ID No. (must match List Form):

Equipment Information

1. Manufacturer: **Heurtey Petrochem**	2. Model No. Serial No.
3. Number of units: **1**	4. Use: **Hydrogen Heater – To heat hydrogen to desired temperature before being mixed with the coal slurry stream prior to entering Catalytic Reactor 200-R-101.**
5. Rated Boiler Horsepower: hp	6. Boiler Serial No.:
7. Date constructed: **2020**	8. Date of last modification and explain: **N/A**
9. Maximum design heat input per unit: **15.34** $\times 10^6$ BTU/hr	10. Peak heat input per unit: $\times 10^6$ BTU/hr
11. Steam produced at maximum design output: LB/hr psig	12. Projected Operating Schedule: Hours/Day **24** Days/Week **7** Weeks/Year **52**
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☐ Natural Gas Burner ☒ Others, specify **Fuel Gas Burner**	14. Proposed type of burners and orientation: ☐ Vertical ☐ Front Wall ☐ Opposed ☐ Tangential ☐ Others, specify
15. Type of draft: ☐ Forced ☐ Induced	16. Percent of ash retained in furnace: %
17. Will flyash be reinjected? ☐ Yes ☐ No	18. Percent of carbon in flyash: %

Stack or Vent Data

19. Inside diameter or dimensions: ft.	20. Gas exit temperature: °F
21. Height: ft.	22. Stack serves: ☐ This equipment only ☐ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: ft^3/min	
24. Estimated percent of moisture: %	

Fuel Requirements

25. Type	Fuel Oil No.	Natural Gas	Gas (**Fuel Gas**)	Coal, Type:	Other:
Quantity (at Design Output)	gph@60°F	ft^3/hr	**21,545** ft^3/hr	TPH	
Annually	$\times 10^3$ gal	$\times 10^6$ ft^3/hr	**188.73** $\times 10^6$ ft^3/yr	tons	
Sulfur	Maximum: wt. % Average: wt. %	gr/100 ft^3	**0** ppm_v	Maximum: wt. %	
Ash (%)				Maximum	
BTU Content	BTU/Gal. Lbs/Gal.@60°F	BTU/ft^3	**712** BTU/ft^3	BTU/lb	
Source			**Unit 410 – Gas Recovery Unit**		
Supplier					
Halogens (Yes/No)					
List and Identify Metals					

26. Gas burner mode of control:
☐ Manual ☐ Automatic hi-low
☐ Automatic full modulation ☐ Automatic on-off

27. Gas burner manufacture:

28. Oil burner manufacture:

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air ☐ Rotary Cup ☐ Other, specify

30. Fuel oil preheated: ☐ Yes ☐ No

31. If yes, indicate temperature: °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:
@ °F, PSIA, % moisture

33. Emission rate at rated capacity: lb/hr

34. Percent excess air actually required for combustion of the fuel described: %

Coal Characteristics

35. Seams:

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur:
% of Moisture: % of Volatile Matter:
% of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the heat exchanger before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
SEE ATTACHMENT J				

38. What quantities of pollutants will be emitted from the heat exchanger after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
SEE ATTACHMENT J				

39. How will waste material from the process and control equipment be disposed of?

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit.

41. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet?

42. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.
SEE ATTACHMENT O

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.
SEE ATTACHMENT O

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.
SEE ATTACHMENT O

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.
SEE ATTACHMENT O

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment L

Emission Unit Data Sheet

(INDIRECT HEAT EXCHANGER)

Emission Unit ID No. (must match List Form): **310-H-103**

Control Device ID No. (must match List Form):

Equipment Information

1. Manufacturer: **Heurtey Petrochem**	2. Model No. Serial No.
3. Number of units: **1**	4. Use: **Fractionation Reboiler – To heat the recycle diesel feed from Fractionator 310-C-201 to promote further hydrocarbon separation.**
5. Rated Boiler Horsepower: hp	6. Boiler Serial No.:
7. Date constructed: **2020**	8. Date of last modification and explain: **N/A**
9. Maximum design heat input per unit: **10.78** $\times 10^6$ BTU/hr	10. Peak heat input per unit: $\times 10^6$ BTU/hr
11. Steam produced at maximum design output: LB/hr psig	12. Projected Operating Schedule: Hours/Day **24** Days/Week **7** Weeks/Year **52**
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☐ Natural Gas Burner ☒ Others, specify **Fuel Gas Burner**	14. Proposed type of burners and orientation: ☐ Vertical ☐ Front Wall ☐ Opposed ☐ Tangential ☐ Others, specify
15. Type of draft: ☐ Forced ☐ Induced	16. Percent of ash retained in furnace: %
17. Will flyash be reinjected? ☐ Yes ☐ No	18. Percent of carbon in flyash: %

Stack or Vent Data

19. Inside diameter or dimensions: ft.	20. Gas exit temperature: °F
21. Height: ft.	22. Stack serves: ☐ This equipment only ☐ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: ft^3/min	
24. Estimated percent of moisture: %	

Fuel Requirements

25. Type	Fuel Oil No.	Natural Gas	Gas (**Fuel Gas**)	Coal, Type:	Other:
Quantity (at Design Output)	gph@60°F	ft^3/hr	**15,140** ft^3/hr	TPH	
Annually	$\times 10^3$ gal	$\times 10^6$ ft^3/hr	**132.63** $\times 10^6$ ft^3/yr	tons	
Sulfur	Maximum: wt. % Average: wt. %	gr/100 ft^3	**0** ppm_v	Maximum: wt. %	
Ash (%)				Maximum	
BTU Content	BTU/Gal. Lbs/Gal.@60°F	BTU/ft^3	**712** BTU/ft^3	BTU/lb	
Source			**Unit 410 – Gas Recovery Unit**		
Supplier					
Halogens (Yes/No)					
List and Identify Metals					

26. Gas burner mode of control:
☐ Manual ☐ Automatic hi-low
☐ Automatic full modulation ☐ Automatic on-off

27. Gas burner manufacture:

28. Oil burner manufacture:

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air ☐ Rotary Cup ☐ Other, specify

30. Fuel oil preheated: ☐ Yes ☐ No

31. If yes, indicate temperature: °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:
@ °F, PSIA, % moisture

33. Emission rate at rated capacity: lb/hr

34. Percent excess air actually required for combustion of the fuel described: %

Coal Characteristics

35. Seams:

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur:
% of Moisture: % of Volatile Matter:
% of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the heat exchanger before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
SEE ATTACHMENT J				

38. What quantities of pollutants will be emitted from the heat exchanger after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
SEE ATTACHMENT J				

39. How will waste material from the process and control equipment be disposed of?

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit.

41. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet?

42. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.
SEE ATTACHMENT O

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.
SEE ATTACHMENT O

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.
SEE ATTACHMENT O

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.
SEE ATTACHMENT O

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): **700-HR-1**

1. Name or type and model of proposed affected source: **Hydrogen Reformer**
2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.
3. Name(s) and maximum amount of proposed process material(s) charged per hour: **Natural gas and fuel gas – 1,238 MMBtu/hr**
4. Name(s) and maximum amount of proposed material(s) produced: **Hydrogen (H_2) gas – 75 MMscf/day**
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants: **C_xH_y (mostly methane – CH_4) + O_2 → H_2 + CO + CO_2**

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Natural gas – 28 MMscf/day;
Fuel gas – 169.5 MMBtu/hr

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: **537** $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	**24**	Days/Week	**7**	Weeks/Year	**52**

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:

@ °F and psia

a.	**See Attachment J**		
b.			
c.			
d.			
e.			
f.			

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
See Attachment O	**See Attachment O**
REPORTING	TESTING
See Attachment O	**See Attachment O**

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): **440-CF-1**

1. Name or type and model of proposed affected source: **Claus Furnace**
2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.
3. Name(s) and maximum amount of proposed process material(s) charged per hour: **Acid and sour gas from Unit 420 and Unit 430 – 5,088 lb/hr**
4. Name(s) and maximum amount of proposed material(s) produced per hour:
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants: **$2\ H_2S + 3\ O_2 \rightarrow 2\ SO_2 + 2\ H_2O$;** **$4\ H_2S + 2\ SO_2 \rightarrow 3\ S_2 + 4\ H_2O$**

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Fuel gas for startup operations;
Acid and sour gases from Unit 420 and Unit 430 during normal operation

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (lb/hr):

11,767 @ **2250** °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: **4.4** $\times 10^6$ BTU/hr.

7. Projected operating schedule:

Hours/Day	**24**	Days/Week	**7**	Weeks/Year	**52**

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:			
@		°F and	psia
a.	**See Attachment J**		
b.			
c.			
d.			
e.			
f.			

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
See Attachment O	**See Attachment O**
REPORTING	TESTING
See Attachment O	**See Attachment O**

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Attachment L
Emission Unit Data Sheet
Sulfur Recovery Incinerator

Emission Unit ID No. (must match List Form): **440-SRI-1**

Control Device ID No. (must match List Form): **440-SRI-1**

Equipment Information

1. Manufacturer:	2. Model No.
3. On a separate sheet sketch or draw the proposed incinerator showing the location and dimensions (inside and out) of (1) the primary combustion chamber, (2) the secondary combustion chamber, (3) the flame port, (4) auxiliary burners, and (5) dampers **with special emphasis on dimensions of the flame port and secondary combustion chambers (inside). Also,** sketch in the minimum distance the gas travels through the secondary combustion chamber.	
4. Rated capacity of the incinerator for the type of waste to be burned: Maximum: **9,351** lb/hr; Typical: lb/hr; Annual: **40,957.4** tons/yr	
5. By what means is waste charged? ☐ Batch ☒ Continuous ☐ Periodically	
6. Type: ☐ Multiple Chamber ☒ Single Chamber ☐ Other, specify:	
7. Projected operating schedule: **24** hr/day **365** day/yr	

Primary Combustion Chamber

8. Volume: ft^3	9. Effective grate area: ft^2
10. Maximum temperature: °F	11. Burning rate: $lb/ft^2/hr$
12. Heat release in primary chamber: $BTU/hr/ft^3$	13. Total heat release in incinerator: $BTU/hr/ft^3$

Secondary Combustion Chamber

14. Volume: ft^3	15. Cross sectional area: ft^2
16. Volume of gas through secondary combustion chamber: ACFM @ °F	17. Gas velocity through secondary combustion chamber: ft/sec
18. Minimum gas temperature: °F	19. Minimum retention time of gas: sec
20. Minimum distance of gas travel through secondary combustion chamber: ft	21. Location of air admission:

Flame Port

22. Flame port area: ft^2	23. Velocity through flame port: ft/sec

Dampers

24. Type:	25. Number
26. Diameter: inches	27. Capacity: ACFM @ °F

Combustion Air

28. Type of draft: ☐ Natural
☐ Sliding damper ☐ Forced
☐ Barametric damper ☐ Induced
Windshielding? ☐ Yes ☐ No

29. If draft is forced or induced, describe ID fans or blowers:
Number
HP rating HP
Rated flow ft^3/min
Rated speed RPM
Fan rated draft in. H_2O

30. Theoretical air/refuse ratio: lb air/lb refuse

31. Percent of total air applied as:
overfire air
underfire air

Auxiliary Burners

32. Proposed type and fuel: **Fuel gas**

33. **Primary Burner**
Capacity: **10.6** MMBTU/hr
Number: **1**
Manufacture:
Model:
Estimated capacity: BTU/hr
Fuel: **Fuel gas**
How controlled?
Is there a temperature indicator? ☒ Yes ☐ No
How temperature recorded?

34. **Secondary Burner**
Capacity: MMBTU/hr
Number:
Manufacture:
Model:
Estimated capacity: BTU/hr
Fuel:
How controlled?
Is there a temperature indicator? ☐ Yes ☐ No
How temperature recorded?

Miscellaneous Devices and Controls

35. Automatic loading device. ☐ Yes ☐ No
If yes, describe.

36. Self closing doors. ☐ Yes ☐ No

37. Sparks arrestor ☐ Yes ☐ No

38. Flame failure protection equipment ☐ Yes ☐ No

39. Method of creating turbulence for combustion gases. Describe.

40. Method of cleaning secondary or settling chamber. Describe.

41. Other interlocking devices or controls. If yes, describe. ☐ Yes ☐ No

Installation

42. Indoor Installation: ☐ Yes ☐ No

43. Outdoor Installation: ☐ Yes ☐ No

If yes, describe method of supplying combustion air.

Stack or Vent Data

44. Inside diameter or dimensions: ft	45. Gas exit temperature: °F
46. Height: ft	47. Stack serves: ☐ This equipment only ☒ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent): **Claus Furnace (440-CF-1)**
48. Gas flow rate: ft/min	
49. Estimated percent of moisture: %	

Waste

50. Source of waste: ☐ Hospital ☐ Restaurant ☐ Store ☒ Industry ☐ Apartment ☐ Crematory ☐ Warehouse ☐ Public Institution ☐ Other:

51. Describe fully, in detail, the composition of waste feed to the incinerator:

Water vapor (H_2O) – 5.6 mol %
Hydrogen sulfide (H_2S) – 8 ppm_v
Nitrogen (N_2) – 90.0 mol %
Hydrogen (H_2) – 2.1 mol %
Carbon dioxide (CO_2) – 2.2 mol %
Carbon monoxide (CO) – 50 ppm_v
Carbonyl sulfide (COS) – 50 ppm_v

52. Expected BTU/lb as fired: **119.85** BTU/lb	53. Daily amount: **224,424** lb
54. Does incinerator have a charge hopper ☐ Yes ☐ No	55. What is the volume of the charge hopper? ft^3
56. Does the charge hopper have automatic control? ☐ Yes ☐ No	57. Is the waste charged to the incinerator weighed? ☐ Yes ☐ No
58. Is the secondary chamber preheated prior to charging waste? ☐ Yes ☐ No	59. At what secondary temperature does waste charging begin? °F
60. Is the ash waste quenched? ☐ Yes ☐ No	61. Is all the waste burned generated on site? ☐ Yes ☐ No

62. For hospital waste, is the ash inspected for recognizable combustible components? ☐ Yes ☐ No

63. For hospital waste, are recognizable combustible components of the ash reburned? ☐ Yes ☐ No

64. Is any waste received from outside the local government boundary? ☐ Yes ☐ No

65. Are hazardous or special waste burned? ☒ Yes ☐ No	66. Are potential infectious waste burned? ☐ Yes ☒ No

If yes, please describe:

Tail gas to Sulfur Recovery Incinerator contains carbonyl sulfide (COS) which is a hazardous air pollutant.

67. How will the waste material from process and control equipment be disposed of?

68. Method of charging waste solids: ☐ Manual ☐ Manual charge hopper ☐ Automatic charge hopper ☐ Other, specify:	69. Method of feeding liquids: ☐ Lab pack ☐ Injection as a primary burner fuel ☐ Injection as a secondary burner fuel ☐ Other, specify:
70. Rated steam flow – heat recovery boiler: lbs/hr	71. Rated pressure – recovery boiler: PSIG

Emissions Stream

72. Emission rates:

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA	Tons per Year Tons/yr	Parts per Million ppm
SEE ATTACHMENT N						

73. If an *Air Pollution Control Device* is not submitted, the emission rates should be the same as those reported home "Maximum Potential and Maximum Actual Emissions" on the *Emission Points Data Summary Sheet*.

74. Emissions rates should be substantiated by submitting *stack test data* and/or *calculations*.

Fuel Usage Data

75. Estimated annual fuel cost: $

76. Firing rate: Maximum: **10.6** mmBTU/hr
Typical: mmBTU/hr
Design: mmBTU/hr

77. Fuel type: ☐ Natural Gas ☐ Coal
☐ Fuel Oil, No.
☒ Other: **Fuel gas**

78. Typical heating content of fuel: **712 Btu/scf**

79. Typical fuel sulfur content: **0** wt. %

80. Typical fuel ash content: wt. %

81. Annual fuel usage:

82. Please complete an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit, if applicable.

83. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet?

84. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.
SEE ATTACHMENT O

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.
SEE ATTACHMENT O

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.
SEE ATTACHMENT O

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.
SEE ATTACHMENT O

85. Please describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment L
FUGITIVE EMISSIONS FROM PAVED HAULROADS

INDUSTRIAL PAVED HAULROADS (including all equipment traffic involved in process, haul trucks, endloaders, etc.)

Item Number	Description	Mean Vehicle Weight (tons)	Miles per Trip	Maximum Trips per Hour	Maximum Trips per Year	Control Device ID Number	Control Efficiency (%)
HR-1	Loaded Coal Delivery Trucks	43.0	0.13	11	30,660		75%
HR-2	Unloaded Coal Delivery Trucks	13.0	0.13	11	30,660		75%
HR-3	Loaded Flaked Residue Trucks	40.0	0.53	10	8,282		75%
HR-4	Unloaded Flaked Residue Trucks	13.0	0.53	10	8,282		75%
HR-5	Loaded Sulfur Product Trucks	40.0	0.53	2	741		75%
HR-6	Unloaded Sulfur Product Trucks	13.0	0.53	2	741		75%
HR-7	Loaded Diesel Tanker Trucks	45.65	0.59	12	11,315		75%
HR-8	Unloaded Diesel Tanker Trucks	13.0	0.59	12	11,315		75%
HR-9	Loaded Gasoline Tanker Trucks	42.1	0.59	8	5,840		75%
HR-10	Unloaded Gasoline Tanker Trucks	13.0	0.59	8	5,840		75%
HR-11	Loaded LPG Tanker Trucks	20.1	0.59	2	3,731		75%
HR-12	Unloaded LPG Tanker Trucks	6.5	0.59	2	3,731		75%
HR-13	Loaded Ammonia Trucks	36.2	0.59	1	730		75%
HR-14	Unloaded Ammonia Trucks	13.0	0.59	1	730		75%

Source: *AP-42 Chapter 13.2.1 Paved Roads – 01/2011 Version*

$E_{Hr} = [k \times (sL)^{0.91} x(W)^{1.02}] x [1 - (1.2P/N)] =$ lb/Vehicle Mile Traveled (VMT)

$E_{Day} = [k \times (sL)^{0.91} x (W)^{1.02}] x [1 - (P/4N)] =$ lb/Vehicle Mile Traveled (VMT)

k =	Particle size multiplier	PM – 0.011, PM10 – 0.0022, PM2.5 – 0.00054
$sL_{Liquids}$ =	Default road surface silt loading for low volume roads, <500 Average Daily Traffic (g/m^2) – Used to estimate emissions from liquid product tank trucks	0.6
sL_{Solids} =	Mean road surface silt loading for paved roads at a quarry (g/m^2) – Used to estimate emissions from coal delivery trucks	8.2
P =	Average number of days per year with precipitation >0.01 in	157
N =	Annual averaging period	Hourly – 8760, Daily - 365
W =	Mean vehicle weight (tons)	

For lb/hr: E_{Hr} [lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] = lb/hr

For TPY: E_{Day} [lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] × [Ton ÷ 2000 lb] = Tons/year

SUMMARY OF PAVED HAULROAD EMISSIONS – PM Emissions

Item No.	Uncontrolled		Controlled	
	lb/hr	TPY	lb/hr	TPY
HR-1	4.84	6.15	1.21	1.54
HR-2	1.43	1.82	0.36	0.45
HR-3	16.67	6.30	4.17	1.57
HR-4	5.30	2.00	1.32	0.50
HR-5	3.33	0.56	0.83	0.14
HR-6	1.06	0.18	0.26	0.04
HR-7	2.36	1.01	0.59	0.25
HR-8	0.66	0.28	0.16	0.07
HR-9	1.45	0.48	0.36	0.12
HR-10	0.44	0.15	0.11	0.04
HR-11	0.17	0.14	0.04	0.04
HR-12	0.05	0.05	0.01	0.01
HR-13	0.16	0.05	0.04	0.01
HR-14	0.05	0.02	0.01	<0.01
TOTALS	**37.96**	**19.19**	**9.49**	**4.80**

SUMMARY OF PAVED HAULROAD EMISSIONS – PM_{10} Emissions

Item No.	Uncontrolled		Controlled	
	lb/hr	TPY	lb/hr	TPY
HR-1	0.97	1.23	0.24	0.31
HR-2	0.29	0.36	0.07	0.09
HR-3	3.33	1.26	0.83	0.31
HR-4	1.06	0.40	0.26	0.10
HR-5	0.67	0.11	0.17	0.03
HR-6	0.21	0.04	0.05	<0.01
HR-7	0.47	0.20	0.12	0.05
HR-8	0.13	0.06	0.03	0.01
HR-9	0.29	0.10	0.07	0.02
HR-10	0.09	0.03	0.02	<0.01
HR-11	0.03	0.03	<0.01	<0.01
HR-12	0.01	<0.01	<0.01	<0.01
HR-13	0.03	0.01	<0.01	<0.01
HR-14	0.01	<0.01	<0.01	<0.01
TOTALS	**7.59**	**3.84**	**1.90**	**0.96**

SUMMARY OF PAVED HAULROAD EMISSIONS – $PM_{2.5}$ Emissions

Item No.	Uncontrolled		Controlled	
	lb/hr	TPY	lb/hr	TPY
HR-1	0.24	0.33	0.06	0.08
HR-2	0.07	0.10	0.02	0.02
HR-3	0.82	0.34	0.20	0.08
HR-4	0.26	0.11	0.07	0.03
HR-5	0.16	0.03	0.04	<0.01
HR-6	0.05	<0.01	0.01	<0.01
HR-7	0.12	0.05	0.03	0.01
HR-8	0.03	0.01	<0.01	<0.01
HR-9	0.07	0.02	0.02	<0.01
HR-10	0.02	<0.01	<0.01	<0.01
HR-11	<0.01	<0.01	<0.01	<0.01
HR-12	<0.01	<0.01	<0.01	<0.01
HR-13	<0.01	<0.01	<0.01	<0.01
HR-14	<0.01	<0.01	<0.01	<0.01
TOTALS	**1.86**	**1.02**	**0.42**	**0.26**

ATTACHMENT L – LOADING RACK DATA SHEET

Emission Unit ID#: **640-BR-2**	Emission Point ID#: **640-BR-2**	Year Installed/Modified: **2020**
Emission Unit Description: **Diesel Barge Loading Rack**		
Loading Area Data		
Number of Pumps: **3**	Number of Liquids Loaded: **1**	Max number of barges loading at one (1) time: **1**
Are barges pressure tested for leaks at this or any other location? ☒ Yes ☐ No ☐ Not Required If Yes, Please describe:		
Provide description of closed vent system and any bypasses.		
Are any of the following barge loadout systems utilized? ☐ Closed System to barge passing a MACT level annual leak test? ☐ Closed System to barge passing a NSPS level annual leak test? ☐ Closed System to barge not passing an annual leak test and has vapor return?		

Projected Maximum Operating Schedule (for rack or transfer point as a whole)

Time	Jan – Mar	Apr - Jun	Jul – Sept	Oct - Dec
Hours/day	**10**	**10**	**10**	**10**
Days/week	**5**	**5**	**5**	**5**

Bulk Liquid Data (use extra pages as necessary)

Liquid Name		**Diesel Fuel**		
Max. Daily Throughput (1000 gal/day)		**1,080**		
Max. Annual Throughput (1000 gal/yr)		**68,384**		
Loading Method[1]		**SUB**		
Max. Fill Rate (gal/min)		**3 x 600 gal/min**		
Average Fill Time (min/loading)		**Dependent on Vessel Size**		
Max. Bulk Liquid Temperature (°F)		**60**		
True Vapor Pressure[2]		**0.0065 psig**		
Cargo Vessel Condition[3]		**U**		
Control Equipment or Method[4]		**None**		
Max. Collection Efficiency (%)		**0**		
Max. Control Efficiency (%)		**0**		
Max.VOC Emission Rate	Lb/hr	**1.09**		
	Ton/yr	**0.35**		
Max.HAP Emission Rate	Lb/hr	**0.08**		
	Ton/yr	**0.03**		
Estimation Method[5]		**EPA**		

1 BF Bottom Fill SP Splash Fill SUB Submerged Fill
2 At maximum bulk liquid temperature
3 B Ballasted Vessel C Cleaned U Uncleaned (dedicated service)
O Other (describe)
4 List as many as apply (complete and submit appropriate Air Pollution Control Device Sheets)
CA Carbon Adsorption VB Dedicated Vapor Balance (closed system)
ECD Enclosed Combustion Device F Flare
TO Thermal Oxidization or Incineration
5 EPA EPA Emission Factor in AP-42 MB Material Balance
TM Test Measurement based upon test data submittal O Other (describe)

ATTACHMENT L – LOADING RACK DATA SHEET

Emission Unit ID#: **640-RR-2**	Emission Point ID#: **640-RR-2**	Year Installed/Modified: **2020**
Emission Unit Description: **Diesel Rail Loading Rack**		
Loading Area Data		
Number of Pumps: **2**	Number of Liquids Loaded: **1**	Max number of railcars loading at one (1) time: **1**
Are railcars pressure tested for leaks at this or any other location? ☒ Yes ☐ No ☐ Not Required If Yes, Please describe:		
Provide description of closed vent system and any bypasses. None		
Are any of the following truck loadout systems utilized? ☐ Closed System to railcar passing a MACT level annual leak test? ☐ Closed System to railcar passing a NSPS level annual leak test? ☐ Closed System to railcar not passing an annual leak test and has vapor return?		

Projected Maximum Operating Schedule (for rack or transfer point as a whole)

Time	Jan – Mar	Apr - Jun	Jul – Sept	Oct - Dec
Hours/day	**10**	**10**	**10**	**10**
Days/week	**5**	**5**	**5**	**5**

Bulk Liquid Data (use extra pages as necessary)

Liquid Name		**Diesel Fuel**		
Max. Daily Throughput (1000 gal/day)		**301.10**		
Max. Annual Throughput (1000 gal/yr)		**10,043**		
Loading Method[1]		**SUB**		
Max. Fill Rate (gal/min)		**2 x 400 gal/min**		
Average Fill Time (min/loading)		**Dependent on Vessel Size**		
Max. Bulk Liquid Temperature (°F)		**60**		
True Vapor Pressure[2]		**0.0065 psig**		
Cargo Vessel Condition[3]		**U**		
Control Equipment or Method[4]		**None**		
Max. Collection Efficiency (%)		**0**		
Max. Control Efficiency (%)		**0**		
Max.VOC Emission Rate	Lb/hr	**0.37**		
	Ton/yr	**0.06**		
Max.HAP Emission Rate	Lb/hr	**0.03**		
	Ton/yr	**<0.01**		
Estimation Method[5]		**EPA**		

1 BF Bottom Fill SP Splash Fill SUB Submerged Fill
2 At maximum bulk liquid temperature
3 B Ballasted Vessel C Cleaned U Uncleaned (dedicated service)
O Other (describe)
4 List as many as apply (complete and submit appropriate Air Pollution Control Device Sheets)
CA Carbon Adsorption VB Dedicated Vapor Balance (closed system)
ECD Enclosed Combustion Device F Flare
TO Thermal Oxidization or Incineration
5 EPA EPA Emission Factor in AP-42 MB Material Balance
TM Test Measurement based upon test data submittal O Other (describe)

ATTACHMENT L – LOADING RACK DATA SHEET

Emission Unit ID#: **640-TR-2**	Emission Point ID#: **640-TR-2**	Year Installed/Modified: **2020**
Emission Unit Description: **Diesel Truck Loading Rack**		
Loading Area Data		
Number of Pumps: **6**	Number of Liquids Loaded: **1**	Max number of trucks loading at one (1) time: **6**
Are tanker trucks pressure tested for leaks at this or any other location? ☒ Yes ☐ No ☐ Not Required If Yes, Please describe:		
Provide description of closed vent system and any bypasses.		
Are any of the following truck loadout systems utilized? No ☐ Closed System to tanker truck passing a MACT level annual leak test? ☐ Closed System to tanker truck passing a NSPS level annual leak test? ☐ Closed System to tanker truck not passing an annual leak test and has vapor return?		

Projected Maximum Operating Schedule (for rack or transfer point as a whole)

Time	Jan – Mar	Apr - Jun	Jul – Sept	Oct - Dec
Hours/day	**10**	**10**	**10**	**10**
Days/week	**5**	**5**	**5**	**5**

Bulk Liquid Data (use extra pages as necessary)

Liquid Name		**Diesel Fuel**		
Max. Daily Throughput (1000 gal/day)		**1,080**		
Max. Annual Throughput (1000 gal/yr)		**22,000**		
Loading Method[1]		**SUB**		
Max. Fill Rate (gal/min)		**6 x 600 gal/min**		
Average Fill Time (min/loading)		**Dependent on Vessel Size**		
Max. Bulk Liquid Temperature (°F)		**60**		
True Vapor Pressure[2]		**0.0065 psig**		
Cargo Vessel Condition[3]		**U**		
Control Equipment or Method[4]		**None**		
Max. Collection Efficiency (%)		**0**		
Max. Control Efficiency (%)		**0**		
Max.VOC Emission Rate	Lb/hr	**1.31**		
	Ton/yr	**0.13**		
Max.HAP Emission Rate	Lb/hr	**0.10**		
	Ton/yr	**0.01**		
Estimation Method[5]		**EPA**		

1 BF Bottom Fill SP Splash Fill SUB Submerged Fill
2 At maximum bulk liquid temperature
3 B Ballasted Vessel C Cleaned U Uncleaned (dedicated service)
O Other (describe)
4 List as many as apply (complete and submit appropriate Air Pollution Control Device Sheets)
CA Carbon Adsorption VB Dedicated Vapor Balance (closed system)
ECD Enclosed Combustion Device F Flare
TO Thermal Oxidization or Incineration
5 EPA EPA Emission Factor in AP-42 MB Material Balance
TM Test Measurement based upon test data submittal O Other (describe)

ATTACHMENT L – LOADING RACK DATA SHEET

Emission Unit ID#: **640-BR-1**	Emission Point ID#: **640-BR-1, 640-FL-1**	Year Installed/Modified: **2020**

Emission Unit Description: **Gasoline Barge Loading Rack**

Loading Area Data

Number of Pumps: **3**	Number of Liquids Loaded: **1**	Max number of barges loading at one (1) time: **1**

Are barges pressure tested for leaks at this or any other location? ☒ Yes ☐ No ☐ Not Required
If Yes, Please describe:

Provide description of closed vent system and any bypasses.

Closed vent system to Liquid Product Loadout Flare (640-FL-1).

Are any of the following truck loadout systems utilized?
☒ Closed System to barge passing a MACT level annual leak test?
☐ Closed System to barge passing a NSPS level annual leak test?
☐ Closed System to barge not passing an annual leak test and has vapor return?

Projected Maximum Operating Schedule (for rack or transfer point as a whole)

Time	Jan – Mar	Apr - Jun	Jul – Sept	Oct - Dec
Hours/day	**10**	**10**	**10**	**10**
Days/week	**5**	**5**	**5**	**5**

Bulk Liquid Data (use extra pages as necessary)

Liquid Name		**Gasoline**		
Max. Daily Throughput (1000 gal/day)		**1,080**		
Max. Annual Throughput (1000 gal/yr)		**5,214**		
Loading Method[1]		**SUB**		
Max. Fill Rate (gal/min)		**3 x 600 gal/min**		
Average Fill Time (min/loading)		**Dependent on Vessel Size**		
Max. Bulk Liquid Temperature (°F)		**60**		
True Vapor Pressure[2]		**8.1621 psig**		
Cargo Vessel Condition[3]		**U**		
Control Equipment or Method[4]		**VB; F**		
Max. Collection Efficiency (%)		**99.2**		
Max. Control Efficiency (%)		**98**		
Max.VOC Emission Rate	Lb/hr	**5.07**		
	Ton/yr	**0.12**		
Max.HAP Emission Rate	Lb/hr	**1.76**		
	Ton/yr	**0.04**		
Estimation Method[5]		**EPA**		

1 BF Bottom Fill SP Splash Fill SUB Submerged Fill
2 At maximum bulk liquid temperature
3 B Ballasted Vessel C Cleaned U Uncleaned (dedicated service)
O Other (describe)
4 List as many as apply (complete and submit appropriate Air Pollution Control Device Sheets)
CA Carbon Adsorption VB Dedicated Vapor Balance (closed system)
ECD Enclosed Combustion Device F Flare
TO Thermal Oxidization or Incineration
5 EPA EPA Emission Factor in AP-42 MB Material Balance
TM Test Measurement based upon test data submittal O Other (describe)

ATTACHMENT L – LOADING RACK DATA SHEET

Emission Unit ID#: **640-RR-1**	Emission Point ID#: **640-RR-1** **640-FL-1**	Year Installed/Modified: **2020**

Emission Unit Description: **Gasoline Rail Loading Rack**

Loading Area Data

Number of Pumps: **2**	Number of Liquids Loaded: **1**	Max number of trucks loading at one (1) time: **1**

Are tanker trucks pressure tested for leaks at this or any other location? ☒ Yes ☐ No ☐ Not Required
If Yes, Please describe:

Provide description of closed vent system and any bypasses.

Closed vent system to Liquid Product Loadout Flare (640-FL-1).

Are any of the following truck loadout systems utilized?
☒ Closed System to tanker truck passing a MACT level annual leak test?
☐ Closed System to tanker truck passing a NSPS level annual leak test?
☐ Closed System to tanker truck not passing an annual leak test and has vapor return?

Projected Maximum Operating Schedule (for rack or transfer point as a whole)

Time	Jan – Mar	Apr - Jun	Jul – Sept	Oct - Dec
Hours/day	**10**	**10**	**10**	**10**
Days/week	**5**	**5**	**5**	**5**

Bulk Liquid Data (use extra pages as necessary)

Liquid Name		**Gasoline**		
Max. Daily Throughput (1000 gal/day)		**301.1**		
Max. Annual Throughput (1000 gal/yr)		**5,214**		
Loading Method[1]		**SUB**		
Max. Fill Rate (gal/min)		**2 x 400 gal/min**		
Average Fill Time (min/loading)		**Dependent on Vessel Size**		
Max. Bulk Liquid Temperature (°F)		**60**		
True Vapor Pressure[2]		**8.1621 psig**		
Cargo Vessel Condition[3]		**U**		
Control Equipment or Method[4]		**VB; F**		
Max. Collection Efficiency (%)		**99.2**		
Max. Control Efficiency (%)		**98**		
Max.VOC Emission Rate	Lb/hr	**1.70**		
	Ton/yr	**0.15**		
Max.HAP Emission Rate	Lb/hr	**0.59**		
	Ton/yr	**0.05**		
Estimation Method[5]		**EPA**		

1 BF Bottom Fill SP Splash Fill SUB Submerged Fill
2 At maximum bulk liquid temperature
3 B Ballasted Vessel C Cleaned U Uncleaned (dedicated service)
O Other (describe)
4 List as many as apply (complete and submit appropriate Air Pollution Control Device Sheets)
CA Carbon Adsorption VB Dedicated Vapor Balance (closed system)
ECD Enclosed Combustion Device F Flare
TO Thermal Oxidization or Incineration
5 EPA EPA Emission Factor in AP-42 MB Material Balance
TM Test Measurement based upon test data submittal O Other (describe)

ATTACHMENT L – LOADING RACK DATA SHEET

Emission Unit ID#: **640-TR-1**	Emission Point ID#: **640-TR-1, 640-FL-1**	Year Installed/Modified: **2020**
Emission Unit Description: **Gasoline Truck Loading Rack**		
Loading Area Data		
Number of Pumps: **4**	Number of Liquids Loaded: **1**	Max number of trucks loading at one (1) time: **4**

Are tanker trucks pressure tested for leaks at this or any other location? ☒ Yes ☐ No ☐ Not Required
If Yes, Please describe:

Provide description of closed vent system and any bypasses.

Closed vent system to Liquid Product Loadout Flare (640-FL-1).

Are any of the following truck loadout systems utilized?
☒ Closed System to tanker truck passing a MACT level annual leak test?
☐ Closed System to tanker truck passing a NSPS level annual leak test?
☐ Closed System to tanker truck not passing an annual leak test and has vapor return?

Projected Maximum Operating Schedule (for rack or transfer point as a whole)

Time	Jan – Mar	Apr - Jun	Jul – Sept	Oct - Dec
Hours/day	**10**	**10**	**10**	**10**
Days/week	**5**	**5**	**5**	**5**

Bulk Liquid Data (use extra pages as necessary)

Liquid Name		**Gasoline**		
Max. Daily Throughput (1000 gal/day)		**720**		
Max. Annual Throughput (1000 gal/yr)		**41,710**		
Loading Method[1]		**SUB**		
Max. Fill Rate (gal/min)		**4 x 600 gal/min**		
Average Fill Time (min/loading)		**Dependent on Vessel Size**		
Max. Bulk Liquid Temperature (°F)		**60**		
True Vapor Pressure[2]		**8.1621 psig**		
Cargo Vessel Condition[3]		**U**		
Control Equipment or Method[4]		**VB; F**		
Max. Collection Efficiency (%)		**99.2**		
Max. Control Efficiency (%)		**98**		
Max.VOC Emission Rate	Lb/hr	**4.06**		
	Ton/yr	**1.18**		
Max.HAP Emission Rate	Lb/hr	**1.40**		
	Ton/yr	**0.41**		
Estimation Method[5]		**EPA**		

1 BF Bottom Fill SP Splash Fill SUB Submerged Fill
2 At maximum bulk liquid temperature
3 B Ballasted Vessel C Cleaned U Uncleaned (dedicated service)
O Other (describe)
4 List as many as apply (complete and submit appropriate Air Pollution Control Device Sheets)
CA Carbon Adsorption VB Dedicated Vapor Balance (closed system)
ECD Enclosed Combustion Device F Flare
TO Thermal Oxidization or Incineration
5 EPA EPA Emission Factor in AP-42 MB Material Balance
TM Test Measurement based upon test data submittal O Other (describe)

ATTACHMENT L – LOADING RACK DATA SHEET

Emission Unit ID#: **640-TR-3**	Emission Point ID#: **640-TR-3**	Year Installed/Modified: **2020**
Emission Unit Description: **LPG Truck Loading Rack**		
Loading Area Data		
Number of Pumps: **2**	Number of Liquids Loaded: **1**	Max number of trucks loading at one (1) time: **2**

Are tanker trucks pressure tested for leaks at this or any other location? ☒ Yes ☐ No ☐ Not Required
If Yes, Please describe:

Provide description of closed vent system and any bypasses.

Are any of the following truck loadout systems utilized?
☐ Closed System to tanker truck passing a MACT level annual leak test?
☐ Closed System to tanker truck passing a NSPS level annual leak test?
☐ Closed System to tanker truck not passing an annual leak test and has vapor return?

Projected Maximum Operating Schedule (for rack or transfer point as a whole)

Time	Jan – Mar	Apr - Jun	Jul – Sept	Oct - Dec
Hours/day	**10**	**10**	**10**	**10**
Days/week	**5**	**5**	**5**	**5**

Bulk Liquid Data (use extra pages as necessary)

Liquid Name		**LPG**		
Max. Daily Throughput (1000 gal/day)		**324**		
Max. Annual Throughput (1000 gal/yr)		**22,906**		
Loading Method[1]		**SUB**		
Max. Fill Rate (gal/min)		**600**		
Average Fill Time (min/loading)		**Dependent on Vessel Size**		
Max. Bulk Liquid Temperature (°F)		**60**		
True Vapor Pressure[2]		**20 psig**		
Cargo Vessel Condition[3]		**U**		
Control Equipment or Method[4]		**None**		
Max. Collection Efficiency (%)		**0**		
Max. Control Efficiency (%)		**0**		
Max.VOC Emission Rate	Lb/hr	**1.42**		
	Ton/yr	**1.33**		
Max.HAP Emission Rate	Lb/hr	**<0.01**		
	Ton/yr	**<0.01**		
Estimation Method[5]		**EE**		

1 BF Bottom Fill SP Splash Fill SUB Submerged Fill
2 At maximum bulk liquid temperature
3 B Ballasted Vessel C Cleaned U Uncleaned (dedicated service)
O Other (describe)
4 List as many as apply (complete and submit appropriate Air Pollution Control Device Sheets)
CA Carbon Adsorption VB Dedicated Vapor Balance (closed system)
ECD Enclosed Combustion Device F Flare
TO Thermal Oxidization or Incineration
5 EPA EPA Emission Factor in AP-42 MB Material Balance
TM Test Measurement based upon test data submittal O Other (describe)

Attachment L

EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT **www.epa.gov/tnn/tanks.html**), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (**http://www.epa.gov/tnn/chief/**).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name **Unit 630 – Liquid Products and Intermediates Storage**	2. Tank Name **Diesel Storage Tank 1 and 2**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **630-TK-8/9**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **630-TK-8/9**
5. Date of Commencement of Construction (for existing tanks)	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
7A. Does the tank have more than one mode of operation? ☐ Yes ☒ No (e.g. Is there more than one product stored in the tank?)	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. **28,500 bbl**	
9A. Tank Internal Diameter (ft) **80.00 ft**	9B. Tank Internal Height (or Length) (ft) **32.00 ft**
10A. Maximum Liquid Height (ft) **30.00 ft**	10B. Average Liquid Height (ft) **16.00 ft**
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. **28,500 bbl**	

13A. Maximum annual throughput (gal/yr) **100,426,830 gal/yr**	13B. Maximum daily throughput (gal/day) **275,142 gal/day**
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) **84**	
15. Maximum tank fill rate (gal/min) **191.07 gal/min**	
16. Tank fill method ☐ Submerged ☐ Splash ☒ Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):

☒ Fixed Roof X vertical ___ horizontal ___ flat roof ___ cone roof X dome roof ___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ___ vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

III. TANK CONSTRUCTION & OPERATION INFORMATION – See EPA Tanks 4.09d Simulation

19. Tank Shell Construction:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color	20B. Roof Color	20C. Year Last Painted

21. Shell Condition (if metal and unlined):
☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ YES ☐ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): to

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one) ☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal ☐ Vapor Mounted Resilient Seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO

25D. If YES, how is the secondary seal mounted? (check one) ☐ Shoe ☐ Rim ☐ Other (describe):

25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO

25F. Describe deck fittings; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks ☐ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

IV. SITE INFORMANTION – See EPA Tanks 4.09d Simulation

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION – See EPA Tanks 4.09d Simulation

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.

39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☒ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☐ Conservation Vent (psig)
  Vacuum Setting Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/yr)	Working Loss (lb/yr)	Annual Loss (lb/yr)	Estimation Method[1]
VOC	**659.88**	**1,901.66**	**2,561.54**	**EPA**
HAPs	**36.5**	**105.16**	**141.66**	**EPA**
Hexane	**0.00**	**0.00**	**0.00**	**EPA**
Benzene	**0.00**	**0.00**	**0.00**	**EPA**
Toluene	**0.00**	**0.00**	**0.00**	**EPA**
Ethylbenzene	**6.26**	**18.06**	**24.46**	**EPA**
Xylene	**6.26**	**18.06**	**24.46**	**EPA**

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L

EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT **www.epa.gov/tnn/tanks.html**), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (**http://www.epa.gov/tnn/chief/**).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name **Unit 630 - Liquid Products and Intermediates Storage**	2. Tank Name **Ethanol Storage Tank 1 and 2**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **630-TK-10/11**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **640-FL-1**
5. Date of Commencement of Construction (for existing tanks)	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. **4,000 bbl**	
9A. Tank Internal Diameter (ft) **30.00 ft**	9B. Tank Internal Height (or Length) (ft) **NA**
10A. Maximum Liquid Height (ft) **NA**	10B. Average Liquid Height (ft) **NA**
11A. Maximum Vapor Space Height (ft) **NA**	11B. Average Vapor Space Height (ft) **NA**
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. **4,000 bbl**	

13A. Maximum annual throughput (gal/yr) **4,600,352.5 gal/yr**	13B. Maximum daily throughput (gal/day) **12,603.7 gal/day**
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) **28**	
15. Maximum tank fill rate (gal/min) **8.75 gal/min**	
16. Tank fill method ☐ Submerged ☐ Splash ☒ Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):

- ☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe)
- ☐ External Floating Roof ___ pontoon roof ___ double deck roof
- ☐ Domed External (or Covered) Floating Roof
- ☒ Internal Floating Roof X vertical column support ___ self-supporting
- ☐ Variable Vapor Space ___ lifter roof ___ diaphragm
- ☐ Pressurized ___ spherical ___ cylindrical
- ☐ Underground
- ☐ Other (describe)

III. TANK CONSTRUCTION & OPERATION INFORMATION – See EPA Tanks 4.09d Simulation

19. Tank Shell Construction: ☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)		
20A. Shell Color	20B. Roof Color	20C. Year Last Painted
21. Shell Condition (if metal and unlined): ☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable		
22A. Is the tank heated? ☐ YES ☐ NO		
22B. If YES, provide the operating temperature (°F)		
22C. If YES, please describe how heat is provided to tank.		
23. Operating Pressure Range (psig): to		
24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply		
24A. For dome roof, provide roof radius (ft)		
24B. For cone roof, provide slope (ft/ft)		
25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply		
25A. Year Internal Floaters Installed:		
25B. Primary Seal Type: (check one) ☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal ☐ Vapor Mounted Resilient Seal ☐ Other (describe):		
25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO		
25D. If YES, how is the secondary seal mounted? (check one) ☐ Shoe ☐ Rim ☐ Other (describe):		
25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO		

25F. Describe deck fittings; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks ☐ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

IV. SITE INFORMANTION See EPA Tanks 4.09d Simulation

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION See EPA Tanks 4.09d Simulation

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.			
39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☐ Conservation Vent (psig)
  - Vacuum Setting — Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☒ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/yr)	Working Loss (lb/yr)	Annual Loss (lb/yr)	Estimation Method[1]
VOC	**473.22**	**70.54**	**543.76**	**EPA**

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT **www.epa.gov/tnn/tanks.html**), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (**http://www.epa.gov/tnn/chief/**).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name **Unit 630 - Liquid Products and Intermediates Storage**	2. Tank Name **Gasoline Storage Tank 1 and 2**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **630-TK-6/7**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **640-FL-1**
5. Date of Commencement of Construction (for existing tanks)	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. **20,000 bbl**	
9A. Tank Internal Diameter (ft) **67.00 ft**	9B. Tank Internal Height (or Length) (ft) **NA**
10A. Maximum Liquid Height (ft) **NA**	10B. Average Liquid Height (ft) **NA**
11A. Maximum Vapor Space Height (ft) **NA**	11B. Average Vapor Space Height (ft) **NA**
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. **20,000 bbl**	

13A. Maximum annual throughput (gal/yr) **26,068,665 gal/yr**	13B. Maximum daily throughput (gal/day) **71,421 gal/day**
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) **63**	
15. Maximum tank fill rate (gal/min) **49.60 gal/min**	
16. Tank fill method ☐ Submerged ☐ Splash ☒ Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year
18. Type of tank (check all that apply): ☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe) ☐ External Floating Roof ___ pontoon roof ___ double deck roof ☐ Domed External (or Covered) Floating Roof ☒ Internal Floating Roof X vertical column support ___ self-supporting ☐ Variable Vapor Space ___ lifter roof ___ diaphragm ☐ Pressurized ___ spherical ___ cylindrical ☐ Underground ☐ Other (describe)	

III. TANK CONSTRUCTION & OPERATION INFORMATION - See EPA Tanks 4.09d Simulation

19. Tank Shell Construction: ☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)		
20A. Shell Color	20B. Roof Color	20C. Year Last Painted
21. Shell Condition (if metal and unlined): ☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable		
22A. Is the tank heated? ☐ YES ☐ NO		
22B. If YES, provide the operating temperature (°F)		
22C. If YES, please describe how heat is provided to tank.		
23. Operating Pressure Range (psig): to		
24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply		
24A. For dome roof, provide roof radius (ft)		
24B. For cone roof, provide slope (ft/ft)		
25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply		
25A. Year Internal Floaters Installed:		
25B. Primary Seal Type: (check one) ☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal ☐ Vapor Mounted Resilient Seal ☐ Other (describe):		
25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO		
25D. If YES, how is the secondary seal mounted? (check one) ☐ Shoe ☐ Rim ☐ Other (describe):		
25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO		

25F. Describe deck fittings; indicate the number of each type of fitting:

ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks ☐ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

IV. SITE INFORMANTION - See EPA Tanks 4.09d Simulation

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION - See EPA Tanks 4.09d Simulation

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

39. Provide the following for each liquid or gas to be stored in tank. Add additional pages if necessary.

39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

☐ Carbon Adsorption[1]
☐ Condenser[1]
☐ Conservation Vent (psig)
Vacuum Setting Pressure Setting
☐ Emergency Relief Valve (psig)
☐ Inert Gas Blanket of
☐ Insulation of Tank with
☐ Liquid Absorption (scrubber)[1]
☐ Refrigeration of Tank
☐ Rupture Disc (psig)
☒ Vent to Incinerator[1]
☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/yr)	Working Loss (lb/yr)	Annual Loss (lb/yr)	Estimation Method[1]
VOC	**25,106.02**	**155.52**	**25,261.54**	**EPA**
HAPs	**16,477.44**	**102.07**	**16,579.51**	**EPA**
Hexane	**510.49**	**3.16**	**513.65**	**EPA**
Benzene	**114.75**	**0.71**	**115.46**	**EPA**
Toluene	**3,274.77**	**20.29**	**3,295.05**	**EPA**
Ethylbenzene	**6,289.02**	**38.96**	**6,327.97**	**EPA**
Xylene	**6,289.02**	**38.96**	**6,327.97**	**EPA**

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT **www.epa.gov/tnn/tanks.html**), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (**http://www.epa.gov/tnn/chief/**).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name **Unit 630 - Liquid Products and Intermediates Storage**	2. Tank Name **Heavy Slop Oil Storage Tank**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **630-TK-14**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **630-TK-14**
5. Date of Commencement of Construction (for existing tanks)	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. **16,000 bbl**	
9A. Tank Internal Diameter (ft) **60.00 ft**	9B. Tank Internal Height (or Length) (ft) **32.00 ft**
10A. Maximum Liquid Height (ft) **32.00 ft**	10B. Average Liquid Height (ft) **16.00 ft**
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. **16,000 bbl**	

13A. Maximum annual throughput (gal/yr) **1,316,572 gal/day**	13B. Maximum daily throughput (gal/day) **1,835.62 gal/day**
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) **2**	
15. Maximum tank fill rate (gal/min) **1.27 gal/min**	
16. Tank fill method ☐ Submerged ☐ Splash ☒ Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☐ Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):

☒ Fixed Roof X vertical ___ horizontal ___ flat roof ___ cone roof X dome roof
___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ___ vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

III. TANK CONSTRUCTION & OPERATION INFORMATION - See EPA Tanks 4.09d Simulation

19. Tank Shell Construction: ☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)		
20A. Shell Color	20B. Roof Color	20C. Year Last Painted
21. Shell Condition (if metal and unlined): ☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable		
22A. Is the tank heated? ☐ YES ☐ NO		
22B. If YES, provide the operating temperature (°F)		
22C. If YES, please describe how heat is provided to tank.		
23. Operating Pressure Range (psig): to		
24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply		
24A. For dome roof, provide roof radius (ft)		
24B. For cone roof, provide slope (ft/ft)		
25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply		
25A. Year Internal Floaters Installed:		
25B. Primary Seal Type: (check one) ☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal ☐ Vapor Mounted Resilient Seal ☐ Other (describe):		
25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO		
25D. If YES, how is the secondary seal mounted? (check one) ☐ Shoe ☐ Rim ☐ Other (describe):		
25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO		

25F. Describe deck fittings; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks ☐ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

IV. SITE INFORMANTION - See EPA Tanks 4.09d Simulation

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION - See EPA Tanks 4.09d Simulation

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.

39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☒ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☐ Conservation Vent (psig)
  Vacuum Setting Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/yr)	Working Loss (lb/yr)	Annual Loss (lb/yr)	Estimation Method[1]
VOC	**25.51**	**32.9**	**58.41**	**EPA**
HAPs	**1.41**	**1.82**	**3.23**	**EPA**
Hexane	**0.00**	**0.00**	**0.00**	**EPA**
Benzene	**0.00**	**0.00**	**0.00**	**EPA**
Toluene	**0.00**	**0.00**	**0.00**	**EPA**
Ethylbenzene	**0.25**	**0.32**	**0.56**	**EPA**
Xylene	**0.25**	**0.32**	**0.56**	**EPA**

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L

EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for <u>each</u> new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT **www.epa.gov/tnn/tanks.html**), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (**http://www.epa.gov/tnn/chief/**).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name **Unit 630 - Liquid Products and Intermediates Storage**	2. Tank Name **HYK Heavy Feed Storage Tank**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **630-TK-12**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **630-TK-12**
5. Date of Commencement of Construction (for existing tanks)	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. **3,000 bbl**	
9A. Tank Internal Diameter (ft) **30.00 ft**	9B. Tank Internal Height (or Length) (ft) **24.00 ft**
10A. Maximum Liquid Height (ft) **24.00 ft**	10B. Average Liquid Height (ft) **12.00 ft**
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. **3,000 bbl**	

13A. Maximum annual throughput (gal/yr) **209,454 gal/yr**	13B. Maximum daily throughput (gal/day) **573.58 gal/day**
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) **2**	
15. Maximum tank fill rate (gal/min) **0.40 gal/min**	
16. Tank fill method ☐ Submerged ☐ Splash ☒ Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):

☒ Fixed Roof X vertical ___ horizontal ___ flat roof ___ cone roof X dome roof
___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ___ vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

III. TANK CONSTRUCTION & OPERATION INFORMATION - See EPA Tanks 4.09d Simulation

19. Tank Shell Construction:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color	20B. Roof Color	20C. Year Last Painted

21. Shell Condition (if metal and unlined):
☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ YES ☐ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): to

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one) ☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal ☐ Vapor Mounted Resilient Seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO

25D. If YES, how is the secondary seal mounted? (check one) ☐ Shoe ☐ Rim ☐ Other (describe):

25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO

25F. Describe deck fittings; indicate the number of each type of fitting:

ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks ☐ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

IV. SITE INFORMANTION - See EPA Tanks 4.09d Simulation

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION - See EPA Tanks 4.09d Simulation

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

39. Provide the following for each liquid or gas to be stored in tank. Add additional pages if necessary.

39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☒ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☐ Conservation Vent (psig)
  Vacuum Setting Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/yr)	Working Loss (lb/yr)	Annual Loss (lb/yr)	Estimation Method[1]
VOC	**2.38**	**5.23**	**7.61**	**EPA**
HAPs	**0.13**	**0.29**	**0.42**	**EPA**
Hexane	**0.00**	**0.00**	**0.00**	**EPA**
Benzene	**0.00**	**0.00**	**0.00**	**EPA**
Toluene	**0.00**	**0.00**	**0.00**	**EPA**
Ethylbenzene	**0.03**	**0.05**	**0.08**	**EPA**
Xylene	**0.03**	**0.05**	**0.08**	**EPA**

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT **www.epa.gov/tnn/tanks.html**), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (**http://www.epa.gov/tnn/chief/**).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name **Unit 630 - Liquid Products and Intermediates Storage**	2. Tank Name **HYK Light Feed Storage Tank**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **630-TK-13**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **630-TK-13**

5. Date of Commencement of Construction (for existing tanks)

6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification

7. Description of Tank Modification (if applicable)

7A. Does the tank have more than one mode of operation? ☐ Yes ☒ No
(e.g. Is there more than one product stored in the tank?)

7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).

7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height.

16,000 bbl

9A. Tank Internal Diameter (ft) **60.00 ft**	9B. Tank Internal Height (or Length) (ft) **NA**
10A. Maximum Liquid Height (ft) **NA**	10B. Average Liquid Height (ft) **NA**
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)

12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.

16,000 bbl

13A. Maximum annual throughput (gal/yr) **670,000 gal/yr**	13B. Maximum daily throughput (gal/day) **1,835.62 gal/day**

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)
2

15. Maximum tank fill rate (gal/min) **1.27 gal/min**

16. Tank fill method ☐ Submerged ☐ Splash ☒ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):
- ☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe)
- ☐ External Floating Roof ___ pontoon roof ___ double deck roof
- ☐ Domed External (or Covered) Floating Roof
- ☒ Internal Floating Roof X vertical column support ___ self-supporting
- ☐ Variable Vapor Space ___ lifter roof ___ diaphragm
- ☐ Pressurized ___ spherical ___ cylindrical
- ☐ Underground
- ☐ Other (describe)

III. TANK CONSTRUCTION & OPERATION INFORMATION - See EPA Tanks 4.09d Simulation

19. Tank Shell Construction:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color	20B. Roof Color	20C. Year Last Painted

21. Shell Condition (if metal and unlined):
☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ YES ☐ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): to

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one) ☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal ☐ Vapor Mounted Resilient Seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO

25D. If YES, how is the secondary seal mounted? (check one) ☐ Shoe ☐ Rim ☐ Other (describe):

25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO

25F. Describe deck fittings; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks ☐ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

IV. SITE INFORMANTION - See EPA Tanks 4.09d Simulation

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION - See EPA Tanks 4.09d Simulation

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.

39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☐ Conservation Vent (psig)
  Vacuum Setting Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/yr)	Working Loss (lb/yr)	Annual Loss (lb/yr)	Estimation Method[1]
VOC	**24.16**	**5.53**	**29.69**	**EPA**
HAPs	**2.67**	**0.31**	**1.64**	**EPA**
Hexane	**0.00**	**0.00**	**0.00**	**EPA**
Benzene	**0.00**	**0.00**	**0.00**	**EPA**
Toluene	**0.00**	**0.00**	**0.00**	**EPA**
Ethylbenzene	**0.23**	**0.06**	**0.29**	**EPA**
Xylene	**0.23**	**0.06**	**0.29**	**EPA**

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT **www.epa.gov/tnn/tanks.html**), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (**http://www.epa.gov/tnn/chief/**).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name **Unit 630 - Liquid Products and Intermediates Storage**	2. Tank Name **Light Naphtha Storage Tank 1 and 2**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **630-TK-2/3**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **640-FL-1**
5. Date of Commencement of Construction (for existing tanks)	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. **3,000 bbl**	
9A. Tank Internal Diameter (ft) **30.00 ft**	9B. Tank Internal Height (or Length) (ft) **NA**
10A. Maximum Liquid Height (ft) **NA**	10B. Average Liquid Height (ft) **NA**
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. **3,000 bbl**	

13A. Maximum annual throughput (gal/yr) **10,845,975 gal/yr**	13B. Maximum daily throughput (gal/day) **29,715 gal/day**

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)
87

15. Maximum tank fill rate (gal/min) **20.64 gal/min**

16. Tank fill method ☐ Submerged ☐ Splash ☒ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☐ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):
- ☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe)
- ☐ External Floating Roof ___ pontoon roof ___ double deck roof
- ☐ Domed External (or Covered) Floating Roof
- ☒ Internal Floating Roof X vertical column support ___ self-supporting
- ☐ Variable Vapor Space ___ lifter roof ___ diaphragm
- ☐ Pressurized ___ spherical ___ cylindrical
- ☐ Underground
- ☐ Other (describe)

III. TANK CONSTRUCTION & OPERATION INFORMATION - See EPA Tanks 4.09d Simulation

19. Tank Shell Construction:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color	20B. Roof Color	20C. Year Last Painted

21. Shell Condition (if metal and unlined):
☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ YES ☐ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): to

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one) ☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal ☐ Vapor Mounted Resilient Seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO

25D. If YES, how is the secondary seal mounted? (check one) ☐ Shoe ☐ Rim ☐ Other (describe):

25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO

25F. Describe deck fittings; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks ☐ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

IV. SITE INFORMANTION - See EPA Tanks 4.09d Simulation

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION - See EPA Tanks 4.09d Simulation

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.			
39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☐ Conservation Vent (psig)

  Vacuum Setting   Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/hr)	Working Loss (lb/hr)	Annual Loss (lb/yr)	Estimation Method[1]
VOC	**11,183.24**	**140.92**	**11,324.16**	**EPA**
HAPs	**9,783.78**	**124.86**	**9,908.64**	**EPA**
Hexane	**3,354.44**	**42.81**	**3,397.25**	**EPA**
Benzene	**447.26**	**5.71**	**452.97**	**EPA**
Toluene	**1,956.76**	**24.97**	**1,981.73**	**EPA**
Ethylbenzene	**670.89**	**8.56**	**679.45**	**EPA**
Xylene	**3,354.44**	**42.81**	**3,397.25**	**EPA**
Emissions above are uncontrolled				

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT **www.epa.gov/tnn/tanks.html**), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (**http://www.epa.gov/tnn/chief/**).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name **Unit 630 - Liquid Products and Intermediates Storage**	2. Tank Name **LPG Storage Tank**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **630-TK-1**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **NA**
5. Date of Commencement of Construction (for existing tanks)	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. **11,000 bbl**	
9A. Tank Internal Diameter (ft)	9B. Tank Internal Height (or Length) (ft)
10A. Maximum Liquid Height (ft)	10B. Average Liquid Height (ft)
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)

15. Maximum tank fill rate (gal/min)

16. Tank fill method ☐ Submerged ☐ Splash ☐ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☐ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):
- ☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe)
- ☐ External Floating Roof ___ pontoon roof ___ double deck roof
- ☐ Domed External (or Covered) Floating Roof
- ☐ Internal Floating Roof ___ vertical column support ___ self-supporting
- ☐ Variable Vapor Space ___ lifter roof ___ diaphragm
- ☒ Pressurized X spherical ___ cylindrical
- ☐ Underground
- ☐ Other (describe)

III. TANK CONSTRUCTION & OPERATION INFORMATION

19. Tank Shell Construction:
☒ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color **White**	20B. Roof Color **White**	20C. Year Last Painted **2020**

21. Shell Condition (if metal and unlined):
☒ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ YES ☒ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): **20** to **200**

24. Complete the following section for **Vertical Fixed Roof Tanks** ☒ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☒ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one) ☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal ☐ Vapor Mounted Resilient Seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO

25D. If YES, how is the secondary seal mounted? (check one) ☐ Shoe ☐ Rim ☐ Other (describe):

25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO

25F. Describe deck fittings; indicate the number of each type of fitting:

ACCESS HATCH

BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:

AUTOMATIC GAUGE FLOAT WELL

BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:

COLUMN WELL

BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:

LADDER WELL

PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:

GAUGE-HATCH/SAMPLE PORT

SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:

ROOF LEG OR HANGER WELL

WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)

VACUUM BREAKER

WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:

RIM VENT

WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:

DECK DRAIN (3-INCH DIAMETER)

OPEN:	90% CLOSED:

STUB DRAIN

1-INCH DIAMETER:

OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)

26. Complete the following section for Internal Floating Roof Tanks ☒ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

IV. SITE INFORMANTION

27. Provide the city and state on which the data in this section are based. **Charleston, WV**	
28. Daily Average Ambient Temperature (°F)	**54.98**
29. Annual Average Maximum Temperature (°F)	**65.75**
30. Annual Average Minimum Temperature (°F)	**44.22**
31. Average Wind Speed (miles/hr)	**6.05**
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))	**1,250.57**
33. Atmospheric Pressure (psia)	**14.25**

V. LIQUID INFORMATION

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig) **20**	35B. Maximum (psig) **200**
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.

39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☐ Conservation Vent (psig)
  Vacuum Setting Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	**Breathing Loss (lb/yr)**	**Working Loss (lb/yr)**	**Annual Loss (lb/yr)**	**Estimation Method[1]**

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☐ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT **www.epa.gov/tnn/tanks.html**), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (**http://www.epa.gov/tnn/chief/**).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name **Unit 630 - Liquid Products and Intermediates Storage**	2. Tank Name **Reformate Storage Tank 1 and 2**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **630-TK-4/5**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **630-TK-4/5**
5. Date of Commencement of Construction (for existing tanks)	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. **4,000 bbl**	
9A. Tank Internal Diameter (ft) **30.00 ft**	9B. Tank Internal Height (or Length) (ft) **NA**
10A. Maximum Liquid Height (ft) **NA**	10B. Average Liquid Height (ft) **NA**
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. **4,000 bbl**	

13A. Maximum annual throughput (gal/yr) **15,222,690 gal/yr**	13B. Maximum daily throughput (gal/day) **41,706 gal/day**
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) **91**	
15. Maximum tank fill rate (gal/min) **28.96**	
16. Tank fill method ☐ Submerged ☐ Splash ☒ Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):

☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☒ Internal Floating Roof X vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

III. TANK CONSTRUCTION & OPERATION INFORMATION - See EPA Tanks 4.09d Simulation

19. Tank Shell Construction:

☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color	20B. Roof Color	20C. Year Last Painted

21. Shell Condition (if metal and unlined):

☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ YES ☐ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): to

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one)

☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal

☐ Vapor Mounted Resilient Seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO

25D. If YES, how is the secondary seal mounted? (check one) ☐ Shoe ☐ Rim ☐ Other (describe):

25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO

25F. Describe deck fittings; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks ☐ Does Not Apply		
26A. Deck Type: ☐ Bolted ☐ Welded		
26B. For Bolted decks, provide deck construction:		
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)		
26D. Deck seam length (ft)	26E. Area of deck (ft^2)	
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:	

IV. SITE INFORMANTION - See EPA Tanks 4.09d Simulation

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION - See EPA Tanks 4.09d Simulation

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.

39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☐ Conservation Vent (psig)
  Vacuum Setting Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/yr)	Working Loss (lb/yr)	Annual Loss (lb/yr)	Estimation Method[1]
VOC	**315.36**	**235.52**	**550.88**	**EPA**
HAPs	**231.84**	**155.42**	**387.26**	**EPA**
Hexane	**65.38**	**4.80**	**70.18**	**EPA**
Benzene	**14.40**	**1.74**	**16.14**	**EPA**
Toluene	**70.98**	**30.76**	**101.74**	**EPA**
Ethylbenzene	**44.26**	**59.06**	**103.32**	**EPA**
Xylene	**36.82**	**59.06**	**95.88**	**EPA**

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT **www.epa.gov/tnn/tanks.html**), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (**http://www.epa.gov/tnn/chief/**).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name **Unit 630 - Liquid Products and Intermediates Storage**	2. Tank Name **Light Slop Oil Storage Tank**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **630-TK-15**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **630-TK-15**
5. Date of Commencement of Construction (for existing tanks)	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. **16,000 bbl**	
9A. Tank Internal Diameter (ft) **60.00 ft**	9B. Tank Internal Height (or Length) (ft) **NA**
10A. Maximum Liquid Height (ft) **NA**	10B. Average Liquid Height (ft) **NA**
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. **16,000 bbl**	

13A. Maximum annual throughput (gal/yr) **1,316,572 gal/yr**	13B. Maximum daily throughput (gal/day) **3,607.05 gal/day**
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) **2**	
15. Maximum tank fill rate (gal/min) **2.51 gal/min**	
16. Tank fill method ☐ Submerged ☐ Splash ☒ Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☒ Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):

☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☒ Internal Floating Roof X vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

III. TANK CONSTRUCTION & OPERATION INFORMATION - See EPA Tanks 4.09d Simulation

19. Tank Shell Construction:

☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color	20B. Roof Color	20C. Year Last Painted

21. Shell Condition (if metal and unlined):

☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ YES ☐ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): to

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one)
☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal
☐ Vapor Mounted Resilient Seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO

25D. If YES, how is the secondary seal mounted? (check one) ☐ Shoe ☐ Rim ☐ Other (describe):

25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO

25F. Describe deck fittings; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks ☐ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded	
26B. For Bolted decks, provide deck construction:	
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)	
26D. Deck seam length (ft)	26E. Area of deck (ft^2)
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:

IV. SITE INFORMANTION - See EPA Tanks 4.09d Simulation

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION - See EPA Tanks 4.09d Simulation

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.

39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☐ Conservation Vent (psig)
  Vacuum Setting Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/yr)	Working Loss (lb/yr)	Annual Loss (lb/yr)	Estimation Method[1]
VOC	**24.16**	**5.27**	**29.43**	**EPA**
HAPs	**2.86**	**0.63**	**3.48**	**EPA**
Hexane	**0.05**	**0.01**	**0.06**	**EPA**
Benzene	**0.02**	**0.01**	**0.03**	**EPA**
Toluene	**0.33**	**0.07**	**0.4**	**EPA**
Ethylbenzene	**0.84**	**0.19**	**1.02**	**EPA**
Xylene	**0.84**	**0.19**	**1.02**	**EPA**

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

Attachment L

EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT **www.epa.gov/tnn/tanks.html**), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (**http://www.epa.gov/tnn/chief/**).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name **Unit 430 - Sour Water Stripping**	2. Tank Name **Sour Water Storage Tank**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **430-TK-1**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **430-TK-1**
5. Date of Commencement of Construction (for existing tanks)	
6. Type of change ☒ New Construction ☐ New Stored Material ☐ Other Tank Modification	
7. Description of Tank Modification (if applicable)	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode).	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.):	

II. TANK INFORMATION (required)

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height. **5,000 bbl**	
9A. Tank Internal Diameter (ft) **30.00 ft**	9B. Tank Internal Height (or Length) (ft) **NA**
10A. Maximum Liquid Height (ft) **NA**	10B. Average Liquid Height (ft) **NA**
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights. **5,000 bbl**	

13A. Maximum annual throughput (gal/yr) **165,179,261 gal/yr**	13B. Maximum daily throughput (gal/day) **452,545 gal/day**

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume) **789**

15. Maximum tank fill rate (gal/min) **314.27 gal/min**

16. Tank fill method ☐ Submerged ☐ Splash ☒ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☐ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):
- ☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe)
- ☐ External Floating Roof ___ pontoon roof ___ double deck roof
- ☐ Domed External (or Covered) Floating Roof
- ☐ Internal Floating Roof ___ vertical column support ___ self-supporting
- ☐ Variable Vapor Space ___ lifter roof ___ diaphragm
- ☐ Pressurized ___ spherical ___ cylindrical
- ☐ Underground
- ☐ Other (describe)

III. TANK CONSTRUCTION & OPERATION INFORMATION - See EPA Tanks 4.09d Simulation

19. Tank Shell Construction:
☐ Riveted ☐ Gunite lined ☐ Epoxy-coated rivets ☐ Other (describe)

20A. Shell Color	20B. Roof Color	20C. Year Last Painted

21. Shell Condition (if metal and unlined):
☐ No Rust ☐ Light Rust ☐ Dense Rust ☐ Not applicable

22A. Is the tank heated? ☐ YES ☐ NO

22B. If YES, provide the operating temperature (°F)

22C. If YES, please describe how heat is provided to tank.

23. Operating Pressure Range (psig): to

24. Complete the following section for **Vertical Fixed Roof Tanks** ☐ Does Not Apply

24A. For dome roof, provide roof radius (ft)

24B. For cone roof, provide slope (ft/ft)

25. Complete the following section for **Floating Roof Tanks** ☐ Does Not Apply

25A. Year Internal Floaters Installed:

25B. Primary Seal Type: (check one) ☐ Metallic (Mechanical) Shoe Seal ☐ Liquid Mounted Resilient Seal ☐ Vapor Mounted Resilient Seal ☐ Other (describe):

25C. Is the Floating Roof equipped with a Secondary Seal? ☐ YES ☐ NO

25D. If YES, how is the secondary seal mounted? (check one) ☐ Shoe ☐ Rim ☐ Other (describe):

25E. Is the Floating Roof equipped with a weather shield? ☐ YES ☐ NO

25F. Describe deck fittings; indicate the number of each type of fitting:		
ACCESS HATCH		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
AUTOMATIC GAUGE FLOAT WELL		
BOLT COVER, GASKETED:	UNBOLTED COVER, GASKETED:	UNBOLTED COVER, UNGASKETED:
COLUMN WELL		
BUILT-UP COLUMN – SLIDING COVER, GASKETED:	BUILT-UP COLUMN – SLIDING COVER, UNGASKETED:	PIPE COLUMN – FLEXIBLE FABRIC SLEEVE SEAL:
LADDER WELL		
PIP COLUMN – SLIDING COVER, GASKETED:	PIPE COLUMN – SLIDING COVER, UNGASKETED:	
GAUGE-HATCH/SAMPLE PORT		
SLIDING COVER, GASKETED:	SLIDING COVER, UNGASKETED:	
ROOF LEG OR HANGER WELL		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	SAMPLE WELL-SLIT FABRIC SEAL (10% OPEN AREA)
VACUUM BREAKER		
WEIGHTED MECHANICAL ACTUATION, GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
RIM VENT		
WEIGHTED MECHANICAL ACTUATION GASKETED:	WEIGHTED MECHANICAL ACTUATION, UNGASKETED:	
DECK DRAIN (3-INCH DIAMETER)		
OPEN:	90% CLOSED:	
STUB DRAIN		
1-INCH DIAMETER:		
OTHER (DESCRIBE, ATTACH ADDITIONAL PAGES IF NECESSARY)		

26. Complete the following section for Internal Floating Roof Tanks	☐ Does Not Apply	
26A. Deck Type: ☐ Bolted ☐ Welded		
26B. For Bolted decks, provide deck construction:		
26C. Deck seam: ☐ Continuous sheet construction 5 feet wide ☐ Continuous sheet construction 6 feet wide ☐ Continuous sheet construction 7 feet wide ☐ Continuous sheet construction 5 × 7.5 feet wide ☐ Continuous sheet construction 5 × 12 feet wide ☐ Other (describe)		
26D. Deck seam length (ft)	26E. Area of deck (ft^2)	
For column supported tanks: 26F. Number of columns:	26G. Diameter of each column:	

IV. SITE INFORMANTION - See EPA Tanks 4.09d Simulation

27. Provide the city and state on which the data in this section are based.
28. Daily Average Ambient Temperature (°F)
29. Annual Average Maximum Temperature (°F)
30. Annual Average Minimum Temperature (°F)
31. Average Wind Speed (miles/hr)
32. Annual Average Solar Insulation Factor (BTU/(ft^2·day))
33. Atmospheric Pressure (psia)

V. LIQUID INFORMATION - See EPA Tanks 4.09d Simulation

34. Average daily temperature range of bulk liquid:	
34A. Minimum (°F)	34B. Maximum (°F)
35. Average operating pressure range of tank:	
35A. Minimum (psig)	35B. Maximum (psig)
36A. Minimum Liquid Surface Temperature (°F)	36B. Corresponding Vapor Pressure (psia)
37A. Average Liquid Surface Temperature (°F)	37B. Corresponding Vapor Pressure (psia)
38A. Maximum Liquid Surface Temperature (°F)	38B. Corresponding Vapor Pressure (psia)

39. Provide the following for <u>each</u> liquid or gas to be stored in tank. Add additional pages if necessary.

39A. Material Name or Composition			
39B. CAS Number			
39C. Liquid Density (lb/gal)			
39D. Liquid Molecular Weight (lb/lb-mole)			
39E. Vapor Molecular Weight (lb/lb-mole)			

Maximum Vapor Pressure 39F. True (psia) 39G. Reid (psia)			
Months Storage per Year 39H. From 39I. To			

VI. EMISSIONS AND CONTROL DEVICE DATA (required)

40. Emission Control Devices (check as many as apply): ☐ Does Not Apply

- ☐ Carbon Adsorption[1]
- ☐ Condenser[1]
- ☐ Conservation Vent (psig)
  - Vacuum Setting Pressure Setting
- ☐ Emergency Relief Valve (psig)
- ☐ Inert Gas Blanket of
- ☐ Insulation of Tank with
- ☐ Liquid Absorption (scrubber)[1]
- ☐ Refrigeration of Tank
- ☐ Rupture Disc (psig)
- ☐ Vent to Incinerator[1]
- ☐ Other[1] (describe):

[1] Complete appropriate Air Pollution Control Device Sheet.

41. Expected Emission Rate (submit Test Data or Calculations here or elsewhere in the application).

Material Name & CAS No.	Breathing Loss (lb/yr)	Working Loss (lb/yr)	Annual Loss (lb/yr)	Estimation Method[1]
VOC	**30.08**	**301.27**	**331.35**	**EPA**
HAPs	**26.32**	**263.61**	**289.93**	**EPA**
Hexane	**9.02**	**90.38**	**99.41**	**EPA**
Benzene	**1.20**	**12.05**	**13.25**	**EPA**
Toluene	**5.26**	**52.72**	**57.99**	**EPA**
Ethylbenzene	**1.80**	**18.08**	**19.88**	**EPA**
Xylene	**9.02**	**90.38**	**99.41**	**EPA**

[1] EPA = EPA Emission Factor, MB = Material Balance, SS = Similar Source, ST = Similar Source Test, Throughput Data, O = Other (specify)

☒ Remember to attach emissions calculations, including TANKS Summary Sheets if applicable.

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification	
User Identification:	DSF - Sour Water Storage Tank
City:	Point Pleasant
State:	West Virginia
Company:	DSF
Type of Tank:	Internal Floating Roof Tank
Description:	5,000 BBL storage tank for sour water holding storage in the Unit 430 - Sour Water Stripping process. In order to provide a conservative estimate of emissions, sour water is assumed to be 80% water and 20% light naphtha.
Tank Dimensions	
Diameter (ft):	30.00
Volume (gallons):	210,000.00
Turnovers:	786.57
Self Supp. Roof? (y/n):	N
No. of Columns:	1.00
Eff. Col. Diam. (ft):	1.00
Paint Characteristics	
Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good
Rim-Seal System	
Primary Seal:	Mechanical Shoe
Secondary Seal	None
Deck Characteristics	
Deck Fitting Category:	Typical
Deck Type:	Bolted
Construction:	Panel
Deck Seam:	Panel: 5 x 12 Ft
Deck Seam Len. (ft):	197.92

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Ungask.	1
Ladder Well (36-in. Diam.)/Sliding Cover, Ungasketed	1
Roof Leg or Hanger Well/Adjustable	10
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1
Stub Drain (1-in. Diameter)/Slit Fabric Seal 10% Open	8
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

DSF - Sour Water Storage Tank - Internal Floating Roof Tank Point Pleasant, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Sour Water	All	56.67	51.31	62.04	55.00	0.2625	N/A	N/A	28.2755			21.71	
Jet naphtha (JP-4)						1.2002	N/A	N/A	80.0000	0.2000	0.4681	120.00	Option 1: VP50 = 1 VP60 = 1.3
Water						0.2273	N/A	N/A	18.0200	0.8000	0.5319	18.02	Option 2: A=8.10765, B=1750.286, C=235

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

DSF - Sour Water Storage Tank - Internal Floating Roof Tank Point Pleasant, West Virginia

Annual Emission Calcaulations	
Rim Seal Losses (lb):	22.8596
Seal Factor A (lb-mole/ft-yr):	5.8000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.3000
Value of Vapor Pressure Function:	0.0046
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.2625
Tank Diameter (ft):	30.0000
Vapor Molecular Weight (lb/lb-mole):	28.2755
Product Factor:	1.0000
Withdrawal Losses (lb):	1,506.3384
Number of Columns:	1.0000
Effective Column Diameter (ft):	1.0000
Annual Net Throughput (gal/yr.):	165,179,261.0000
Shell Clingage Factor (bbl/1000 sqft):	0.0015
Average Organic Liquid Density (lb/gal):	7.8613
Tank Diameter (ft):	30.0000
Deck Fitting Losses (lb):	36.7594
Value of Vapor Pressure Function:	0.0046
Vapor Molecular Weight (lb/lb-mole):	28.2755
Product Factor:	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	279.8000
Deck Seam Losses (lb):	4.6350
Deck Seam Length (ft):	197.9200
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.1400
Deck Seam Length Factor(ft/sqft):	0.2800
Tank Diameter (ft):	30.0000
Vapor Molecular Weight (lb/lb-mole):	28.2755
Product Factor:	1.0000
Total Losses (lb):	1,570.5924

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1	36.00	5.90	1.20	4.7296
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1	14.00	5.40	1.10	1.8393
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Ungask.	1	47.00	0.00	0.00	6.1747
Ladder Well (36-in. Diam.)/Sliding Cover, Ungasketed	1	76.00	0.00	0.00	9.9847
Roof Leg or Hanger Well/Adjustable	10	7.90	0.00	0.00	10.3788
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1	12.00	0.00	0.00	1.5765
Stub Drain (1-in. Diameter)/	8	1.20	0.00	0.00	1.2612
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	0.8145

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

DSF - Sour Water Storage Tank - Internal Floating Roof Tank Point
Pleasant, West Virginia

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Sour Water	22.86	1,506.34	36.76	4.63	1,570.59
Water	12.16	1,205.07	19.55	2.47	1,239.24
Jet naphtha (JP-4)	10.70	301.27	17.21	2.17	331.35

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	DSF - Light Slop Oil Tank
City:	Point Pleasant
State:	West Virginia
Company:	DSF
Type of Tank:	Internal Floating Roof Tank
Description:	16,000 BBL internal floating roof storage tank for the light slop oil for plant shutdowns estimated to occur for one (1) month. To provide a conservative estimate for emissions, storage is assumed to occur during July.

Tank Dimensions

Diameter (ft):	60.00
Volume (gallons):	670,000.00
Turnovers:	1.97
Self Supp. Roof? (y/n):	N
No. of Columns:	1.00
Eff. Col. Diam. (ft):	1.00

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Rim-Seal System

Primary Seal:	Mechanical Shoe
Secondary Seal	None

Deck Characteristics

Deck Fitting Category:	Typical	
Deck Type:	Bolted	
Construction:	Panel	
Deck Seam:	Panel: 5 x 12 Ft	
Deck Seam Len. (ft):		791.68

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Ungask.	1
Ladder Well (36-in. Diam.)/Sliding Cover, Ungasketed	1
Roof Leg or Hanger Well/Adjustable	17
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1
Stub Drain (1-in. Diameter)/Slit Fabric Seal 10% Open	29
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

DSF - Light Slop Oil Tank - Internal Floating Roof Tank Point Pleasant, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Light Slop Oil	Jul	66.29	60.27	72.31	55.00	0.2369	N/A	N/A	81.4403			177.49	
Distillate fuel oil no. 2						0.0081	N/A	N/A	130.0000	0.8955	0.0460	188.00	Option 1: VP60 = .0065 VP70 = .009
Jet naphtha (JP-4)						1.4887	N/A	N/A	80.0000	0.1045	0.9540	120.00	Option 1: VP60 = 1.3 VP70 = 1.6

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

DSF - Light Slop Oil Tank - Internal Floating Roof Tank Point Pleasant, West Virginia

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):							9.8970					
Seal Factor A (lb-mole/ft-yr):							5.8000					
Seal Factor B (lb-mole/ft-yr (mph)^n):							0.3000					
Value of Vapor Pressure Function:							0.0042					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.2369					
Tank Diameter (ft):							60.0000					
Vapor Molecular Weight (lb/lb-mole):							81.4403					
Product Factor:							1.0000					
Withdrawal Losses (lb):							5.2741					
Number of Columns:							1.0000					
Effective Column Diameter (ft):							1.0000					
Net Throughput (gal/mo.):							1,316,572.0000					
Shell Clingage Factor (bbl/1000 sqft):							0.0015					
Average Organic Liquid Density (lb/gal):							7.0198					
Tank Diameter (ft):							60.0000					
Deck Fitting Losses (lb):							10.2469					
Value of Vapor Pressure Function:							0.0042					
Vapor Molecular Weight (lb/lb-mole):							81.4403					
Product Factor:							1.0000					
Tot. Roof Fitting Loss Fact.(lb-mole/yr):							360.3000					
Deck Seam Losses (lb):							4.0134					
Deck Seam Length (ft):							791.6800					
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):							0.1400					
Deck Seam Length Factor(ft/sqft):							0.2800					
Tank Diameter (ft):							60.0000					
Vapor Molecular Weight (lb/lb-mole):							81.4403					
Product Factor:							1.0000					
Total Losses (lb):							29.4314					

Roof Fitting/Status	Quantity	KFa(lb-mole/yr)	Roof Fitting Loss Factors KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1	36.00	5.90	1.20	1.0435
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1	14.00	5.40	1.10	0.4058
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Ungask.	1	47.00	0.00	0.00	1.3623
Ladder Well (36-in. Diam.)/Sliding Cover, Ungasketed	1	76.00	0.00	0.00	2.2029
Roof Leg or Hanger Well/Adjustable	17	7.90	0.00	0.00	3.8927
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1	12.00	0.00	0.00	0.3478
Stub Drain (1-in. Diameter)/	29	1.20	0.00	0.00	1.0087
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	0.1797

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

DSF - Light Slop Oil Tank - Internal Floating Roof Tank Point
Pleasant, West Virginia

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Light Slop Oil	9.90	5.27	10.25	4.01	29.43
Distillate fuel oil no. 2	0.46	4.72	0.47	0.18	5.83
Jet naphtha (JP-4)	9.44	0.55	9.78	3.83	23.60

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	DSF - Light Naphtha v0.2
City:	Point Pleasant
State:	West Virginia
Company:	DSF
Type of Tank:	Internal Floating Roof Tank
Description:	3,000 BBL internal floating roof storage tanks for light naphtha storage at the DSF facility

Tank Dimensions

Diameter (ft):	30.00
Volume (gallons):	126,000.00
Turnovers:	86.08
Self Supp. Roof? (y/n):	N
No. of Columns:	1.00
Eff. Col. Diam. (ft):	1.00

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Rim-Seal System

Primary Seal:	Mechanical Shoe
Secondary Seal	None

Deck Characteristics

Deck Fitting Category:	Typical
Deck Type:	Bolted
Construction:	Panel
Deck Seam:	Panel: 5 x 12 Ft
Deck Seam Len. (ft):	197.92

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Ungask.	1
Ladder Well (36-in. Diam.)/Sliding Cover, Ungasketed	1
Roof Leg or Hanger Well/Adjustable	10
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1
Stub Drain (1-in. Diameter)/Slit Fabric Seal 10% Open	8
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

DSF - Light Naphtha v0.2 - Internal Floating Roof Tank Point
Pleasant, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 15.0)	All	56.67	51.31	62.04	55.00	7.6647	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

DSF - Light Naphtha v0.2 - Internal Floating Roof Tank Point Pleasant, West Virginia

Annual Emission Calcaulations	
Rim Seal Losses (lb):	1,989.3304
Seal Factor A (lb-mole/ft-yr):	5.8000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.3000
Value of Vapor Pressure Function:	0.1905
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	7.6647
Tank Diameter (ft):	30.0000
Vapor Molecular Weight (lb/lb-mole):	60.0000
Product Factor:	1.0000
Withdrawal Losses (lb):	70.4579
Number of Columns:	1.0000
Effective Column Diameter (ft):	1.0000
Annual Net Throughput (gal/yr.):	10,845,975.0000
Shell Clingage Factor (bbl/1000 sqft):	0.0015
Average Organic Liquid Density (lb/gal):	5.6000
Tank Diameter (ft):	30.0000
Deck Fitting Losses (lb):	3,198.9347
Value of Vapor Pressure Function:	0.1905
Vapor Molecular Weight (lb/lb-mole):	60.0000
Product Factor:	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	279.8000
Deck Seam Losses (lb):	403.3535
Deck Seam Length (ft):	197.9200
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.1400
Deck Seam Length Factor(ft/sqft):	0.2800
Tank Diameter (ft):	30.0000
Vapor Molecular Weight (lb/lb-mole):	60.0000
Product Factor:	1.0000
Total Losses (lb):	5,662.0764

		Roof Fitting Loss Factors			
Roof Fitting/Status	Quantity	KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1	36.00	5.90	1.20	411.5856
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1	14.00	5.40	1.10	160.0611
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Ungask.	1	47.00	0.00	0.00	537.3479
Ladder Well (36-in. Diam.)/Sliding Cover, Ungasketed	1	76.00	0.00	0.00	868.9029
Roof Leg or Hanger Well/Adjustable	10	7.90	0.00	0.00	903.2017
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1	12.00	0.00	0.00	137.1952
Stub Drain (1-in. Diameter)/	8	1.20	0.00	0.00	109.7562
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	70.8842

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

DSF - Light Naphtha v0.2 - Internal Floating Roof Tank Point
Pleasant, West Virginia

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Gasoline (RVP 15.0)	1,989.33	70.46	3,198.93	403.35	5,662.08

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	DSF - HYK Light Feed Tank
City:	Point Pleasant
State:	West Virginia
Company:	DSF
Type of Tank:	Internal Floating Roof Tank
Description:	16,000 BBL internal floating roof storage tank for the HYK Light Feed for plant shutdowns estimated to occur for one (1) month. To provide a conservative estimate for emissions, storage is assumed to occur during July.

Tank Dimensions

Diameter (ft):	60.00
Volume (gallons):	670,000.00
Turnovers:	1.97
Self Supp. Roof? (y/n):	N
No. of Columns:	4.00
Eff. Col. Diam. (ft):	1.00

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Rim-Seal System

Primary Seal:	Mechanical Shoe
Secondary Seal	None

Deck Characteristics

Deck Fitting Category:	Typical
Deck Type:	Bolted
Construction:	Panel
Deck Seam:	Panel: 5 x 12 Ft
Deck Seam Len. (ft):	791.68

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Ungask.	1
Ladder Well (36-in. Diam.)/Sliding Cover, Ungasketed	1
Roof Leg or Hanger Well/Adjustable	17
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1
Stub Drain (1-in. Diameter)/Slit Fabric Seal 10% Open	29
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

DSF - HYK Light Feed Tank - Internal Floating Roof Tank Point Pleasant, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
HYK Light Feed	Jul	66.29	60.27	72.31	55.00	0.2369	N/A	N/A	81.4403			177.49	
Distillate fuel oil no. 2						0.0081	N/A	N/A	130.0000	0.8955	0.0460	188.00	Option 1: VP60 = .0065 VP70 = .009
Jet naphtha (JP-4)						1.4887	N/A	N/A	80.0000	0.1045	0.9540	120.00	Option 1: VP60 = 1.3 VP70 = 1.6

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

DSF - HYK Light Feed Tank - Internal Floating Roof Tank Point Pleasant, West Virginia

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):							9.8970					
Seal Factor A (lb-mole/ft-yr):							5.8000					
Seal Factor B (lb-mole/ft-yr (mph)^n):							0.3000					
Value of Vapor Pressure Function:							0.0042					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.2369					
Tank Diameter (ft):							60.0000					
Vapor Molecular Weight (lb/lb-mole):							81.4403					
Product Factor:							1.0000					
Withdrawal Losses (lb):							5.5335					
Number of Columns:							4.0000					
Effective Column Diameter (ft):							1.0000					
Net Throughput (gal/mo.):							1,316,572.0000					
Shell Clingage Factor (bbl/1000 sqft):							0.0015					
Average Organic Liquid Density (lb/gal):							7.0198					
Tank Diameter (ft):							60.0000					
Deck Fitting Losses (lb):							10.2469					
Value of Vapor Pressure Function:							0.0042					
Vapor Molecular Weight (lb/lb-mole):							81.4403					
Product Factor:							1.0000					
Tot. Roof Fitting Loss Fact.(lb-mole/yr):							360.3000					
Deck Seam Losses (lb):							4.0134					
Deck Seam Length (ft):							791.6800					
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):							0.1400					
Deck Seam Length Factor(ft/sqft):							0.2800					
Tank Diameter (ft):							60.0000					
Vapor Molecular Weight (lb/lb-mole):							81.4403					
Product Factor:							1.0000					
Total Losses (lb):							29.6908					

			Roof Fitting Loss Factors		
Roof Fitting/Status	Quantity	KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1	36.00	5.90	1.20	1.0435
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1	14.00	5.40	1.10	0.4058
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Ungask.	1	47.00	0.00	0.00	1.3623
Ladder Well (36-in. Diam.)/Sliding Cover, Ungasketed	1	76.00	0.00	0.00	2.2029
Roof Leg or Hanger Well/Adjustable	17	7.90	0.00	0.00	3.8927
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1	12.00	0.00	0.00	0.3478
Stub Drain (1-in. Diameter)/	29	1.20	0.00	0.00	1.0087
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	0.1797

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

DSF - HYK Light Feed Tank - Internal Floating Roof Tank Point
Pleasant, West Virginia

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
HYK Light Feed	9.90	5.53	10.25	4.01	29.69
Distillate fuel oil no. 2	0.46	4.96	0.47	0.18	6.07
Jet naphtha (JP-4)	9.44	0.58	9.78	3.83	23.62

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	DSF - HYK Heavy Feed Storage Tank
City:	Point Pleasant
State:	West Virginia
Company:	DSF
Type of Tank:	Vertical Fixed Roof Tank
Description:	3,000 BBL vertical fixed roof storage tank for the HYK Heavy Feed for plant shutdowns estimated to occur about one (1) month. To provide a conservative estimate for HYK Heavy Feed emissions, storage is assumed to occur during July.

Tank Dimensions

Shell Height (ft):	24.00
Diameter (ft):	30.00
Liquid Height (ft) :	23.83
Avg. Liquid Height (ft):	12.00
Volume (gallons):	126,000.00
Turnovers:	1.66
Net Throughput(gal/yr):	209,454.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Dome
Height (ft)	0.00
Radius (ft) (Dome Roof)	0.00

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

DSF - HYK Heavy Feed Storage Tank - Vertical Fixed Roof Tank Point Pleasant, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	Jul	66.29	60.27	72.31	55.00	0.0081	0.0066	0.0097	130.0000			188.00	Option 1: VP60 = .0065 VP70 = .009

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

DSF - HYK Heavy Feed Storage Tank - Vertical Fixed Roof Tank Point Pleasant, West Virginia

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):							2.3793					
Vapor Space Volume (cu ft):							9,936.8122					
Vapor Density (lb/cu ft):							0.0002					
Vapor Space Expansion Factor:							0.0418					
Vented Vapor Saturation Factor:							0.9940					
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):							9,936.8122					
Tank Diameter (ft):							30.0000					
Vapor Space Outage (ft):							14.0577					
Tank Shell Height (ft):							24.0000					
Average Liquid Height (ft):							12.0000					
Roof Outage (ft):							2.0577					
Roof Outage (Dome Roof)												
Roof Outage (ft):							2.0577					
Dome Radius (ft):							30.0000					
Shell Radius (ft):							15.0000					
Vapor Density												
Vapor Density (lb/cu ft):							0.0002					
Vapor Molecular Weight (lb/lb-mole):							130.0000					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.0081					
Daily Avg. Liquid Surface Temp. (deg. R):							525.9609					
Daily Average Ambient Temp. (deg. F):							75.0500					
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):							10.731					
Liquid Bulk Temperature (deg. R):							514.6733					
Tank Paint Solar Absorptance (Shell):							0.1700					
Tank Paint Solar Absorptance (Roof):							0.1700					
Daily Total Solar Insulation Factor (Btu/sqft day):							1,836.9933					
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:							0.0418					
Daily Vapor Temperature Range (deg. R):							24.0801					
Daily Vapor Pressure Range (psia):							0.0031					
Breather Vent Press. Setting Range(psia):							0.0600					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.0081					
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.0066					
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.0097					
Daily Avg. Liquid Surface Temp. (deg R):							525.9609					
Daily Min. Liquid Surface Temp. (deg R):							519.9409					
Daily Max. Liquid Surface Temp. (deg R):							531.9810					
Daily Ambient Temp. Range (deg. R):							21.3000					
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:							0.9940					
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.0081					
Vapor Space Outage (ft):							14.0577					
Working Losses (lb):							5.2336					

Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0081
Net Throughput (gal/mo.):	209,454.0000
Annual Turnovers:	1.6623
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	126,000.0000
Maximum Liquid Height (ft):	23.8290
Tank Diameter (ft):	30.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	7.6130

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

DSF - HYK Heavy Feed Storage Tank - Vertical Fixed Roof Tank Point
Pleasant, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	5.23	2.38	7.61

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification	
User Identification:	DSF - Heavy Slop Oil Tank
City:	Point Pleasant
State:	West Virginia
Company:	DSF
Type of Tank:	Vertical Fixed Roof Tank
Description:	16,000 BBL vertical fixed roof storage tank for the heavy slop oil feed for plant shutdowns estimated to occur about one (1) month. To provide a conservative estimate for heavy slop oil emissions, storage is assumed to occur during July.
Tank Dimensions	
Shell Height (ft):	32.00
Diameter (ft):	60.00
Liquid Height (ft) :	31.68
Avg. Liquid Height (ft):	16.00
Volume (gallons):	670,000.00
Turnovers:	1.97
Net Throughput(gal/yr):	1,316,572.00
Is Tank Heated (y/n):	N
Paint Characteristics	
Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good
Roof Characteristics	
Type:	Dome
Height (ft)	32.00
Radius (ft) (Dome Roof)	60.00
Breather Vent Settings	
Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

DSF - Heavy Slop Oil Tank - Vertical Fixed Roof Tank Point Pleasant, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	Jul	66.29	60.27	72.31	55.00	0.0081	0.0066	0.0097	130.0000			188.00	Option 1: VP60 = .0065 VP70 = .009

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

DSF - Heavy Slop Oil Tank - Vertical Fixed Roof Tank Point Pleasant, West Virginia

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):							25.5122					
Vapor Space Volume (cu ft):							107,635.1530					
Vapor Density (lb/cu ft):							0.0002					
Vapor Space Expansion Factor:							0.0418					
Vented Vapor Saturation Factor:							0.9840					
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):							107,635.1530					
Tank Diameter (ft):							60.0000					
Vapor Space Outage (ft):							38.0681					
Tank Shell Height (ft):							32.0000					
Average Liquid Height (ft):							16.0000					
Roof Outage (ft):							22.0681					
Roof Outage (Dome Roof)												
Roof Outage (ft):							22.0681					
Dome Radius (ft):							60.0000					
Shell Radius (ft):							30.0000					
Vapor Density												
Vapor Density (lb/cu ft):							0.0002					
Vapor Molecular Weight (lb/lb-mole):							130.0000					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.0081					
Daily Avg. Liquid Surface Temp. (deg. R):							525.9609					
Daily Average Ambient Temp. (deg. F):							75.0500					
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):							10.731					
Liquid Bulk Temperature (deg. R):							514.6733					
Tank Paint Solar Absorptance (Shell):							0.1700					
Tank Paint Solar Absorptance (Roof):							0.1700					
Daily Total Solar Insulation Factor (Btu/sqft day):							1,836.9933					
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:							0.0418					
Daily Vapor Temperature Range (deg. R):							24.0801					
Daily Vapor Pressure Range (psia):							0.0031					
Breather Vent Press. Setting Range(psia):							0.0600					
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):							0.0081					
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):							0.0066					
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):							0.0097					
Daily Avg. Liquid Surface Temp. (deg R):							525.9609					
Daily Min. Liquid Surface Temp. (deg R):							519.9409					
Daily Max. Liquid Surface Temp. (deg R):							531.9810					
Daily Ambient Temp. Range (deg. R):							21.3000					
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:							0.9840					
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):							0.0081					
Vapor Space Outage (ft):							38.0681					
Working Losses (lb):							32.8972					

Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0081
Net Throughput (gal/mo.):	1,316,572.0000
Annual Turnovers:	1.9650
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	670,000.0000
Maximum Liquid Height (ft):	31.6774
Tank Diameter (ft):	60.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	58.4094

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

DSF - Heavy Slop Oil Tank - Vertical Fixed Roof Tank Point
Pleasant, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	32.90	25.51	58.41

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification	
User Identification:	DSF - Heavy Naphtha
City:	Point Pleasant
State:	West Virginia
Company:	DSF
Type of Tank:	Internal Floating Roof Tank
Description:	4,000 BBL internal floating roof storage tanks for heavy naphtha storage at the DSF facility
Tank Dimensions	
Diameter (ft):	30.00
Volume (gallons):	168,000.00
Turnovers:	90.61
Self Supp. Roof? (y/n):	N
No. of Columns:	1.00
Eff. Col. Diam. (ft):	1.00
Paint Characteristics	
Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good
Rim-Seal System	
Primary Seal:	Mechanical Shoe
Secondary Seal	None
Deck Characteristics	
Deck Fitting Category:	Typical
Deck Type:	Bolted
Construction:	Panel
Deck Seam:	Panel: 5 x 12 Ft
Deck Seam Len. (ft):	197.92

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Ungask.	1
Ladder Well (36-in. Diam.)/Sliding Cover, Ungasketed	1
Roof Leg or Hanger Well/Adjustable	10
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1
Stub Drain (1-in. Diameter)/Slit Fabric Seal 10% Open	8
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

DSF - Heavy Naphtha - Internal Floating Roof Tank Point Pleasant, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Heavy Naphtha	All	56.67	51.31	62.04	55.00	0.1858	N/A	N/A	98.2949			105.82	
Benzene						1.0642	N/A	N/A	78.1100	0.0074	0.0456	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0966	N/A	N/A	106.1700	0.2508	0.1404	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						1.7536	N/A	N/A	86.1700	0.0204	0.2073	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Octane (-n)						0.1344	N/A	N/A	114.2300	0.3400	0.2649	114.23	Option 1: VP50 = .112388 VP60 = .145444
Toluene						0.2974	N/A	N/A	92.1300	0.1306	0.2251	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Xylenes (mixed isomers)						0.0803	N/A	N/A	106.1700	0.2508	0.1167	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

DSF - Heavy Naphtha - Internal Floating Roof Tank Point Pleasant, West Virginia

Annual Emission Calcaulations	
Rim Seal Losses (lb):	56.0981
Seal Factor A (lb-mole/ft-yr):	5.8000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.3000
Value of Vapor Pressure Function:	0.0033
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.1858
Tank Diameter (ft):	30.0000
Vapor Molecular Weight (lb/lb-mole):	98.2949
Product Factor:	1.0000
Withdrawal Losses (lb):	117.7588
Number of Columns:	1.0000
Effective Column Diameter (ft):	1.0000
Annual Net Throughput (gal/yr.):	15,222,690.0000
Shell Clingage Factor (bbl/1000 sqft):	0.0015
Average Organic Liquid Density (lb/gal):	6.6685
Tank Diameter (ft):	30.0000
Deck Fitting Losses (lb):	90.2083
Value of Vapor Pressure Function:	0.0033
Vapor Molecular Weight (lb/lb-mole):	98.2949
Product Factor:	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	279.8000
Deck Seam Losses (lb):	11.3744
Deck Seam Length (ft):	197.9200
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.1400
Deck Seam Length Factor(ft/sqft):	0.2800
Tank Diameter (ft):	30.0000
Vapor Molecular Weight (lb/lb-mole):	98.2949
Product Factor:	1.0000
Total Losses (lb):	275.4396

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1	36.00	5.90	1.20	11.6065
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1	14.00	5.40	1.10	4.5136
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Ungask.	1	47.00	0.00	0.00	15.1529
Ladder Well (36-in. Diam.)/Sliding Cover, Ungasketed	1	76.00	0.00	0.00	24.5026
Roof Leg or Hanger Well/Adjustable	10	7.90	0.00	0.00	25.4698
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1	12.00	0.00	0.00	3.8688
Stub Drain (1-in. Diameter)/	8	1.20	0.00	0.00	3.0951
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	1.9989

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

DSF - Heavy Naphtha - Internal Floating Roof Tank Point
Pleasant, West Virginia

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Heavy Naphtha	56.10	117.76	90.21	11.37	275.44
Octane (-n)	14.86	40.04	23.90	3.01	81.81
Hexane (-n)	11.63	2.40	18.70	2.36	35.09
Benzene	2.56	0.87	4.12	0.52	8.07
Toluene	12.63	15.38	20.30	2.56	50.87
Ethylbenzene	7.87	29.53	12.66	1.60	51.66
Xylenes (mixed isomers)	6.55	29.53	10.53	1.33	47.94

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	DSF - Gasoline Tanks
City:	Point Pleasant
State:	West Virginia
Company:	DSF
Type of Tank:	Internal Floating Roof Tank
Description:	20,000 BBL internal floating roof storage tanks for gasoline product at the DSF facility

Tank Dimensions

Diameter (ft):	67.00
Volume (gallons):	420,000.00
Turnovers:	62.07
Self Supp. Roof? (y/n):	N
No. of Columns:	4.00
Eff. Col. Diam. (ft):	1.00

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Rim-Seal System

Primary Seal:	Mechanical Shoe
Secondary Seal	None

Deck Characteristics

Deck Fitting Category:	Typical
Deck Type:	Bolted
Construction:	Panel
Deck Seam:	Panel: 5 x 12 Ft
Deck Seam Len. (ft):	987.18

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Ungask.	4
Ladder Well (36-in. Diam.)/Sliding Cover, Ungasketed	1
Roof Leg or Hanger Well/Adjustable	20
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1
Stub Drain (1-in. Diameter)/Slit Fabric Seal 10% Open	36
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

DSF - Gasoline Tanks - Internal Floating Roof Tank Point Pleasant, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 15.0)	All	56.67	51.31	62.04	55.00	7.6647	N/A	N/A	60.0000			92.00	Option 4: RVP=15, ASTM Slope=3

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

DSF - Gasoline Tanks - Internal Floating Roof Tank Point Pleasant, West Virginia

Annual Emission Calcaulations	
Rim Seal Losses (lb):	4,442.8378
Seal Factor A (lb-mole/ft-yr):	5.8000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.3000
Value of Vapor Pressure Function:	0.1905
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	7.6647
Tank Diameter (ft):	67.0000
Vapor Molecular Weight (lb/lb-mole):	60.0000
Product Factor:	1.0000
Withdrawal Losses (lb):	77.7623
Number of Columns:	4.0000
Effective Column Diameter (ft):	1.0000
Annual Net Throughput (gal/yr.):	26,068,665.0000
Shell Clingage Factor (bbl/1000 sqft):	0.0015
Average Organic Liquid Density (lb/gal):	5.6000
Tank Diameter (ft):	67.0000
Deck Fitting Losses (lb):	6,098.3265
Value of Vapor Pressure Function:	0.1905
Vapor Molecular Weight (lb/lb-mole):	60.0000
Product Factor:	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	533.4000
Deck Seam Losses (lb):	2,011.8358
Deck Seam Length (ft):	987.1800
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.1400
Deck Seam Length Factor(ft/sqft):	0.2800
Tank Diameter (ft):	67.0000
Vapor Molecular Weight (lb/lb-mole):	60.0000
Product Factor:	1.0000
Total Losses (lb):	12,630.7624

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1	36.00	5.90	1.20	411.5856
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1	14.00	5.40	1.10	160.0611
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Ungask.	4	47.00	0.00	0.00	2,149.3914
Ladder Well (36-in. Diam.)/Sliding Cover, Ungasketed	1	76.00	0.00	0.00	868.9029
Roof Leg or Hanger Well/Adjustable	20	7.90	0.00	0.00	1,806.4034
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1	12.00	0.00	0.00	137.1952
Stub Drain (1-in. Diameter)/	36	1.20	0.00	0.00	493.9027
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	70.8842

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

DSF - Gasoline Tanks - Internal Floating Roof Tank Point
Pleasant, West Virginia

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Gasoline (RVP 15.0)	4,442.84	77.76	6,098.33	2,011.84	12,630.76

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	DSF - Ethanol Tanks
City:	Point Pleasant
State:	West Virginia
Company:	DSF
Type of Tank:	Internal Floating Roof Tank
Description:	4,000 BBL internal floating roof storage tanks for ethanol storage at the DSF facility

Tank Dimensions

Diameter (ft):		30.00
Volume (gallons):		168,000.00
Turnovers:		27.38
Self Supp. Roof? (y/n):	N	
No. of Columns:		1.00
Eff. Col. Diam. (ft):		1.00

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Rim-Seal System

Primary Seal:	Mechanical Shoe
Secondary Seal	None

Deck Characteristics

Deck Fitting Category:	Typical	
Deck Type:	Bolted	
Construction:	Panel	
Deck Seam:	Panel: 5 x 12 Ft	
Deck Seam Len. (ft):		197.92

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Ungask.	1
Ladder Well (36-in. Diam.)/Sliding Cover, Ungasketed	1
Roof Leg or Hanger Well/Adjustable	10
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1
Stub Drain (1-in. Diameter)/Slit Fabric Seal 10% Open	8
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

DSF - Ethanol Tanks - Internal Floating Roof Tank Point Pleasant, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Ethyl alcohol	All	56.67	51.31	62.04	55.00	0.5863	N/A	N/A	46.0700			46.07	Option 2: A=8.321, B=1718.21, C=237.52

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

DSF - Ethanol Tanks - Internal Floating Roof Tank Point Pleasant, West Virginia

Annual Emission Calcaulations	
Rim Seal Losses (lb):	84.1771
Seal Factor A (lb-mole/ft-yr):	5.8000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.3000
Value of Vapor Pressure Function:	0.0105
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.5863
Tank Diameter (ft):	30.0000
Vapor Molecular Weight (lb/lb-mole):	46.0700
Product Factor:	1.0000
Withdrawal Losses (lb):	35.2749
Number of Columns:	1.0000
Effective Column Diameter (ft):	1.0000
Annual Net Throughput (gal/yr.):	4,600,352.5000
Shell Clingage Factor (bbl/1000 sqft):	0.0015
Average Organic Liquid Density (lb/gal):	6.6100
Tank Diameter (ft):	30.0000
Deck Fitting Losses (lb):	135.3607
Value of Vapor Pressure Function:	0.0105
Vapor Molecular Weight (lb/lb-mole):	46.0700
Product Factor:	1.0000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	279.8000
Deck Seam Losses (lb):	17.0676
Deck Seam Length (ft):	197.9200
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.1400
Deck Seam Length Factor(ft/sqft):	0.2800
Tank Diameter (ft):	30.0000
Vapor Molecular Weight (lb/lb-mole):	46.0700
Product Factor:	1.0000
Total Losses (lb):	271.8803

		Roof Fitting Loss Factors			
Roof Fitting/Status	Quantity	KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1	36.00	5.90	1.20	17.4160
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1	14.00	5.40	1.10	6.7729
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Ungask.	1	47.00	0.00	0.00	22.7375
Ladder Well (36-in. Diam.)/Sliding Cover, Ungasketed	1	76.00	0.00	0.00	36.7670
Roof Leg or Hanger Well/Adjustable	10	7.90	0.00	0.00	38.2183
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1	12.00	0.00	0.00	5.8053
Stub Drain (1-in. Diameter)/	8	1.20	0.00	0.00	4.6443
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	2.9994

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

DSF - Ethanol Tanks - Internal Floating Roof Tank Point
Pleasant, West Virginia

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Ethyl alcohol	84.18	35.27	135.36	17.07	271.88

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	DSF - Diesel Tanks v0.2
City:	Point Pleasant
State:	West Virginia
Company:	DSF
Type of Tank:	Vertical Fixed Roof Tank
Description:	28,500 BBL vertical fixed roof tanks with dome roof for diesel product at the DSF facility

Tank Dimensions

Shell Height (ft):	32.00
Diameter (ft):	80.00
Liquid Height (ft) :	30.00
Avg. Liquid Height (ft):	16.00
Volume (gallons):	1,197,000.00
Turnovers:	83.90
Net Throughput(gal/yr):	100,426,830.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Dome
Height (ft)	32.00
Radius (ft) (Dome Roof)	80.00

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

DSF - Diesel Tanks v0.2 - Vertical Fixed Roof Tank Point Pleasant, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Distillate fuel oil no. 2	All	56.67	51.31	62.04	55.00	0.0058	0.0048	0.0070	130.0000			188.00	Option 1: VP50 = .0045 VP60 = .0065

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

DSF - Diesel Tanks v0.2 - Vertical Fixed Roof Tank Point Pleasant, West Virginia

Annual Emission Calcaulations	
Standing Losses (lb):	329.9439
Vapor Space Volume (cu ft):	178,006.8283
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.0375
Vented Vapor Saturation Factor:	0.9892
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	178,006.8283
Tank Diameter (ft):	80.0000
Vapor Space Outage (ft):	35.4133
Tank Shell Height (ft):	32.0000
Average Liquid Height (ft):	16.0000
Roof Outage (ft):	19.4133
Roof Outage (Dome Roof)	
Roof Outage (ft):	19.4133
Dome Radius (ft):	80.0000
Shell Radius (ft):	40.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0058
Daily Avg. Liquid Surface Temp. (deg. R):	516.3441
Daily Average Ambient Temp. (deg. F):	54.9833
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	514.6733
Tank Paint Solar Absorptance (Shell):	0.1700
Tank Paint Solar Absorptance (Roof):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,250.5726
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0375
Daily Vapor Temperature Range (deg. R):	21.4567
Daily Vapor Pressure Range (psia):	0.0022
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0058
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0048
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0070
Daily Avg. Liquid Surface Temp. (deg R):	516.3441
Daily Min. Liquid Surface Temp. (deg R):	510.9799
Daily Max. Liquid Surface Temp. (deg R):	521.7082
Daily Ambient Temp. Range (deg. R):	21.5333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9892
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0058
Vapor Space Outage (ft):	35.4133
Working Losses (lb):	950.8261

Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0058
Annual Net Throughput (gal/yr.):	100,426,830.0000
Annual Turnovers:	83.8988
Turnover Factor:	0.5242
Maximum Liquid Volume (gal):	1,197,000.0000
Maximum Liquid Height (ft):	30.0000
Tank Diameter (ft):	80.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	1,280.7700

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

DSF - Diesel Tanks v0.2 - Vertical Fixed Roof Tank Point
Pleasant, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	950.83	329.94	1,280.77

Attachment M

Attachment M
Air Pollution Control Device Sheet
(BAGHOUSE)

Control Device ID No. (must match Emission Units Table): 100-BH-1

Equipment Information and Filter Characteristics

1. Manufacturer: **CAMCORP**
   Model No.
2. Total number of compartments:
3. Number of compartment online for normal operation:
4. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.
5. Baghouse Configuration: (check one)
   ☐ Open Pressure ☐ Closed Pressure ☐ Closed Suction
   ☐ Electrostatically Enhanced Fabric
   ☐ Other, Specify
6. Filter Fabric Bag Material:
   ☐ Nomex nylon ☐ Wool
   ☒ Polyester ☐ Polypropylene
   ☐ Acrylics ☐ Ceramics
   ☐ Fiber Glass
   ☐ Cotton Weight oz./sq.yd
   ☐ Teflon Thickness in
   ☐ Others, specify
7. Bag Dimension:
   Diameter in.
   Length ft.
8. Total cloth area: **8262** ft^2
9. Number of bags:
10. Operating air to cloth ratio: ft/min
11. Baghouse Operation: ☒ Continuous ☐ Automatic ☐ Intermittent
12. Method used to clean bags:
    ☐ Mechanical Shaker ☐ Sonic Cleaning ☐ Reverse Air Jet
    ☐ Pneumatic Shaker ☐ Reverse Air Flow ☐ Other:
    ☐ Bag Collapse ☒ Pulse Jet
    ☐ Manual Cleaning ☐ Reverse Jet
13. Cleaning initiated by:
    ☐ Timer ☐ Frequency if timer actuated
    ☐ Expected pressure drop range in. of water ☐ Other
14. Operation Hours: Max. per day: **24**
    Max. per yr: **8760**
15. Collection efficiency: Rating: %
    Guaranteed minimum: %

Gas Stream Characteristics

16. Gas flow rate into the collector: **31,112** ACFM at **180** °F and PSIA
    ACFM: Design: PSIA Maximum: PSIA Average Expected: PSIA
17. Water Vapor Content of Effluent Stream: lb. Water/lb. Dry Air
18. Gas Stream Temperature: **180** °F
19. Fan Requirements: **150** hp
    OR ft^3/min
20. Stabilized static pressure loss across baghouse. Pressure Drop: High in. H_2O
    Low in. H_2O
21. Particulate Loading: Inlet: grain/scf Outlet: **0.01** grain/dscf

22. Type of Pollutant(s) to be collected (if particulate give specific type):
PM, PM_{10}, and $PM_{2.5}$

23. Is there any SO_3 in the emission stream? ☒ No ☐ Yes SO_3 content: ppmv

24. Emission rate of pollutant (specify) into and out of collector at maximum design operating conditions:

	IN		OUT	
Pollutant	**lb/hr**	**grains/acf**	**lb/hr**	**grains/acf**
PM			**1.84**	
PM_{10}			**1.84**	
$PM_{2.5}$			**0.92**	

25. Complete the table:

	Particle Size Distribution at Inlet to Collector	Fraction Efficiency of Collector
Particulate Size Range (microns)	**Weight % for Size Range**	**Weight % for Size Range**
0 – 2		
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

26. How is filter monitored for indications of deterioration (e.g., broken bags)? ☐ Continuous Opacity ☐ Pressure Drop ☒ Alarms-Audible to Process Operator ☐ Visual opacity readings, Frequency: ☐ Other, specify:
27. Describe any recording device and frequency of log entries:
28. Describe any filter seeding being performed:
29. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):
30. Describe the collection material disposal system:
31. Have you included ***Baghouse Control Device*** in the Emissions Points Data Summary Sheet?

32. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING: **See Attachment O**	RECORDKEEPING: **See Attachment O**
REPORTING: **See Attachment O**	TESTING: **See Attachment O**

MONITORING:	Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.
RECORDKEEPING:	Please describe the proposed recordkeeping that will accompany the monitoring.
REPORTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.
TESTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.

33. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.

34. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

35. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment M
Air Pollution Control Device Sheet
(OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): **100-TC-1-FF, 100-TC-2-FF, 100-TH-2-FF, 100-TC-3-FF, 100-TC-4-FF, 100-TH-4-FF, 100-TH-5-FF, 100-TC-5-FF, 100-TH-6-FF, 100-TH-7-FF, 100-TC-6-FF, 100-TC-7-FF, 200-S-108FF, 200-S-105-FF, 610-TC-2-FF, 610-SD-1-FF, and 610-SD-2-FF**

Equipment Information

1. Manufacturer: Model No.	2. Control Device Name: **Coal Transfer Conveyor 1 Filter, Coal Transfer Conveyor 2 Filter, Radial Stacker Hopper Filter, Radial Stacker Transfer Conveyor Filter, Coal Milling Transfer Conveyor 1 Filter, Coal Milling Hopper 1 Filter, Coal Milling Hopper 2 Filter, Coal Milling Transfer Conveyor 2 Filter, Coal Storage Silo 1 Hopper Filter, Coal Storage Silo 2 Hopper Filter, Coal Silo Transfer Conveyor 1 Filter, Coal Silo Transfer Conveyor 2 Filter, Feed Coal Bin Filter, Feed Coal Conveyor Filter, Pipe Conveyor 1 Filter, Flaked Residue Storage Dome 1 Filter, and Flaked Residue Storage Dome 2 Filter** Type: **Fabric Filters**
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.	
5. Provide a scale diagram of the control device showing internal construction.	
6. Submit a schematic and diagram with dimensions and flow rates.	
7. Guaranteed minimum collection efficiency for each pollutant collected:	
8. Attached efficiency curve and/or other efficiency information.	
9. Design inlet volume: **1200** SCFM	10. Capacity:
11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any.	
12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.	
13. Description of method of handling the collected material(s) for reuse of disposal.	

Gas Stream Characteristics

14. Are halogenated organics present?	☐ Yes	☒ No
Are particulates present?	☒ Yes	☐ No
Are metals present?	☐ Yes	☒ No

15. Inlet Emission stream parameters:	**Maximum**	**Typical**
Pressure (mmHg):		
Heat Content (BTU/scf):		
Oxygen Content (%):		
Moisture Content (%):		
Relative Humidity (%):		

16. Type of pollutant(s) controlled: ☐ SO_x ☐ Odor
☒ Particulate (type): **PM, PM_{10}, and $PM_{2.5}$** ☐ Other

17. Inlet gas velocity: ft/sec

18. Pollutant specific gravity:

19. Gas flow into the collector:
1200 SCFM @ °F and **14.7** PSIA

20. Gas stream temperature:
Inlet: °F
Outlet: °F

21. Gas flow rate:
Design Maximum: **1200** SCFM
Average Expected: SCFM

22. Particulate Grain Loading in grains/scf:
Inlet:
Outlet: **0.01 grains/dscf**

23. Emission rate of each pollutant (specify) into and out of collector:

Pollutant	**IN Pollutant**		**Emission Capture Efficiency %**	**OUT Pollutant**		**Control Efficiency %**
	lb/hr	**grains/acf**		**lb/hr**	**grains/dscf**	
PM				**0.10**		
PM_{10}				**0.10**		
$PM_{2.5}$				**0.05**		

24. Dimensions of stack: Height ft. Diameter ft.

25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector.

Particulate Distribution

26. Complete the table:	**Particle Size Distribution at Inlet to Collector**	**Fraction Efficiency of Collector**
Particulate Size Range (microns)	**Weight % for Size Range**	**Weight % for Size Range**
0 – 2		
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		

60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):

28. Describe the collection material disposal system:

29. Have you included ***Other Collectores Control Device*** in the Emissions Points Data Summary Sheet?

30. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING: **See Attachment O**	RECORDKEEPING: **See Attachment O**
REPORTING: **See Attachment O**	TESTING: **See Attachment O**

MONITORING: Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING: Please describe any proposed emissions testing for this process equipment on air pollution control device.

TESTING: Please describe any proposed emissions testing for this process equipment on air pollution control device.

31. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

32. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

33. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment M
Air Pollution Control Device Sheet
(OTHER COLLECTORS)

Control Device ID No. (must match Emission Units Table): **100-CS-1-FF, 100-CS-2-FF, and 610-SS-1-FF**

Equipment Information

1. Manufacturer: Model No.	2. Control Device Name: **Coal Storage Silo 1 Filter, Coal Storage Silo 2 Filter, and Surge Flake Silo Filter** Type: **Fabric Filters**

3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.

4. On a separate sheet(s) supply all data and calculations used in selecting or designing this collection device.

5. Provide a scale diagram of the control device showing internal construction.

6. Submit a schematic and diagram with dimensions and flow rates.

7. Guaranteed minimum collection efficiency for each pollutant collected:

8. Attached efficiency curve and/or other efficiency information.

9. Design inlet volume: **800** SCFM	10. Capacity:

11. Indicate the liquid flow rate and describe equipment provided to measure pressure drop and flow rate, if any.

12. Attach any additional data including auxiliary equipment and operation details to thoroughly evaluate the control equipment.

13. Description of method of handling the collected material(s) for reuse of disposal.

Gas Stream Characteristics

14. Are halogenated organics present? ☐ Yes ☒ No
Are particulates present? ☒ Yes ☐ No
Are metals present? ☐ Yes ☒ No

15. Inlet Emission stream parameters:	**Maximum**	**Typical**
Pressure (mmHg):		
Heat Content (BTU/scf):		
Oxygen Content (%):		
Moisture Content (%):		
Relative Humidity (%):		

16. Type of pollutant(s) controlled: ☐ SO_x ☒ Particulate (type): **PM, PM_{10}, and $PM_{2.5}$**	☐ Odor ☐ Other
17. Inlet gas velocity: ft/sec	18. Pollutant specific gravity:
19. Gas flow into the collector: **800** SCFM @ °F and **14.7** PSIA	20. Gas stream temperature: Inlet: °F Outlet: °F
21. Gas flow rate: Design Maximum: **800** SCFM Average Expected: SCFM	22. Particulate Grain Loading in grains/dscf: Inlet: Outlet: **0.01 grains/dscf**

23. Emission rate of each pollutant (specify) into and out of collector:

Pollutant	**IN Pollutant**		**Emission Capture Efficiency %**	**OUT Pollutant**		**Control Efficiency %**
	lb/hr	**grains/acf**		**lb/hr**	**grains/acf**	
PM				**0.07**		
PM_{10}				**0.07**		
$PM_{2.5}$				**0.03**		

24. Dimensions of stack: Height ft. Diameter ft.

25. Supply a curve showing proposed collection efficiency versus gas volume from 25 to 130 percent of design rating of collector.

Particulate Distribution

26. Complete the table:	**Particle Size Distribution at Inlet to Collector**	**Fraction Efficiency of Collector**
Particulate Size Range (microns)	**Weight % for Size Range**	**Weight % for Size Range**
0 – 2		
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

27. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):

28. Describe the collection material disposal system:

29. Have you included ***Other Collectores Control Device*** in the Emissions Points Data Summary Sheet?

30. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING: **See Attachment O**	RECORDKEEPING: **See Attachment O**
REPORTING: **See Attachment O**	TESTING: **See Attachment O**

MONITORING: Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING: Please describe any proposed emissions testing for this process equipment on air pollution control device.

TESTING: Please describe any proposed emissions testing for this process equipment on air pollution control device.

31. Manufacturer’s Guaranteed Control Efficiency for each air pollutant.

32. Manufacturer’s Guaranteed Control Efficiency for each air pollutant.

33. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment M
Air Pollution Control Device Sheet
(FLARE SYSTEM)

Control Device ID No. (must match Emission Units Table): **620-FL-1**

Equipment Information

1. Manufacturer: Model No.	2. Method: ☒ Elevated flare ☐ Ground flare ☐ Other Describe
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. Method of system used: ☐ Steam-assisted ☐ Air-assisted ☐ Pressure-assisted ☒ Non-assisted	
5. Maximum capacity of flare: scf/min **6,230,769** scf/hr Average flow to flare: **2,138,613** scf/hr	6. Dimensions of stack: Diameter ft. Height ft.
7. Estimated combustion efficiency: (Waste gas destruction efficiency) Estimated: % Minimum guaranteed: **98** %	8. Fuel used in burners: ☐ Natural Gas ☐ Fuel Oil, Number ☒ Other: **Fuel gas**
9. Number of burners: Maximum Relieving Rate: **2,614** MMBTU/hr Average Relieving Rate: **990** MMBTU/hr	11. Describe method of controlling flame:
10. Will preheat be used? ☐ Yes ☐ No	
12. Flare height: ft	14. Natural gas flow rate to flare pilot flame per pilot light: scf/min scf/hr
13. Flare tip inside diameter: ft	
15. Number of pilot lights: Total BTU/hr	16. Will automatic re-ignition be used? ☐ Yes ☐ No
17. If automatic re-ignition will be used, describe the method:	
18. Is pilot flame equipped with a monitor? ☐ Yes ☐ No If yes, what type? ☐ Thermocouple ☐ Infra-Red ☐ Ultra Violet ☐ Camera with monitoring control room ☐ Other, Describe:	
19. Hours of unit operation per year: **8 (Maximum of four 30-min flaring events per process unit)**	

Steam Injection

20. Will steam injection be used? ☐ Yes ☐ No	21. Steam pressure PSIG Minimum Expected: Design Maximum:
22. Total Steam flow rate: LB/hr	23. Temperature: °F
24. Velocity ft/sec	25. Number of jet streams
26. Diameter of steam jets: in	27. Design basis for steam injected: LB steam/LB hydrocarbon
28. How will steam flow be controlled if steam injection is used?	

Characteristics of the Waste Gas Stream to be Burned

29.	Name	Quantity Grains of H_2S/100 ft^3	Quantity (LB/hr, ft^3/hr, etc)	Source of Material
	Unit 200 Emergency Flaring Event		**25,000**	
	Unit 310 Emergency Flaring Event		**81,000**	
	Unit 320 Emergency Flaring Event		**18,000**	
	Unit 420 Emergency Flaring Event		**15,000**	

30. Estimate total combustible to flare: **139,000** LB/hr Maximum mass flow rate of waste gas **6,230,769** scfh	
31. Estimated total flow rate to flare including materials to be burned, carrier gases, auxiliary fuel, etc.: LB/hr or ACF/hr	
32. Give composition of carrier gases:	
33. Temperature of emission stream: °F Heating value of emission stream: **2,614** BTU/ft^3 (Maximum) **990** BTU/ft^3 (Average) Mean molecular weight of emission stream: MW = lb/lb-mole	34. Identify and describe all auxiliary fuels to be burned. BTU/scf BTU/scf BTU/scf BTU/scf BTU/scf
35. Temperature of flare gas: °F	36. Flare gas flow rate: scf/min
37. Flare gas heat content: BTU/ft^3	38. Flare gas exit velocity: scf/min
39. Maximum rate during emergency for one major piece of equipment or process unit: scf/min	
40. Maximum rate during emergency for one major piece of equipment or process unit: BTU/min	

41.	Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):
42.	Describe the collection material disposal system:
43.	Have you included ***Flare Control Device*** in the Emissions Points Data Summary Sheet?

44. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING: **See Attachment O**	RECORDKEEPING: **See Attachment O**
REPORTING: **See Attachment O**	TESTING: **See Attachment O**

MONITORING: Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING: Please describe any proposed emissions testing for this process equipment on air pollution control device.

TESTING: Please describe any proposed emissions testing for this process equipment on air pollution control device.

45. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.

46. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

47. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment N

Domestic Synthetic Fuels I Site Emission Levels

	VOCs		HAPs		CO		NO_x		PM_{Total}		PM_{10}		$PM_{2.5}$		$PM_{Condensable}$		$PM_{Filterable}$		SO_2	
Emission Sources	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**	**lb/hr**	**tons/yr**
Unit 100 - Coal Handling																				
Coal Handling Transfer Points	--	--	--	--	--	--	--	--	3.06	2.94	1.77	2.18	0.48	0.85	--	--	3.06	2.94	--	--
Coal Stockpiles	--	--	--	--	--	--	--	--	0.16	0.71	0.08	0.33	0.04	0.17	--	--	0.16	0.71	--	--
Coal Milling Dryer	0.08	0.35	0.03	0.12	1.23	5.39	1.47	6.42	0.11	0.49	0.03	0.12	0.03	0.12	0.08	0.37	0.03	0.12	<0.01	0.04
Coal Milling Baghouse and Storage Silos	--	--	--	--	--	--	--	--	2.60	11.38	2.60	11.38	1.30	5.69	--	--	2.60	11.38	--	--
Unit 200 - H-Coal																				
Unit 200 Coal Handling	--	--	--	--	--	--	--	--	0.21	0.90	0.21	0.90	0.10	0.45	--	--	0.21	0.90	--	--
Slurry Feed Heater	0.56	2.43	0.20	0.86	2.28	9.98	2.96	12.97	1.00	4.38	0.41	1.78	0.41	1.78	0.59	2.60	0.41	1.78	0.01	0.06
Hydrogen Heater	0.13	0.55	0.04	0.18	0.47	2.07	0.71	3.10	0.21	0.91	0.08	0.37	0.08	0.37	0.12	0.54	0.08	0.37	0.01	0.06
Feed Catalyst Bins	--	--	<0.01	0.02	--	--	--	--	0.10	0.45	0.10	0.45	0.05	0.23	--	--	0.10	0.45	--	--
Spent Catalyst Drums	--	--	<0.01	<0.01	--	--	--	--	<0.01	<0.01	<0.001	<0.01	<0.01	<0.01	--	--	<0.001	<0.01	--	--
Vaccuum Tower Feed Heater	0.21	0.90	0.07	0.29	0.76	3.34	1.15	5.02	0.34	1.47	0.14	0.60	0.14	0.60	0.20	0.87	0.14	0.60	0.02	0.09
Unit 310 - Hydrocracker																				
Hydrocracker Reaction Heater	0.07	0.30	0.02	0.10	0.26	1.13	0.39	1.69	0.11	0.49	0.05	0.20	0.05	0.20	0.07	0.29	0.05	0.20	<0.01	0.03
Fractionation Reboiler	0.09	0.39	0.03	0.12	0.33	1.45	0.50	2.18	0.15	0.64	0.06	0.26	0.06	0.26	0.09	0.38	0.06	0.26	<0.01	0.04
Unit 320 - Catalytic Converter																				
Catalytic Reaction Heater 1	0.10	0.43	0.03	0.14	0.37	1.61	0.55	2.41	0.16	0.70	0.07	0.29	0.07	0.29	0.10	0.42	0.07	0.29	0.01	0.04
Catalytic Reaction Heater 2	0.10	0.43	0.03	0.14	0.37	1.61	0.55	2.41	0.16	0.70	0.07	0.29	0.07	0.29	0.10	0.42	0.07	0.29	0.01	0.04
Catalytic Reaction Heater 3	0.10	0.43	0.03	0.14	0.37	1.61	0.55	2.41	0.16	0.70	0.07	0.29	0.07	0.29	0.10	0.42	0.07	0.29	0.01	0.04
Catalytic Reaction Heater 4	0.10	0.43	0.03	0.14	0.37	1.61	0.55	2.41	0.16	0.70	0.07	0.29	0.07	0.29	0.10	0.42	0.07	0.29	0.01	0.04
Unit 440 - Sulfur Recovery Unit																				
SRU Incinerator	0.14	0.60	0.06	0.27	1.70	7.43	4.22	18.48	0.16	0.70	0.04	0.18	0.04	0.18	0.12	0.53	0.04	0.18	5.64	24.71
Unit 500 - Utilities																				
Steam Boiler - Start Up	0.13	<0.01	0.05	<0.01	2.22	0.07	0.85	0.03	0.20	<0.01	0.05	<0.01	0.05	<0.01	0.15	<0.01	0.05	<0.01	0.02	<0.01
Steam Boiler - Normal Operations	0.03	0.12	0.01	0.06	0.58	2.51	0.22	0.96	0.05	0.23	0.01	0.06	0.01	0.06	0.04	0.17	0.01	0.06	<0.01	0.02
Emergency Generator	1.54	0.08	0.01	<0.01	4.06	0.20	18.85	0.94	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.24	0.06
Cooling Towers	--	--	--	--	--	--	--	--	6.34	27.79	6.34	27.79	3.17	13.89	--	--	6.34	27.79	--	--
Unit 610 - Solid Products Handling																				
Flaked Residue Handling	--	--	--	--	--	--	--	--	3.77	2.58	1.98	2.09	0.43	0.89	--	--	3.77	2.58	--	--
Sulfur Product Stockpile	--	--	--	--	--	--	--	--	0.05	0.23	0.02	0.11	0.01	0.05	--	--	0.05	0.23	--	--
Sulfur Product Transfer Points	--	--	--	--	--	--	--	--	3.17	1.12	1.50	0.53	0.23	0.08	--	--	3.17	1.12	--	--
Unit 620 - Flare System																				
Emergency Flare	--	1.13	--	0.35	--	1.25	--	0.27	--	0.04	--	0.01	--	0.01	--	0.03	--	0.01	--	0.17
Unit 630 - Liquid Products and Intermediates Storage																				
Storage Vessels	0.53	1.62	0.07	0.26	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unit 640 - Liquid Product Loadout																				
Liquid Loading - Gasoline Trucks	4.06	1.18	1.40	0.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Liquid Loading - Diesel Trucks	1.31	0.13	0.10	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Liquid Loading - LPG Trucks	4.08	3.80	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Liquid Loading - Gasoline Railcar	1.70	0.15	0.59	0.05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Liquid Loading - Diesel Railcar	0.37	0.06	0.03	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Liquid Loading - Gasoline Barge	5.07	0.12	1.76	0.04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Liquid Loading - Diesel Barge	1.09	0.35	0.08	0.03	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Liquid Loading and Storage Vessel Flare	26.91	3.84	9.34	1.41	8.56	1.17	1.88	0.26	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01
Unit 700 - Hydrogen Plant																				
Hydrogen Reformer - Normal Operations	3.23	14.04	0.87	3.77	6.60	28.70	4.13	17.95	4.45	19.34	1.11	4.83	1.11	4.83	3.33	14.50	1.11	4.83	0.35	1.53
Hydrogen Reformer - Startup	3.23	0.10	0.87	0.03	6.60	0.20	34.37	1.03	4.45	0.13	1.11	0.03	1.11	0.03	3.33	0.10	1.11	0.03	0.35	0.01
Miscellaneous DSF Facility Emissions																				
Haul Roads	--	--	--	--	--	--	--	--	9.24	3.77	1.85	0.75	1.85	0.75	--	--	3.77	3.77	--	--
Initial Catalyst Handling	--	--	0.07	<0.01	--	--	--	--	2.45	<0.01	1.21	<0.01	0.22	<0.01	--	--	2.45	<0.01	--	--
Fugitive Leaks	11.91	52.15	1.84	8.06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Totals	**66.83**	**86.10**	**17.66**	**16.96**	**37.12**	**71.32**	**73.88**	**80.91**	**43.05**	**83.49**	**21.02**	**56.11**	**11.23**	**32.65**	**8.54**	**22.04**	**29.03**	**61.45**	**7.69**	**26.98**

Domestic Synthetic Fuels I Site Emission Levels - HAP Speciation

	Total HAPs		Formaldehyde		n-Hexane		Benzene		Toluene		Ethylbenzene		Xylene		Carbonyl Sulfide		HAP Metals	
Emission Sources	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
Unit 100 - Coal Handling																		
Coal Handling Transfer Points	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coal Stockpiles	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coal Milling Dryer	0.03	0.12	<0.01	<0.01	0.03	0.12	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	<0.01	<0.01
Coal Milling Baghouse and Storage Silos	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unit 200 - H-Coal																		
Unit 200 Coal Handling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Slurry Feed Heater	0.20	0.86	<0.01	0.03	0.19	0.82	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	<0.01	<0.01
Hydrogen Heater	0.04	0.18	<0.01	<0.01	0.04	0.17	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	<0.01	<0.01
Feed Catalyst Bins	<0.01	0.02	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	0.02
Spent Catalyst Drums	<0.01	<0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	<0.01	<0.01
Vaccuum Tower Feed Heater	0.07	0.29	<0.01	0.01	0.06	0.27	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	<0.01	<0.01
Unit 310 - Hydrocracker																		
Hydrocracker Reaction Heater	0.02	0.10	<0.01	<0.01	0.02	0.09	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	<0.01	<0.01
Fractionation Reboiler	0.03	0.12	<0.01	<0.01	0.03	0.12	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	<0.01	<0.01
Unit 320 - Catalytic Converter																		
Catalytic Reaction Heater 1	0.03	0.14	<0.01	<0.01	0.03	0.13	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	<0.01	<0.01
Catalytic Reaction Heater 2	0.03	0.14	<0.01	<0.01	0.03	0.13	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	<0.01	<0.01
Catalytic Reaction Heater 3	0.03	0.14	<0.01	<0.01	0.03	0.13	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	<0.01	<0.01
Catalytic Reaction Heater 4	0.03	0.14	<0.01	<0.01	0.03	0.13	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	<0.01	<0.01
Unit 440 - Sulfer Recovery																		
SRU Incinerator	0.06	0.27	<0.01	<0.01	0.04	0.17	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.09	--	--
Unit 500 - Utilities																		
Steam Boiler - Startup	0.05	<0.01	<0.01	<0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	<0.01	<0.01
Steam Boiler - Normal Operation	0.01	0.06	<0.01	<0.01	0.01	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	<0.01	<0.01
Emergency Engine 1	0.01	<0.01	<0.01	<0.01	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	--	--
Cooling Towers	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unit 610 - Solid Products Handling																		
Flaked Residue Handling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfur Product Stockpile	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Sulfur Product Transfer Points	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Unit 620 - Flare System																		
Emergency Flare	--	0.35	--	<0.01	--	0.01	--	<0.01	--	0.08	--	0.13	--	0.13	--	--	--	--
Unit 630 - Liquid Products and Intermediates Storage																		
Storage Vessels	0.07	0.26	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	0.02	0.08	0.02	0.08	--	--	--	--
Unit 640 - Liquid Product Loadout																		
Liquid Loading - Gasoline Trucks	1.40	0.41	--	--	<0.01	<0.01	0.03	<0.01	0.61	0.18	0.16	0.05	0.61	0.18	--	--	--	--
Liquid Loading - Diesel Trucks	0.10	0.01	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	0.02	<0.01	--	--	--	--
Liquid Loading - LPG Trucks	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Liquid Loading - Gasoline Railcar	0.59	0.05	--	--	<0.01	<0.01	0.01	<0.01	0.25	0.02	0.07	<0.01	0.25	0.02	--	--	--	--
Liquid Loading - Diesel Railcar	0.03	<0.01	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	--	--
Liquid Loading - Gasoline Barge	1.76	0.04	--	--	<0.01	<0.01	0.03	<0.01	0.76	0.02	0.20	<0.01	0.76	0.02	--	--	--	--
Liquid Loading - Diesel Barge	0.08	0.03	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	0.02	<0.01	--	--	--	--
Liquid Loading and Storage Vessel Flare	9.34	1.41	<0.01	<0.01	0.01	<0.01	0.17	0.02	4.04	0.57	1.09	0.21	4.04	0.60	--	--	--	--
Unit 700 - Hydrogen Plant																		
Hydrogen Reformer - Normal Operations	0.87	3.77	0.04	0.19	0.82	3.56	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	<0.01	<0.01
Hydrogen Reformer - Startup	0.87	0.03	0.04	<0.01	0.82	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	<0.01	<0.01
Miscellaneous DSF Facility Emissions																		
Haul Roads	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Catalyst Handling	0.07	<0.01	--	--	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	--	--	0.07	<0.01
Fugitive Leaks	1.84	8.06	--	--	0.10	0.42	0.03	0.12	0.39	1.69	0.64	2.79	0.67	2.92	--	--	--	--
Totals	**17.66**	**16.96**	**0.12**	**0.29**	**2.33**	**6.37**	**0.27**	**0.16**	**6.05**	**2.60**	**2.22**	**3.27**	**6.40**	**3.95**	**0.02**	**0.09**	**0.07**	**0.02**

PM Emissions from Coal Handling Transfer to Coal Mill 100-CM-1

Constant	PM	PM-10	PM-2.5
k	0.74	0.35	0.05

where

k		Particle size multiplier [1]
U	7.0	Wind Speed (mph) [2]

Emission Point ID Number	Transfer Point Description	Material Moisture Content, M (%)	Maximum Transfer Rate (ton/hr)	Maximum Transfer Rate (ton/yr)	Fan Flow Rate (scf/min)	Mechanical Vent Exhaust Concentration (grain/dscf)[3]	Control Device ID Number	Control Efficiency (%)	PM Emissions (lbs/hr)	PM Emissions (tons/yr)	PM-10 Emissions (lbs/hr)	PM-10 Emissions (tons/yr)	PM-2.5 Emissions (lbs/hr)[4]	PM-2.5 Emissions (tons/yr)[4]
100-TH-1	Barge Unloading to Barge Receiving Hopper	6	1,000.00	912,500.00					0.79	0.36	0.37	0.17	0.06	0.03
100-TC-1	Barge Receiving Hopper to Coal Transfer Conveyor 1	6	1,000.00	912,500.00	1200	0.010			0.10	0.15	0.10	0.15	0.05	0.08
100-TC-2	Coal Transfer Conveyor 1 to Coal Transfer Conveyor 2	6	1,000.00	912,500.00	1200	0.010			0.10	0.15	0.10	0.15	0.05	0.08
100-TH-2	Coal Transfer Conveyor 2 to Radial Stacker Hopper	6	1,000.00	912,500.00	1200	0.010			0.10	0.15	0.10	0.15	0.05	0.08
100-TC-3	Radial Stacker Hopper to Radial Stacker Transfer Conveyor	6	1,000.00	912,500.00	1200	0.010			0.10	0.15	0.10	0.15	0.05	0.08
100-CSP-1	Radial Stacker Transfer Conveyor to Storage Piles	6	1,000.00	912,500.00					0.79	0.36	0.37	0.17	0.06	0.03
100-TH-3	Front Loader to Coal Surge Hopper	6	104.17	912,500.00					0.08	0.36	0.04	0.17	<0.01	0.03
100-TC-4	Coal Surge Hopper to Coal Milling Transfer Conveyor 1	6	104.17	912,500.00	1200	0.010			0.10	0.45	0.10	0.45	0.05	0.23
100-TH-4	Coal Milling Transfer Conveyor 1 to Coal Milling Hopper	6	104.17	912,500.00	1200	0.010			0.10	0.45	0.10	0.45	0.05	0.23
100-TU-1	Coal Truck Unloading to Truck Dump Pile	6	1,000.00	912,500.00					0.79	0.36	0.37	0.17	0.06	0.03
Totals:									**3.06**	**2.94**	**1.77**	**2.18**	**0.48**	**0.85**

Notes:

[1] - Particle Size Multiplier used from AP-42 Chapter 13.2.4 Particle Size Multipliers for Aggregate Handling and Storage Piles - 11/2006 Version

[2] - Mean Wind Speed used from AP-42 Chapter 13.2.4 Particle Size Multipliers for Aggregate Handling and Storage Piles - 11/2006 Version

[3] - PM limit from any mechanical vent on coal processing or conveying equipment, coal storage system, or coal transfer and loading system affected facility per NSPS Subpart Y

[4] - For transfer points with mechanical vents, $PM_{2.5}$ is conservatively estimated to be 50% of PM_{10}

[5] - Equation 1 from AP-42 13.2.4 Aggregate Handling and Storage Piles - 11/2006 Version

Example Calculations:

Emissions (lb PM/ton transferred) - $E = [k \times (0.0032 \times ((U/5)^{1.3}/(M/2)^{1.4}]$ [5]

If not equipped with mechanical vent

Emissions (lb/hr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton transferred/hr)

Emissions (ton/yr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton/yr) x (1 ton PM/2000 lb PM)

If equipped with mechanical vent

Emissions (lb/hr) = Mechanical Vent Exhaust Concentration (grain/scf) x Fan Flow Rate (scf/min) x (60 min/1 hr) x (1 lb/7000 grain)

Emissions (ton/yr) = Emissions (lb/hr) x (1 ton/2000 lb) x Annual Hours of Operation (8760 hr/yr)

Fugitive PM Emissions from Coal Stockpiles

Constant	PM	PM-10	PM-2.5
k	1.70	0.80	0.40

where

k		Particle size multiplier [1]
f	20	Percentage of time the unobstructed wind speed is greater than 12 mph at the mean pile height [2]
P	157	Number of days per year with precipitation >0.01 in. 3

Fugitive Emission Point ID Number	Storage Pile Description	[4] Material Silt Content, s (%)	Stockpile Base Area (ft^2)	Stockpile Base Area (acres)	Control Device	Control Efficiency (%)	PM Emissions (lbs/hr)	PM Emissions (tons/yr)	PM-10 Emissions (lbs/hr)	PM-10 Emissions (tons/yr)	PM-2.5 Emissions (lbs/hr)	PM-2.5 Emissions (tons/yr)
100-CSP-1	Active Storage Pile	2.2	26,000	0.60	Wind Shield	50%	0.04	0.16	0.02	0.08	<0.01	0.04
100-CSP-2	Backup Storage Pile	2.2	88,000	2.02	Wind Shield	50%	0.12	0.54	0.06	0.26	0.03	0.13
100-CSP-3	Truck Dump Pile at Active Storage Pile	2.2	530	0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Totals:							**0.16**	**0.71**	**0.08**	**0.33**	**0.04**	**0.17**

Notes:

1 - PM and PM_{10} Particle Size Multiplier from WVDAQ Coal Preparation Plant G10-D Emission Calculation Spreadsheet. $PM_{2.5}$ was conservatively estimated to be 50% of PM_{10} emissions.

2 - f value WVDAQ Coal Preparation Plant 610-D Emission Calculation Spreadsheet.

3 - Number of days per year with precipitation >0.01 inches for Zone 1 - Western Plateau found in Table B - Precipitation Zones in West Virginia on Page 22 of the West Virginia G10-D Instructions and Forms document

4 - Mean silt content (%) for coal in Table 13.2.4-1 - Typical Silt and Moisture Contents of Materials at Various Industires in AP-42 13.2.4 Aggregate Handling and Storage Piles - 11/2006 Version

5 - Equation for lb PM/day/acre from WVDAQ Coal Preparation Plant G10-D Emission Calculation Spreadsheet.

Example Calculations:

Emissions (lb PM/day/acre) - E = [k × (s/1.5) x (365-P)/235 x (f/15)] [5]
Emissions (lb/hr) = [E (lb PM/day/acre) x Stockpile Base Area (acres)]/ 24 (hr/day)
Emissions (ton/yr) = [E (lb PM/day/acre) x Stockpile Base Area (acres) *365 days] / 2000 (lb/ton)

Coal Milling Dryer (100-CMD-1)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heater Rating (MMBtu/hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
VOCs	5.5	lb/10^6 scf	AP-42 Chapter 1.4	13.45	918	8,760	0.08	0.35
Hexane	1.8	lb/10^6 scf	AP-42 Chapter 1.4	13.45	918	8,760	0.03	0.12
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	13.45	918	8,760	<0.01	<0.01
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	13.45	918	8,760	<0.01	<0.01
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	13.45	918	8,760	<0.01	<0.01
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	13.45	918	8,760	<0.01	<0.01
CO	84	lb/10^6 scf	AP-42 Chapter 1.4	13.45	918	8,760	1.23	5.39
NO_x	100	lb/10^6 scf	AP-42 Chapter 1.4	13.45	918	8,760	1.47	6.42
$PM_{Filterable}$	1.9	lb/10^6 scf	AP-42 Chapter 1.4	13.45	918	8,760	0.03	0.12
$PM_{Condensable}$	5.7	lb/10^6 scf	AP-42 Chapter 1.4	13.45	918	8,760	0.08	0.37
PM_{Total}	7.6	lb/10^6 scf	AP-42 Chapter 1.4	13.45	918	8,760	0.11	0.49
SO_2	0.6	lb/10^6 scf	AP-42 Chapter 1.4	13.45	918	8,760	<0.01	0.04
Total HAPs							0.03	0.12

Notes:
- Emission rates displayed above represent the max. hourly and max. annual emissions for the Coal Milling Dryer (100-CMD-1) in Unit 100 - Coal Handling.
- Heat value 918 Btu/scf is the heat value for pipeline quality natural gas that will be used at the DSF facility.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/10^6 scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating **(MMBtu/hr)**

Max. Annual Emission Rate **(tpy)** = Max Hourly Emissions **(lb/hr)** x Annual Operating Hours **(hr/yr)** x **(1 ton/2000 lb)**

PM Emissions from Milled Coal Handling

Constant	PM	PM-10	PM-2.5
k	0.74	0.35	0.05

where

k — Particle size multiplier [1]

U — 7.0 — Wind Speed (mph) [2]

Emission Point ID Number	Transfer Point Description	Material Moisture Content, M (%)	Maximum Transfer Rate (ton/hr)	Maximum Transfer Rate (ton/yr)	Fan Flow Rate (scf/min)	Mechanical Vent Exhaust Concentration (grain/dscf)[3]	Control Device ID Number	Control Efficiency (%)	PM Emissions (lbs/hr)	PM Emissions (tons/yr)	PM-10 Emissions (lbs/hr)	PM-10 Emissions (tons/yr)	PM-2.5 Emissions (lbs/hr)[4]	PM-2.5 Emissions (tons/yr)[4]
100-BH-1	Coal Mill Baghouse	3	104.17	912,500.00	21500	0.010			1.84	8.07	1.84	8.07	0.92	4.04
100-TH-5	Coal Mill/Coal Mill Baghouse to Coal Milling Hopper 2	3	104.17	912,500.00	1200	0.010			0.10	0.45	0.10	0.45	0.05	0.23
100-TC-5	Coal Milling Hopper 2 to Coal Milling Transfer Conveyor 2	3	104.17	912,500.00	1200	0.010			0.10	0.45	0.10	0.45	0.05	0.23
100-CS-1	Coal Milling Transfer Conveyor 2 to Coal Storage Silo 1	3	104.17	912,500.00	800	0.010			0.07	0.30	0.07	0.30	0.03	0.15
100-CS-2	Coal Milling Transfer Conveyor 2 to Coal Storage Silo 2	3	104.17	912,500.00	800	0.010			0.07	0.30	0.07	0.30	0.03	0.15
100-TH-6	Milled coal from Coal Storage Silo 1 to Coal Storage Silo Hopper 1	3	416.67	912,500.00	1200	0.010			0.10	0.45	0.10	0.45	0.05	0.23
100-TH-7	Milled coal from Coal Storage Silo 2 to Coal Storage Silo Hopper 2	3	416.67	912,500.00	1200	0.010			0.10	0.45	0.10	0.45	0.05	0.23
100-TC-6	Coal Storage Silo Hopper 1/2 to Coal Silo Transfer Conveyor 1	3	416.67	912,500.00	1200	0.010			0.10	0.45	0.10	0.45	0.05	0.23
100-TC-7	Coal Silo Transfer Conveyor 1 to Coal Silo Transfer Conveyor 2	3	416.67	912,500.00	1200	0.010			0.10	0.45	0.10	0.45	0.05	0.23
Totals:									**2.60**	**11.38**	**2.60**	**11.38**	**1.30**	**5.69**

Notes:

1 - Particle Size Multiplier used from AP-42 Chapter 13.2.4 Particle Size Multipliers for Aggregate Handling and Storage Piles - 11/2006 Version

2 - Mean Wind Speed used from AP-42 Chapter 13.2.4 Particle Size Multipliers for Aggregate Handling and Storage Piles - 11/2006 Version

3 - PM limit from any mechanical vent on coal processing or conveying equipment, coal storage system, or coal transfer and loading system affected facility per NSPS Subpart Y

4 - For transfer points with mechanical vents, $PM_{2.5}$ is conservatively estimated to be 50% of PM_{10}

5 - Equation 1 from AP-42 13.2.4 Aggregate Handling and Storage Piles - 11/2006 Version

Example Calculations:

Emissions (lb PM/ton transferred) - E = $[k \times (0.0032 \times ((U/5)^{1.3}/(M/2)^{1.4}]$ [5]

If not equipped with mechanical vent

Emissions (lb/hr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton transferred/hr)

Emissions (ton/yr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton/yr) x (1 ton PM/2000 lb PM)

If equipped with mechanical vent

Emissions (lb/hr) = Mechanical Vent Exhaust Concentration (grain/scf) x Fan Flow Rate (scf/min) x (60 min/1 hr) x (1 lb/7000 grain)

Emissions (ton/yr) = Emissions (lb/hr) x (1 ton/2000 lb) x Annual Hours of Operation (8760 hr/yr)

PM Emissions from Unit 200 Feed Coal Handling

Constant	PM	PM-10	PM-2.5
k	0.74	0.35	0.05

where

k — Particle size multiplier [1]

U — 7.0 — Wind Speed (mph) [2]

Emission Point ID Number	Transfer Point Description	Material Moisture Content, M (%)	Maximum Transfer Rate (ton/hr)	Maximum Transfer Rate (ton/yr)	Fan Flow Rate (scf/min)	Mechanical Vent Exhaust Concentration (grain/dscf)[3]	Control Device ID Number	Control Efficiency (%)	PM Emissions (lbs/hr)	PM Emissions (tons/yr)	PM-10 Emissions (lbs/hr)	PM-10 Emissions (tons/yr)	PM-2.5 Emissions (lbs/hr)[4]	PM-2.5 Emissions (tons/yr)[4]
200-S-108	Coal Silo Transfer Conveyor to Feed Coal Bin 200-D-110	3	416.67	912,500.00	1200	0.010			0.10	0.45	0.10	0.45	0.05	0.23
200-S-105	Feed Coal Bin 200-D-110 to Feed Coal Conveyor 200-S-105	3	156.25	912,500.00	1200	0.010			0.10	0.45	0.10	0.45	0.05	0.23
Totals:									**0.21**	**0.90**	**0.21**	**0.90**	**0.10**	**0.45**

Notes:

1 - Particle Size Multiplier used from AP-42 Chapter 13.2.4 Particle Size Multipliers for Aggregate Handling and Storage Piles - 11/2006 Version

2 - Mean Wind Speed used from AP-42 Chapter 13.2.4 Particle Size Multipliers for Aggregate Handling and Storage Piles - 11/2006 Version

3 - PM limit from any mechanical vent on coal processing or conveying equipment, coal storage system, or coal transfer and loading system affected facility per NSPS Subpart Y

4 - For transfer points with mechanical vents, $PM_{2.5}$ is conservatively estimated to be 50% of PM_{10}

5 - Equation 1 from AP-42 13.2.4 Aggregate Handling and Storage Piles - 11/2006 Version

Example Calculations:

Emissions (lb PM/ton transferred) - $E = [k \times (0.0032 \times ((U/5)^{1.3}/(M/2)^{1.4}]$ [5]

If not equipped with mechanical vent

Emissions (lb/hr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton transferred/hr)

Emissions (ton/yr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton/yr) x (1 ton PM/2000 lb PM)

If equipped with mechanical vent

Emissions (lb/hr) = Mechanical Vent Exhaust Concentration (grain/scf) x Fan Flow Rate (scf/min) x (60 min/1 hr) x (1 lb/7000 grain)

Emissions (ton/yr) = Emissions (lb/hr) x (1 ton/2000 lb) x Annual Hours of Operation (8760 hr/yr)

Slurry Feed Heater (200-H-102)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heater Rating (MMBtu/hr)	Heat Value of Fuel Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
VOCs	0.0075	lb/MMBtu	Vendor Guarantee	74.02	712	8,760	0.56	2.43
Hexane	1.8	lb/10^6 scf	AP-42 Chapter 1.4	74.02	712	8,760	0.19	0.82
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	74.02	712	8,760	<0.01	0.03
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	74.02	712	8,760	<0.01	<0.01
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	74.02	712	8,760	<0.01	<0.01
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	74.02	712	8,760	<0.01	<0.01
CO	0.031	lb/MMBtu	Vendor Guarantee	74.02	712	8,760	2.28	9.98
NO_x	0.040	lb/MMBtu	NSPS Subpart Ja	74.02	712	8,760	2.96	12.97
$PM_{10/2.5}$	0.006	lb/MMBtu	Vendor Guarantee	74.02	712	8,760	0.41	1.78
$PM_{Condensable}$	5.7	lb/10^6 scf	AP-42 Chapter 1.4	74.02	712	8,760	0.59	2.60
PM_{Total}				74.02	712	8,760	1.00	4.38
SO_2	0.6	lb/10^6 scf	AP-42 Chapter 1.4	74.02	712	8,760	0.06	0.27
Total HAPs							0.20	0.86

Notes:
- Emission rates displayed above represent the max. hourly and max. annual emissions for the Slurry Feed Heater (200-H-102) in Unit 200 - H-Coal.
- Heat Value of Fuel Gas from Unit 410 - Gas Recovery Unit.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/10^6 scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating **(MMBtu/hr)**

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/MMBtu)** x Heater Rating **(MMBtu/hr)**

Max. Annual Emission Rate **(tpy)** = Max Hourly Emissions **(lb/hr)** x Annual Operating Hours **(hr/yr)** x **(1 ton/2000 lb)**

Hydrogen Heater (200-H-101)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heater Rating (MMBtu/hr)	Heat Value of Fuel Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
VOCs	0.0082	lb/MMBtu	Vendor Guarantee	15.34	712	8,760	0.13	0.55
Hexane	1.8	lb/10^6 scf	AP-42 Chapter 1.4	15.34	712	8,760	0.04	0.17
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	15.34	712	8,760	<0.01	<0.01
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	15.34	712	8,760	<0.01	<0.01
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	15.34	712	8,760	<0.01	<0.01
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	15.34	712	8,760	<0.01	<0.01
CO	0.031	lb/MMBtu	Vendor Guarantee	15.34	712	8,760	0.47	2.07
NO_x	0.046	lb/MMBtu	Vendor Guarantee	15.34	712	8,760	0.71	3.10
$PM_{10/2.5}$	0.0055	lb/MMBtu	Vendor Guarantee	15.34	712	8,760	0.08	0.37
$PM_{Condensable}$	5.7	lb/10^6 scf	AP-42 Chapter 1.4	15.34	712	8,760	0.12	0.54
PM_{Total}				15.34	712	8,760	0.21	0.91
SO_2	0.6	lb/10^6 scf	AP-42 Chapter 1.4	15.34	712	8,760	0.01	0.06
Total HAPs							0.04	0.18

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for the Hydrogen Heater (200-H-101) in Unit 200 - H-Coal.
- Heat Value of Fuel Gas from Unit 410 - Gas Recovery Unit.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/10^6 scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating **(MMBtu/hr)**

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/MMBtu)** x Heater Rating **(MMBtu/hr)**

Max. Annual Emission Rate **(tpy)** = Max Hourly Emissions **(lb/hr)** x Annual Operating Hours **(hr/yr)** x **(1 ton/2000 lb)**

PM Emissions from Feed Catalyst Bins 200-D-204/205/206 Loading

Constant	PM	PM-10	PM-2.5
k	0.74	0.35	0.05

where

k		Particle size multiplier [1]
U	7.0	Wind Speed (mph) [2]

Catalyst Information			
Unit Catalyst Used Within	Catalyst Name	HAP Metals Composition (%)	HAP Metals in Catalyst
Unit 200	Axens HF 858	4	CoO, NiO

Emission Point ID Number	Transfer Point Description	Material Moisture Content, M[3] (%)	Maximum Transfer Rate (ton/hr)	Maximum Transfer Rate (ton/yr)	Fan Flow Rate (scf/min)	Mechanical Vent Exhaust Concentration (grain/dscf)	PM Emissions (lb/hr)	PM Emissions (ton/yr)	HAP Metals (lb/hr)	HAP Metals (ton/yr)	PM-10 Emissions (lb/hr)	PM-10 Emissions (ton/yr)	PM-2.5 Emissions (lbs/hr)	PM-2.5 Emissions (ton/yr)
200-D-206	Axens HF 858 to Feed Catalyst Bins 200-D-204/205/206	0.9	2.20	803.00	1200	0.010	0.10	0.45	<0.01	0.02	0.10	0.45	0.05	0.23
Totals:							**0.10**	**0.45**	**<0.01**	**0.02**	**0.10**	**0.45**	**0.05**	**0.23**

Notes:

[1] - Particle Size Multiplier used from AP-42 Chapter 13.2.4 Particle Size Multipliers for Aggregate Handling and Storage Piles - 11/2006 Version

[2] - Mean Wind Speed used from AP-42 Chapter 13.2.4 Particle Size Multipliers for Aggregate Handling and Storage Piles - 11/2006 Version

[3] - Moisture content of pellets used from AP-42 Chapter 13.2.4-1 Typical Silt and Moisture Contents of Materials at Various Industries - 11/2006 Version

[4] - For transfer points with mechanical vents, $PM_{2.5}$ is conservatively estimated to be 50% of PM_{10}

Example Calculations:

Emissions (lb PM/ton transferred) - E = $[k \times (0.0032 \times ((U/5)^{1.3}/(M/2)^{1.4}]$ [3]

Emissions (lb/hr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton transferred/hr)

Emissions (ton/yr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton/yr) x (1 ton PM/2000 lb PM)

HAP Metal Emissions (lb/hr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton transferred/hr) x Percent Metal Composition (%)

HAP Metal Emissions (ton/yr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton transferred/yr) x Percent Metal Composition (%)

PM Emissions from Spent Catalyst Drums (200-D-209) Loading

Constant	PM	PM-10	PM-2.5
k	0.74	0.35	0.05

where
k — Particle size multiplier [1]
U — 7.0 — Wind Speed (mph) [2]

Catalyst Information			
Unit Catalyst Used Within	Catalyst Name	HAP Metals Composition (%)	HAP Metals in Catalyst
Unit 200	Axens HF 858	2.5	CoO, NiO

Emission Point ID Number	Transfer Point Description	Material Moisture Content, M (%)[4]	Maximum Transfer Rate (ton/hr)	Maximum Transfer Rate (ton/yr)	PM Emissions (lb/hr)	PM Emissions (ton/yr)	HAP Metals (lb/hr)	HAP Metals (ton/yr)	PM-10 Emissions (lb/hr)	PM-10 Emissions (ton/yr)	PM-2.5 Emissions (lbs/hr)	PM-2.5 Emissions (ton/yr)
200-D-206	Spent Catalyst Addition/Withdrawal Bin	38	3.52	1,284.80	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
200-D-207	Spent Catalyst Cooling Bin	38	3.52	1,284.80	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
200-D-208	Spent Catalyst Loading Hopper	38	3.52	1,284.80	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
200-D-209	Spent Catalyst Drum Loading	38	3.52	1,284.80	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Totals:					**<0.01**	**<0.01**	**<0.01**	**<0.01**	**<0.001**	**<0.01**	**<0.01**	**<0.01**

Notes:

[1] - Particle Size Multiplier used from AP-42 Chapter 13.2.4 Particle Size Multipliers for Aggregate Handling and Storage Piles - 11/2006 Version

[2] - Mean Wind Speed used from AP-42 Chapter 13.2.4 Particle Size Multipliers for Aggregate Handling and Storage Piles - 11/2006 Version

[3] - Equation 1 from AP-42 13.2.4 Aggregate Handling and Storage Piles - 11/2006 Version

[4] - Spent catalyst is generally saturated with hydrocarbon liquid. Moisture content is calculated from engineering estimates for similar operations.

Example Calculations:

Emissions (lb PM/ton transferred) - E = $[k \times (0.0032 \times ((U/5)^{1.3}/(M/2)^{1.4}]$ [3]

Emissions (lb/hr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton transferred/hr)

Emissions (ton/yr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton/yr) x (1 ton PM/2000 lb PM)

HAP Metals Emissions (lb/hr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton transferred/hr) x Percent HAP Metals Composition (%)

HAP Metals Emissions (ton/yr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton transferred/yr) x Percent HAP Metals Composition (%)

Vacuum Tower Feed Heater (200-H-301)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heater Rating (MMBtu/hr)	Heat Value of Fuel Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
VOCs	0.0083	lb/MMBtu	Vendor Guarantee	24.79	712	8,760	0.21	0.90
Hexane	1.8	lb/10^6 scf	AP-42 Chapter 1.4	24.79	712	8,760	0.06	0.27
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	24.79	712	8,760	<0.01	0.01
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	24.79	712	8,760	<0.01	<0.01
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	24.79	712	8,760	<0.01	<0.01
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	24.79	712	8,760	<0.01	<0.01
CO	0.031	lb/MMBtu	Vendor Guarantee	24.79	712	8,760	0.76	3.34
NO_x	0.046	lb/MMBtu	Vendor Guarantee	24.79	712	8,760	1.15	5.02
$PM_{10/2.5}$	0.006	lb/MMBtu	Vendor Guarantee	24.79	712	8,760	0.14	0.60
$PM_{Condensable}$	5.7	lb/10^6 scf	AP-42 Chapter 1.4	24.79	712	8,760	0.20	0.87
PM_{Total}				24.79	712	8,760	0.34	1.47
SO_2	0.6	lb/10^6 scf	AP-42 Chapter 1.4	24.79	712	8,760	0.02	0.09
Total HAPs							0.07	0.29

Notes:
- Emission rates displayed above represent the max. hourly and max. annual emissions for the Vacuum Tower Feed Heater (200-H-301) in Unit 200 - H-Coal.
- Heat Value of Fuel Gas from Unit 410 - Gas Recovery Unit.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/10^6 scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating **(MMBtu/hr)**

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/MMBtu)** x Heater Rating **(MMBtu/hr)**

Hydrocracker Reaction Heater (310-H-101)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heater Rating (MMBtu/hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
VOCs	0.0082	lb/MMBtu	Vendor Guarantee	8.37	712	8,760	0.07	0.30
Hexane	1.8	lb/10^6 scf	AP-42 Chapter 1.4	8.37	712	8,760	0.02	0.09
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	8.37	712	8,760	<0.01	<0.01
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	8.37	712	8,760	<0.01	<0.01
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	8.37	712	8,760	<0.01	<0.01
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	8.37	712	8,760	<0.01	<0.01
CO	0.031	lb/MMBtu	Vendor Guarantee	8.37	712	8,760	0.26	1.13
NO_x	0.046	lb/MMBtu	Vendor Guarantee	8.37	712	8,760	0.39	1.69
$PM_{10/2.5}$	0.005	lb/MMBtu	Vendor Guarantee	8.37	712	8,760	0.05	0.20
$PM_{Condensable}$	5.7	lb/10^6 scf	AP-42 Chapter 1.4	8.37	712	8,760	0.07	0.29
PM_{Total}				8.37	712	8,760	0.11	0.49
SO_2	0.6	lb/10^6 scf	AP-42 Chapter 1.4	8.37	712	8,760	<0.01	0.03
Total HAPs							0.02	0.10

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for the Hydrocracker Reaction Heater (310-H-101) in Unit 310 - Hydrocracker.
- Heat Value of Fuel Gas from Unit 410 - Gas Recovery Unit.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/10^6 scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating **(MMBtu/hr)**

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/MMBtu)** x Heater Rating **(MMBtu/hr)**

Max. Annual Emission Rate **(tpy)** = Max Hourly Emissions **(lb/hr)** x Annual Operating Hours **(hr/yr)** x **(1 ton/2000 lb)**

Fractionation Reboiler (310-H-103)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heater Rating (MMBtu/hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
VOCs	0.0083	lb/MMBtu	Vendor Guarantee	10.78	712	8,760	0.09	0.39
Hexane	1.8	lb/10^6 scf	AP-42 Chapter 1.4	10.78	712	8,760	0.03	0.12
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	10.78	712	8,760	<0.01	<0.01
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	10.78	712	8,760	<0.01	<0.01
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	10.78	712	8,760	<0.01	<0.01
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	10.78	712	8,760	<0.01	<0.01
CO	0.031	lb/MMBtu	Vendor Guarantee	10.78	712	8,760	0.33	1.45
NO_x	0.046	lb/MMBtu	Vendor Guarantee	10.78	712	8,760	0.50	2.18
$PM_{10/2.5}$	0.006	lb/MMBtu	Vendor Guarantee	10.78	712	8,760	0.06	0.26
$PM_{Condensable}$	5.7	lb/10^6 scf	AP-42 Chapter 1.4	10.78	712	8,760	0.09	0.38
PM_{Total}				10.78	712	8,760	0.15	0.64
SO_2	0.6	lb/10^6 scf	AP-42 Chapter 1.4	10.78	712	8,760	<0.01	0.04
Total HAPs							0.03	0.12

Notes:
- Emission rates displayed above represent the max. hourly and max. annual emissions for the Fractionation Reboiler (310-H-103) in Unit 310 - Hydrocracker.
- Heat Value of Fuel Gas from Unit 410 - Gas Recovery Unit.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/10^6 scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating **(MMBtu/hr)**

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/MMBtu)** x Heater Rating **(MMBtu/hr)**

Max. Annual Emission Rate **(tpy)** = Max Hourly Emissions **(lb/hr)** x Annual Operating Hours **(hr/yr)** x **(1 ton/2000 lb)**

Catalytic Reaction Heater 1 (320-H-201)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heater Rating (MMBtu/hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
VOCs	0.0083	lb/MMBtu	Vendor Guarantee	11.89	712	8,760	0.10	0.43
Hexane	1.8	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	0.03	0.13
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	<0.01	<0.01
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	<0.01	<0.01
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	<0.01	<0.01
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	<0.01	<0.01
CO	0.031	lb/MMBtu	Vendor Guarantee	11.89	712	8,760	0.37	1.61
NO_x	0.046	lb/MMBtu	Vendor Guarantee	11.89	712	8,760	0.55	2.41
$PM_{10/2.5}$	0.0055	lb/MMBtu	Vendor Guarantee	11.89	712	8,760	0.07	0.29
$PM_{Condensable}$	5.7	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	0.10	0.42
PM_{Total}				11.89	712	8,760	0.16	0.70
SO_2	0.6	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	0.01	0.04
Total HAPs							0.03	0.14

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for the Catalytic Reaction Heater 1 (320-H-201) in Unit 320 - Catalytic Reformer.
- Heat Value of Fuel Gas from Unit 410 - Gas Recovery Unit.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/10^6 scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating **(MMBtu/hr)**

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/MMBtu)** x Heater Rating **(MMBtu/hr)**

Max. Annual Emission Rate **(tpy)** = Max Hourly Emissions **(lb/hr)** x Annual Operating Hours **(hr/yr)** x **(1 ton/2000 lb)**

Catalytic Reaction Heater 2 (320-H-202)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heater Rating (MMBtu/hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
VOCs	0.0083	lb/MMBtu	Vendor Guarantee	11.89	712	8,760	0.10	0.43
Hexane	1.8	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	0.03	0.13
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	<0.01	<0.01
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	<0.01	<0.01
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	<0.01	<0.01
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	<0.01	<0.01
CO	0.031	lb/MMBtu	Vendor Guarantee	11.89	712	8,760	0.37	1.61
NO_x	0.046	lb/MMBtu	Vendor Guarantee	11.89	712	8,760	0.55	2.41
$PM_{10/2.5}$	0.0055	lb/MMBtu	Vendor Guarantee	11.89	712	8,760	0.07	0.29
$PM_{Condensable}$	5.7	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	0.10	0.42
PM_{Total}				11.89	712	8,760	0.16	0.70
SO_2	0.6	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	0.01	0.04
Total HAPs							0.03	0.14

Notes:
- Emission rates displayed above represent the max. hourly and max. annual emissions for the Catalytic Reaction Heater 2 (320-H-202) in Unit 320 - Catalytic Reformer.
- Heat Value of Fuel Gas from Unit 410 - Gas Recovery Unit.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/10^6 scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating **(MMBtu/hr)**

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/MMBtu)** x Heater Rating **(MMBtu/hr)**

Max. Annual Emission Rate **(tpy)** = Max Hourly Emissions **(lb/hr)** x Annual Operating Hours **(hr/yr)** x **(1 ton/2000 lb)**

Catalytic Reaction Heater 3 (320-H-203)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heater Rating (MMBtu/hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
VOCs	0.0083	lb/MMBtu	Vendor Guarantee	11.89	712	8,760	0.10	0.43
Hexane	1.8	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	0.03	0.13
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	<0.01	<0.01
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	<0.01	<0.01
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	<0.01	<0.01
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	<0.01	<0.01
CO	0.031	lb/MMBtu	Vendor Guarantee	11.89	712	8,760	0.37	1.61
NO_x	0.046	lb/MMBtu	Vendor Guarantee	11.89	712	8,760	0.55	2.41
$PM_{10/2.5}$	0.0055	lb/MMBtu	Vendor Guarantee	11.89	712	8,760	0.07	0.29
$PM_{Condensable}$	5.7	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	0.10	0.42
PM_{Total}				11.89	712	8,760	0.16	0.70
SO_2	0.6	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	0.01	0.04
Total HAPs							0.03	0.14

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for the Catalytic Reaction Heater 3 (320-H-203) in Unit 320 - Catalytic Reformer.
- Heat Value of Fuel Gas from Unit 410 - Gas Recovery Unit.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/10^6 scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating **(MMBtu/hr)**

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/MMBtu)** x Heater Rating **(MMBtu/hr)**

Max. Annual Emission Rate **(tpy)** = Max Hourly Emissions **(lb/hr)** x Annual Operating Hours **(hr/yr)** x **(1 ton/2000 lb)**

Catalytic Reaction Heater 4 (320-H-204)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heater Rating (MMBtu/hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
VOCs	0.0083	lb/MMBtu	Vendor Guarantee	11.89	712	8,760	0.10	0.43
Hexane	1.8	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	0.03	0.13
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	<0.01	<0.01
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	<0.01	<0.01
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	<0.01	<0.01
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	<0.01	<0.01
CO	0.031	lb/MMBtu	Vendor Guarantee	11.89	712	8,760	0.37	1.61
NO_x	0.046	lb/MMBtu	Vendor Guarantee	11.89	712	8,760	0.55	2.41
$PM_{10/2.5}$	0.0055	lb/MMBtu	Vendor Guarantee	11.89	712	8,760	0.07	0.29
$PM_{Condensable}$	5.7	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	0.10	0.42
PM_{Total}				11.89	712	8,760	0.16	0.70
SO_2	0.6	lb/10^6 scf	AP-42 Chapter 1.4	11.89	712	8,760	0.01	0.04
Total HAPs							0.03	0.14

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for the Catalytic Reaction Heater 4 (320-H-204) in Unit 320 - Catalytic Reformer.
- Heat Value of Fuel Gas from Unit 410 - Gas Recovery Unit.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/10^6 scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating **(MMBtu/hr)**

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/MMBtu)** x Heater Rating **(MMBtu/hr)**

Max. Annual Emission Rate **(tpy)** = Max Hourly Emissions **(lb/hr)** x Annual Operating Hours **(hr/yr)** x **(1 ton/2000 lb)**

SRU Incinerator (440-SRI-1)

Emissions from Input Streams to SRU Incinerator

Input to Enclosed Combustion Device	Pollutant	Amount of Gas Sent to SRU Incinerator (lbs/hr)	Amount of Gas Sent to SRU Incinerator (ton/yr)	SRU Incinerator Combustion Efficiency	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
Unit 440 Amine Treating Tail Gas	VOCs	1.03	4.52	98%	0.02	0.09
	HAPs	1.03	4.52	98%	0.02	0.09
	COS	1.03	4.52	98%	0.02	0.09
	H_2S	0.09	0.41	98%	<0.01	<0.01
	SO_2	--	--	98%	5.64	24.71
	CO	0.48	2.11	98%	<0.01	0.04
Unit 430 Sour Water Storage Tank	VOCs	0.04	0.17	98%	<0.01	<0.01
	HAPs	0.03	0.14	98%	<0.01	<0.01
	Hexane	0.01	0.04	98%	<0.01	<0.01
	Benzene	<0.01	<0.01	98%	<0.01	<0.01
	Toluene	<0.01	0.03	98%	<0.01	<0.01
	Ethylbenzene	<0.01	0.01	98%	<0.01	<0.01
	Xylene	0.01	0.05	98%	<0.01	<0.01
Totals	VOCs	1.07	4.68	--	0.02	0.09
	HAPs	1.06	4.66	--	0.02	0.09
	Hexane	0.01	0.04	--	<0.01	<0.01
	Benzene	<0.01	<0.01	--	<0.01	<0.01
	Toluene	<0.01	0.03	--	<0.01	<0.01
	Ethylbenzene	<0.01	0.01	--	<0.01	<0.01
	Xylene	0.01	0.05	--	<0.01	<0.01
	H_2S	0.09	0.41	--	<0.01	<0.01
	SO_2	--	--	--	5.64	24.71
	CO	0.48	2.11		<0.01	0.04

Unit 440 Amine Treating Tail Gas Stream Components	Unit 440 Amine Treating Tail Gas Stream Mole Fraction	Unit 440 Amine Treating Tail Gas Stream Mass Fraction
COS	5.00E-05	1.10E-04
H2S	8.00E-06	1.00E-05
CO	5.00E-05	5.14E-05
CO2	0.02	0.04

Unit 430 Sour Water Storage Tank Gas Stream Components	Unit 430 Sour Water Storage Tank Gas Stream Mole Fraction	Unit 430 Sour Water Storage Tank Gas Stream Mass Fraction
VOC	1.00	1.00
Hexane	0.30	0.26
Benzene	0.04	0.03
Toluene	0.18	0.17
Ethylbenzene	0.06	0.07
Xylene	0.30	0.33

Vent Gas Properties

Vent Gas Properties	Mass Flow Rate (lb/hr)	Density (lb/ft^3)
Unit 440 Amine Treating Tail Gas	9351	0.07
Sour Water Tank Flash Gas	0.04	0.27

SRU Incinerator (440-SRI-1)

Emissions from firing SRU Incinerator and Claus Furnace

Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factors (lb/MMBtu)	Heat Value of Fuel Gas (Btu/scf)	Enclosed Ground Flare Pilot Rating (Btu/hr)	Combined SRU Incinerator and Claus Furnace Rating (Btu/hr)	Pilot Max. Hourly Emissions (lb/yr)	Pilot Max. Hourly Emissions (tons/yr)	Burner Max.Hourly Emissions (lb/hr)	Burner Max.Hourly Emissions (tons/hr)	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
VOCs	5.50	--	712	30,000	15,000,000	<0.01	<0.01	0.12	0.51	0.12	0.51
Hexane	1.80	--	712	30,000	15,000,000	<0.01	<0.01	0.04	0.17	0.04	0.17
Formaldehyde	0.075	--	712	30,000	15,000,000	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
CO	--	0.11	712	30,000	15,000,000	--	--	--	--	1.69	7.39
NO_x	--	0.28	712	30,000	15,000,000	--	--	--	--	4.22	18.48
$PM_{Condensable}$	5.70	--	712	30,000	15,000,000	<0.01	<0.01	0.12	0.53	0.12	0.53
$PM_{10/2.5}$	1.90	--	712	30,000	15,000,000	<0.01	<0.01	0.04	0.18	0.04	0.18
PM_{Total}	7.60	--	712	30,000	15,000,000	<0.01	<0.01	0.16	0.70	0.16	0.70
Total HAPs										0.16	0.68

Total Enclosed Combustion Device Emissions

Pollutant	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
VOCs	0.14	0.60
HAPs	0.06	0.27
Hexane	0.04	0.17
Formaldehyde	<0.01	<0.01
CO	1.70	7.43
NO_x	4.22	18.48
$PM_{Condensable}$	0.12	0.53
$PM_{10/2.5}$	0.04	0.18
PM_{Total}	0.16	0.70
H_2S	<0.01	<0.01
SO_2	5.64	24.71

Notes:

- Emissions from Enclosed Combustion Device Operations from AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.
- SO2 emissions from the SRU Incinerator are calcualated to comply with the 250 ppm_v emission limitation for Sulfur Recovery Units per NSPS Subpart Ja. Density of SO_2 gas at normal pressure and temperature conditions (68°F and 14.7 psia) is 0.1703 lb/scf per Engineering Toolbox.
- CO and NO_x emission factors in lb/MMBtu from firing the SRU Incinerator and Claus Furnace are manufacturer guaranteed emission rates.

Example Calculations:

- Max Hourly SO_2 emissions from SRU Incinerator **(lb/hr)** = [250 x 10^{-6} **(scf SO_2/scf Incinerator Gas)** x Density SO_2 Gas **(lb SO_2/scf SO_2)** x Incinerator Gas Flow Rate **(lb Incinerator Gas/hr)**] ÷ Incinerator Gas Density **(lb Incinerator Gas/scf Incinerator Gas)**
- Max Hourly emissions from Input Streams to SRU Incinerator **(lb/hr)** = Amount of Gas sent to SRU Incinerator **(lb/hr)** x (100 - SRU Incinerator Combustion Efficiency **(%)**/100)
- Max Hourly Emissions from SRU Incinerator and Claus Furnace **(lb/hr)** = [(Emission factor **($lb/10^6$ scf)** ÷ Heat Value of Fuel Gas Gas **(Btu/scf)** x Pilot Gas Rating **(Btu/hr)**)/10^6] + [(Emission factor **($lb/10^6$ scf)** ÷ Heat Value of Fuel Gas Gas **(Btu/scf)** x Combined SRU Incinerator and Claus Furnace Rating **(Btu/hr)**)/10^6]
- Max Hourly Emissions from SRU Incinerator and Claus Furnace **(lb/hr)** = Emission Factor **(lb/MMBtu)** x Combined SRU Incinerator and Claus Furnace Heat Rating **(MMBtu/hr)**
- Max Yearly Emissions **(ton/yr)** = Max Hourly Emissions **(lb/hr)** x 8760 **(hr/yr)** ÷ 2000 **(lb/ton)**

Steam Boiler (500-SB-1) - Startup Operation

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heater Rating (MMBtu/hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
VOCs	0.01	lb/10^6 scf	AP-42 Chapter 1.4	24.3	918	60	0.13	<0.01
Hexane	1.8	lb/10^6 scf	AP-42 Chapter 1.4	24.3	918	60	0.05	<0.01
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	24.3	918	60	<0.01	<0.01
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	24.3	918	60	<0.01	<0.01
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	24.3	918	60	<0.01	<0.01
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	24.3	918	60	<0.01	<0.01
CO	84	lb/10^6 scf	AP-42 Chapter 1.4	24.3	918	60	2.22	0.07
NO_x	32	lb/10^6 scf	AP-42 Chapter 1.4	24.3	918	60	0.85	0.03
$PM_{10/2.5}$	1.9	lb/10^6 scf	AP-42 Chapter 1.4	24.3	918	60	0.05	<0.01
$PM_{Condensable}$	5.7	lb/10^6 scf	AP-42 Chapter 1.4	24.3	918	60	0.15	<0.01
PM_{Total}	7.6	lb/10^6 scf	AP-42 Chapter 1.5	24.3	918	60	0.20	<0.01
SO_2	0.60	lb/10^6 scf	AP-42 Chapter 1.4	24.3	918	60	0.02	<0.01
Total HAPs							0.05	<0.01

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for the startup emissions from the Steam Boiler (500-SB-1) in Unit 500 - Utilities.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 60 hr/yr.

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/10^6 scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating (**MMBtu/hr)**

Max. Annual Emission Rate **(tpy)** = Max Hourly Emissions **(lb/hr)** x Annual Operating Hours **(hr/yr)** x **(1 ton/2000 lb)**

Steam Boiler (500-SB-1) - Normal Operation

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heater Rating (MMBtu/hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
VOCs	0.01	lb/10^6 scf	AP-42 Chapter 1.4	4.9	712	8,700	0.03	0.12
Hexane	1.8	lb/10^6 scf	AP-42 Chapter 1.4	4.9	712	8,700	0.01	0.05
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	4.9	712	8,700	<0.01	<0.01
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	4.9	712	8,700	<0.01	<0.01
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	4.9	712	8,700	<0.01	<0.01
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	4.9	712	8,700	<0.01	<0.01
CO	84	lb/10^6 scf	AP-42 Chapter 1.4	4.9	712	8,700	0.58	2.51
NO_x	32	lb/10^6 scf	AP-42 Chapter 1.4	4.9	712	8,700	0.22	0.96
$PM_{10/2.5}$	1.9	lb/10^6 scf	AP-42 Chapter 1.4	4.9	712	8,700	0.01	0.06
$PM_{Condensable}$	5.7	lb/10^6 scf	AP-42 Chapter 1.4	4.9	712	8,700	0.04	0.17
PM_{Total}	7.6	lb/10^6 scf	AP-42 Chapter 1.5	4.9	712	8,700	0.05	0.23
SO_2	0.60	lb/10^6 scf	AP-42 Chapter 1.4	4.9	712	8,700	<0.01	0.02
Total HAPs							0.01	0.06

Notes:
- Emission rates displayed above represent the max. hourly and max. annual emissions for the normal operation emissions from the Steam Boiler (500-SB-1) in Unit 500 - Utilities.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8700 hr/yr.

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/10^6 scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating (**MMBtu/hr)**

Max. Annual Emission Rate **(tpy)** = Max Hourly Emissions **(lb/hr)** x Annual Operating Hours **(hr/yr)** x **(1 ton/2000 lb)**

Emergency Generator (500-EG-1)

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Engine Rating (bhp)	Engine Rating (kW)	Fuel Consumption (gal/hr)	Heat Value of Diesel (MMBtu/gal)	Annual Operating Hours	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
VOC	3.60E-01	lb/MMBtu	AP-42 Chapter 3.3	671	500	31.20	0.14	100.00	1.54	0.08
Formaldehyde	1.18E-03	lb/MMBtu	AP-42 Chapter 3.3	671	500	31.20	0.14	100.00	<0.01	<0.01
Benzene	9.33E-04	lb/MMBtu	AP-42 Chapter 3.3	671	500	31.20	0.14	100.00	<0.01	<0.01
Toluene	4.09E-04	lb/MMBtu	AP-42 Chapter 3.3	671	500	31.20	0.14	100.00	<0.01	<0.01
Ethylbenzene	0.00E+00	lb/MMBtu	AP-42 Chapter 3.3	671	500	31.20	0.14	100.00	<0.01	<0.01
Xylene	2.85E-04	lb/MMBtu	AP-42 Chapter 3.3	671	500	31.20	0.14	100.00	<0.01	<0.01
CO	9.50E-01	lb/MMBtu	AP-42 Chapter 3.3	671	500	31.20	0.14	100.00	4.06	0.20
NO_x	4.41E+00	lb/MMBtu	AP-42 Chapter 3.3	671	500	31.20	0.14	100.00	18.85	0.94
$PM_{Filterable}$	2.20E-03	lb/MMBtu	AP-42 Chapter 3.3	671	500	31.20	0.14	100.00	<0.01	<0.01
$PM_{Condensable}$	0.00E+00	lb/MMBtu	AP-42 Chapter 3.3	671	500	31.20	0.14	100.00	<0.01	<0.01
PM_{Total}	3.10E-01	lb/MMBtu	AP-42 Chapter 3.3	671	500	31.20	0.14	100.00	1.33	0.07
SO_2	2.90E-01	lb/MMBtu	AP-42 Chapter 3.3	671	500	31.20	0.14	100.00	1.24	0.06
Total HAPs									0.01	<0.01

Notes:

- Emission rates displayed above represent the max. hourly and max. annual emissions for one 500 kW Generac SD500 Diesel Emergency Generator. A specification sheet for the Generac SD500 Diesel Emergency Generator is attached with this application.
- AP-42, Chapter 3.3, Table 3.3-1 and 3.3-2 - Emission factors for uncontrolled gasoline and diesel industrial engines
- Heat Value of Diesel calculated via the average heating value of diesel and density of diesel in Footnote "a" in AP-42 Chapter 3.4, Table 3.4-1.
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

Example Equations:

Max. Hourly Emission Rate **(lb/hr)** = Emission Factor **(lb/MMBtu)** x Fuel Consumption **(gal/hr)** x Heat Value of Diesel **(MMBtu/gal)**

Max. Annual Emission Rate **(ton/yr)** = Max. Hourly Emission Rate **(lb/hr)** x Annual Operating Hours **(hr/yr)** ÷ 2000 **(lb/ton)**

PM Emissions from Cooling Towers (500-CT-1)

Emission Point ID	Cooling Water Flow Rate [1] (gpm)
CT-1	5,565

Emission Point ID	Emission Point Description	PM Emission Factor [2] (lb/10^3 gal)	Annual Operating Hours (hr/yr)	PM Emissions (lbs/hr)	PM Emissions (tons/yr)	PM-10 Emissions (lbs/hr)	PM-10 Emissions (tons/yr)	PM-2.5 Emissions (lbs/hr)[3]	PM-2.5 Emissions (tons/yr)[3]
500-CT-1	Unit 520 Cooling Water Towers	0.019	8,760	6.34	27.79	6.34	27.79	3.17	13.89
Totals:				**6.34**	**27.79**	**6.34**	**27.79**	**3.17**	**13.89**

Notes:

1 - Cooling water flow rate requirement for the Domestic Synthetic Fuels I facility was determined to be 5,565 gpm.

2 - PM Emission Factor for Cooling Towers from AP-42 Chapter 13.4, Table 13.4-1 Particulate Emissions Factors for Wet Cooling Towers.

3 - Assume PM Emission Factor is emitted as PM/PM10. PM2.5 is assumed to be 50% of PM/PM10.

Example Calculations:

Max Hourly PM Emissions **(lb/hr)** = [PM Emission Factor **(lb/10^3 gal) x** Cooling Water Flow Rate **(gal/min)** x 60 **(min/hr)**] ÷ 1000 **(gal/10^3 gal)**

Max Annual PM Emissions **(ton/yr)** = Max Hourly PM Emissions **(lb/hr)** *8,760 **(hr/yr)** / 2,000 **(lb/ton)**

PM Emissions from Flaked Residue Product Handling

Constant	PM	PM-10	PM-2.5
k	0.74	0.35	0.05

where

k		Particle size multiplier [1]
U	7.0	Wind Speed (mph) [2]

Emission Point ID Number	Transfer Point Description	Material Moisture Content, M (%) [6]	Maximum Transfer Rate (ton/hr)	Maximum Transfer Rate (ton/yr)	Fan Flow Rate (scf/min)	Mechanical Vent Exhaust Concentration (grain/dscf)[3]	Control Device ID Number	Control Efficiency (%)	PM Emissions (lbs/hr)	PM Emissions (tons/yr)	PM-10 Emissions (lbs/hr)	PM-10 Emissions (tons/yr)	PM-2.5 Emissions (lbs/hr)[4]	PM-2.5 Emissions (tons/yr)[4]
610-TC-1	Slurry Residue to Flaker Transfer Conveyor	3	25.53	223,599					0.05	0.23	0.03	0.11	<0.01	0.02
610-SS-1	Flaker Tansfer Conveyor to Surge Flake Silo	3	25.53	223,599	800	0.010			0.07	0.30	0.07	0.30	0.03	0.15
610-TC-2	Surge Flake Silo to Pipe Conveyor 1	3	25.53	223,599	1200	0.010			0.10	0.45	0.10	0.45	0.05	0.23
610-SD-1	Pipe Conveyor 1 to Stacker Conveyor 1	3	25.53	223,599	1200	0.010			0.10	0.45	0.10	0.45	0.05	0.23
	Pipe Conveyor 1 to Pipe Conveyor 2	3	25.53	223,599										
	Stacker Conveyor 1 to Dome 1 Storage Pile	3	25.53	223,599										
	Dome 1 Storage Pile to Loading Hopper 1	3	536.03	223,599										
	Loading Hopper 1 to Flake Loading Conveyor	3	536.03	223,599										
610-SD-2	Pipe Conveyor 2 to Stacker Conveyor 2	3	25.53	223,599	1200	0.010			0.10	0.45	0.10	0.45	0.05	0.23
	Stacker Conveyor 2 to Dome 2 Storage Pile	3	25.53	223,599										
	Dome 2 Storage Pile to Loading Hopper 2	3	536.03	223,599										
	Loading Hopper 2 to Flake Loading Conveyor	3	536.03	223,599										
610-TC-7	Flake Loading Conveyor to Truck Loading Conveyor	3	536.03	223,599					1.11	0.23	0.53	0.11	0.08	0.02
610-TH-3	Truck Loading Conveyor to Truck Loading Hopper	3	536.03	223,599					1.11	0.23	0.53	0.11	0.08	0.02
610-TR-1	Truck Loading Hopper to Flake Hauling Truck	3	536.03	223,599					1.11	0.23	0.53	0.11	0.08	0.02
Totals:									**3.77**	**2.58**	**1.98**	**2.09**	**0.43**	**0.89**

Notes:

[1] - Particle Size Multiplier used from AP-42 Chapter 13.2.4 Particle Size Multipliers for Aggregate Handling and Storage Piles - 11/2006 Version

[2] - Mean Wind Speed used from AP-42 Chapter 13.2.4 Particle Size Multipliers for Aggregate Handling and Storage Piles - 11/2006 Version

3 - Mechanical vent exhaust concentration per Domestic Synthetic Fuels I operations.

[4] - For transfer points with mechanical vents, $PM_{2.5}$ is conservatively estimated to be 50% of PM_{10}

[5] - Equation 1 from AP-42 13.2.4 Aggregate Handling and Storage Piles - 11/2006 Version

[6] - Moisture content conservatively assumed to be equivalent to input coal moisture content.

Example Calculations:

Emissions (lb PM/ton transferred) - E = [k × (0.0032 x $((U/5)^{1.3}/(M/2)^{1.4}]$ [5]

If not equipped with mechanical vent

Emissions (lb/hr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton transferred/hr)

Emissions (ton/yr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton/yr) x (1 ton PM/2000 lb PM)

If equipped with mechanical vent

Emissions (lb/hr) = Mechanical Vent Exhaust Concentration (grain/scf) x Fan Flow Rate (scf/min) x (60 min/1 hr) x (1 lb/7000 grain)

Emissions (ton/yr) = Emissions (lb/hr) x (1 ton/2000 lb) x (8760 hr/1 yr)

PM Emissions from Sulfur Product Handling

Constant	PM	PM-10	PM-2.5
k	0.74	0.35	0.05

where

k		Particle size multiplier [1]
U	7.0	Wind Speed (mph) [2]

Emission Point ID Number	Transfer Point Description	Material Moisture Content, M [3] (%)	Maximum Transfer Rate (ton/hr)	Maximum Transfer Rate (ton/yr)	Control Device ID Number	Control Efficiency (%)	PM Emissions (lbs/hr)	PM Emissions (tons/yr)	PM-10 Emissions (lbs/hr)	PM-10 Emissions (tons/yr)	PM-2.5 Emissions (lbs/hr)[4]	PM-2.5 Emissions (tons/yr)[4]
610-TH-4	Sulfur Product from Sulfur Pit to Sulfur Storage Pile Hopper	0.70	2.28	19,995			0.04	0.16	0.02	0.08	<0.01	0.01
610-TC-8	Sulfur Product from Sulfur Storage Pile Hopper to Sulfur Storage Pile Conveyor	0.70	2.28	19,995			0.04	0.16	0.02	0.08	<0.01	0.01
610-SP-3	Sulfur Product from Sulfur Storage Pile Conveyor to Sulfur Storage Pile	0.70	2.28	19,995			0.04	0.16	0.02	0.08	<0.01	0.01
610-TH-5	Sulfur Product from Sulfur Storage Pile to Sulfur Loading Hopper 1	0.70	47.93	19,995			0.76	0.16	0.36	0.08	0.05	0.01
610-TC-9	Sulfur Product from Sulfur Loading Hopper 1 to Sulfur Loading Conveyor	0.70	47.93	19,995			0.76	0.16	0.36	0.08	0.05	0.01
610-TH-6	Sulfur Product from Sulfur Loading Conveyor to Sulfur Loading Hopper 2	0.70	47.93	19,995			0.76	0.16	0.36	0.08	0.05	0.01
610-TR-2	Sulfur Product from Sulfur Loading Hopper to Sulfur Product Trucks	0.70	47.93	19,995			0.76	0.16	0.36	0.08	0.05	0.01
Totals:							**3.17**	**1.12**	**1.50**	**0.53**	**0.23**	**0.08**

Notes:

[1] - Particle Size Multiplier used from AP-42 Chapter 13.2.4 Particle Size Multipliers for Aggregate Handling and Storage Piles - 11/2006 Version

[2] - Mean Wind Speed used from AP-42 Chapter 13.2.4 Particle Size Multipliers for Aggregate Handling and Storage Piles - 11/2006 Version

[3] - Moisture content of crushed limestone used from AP-42 Chapter 13.2.4-1 Typical Silt and Moisture Contents of Materials at Various Industries - 11/2006 Version

[4] - Equation 1 from AP-42 13.2.4 Aggregate Handling and Storage Piles - 11/2006 Version

Example Calculations:

Emissions (lb PM/ton transferred) - E = $[k \times (0.0032 \times ((U/5)^{1.3}/(M/2)^{1.4}]$ [4]

Emissions (lb/hr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton transferred/hr)

Emissions (ton/yr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton/yr) x (1 ton PM/2000 lb PM)

Fugitive PM Emissions from Sulfur Stockpiles

Constant	PM	PM-10	PM-2.5
k	1.70	0.80	0.40

where

k		Particle size multiplier [1]
f	20	Percentage of time the unobstructed wind speed is greater than 12 mph at the mean pile height [2]
P	157	Number of days per year with precipitation >0.01 in. 3

Transfer Point Number	Storage Pile Description	Material Silt Content, s [4] (%)	Stockpile Base Area (ft^2)	Stockpile Base Area (acres)	Control Device ID Number	Control Efficiency (%)	PM Emissions (lbs/hr)	PM Emissions (tons/yr)	PM-10 Emissions (lbs/hr)	PM-10 Emissions (tons/yr)	PM-2.5 Emissions (lbs/hr)	PM-2.5 Emissions (tons/yr)
610-SP-3	Sulfur Storage Pile	80.0	511	0.01			0.05	0.23	0.02	0.11	0.01	0.05
Totals:							**0.05**	**0.23**	**0.02**	**0.11**	**0.01**	**0.05**

Notes:

[1] - PM and PM_{10} Particle Size Multiplier from WVDAQ Coal Preparation Plant G10-D Emission Calculation Spreadsheet. $PM_{2.5}$ was conservatively estimated to be 50% of PM_{10} emissions.

[2] - f value WVDAQ Coal Preparation Plant 610-D Emission Calculation Spreadsheet.

[3] - Number of days per year with precipitation >0.01 inches for Zone 1 - Western Plateau found in Table B - Precipitation Zones in West Virginia on Page 22 of the West Virginia G10-D Instructions and Forms document

[4] - Mean silt content (%) for fly ash in Table 13.2.4-1 - Typical Silt and Moisture Contents of Materials at Various Industires in AP-42 13.2.4 Aggregate Handling and Storage Piles - 11/2006 Version

[5] - Equation for lb PM/day/acre from WVDAQ Coal Preparation Plant G10-D Emission Calculation Spreadsheet.

Example Calculations:

Emissions (lb PM/day/acre) - E = [k × (s/1.5) x (365-P)/235 x (f/15)] [5]

Emissions (lb/hr) = [E (lb PM/day/acre) x Stockpile Base Area (acres)]/ 24 (hr/day)

Emissions (ton/yr) = [E (lb PM/day/acre) x Stockpile Base Area (acres) *365 days] / 2000 (lb/ton)

Emergency Flare (620-FL-1)

Emissions from Emergency Flaring Events

Input to Enclosed Combustion Device	Pollutant	Amount of Gas Sent to Emergency Flare (lbs/hr)	Amount of Gas Sent to Emergency Flare (tons/year)	Emergency Flare Combustion Efficiency	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
Unit 200 Depressurization	VOCs	6989.41	6.99	98%	139.79	0.14
	HAPs	1126.60	1.13	98%	22.53	0.02
	Benzene	17.07	0.02	98%	0.34	<0.01
	Toluene	256.05	0.26	98%	5.12	<0.01
	Ethylbenzene	426.74	0.43	98%	8.53	<0.01
	Xylene	426.74	0.43	98%	8.53	<0.01
	CO	291.58	0.29	98%	5.83	<0.01
	CH_4	1575.00	1.58	98%	31.50	0.03
Unit 310 Depressurization	VOCs	22645.70	22.65	98%	452.91	0.45
	HAPs	3650.19	3.65	98%	73.00	0.07
	Benzene	55.31	0.06	98%	1.11	<0.01
	Toluene	829.59	0.83	98%	16.59	0.02
	Ethylbenzene	1382.65	1.38	98%	27.65	0.03
	Xylene	1382.65	1.38	98%	27.65	0.03
	CO	944.70	0.94	98%	18.89	0.02
Unit 320 Stabilizer Feed Loss	VOCs	17583.51	17.58	98%	351.67	0.35
	HAPs	11880.00	11.88	98%	237.60	0.24
	Benzene	180.00	0.18	98%	3.60	<0.01
	Toluene	2700.00	2.70	98%	54.00	0.05
	Ethylbenzene	4500.00	4.50	98%	90.00	0.09
	Xylene	4500.00	4.50	98%	90.00	0.09
Unit 420 Control Valve Failure	VOCs	7790.74	7.79	98%	155.81	0.16
	HAPs	189.93	0.19	98%	3.80	<0.01
	Benzene	2.88	<0.01	98%	0.06	<0.01
	Toluene	43.16	0.04	98%	0.86	<0.01
	Ethylbenzene	71.94	0.07	98%	1.44	<0.01
	Xylene	71.94	0.07	98%	1.44	<0.01
	H_2S	89.70	0.09	98%	1.79	<0.01
	SO_2	--	--	98%	165.15	0.17
Totals	VOCs	55009.36	55.01	--	1,100.19	1.10
	HAPs	16846.72	16.85	--	336.93	0.34
	Benzene	255.25	0.26	--	5.11	<0.01
	Toluene	3828.80	3.83	--	76.58	0.08
	Ethylbenzene	6381.33	6.38	--	127.63	0.13
	Xylene	6381.33	6.38	--	127.63	0.13
	H_2S	89.70	0.09	--	1.79	<0.01
	CO	1236.28	1.24	--	24.73	0.02
	SO_2	--	--	--	165.15	0.17

Gas Compositions from Process Units sent to Emergency Flare (620-FL-1)

Gas Stream	Mole Fraction - Unit 200 and Unit 310 Feed Streams	Weight Fraction - Unit 200 and 310 Feed Streams	Mole Fraction - Unit 320 Feed Stream	Weight Fraction - Unit 320 Feed Stream	Mole Fraction - Unit 420 Feed Stream	Weight Fraction - Unit 420 Feed Stream
Methane	0.063	0.210	0.007	0.002	0.082	0.077
Ethane	0.020	0.125	0.047	0.021	0.071	0.125
Propane	0.015	0.138	0.078	0.052	0.091	0.235
Butane	0.008	0.097	0.051	0.045	0.080	0.272
Pentanes	0.003	0.045	0.811	0.881	0.003	0.013
Carbon Monoxide	0.002	0.012	0.000	0.000	0.000	0.000

Vent Gas Properties

Vent Gas Properties	Mass Flow Rate (lb/hr)	Density (lb/ft^3)
Unit 200 Emergency Flare Feed	25000.00	0.014
Unit 310 Emergency Flare Feed	81000.00	0.014
Unit 320 Emergency Flare Feed	18000.00	0.265
Unit 420 Emergency Flare Feed	15000.00	0.045

Emergency Flare (620-FL-1)

Emissions from firing Emergency Flare (620-FL-1)

Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factors (lb/MMBtu)	Heat Value of Fuel Gas (Btu/scf)	Emergency Flare Pilot Gas Rating (Btu/hr)	Emergency Flare Burner Rating (Btu/hr)	Pilot Max. Hourly Emissions (lb/yr)	Pilot Max. Hourly Emissions (tons/yr)	Burner Max.Hourly Emissions (lb/hr)	Burner Max.Hourly Emissions (tons/yr)	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
VOCs	5.50	--	712	30,000	990,004,881	<0.01	<0.01	--	--	7.65	0.03
Hexane	1.80	--	712	30,000	990,004,881	<0.01	<0.01	--	--	2.50	0.01
Formaldehyde	0.075	--	712	30,000	990,004,881	<0.01	<0.01	--	--	0.10	<0.01
CO	84	0.31	712	30,000	990,004,881	<0.01	<0.01	306.90	1.23	306.91	1.23
NO_x	100	0.07	712	30,000	990,004,881	<0.01	<0.01	67.32	0.27	67.32	0.27
$PM_{Condensable}$	5.70	--	712	30,000	990,004,881	<0.01	<0.01	7.93	0.03	7.93	0.03
$PM_{Filterable}$	1.90	--	712	30,000	990,004,881	<0.01	<0.01	2.64	0.01	2.64	0.01
PM_{Total}	7.60	--	712	30,000	990,004,881	<0.01	<0.01	10.57	0.04	10.57	0.04
SO_2	0.60	--	712	30,000	990,004,881	<0.01	<0.01	0.83	<0.01	0.83	<0.01
Total HAPs										10.25	0.04

Emergency Flare (620-FL-1)

Total Emergency Flare (620-FL-1) Emissions

Pollutant	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
VOCs	1,107.83	1.13
HAPs	339.54	0.35
Hexane	2.50	0.01
Formaldehyde	0.10	<0.01
CO	331.63	1.25
NO_x	67.32	0.27
$PM_{Condensable}$	7.93	0.03
$PM_{Filterable}$	2.64	0.01
PM_{Total}	10.57	0.04
SO_2	165.99	0.17

Notes:
- Emission Factors in lb/10^6 scf are from AP-42 Chapter 1.4, Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion for combustion of facility fuel gas.
- Emission Factor for NO_x in lb/MMBtu is from AP-42 Chapter 13.5, Table 13.5-1 THC, NO_x, and Soot Emission for Flare Operations for Certain Chemical Manufacturing Processes (02/2018 Version)
- Emission Factor for CO in lb/MMBtu is from AP-42 Chapter 13.5, Table 13.5-2 Emission Factors for Elevated Flare Operations for Certain Refinery and Chemical Manufacturing Processes (02/2018 Version)
- Max. Annual Emissions based upon Max. Hourly Emissions at a maximum of 8 hr/yr. Each unit sending streams to Emergency Flare (620-FL-1) is assumed to have a maximum of four (4), 30 minute emergency events per year.

Example Calculations:
- Max Hourly emissions from Input Streams to Emergency Flare **(lb/hr)** = Amount of Gas sent to Emergency Flare **(lb/hr)** x (100 - Emergency Flare Combustion Efficiency **(%)**/100)
- Max Hourly Emissions from Emergency Flare **(lb/hr)** = [(Emission factor **(lb/10^6 scf)** ÷ Heat Value of Fuel Gas Gas **(Btu/scf)** x Pilot Gas Rating **(Btu/hr)**)/10^6] + [(Emission factor **(lb/10^6 scf)** ÷ Heat Value of Fuel Gas Gas **(Btu/scf)** x Emergency Flare Rating **(Btu/hr)**)/10^6]
- Max Hourly Emissions from Emergency Flare **(lb/hr)** = Emission Factor **(lb/MMBtu)** x Emergency Flare Heat Rating **(MMBtu/hr)**
- Max Yearly Emissions **(ton/yr)** = Max Hourly Emissions **(lb/hr)** x 8760 **(hr/yr)** ÷ 2000 **(lb/ton)**

Liquid Product and Intermediate Storage Tanks

Liquid Product and Intermediate Storage Tank Emissions to the Atmosphere

Emission Unit ID Number	Storage Tank Description	VOC			HAPs			n-Hexane			Benzene			Toluene			Ethylbenzene			Xylene		
		lb/hr	lb/yr	ton/yr	lb/hr	lb/yr	ton/yr	lb/hr	lb/yr	ton/yr	lb/hr	lb/yr	ton/yr	lb/hr	lb/yr	ton/yr	lb/hr	lb/yr	ton/yr	lb/hr	lb/yr	ton/yr
630-TK-8 and 630-TK-9	Diesel Storage Tank 1 and 2	0.29	2561.54	1.28	0.02	141.66	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	24.46	0.01	0.00	24.46	0.01
630-TK-4 and 630-TK-5	Reformate Storage Tank 1 and 2	0.06	550.88	0.28	0.04	363.56	0.18	0.00	11.22	0.01	0.00	4.07	0.00	0.01	71.95	0.04	0.02	138.17	0.07	0.02	138.16	0.07
630-TK-12	HYK Heavy Feed Storage Tank	0.01	7.61	0.00	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.07	0.00
630-TK-13	HYK Light Feed Storage Tank	0.04	29.69	0.01	0.00	3.51	0.00	0.00	0.06	0.00	0.00	0.02	0.00	0.00	0.40	0.00	0.00	1.03	0.00	0.00	1.03	0.00
630-TK-14	Heavy Slop Oil Storage Tank	0.08	58.41	0.03	0.00	3.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.56	0.00
630-TK-15	Light Slop Oil Storage Tank	0.04	29.43	0.01	0.00	3.48	0.00	0.00	0.06	0.00	0.00	0.02	0.00	0.00	0.40	0.00	0.00	1.02	0.00	0.00	1.02	0.00
Total:		**0.53**	**3,237.56**	**1.62**	**0.07**	**515.86**	**0.26**	**<0.01**	**11.34**	**<0.01**	**<0.01**	**4.11**	**<0.01**	**<0.01**	**72.75**	**0.04**	**0.02**	**165.31**	**0.08**	**0.02**	**165.29**	**0.08**

Liquid Product and Intermediate Storage Tank Emissions to Liquid Product Loadout Flare (640-FL-1)

Emission Unit ID Number	Storage Tank Description	VOC			HAPs			n-Hexane			Benzene			Toluene			Ethylbenzene			Xylene		
		lb/hr	lb/yr	ton/yr	lb/hr	lb/yr	ton/yr	lb/hr	lb/yr	ton/yr	lb/hr	lb/yr	ton/yr	lb/hr	lb/yr	ton/yr	lb/hr	lb/yr	ton/yr	lb/hr	lb/yr	ton/yr
630-TK-6 and 630-TK-7	Gasoline Storage Tank 1 and 2	2.88	25261.52	12.63	1.89	16579.50	8.29	0.06	513.65	0.26	0.01	115.46	0.06	0.38	3295.05	1.65	0.72	6327.97	3.16	0.72	6327.37	3.16
630-TK-2 and 630-TK-3	Light Naphtha Storage Tank 1 and 2	1.29	11324.16	5.66	1.13	9908.64	4.95	0.39	3397.25	1.70	0.05	452.97	0.23	0.23	1981.73	0.99	0.08	679.45	0.34	0.39	3397.25	1.70
630-TK-10 and 630-TK-11	Ethanol Storage Tank 1 and 2	0.06	543.76	0.27	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total:		**4.24**	**37,129.44**	**18.56**	**3.02**	**26,488.14**	**13.24**	**0.45**	**3,910.90**	**1.96**	**0.06**	**568.42**	**0.28**	**0.60**	**5,276.78**	**2.64**	**0.80**	**7,007.42**	**3.50**	**1.11**	**9,724.62**	**4.86**

Liquid Product and Intermediate Storage Tank Emissions to SRU Incinerator (440-SRI-1)

Emission Unit ID Number	Storage Tank Description	VOC			HAPs			n-Hexane			Benzene			Toluene			Ethylbenzene			Xylene		
		lb/hr	lb/yr	ton/yr	lb/hr	lb/yr	ton/yr	lb/hr	lb/yr	ton/yr	lb/hr	lb/yr	ton/yr	lb/hr	lb/yr	ton/yr	lb/hr	lb/yr	ton/yr	lb/hr	lb/yr	ton/yr
430-TK-1	Sour Water Storage Tank	0.04	331.35	0.17	0.03	289.93	0.14	0.01	99.41	0.05	0.00	13.25	0.01	0.01	57.99	0.03	0.00	19.88	0.01	0.01	99.41	0.05
Total:		**0.04**	**331.35**	**0.17**	**0.03**	**289.93**	**0.14**	**0.01**	**99.41**	**0.05**	**<0.01**	**13.25**	**<0.01**	**<0.01**	**57.99**	**0.03**	**<0.01**	**19.88**	**<0.01**	**0.01**	**99.41**	**0.05**

Notes:

- VOC Annual emission rates in lb/yr calculated via EPA TANKs 4.09d simulations. Printouts of the EPA TANKs 4.09d simulations are attached with this application.
- HYK Heavy Feed Storage Tank (630-TK-12), HYK Light Feed Storage Tank (630-TK-13), Heavy Slop Oil Storage Tank (630-TK-14), and Light Slop Oil Storage Tank (630-TK-15) are only in operation during a plant shutdown and are assumed to be in service for one (1) month or 720 hours per year. Maximum Hourly Emissions (lb/hr) for these storage tanks are calculated by taking the annual emissions in lb/yr from the EPA TANKs 4.09d simulations and dividing by 720 hours.
- Total HAPs and speciated HAPs annual emission rates calculated based upon weight fraction of the components in the liquid products and intermediates.
- Gasoline product from the Domestic Synthetic Fuels I facility will have a composition representative to the gasoline compositions within the Global Companies, LLC Safety Data Sheet (SDS) for Unleaded Gasoline with Ethanol. The Global Companies, LLC SDS for unleaded gasoline is included as a part of this application.
- Diesel fuel product from the Domestic Synthetic Fuels I facility will have a composition representative to the gasoline compositions within the CITGO Petroluem Corpoartion Safety Data Sheet (SDS) for No.2 Diesel Fuel, Low Sulfur. The CITGO Petroluem Company SDS for diesel fuel is included as a part of this application.
- Light Naphtha product from the Domestic Synthetic Fuels I facility will have a composition representative to the naphtha compositions within the Tesoro Refining Safety Data Sheet (SDS) for Naphtha. The Tesoro Refining SDS for naphtha is included as a part of this application.

Example Calculations:

Max Hourly Emission Rate **(lb/hr)** = Max Annual Emission Rate per EPA TANKs 4.09d **(lb/yr)** x Weight Composition of Fluid **(%)** ÷ 8760 **(hr/yr)**

Max Annual Emission Rate **(ton/yr)** = Max Annual Emission Rate per EPA TANKs 4.09d **(lb/yr)** x Weight Composition of Fluid **(%)** ÷ 2000 **(lb/ton)**

Liquid Product and Intermediate Storage Tanks

Component	Weight Composition (%)								
	Gasoline	Diesel	Light Naphtha	Heavy Naphtha	HYK Heavy Feed	HYK Light Feed	Heavy Slop Oil	Light Slop Oil	Sour Water (VOC Content)
VOC	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
HAP	65.63	5.53	87.50	66.00	5.53	11.82	5.53	11.82	87.50
n-Pentane			12.50						
Octane	34.37	0.00		34.00	0.00	3.54	0.00	3.54	12.50
n-dodecane	0.00	94.47		0.00	94.47	84.65	94.47	84.65	
n-Hexane	2.03	0.00	30.00	2.04	0.00	0.21	0.00	0.21	30.00
Benzene	0.46	0.00	4.00	0.74	0.00	0.08	0.00	0.08	4.00
Toluene	13.04	0.00	17.50	13.06	0.00	1.36	0.00	1.36	17.50
Ethylbenzene	25.05	0.95	6.00	25.08	0.95	3.46	0.95	3.46	6.00
Xylene	25.05	0.95	30.00	25.08	0.95	3.46	0.95	3.46	30.00
Naphthalene	0.00	1.15		0.00	1.15	1.03	1.15	1.03	
Cumene	0.00	1.08		0.00	1.08	0.97	1.08	0.97	
Biphenyl	0.00	1.39		0.00	1.39	1.24	1.39	1.24	

Component	Mol Composition (%)								Molecular Weight
	Gasoline	Diesel	Light Naphtha	Heavy Naphtha	HYK Heavy Feed	HYK Light Feed	Heavy Slop Oil	Light Slop Oil	
VOC	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	
HAP	68.12	7.50	0.84	68.50	7.50	16.93	7.50	16.93	
n-Pentane			0.16						72.15
Octane	31.88		0.00	31.50		4.87		4.87	114.23
n-dodecane		92.50	0.00		92.50	78.20	92.50	78.20	170.34
n-Hexane	2.50		0.32	2.50		0.39		0.39	86.18
Benzene	0.62		0.05	1.00		0.15		0.15	78.11
Toluene	15.00		0.17	15.00		2.32		2.32	92.14
Ethylbenzene	25.00	1.50	0.05	25.00	1.50	5.13	1.50	5.13	106.17
Xylene	25.00	1.50	0.26	25.00	1.50	5.13	1.50	5.13	106.16
Naphthalene		1.50	0.00		1.50	1.27	1.50	1.27	128.17
Cumene		1.50	0.00		1.50	1.27	1.50	1.27	120.19
Biphenyl		1.50	0.00		1.50	1.27	1.50	1.27	154.21

Truck Loading Operations - Gasoline and Diesel

Emission Unit ID	Description	S, Saturation Factor [2]	P, psi [3]	MW (lb/lb-mol) [3]	Temperature (°F)	Temperature (°R)	L (lb/Mgal) [1]	Throughput (Mgal/hr)	Throughput (Mgal/yr) [4]
640-TR-1	Gasoline Truck Loading	0.6	8.1621	60	60	520	7.05	72	41,710
640-TR-2	Diesel Truck Loading	0.6	0.0065	130	60	520	0.01	108	22,000

Emissions from Gasoline Truck Loading Operations

Pollutant	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)	Loading Rack Collection Efficiency [5]	Enclosed Combustion Device Combustion Efficiency	Post-Control Max. Yearly Emissions (lb/hr) [6]	Post-Control Max. Yearly Emissions (tons/yr) [6]	Max. Hourly Emissions Not Collected by Loading Rack (lb/hr) [7]	Max. Annual Emissions Not Collected by Loading Rack (tons/yr) [7]
VOCs	507.26	146.93	0.992	0.98	10.06	2.92	4.06	1.18
HAPs	175.61	50.87	0.992	0.98	3.48	1.01	1.40	0.41
Benzene	3.14	0.91	0.992	0.98	0.06	0.02	0.03	<0.01
Toluene	76.09	22.04	0.992	0.98	1.51	0.44	0.61	0.18
Ethylbenzene	20.29	5.88	0.992	0.98	0.40	0.12	0.16	0.05
Xylene	76.09	22.04	0.992	0.98	1.51	0.44	0.61	0.18

Component	Gasoline Composition (Volume %) [8]	Diesel Composition (Volume %) [9]
HAPs	34.62	7.50
Benzene	0.62	
Toluene	15.00	
Ethylbenzene	4.00	1.50
Xylene	15.00	1.50
Naphthalene		1.50
Cumene		1.50
Biphenyl		1.50

Emissions from Diesel Truck Loading Operations

Pollutant	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
VOCs	1.31	0.13
HAPs	0.10	0.01
Benzene	<0.01	<0.01
Toluene	<0.01	<0.01
Ethylbenzene	0.02	<0.01
Xylene	0.02	<0.01

Notes:

1 - Loading loss emission factor in lb/Mgal calculated in accordance with Equation 1 in AP-42 Chapter 5.2 - Transportation and Marketing of Petroleum Liquids.
2 - Saturation factor of 0.6 used in the loading loss emission factor equation for submerged loading of dedicated normal service tank trucks from AP-42 Table 5.2-1.
3 - Gasoline (RVP 15) and diesel (Distillate No. 2) true vapor pressure (psia) and molecular weight (lb/lb-mol) at 60°F from AP-42 Table 7.1-2 Properties of Selected Petroleum Liquids.
4 - Gasoline and diesel fluid throughput for the tank truck loading rack is the maximum amount of product that will be trucked from the facility per year according to Domestic Synthetic Fuels I operations.
5 - Minimum loading rack collection efficiency in accordance with NESHAP Subpart BBBBBB.
6 - Gasoline vapors from truck loading operations are vapor-balanced to the liquid product storage tanks and are realized at the Storage Tank and Loadout Flare.
7 - Max hourly and annual emissions that are not collected by the loading rack and are emitted to atmosphere.
8 - Gasoline product from the Domestic Synthetic Fuels I facility will have a composition representative to the gasoline compositions within the Global Companies, LLC Safety Data Sheet (SDS) for Unleaded Gasoline with Ethanol. The Global Companies, LLC SDS for unleaded gasoline is included as a part of this application.
9 - Diesel fuel product from the Domestic Synthetic Fuels I facility will have a composition representative to the gasoline compositions within the CITGO Petroluem Corpoartion Safety Data Sheet (SDS) for No.2 Diesel Fuel, Low Sulfur. The CITGO Petroluem Company SDS for diesel fuel is included as a part of this application.

Truck Loading Operations - LPG Product (640-TR-3)

Pipe Length (ft)	Loading Pipe Diameter (in)	Volume of Hose Connection (cm^3)
1.25	3	1737.50

Specific Gravity of LPG	Amount Gas Vented Per Loading Event (lb/event)
0.53	2.04

Maximum Number of Events per Year (events/yr)	Maximum Number of Events per Hour (events/hr)	Total Amount of Gas Vented per Year (lb/yr)
3731	2	7604.59

Total VOC Weight Fraction	Maximum Amount of VOC Vented per Hour (lb/hr)	Tons of Gas Vented per Year (ton/yr)	Tons of VOC Vented per Year (ton/yr)
1.0000	4.08	3.80	3.80

Notes:

- This calculation assumes that a 5 ft long section of 3-inch inner diameter hose is between the LPG Loading Rack disconnection valves after the loading of each LPG truck.
- This calculation assumes that all the LPG volume in the LPG Loading Hose between the disconnection valves is volatilized and released to the atmosphere after each loading event.
- Number of events per year is based off the number of 6,000 gallon LPG tank trucks needed to be loaded annually for a facility LPG production rate of 1,460.2 bbl/day.
- The Domestic Synthetic Fuels I facility will require 11 LPG tank trucks to be loaded per day. Assuming an 8 hour shift at the product loading racks, this would require a maximum of 2 tanker truck loading events per hour.

Example Calculations

Volume of Hose Connection **(cm^3)**= [(PI*(Loading Pipe Diameter **(in)***2.54 **(cm/in)**)^2)/4)*(Pipe Length **(ft)** * 12 **(in/ft)** * 2.54 **(cm/in)**)]

Specific Gravity of LPG = (Mole Fraction of Propane x 0.495 + Mole Fraction of Butane x 0.601)

Amount of Gas Vented Per Loading Event **(lb/event)** = Volume of Hose Connection **(cm^3) x** Specific Gravity of LPG x Density of Water**(g/cm^3) x** 0.002205 **(lb/g)**

Total Gas Amount of Gas Vented per Year **(lb/yr)** = Number of Events per Year **(events/yr)** x Amount of Gas Vented Per Event **(lb/event)**

Maximum Amount of VOC Vented per Hour **(lb/hr)** = Amount of Gas Vented per Event (lb/event) x Maximum Number of Events per Hour **(event/hr)**

Tons of VOC Vented per Year **(ton/yr)** = Tons of Gas Vented per Year **(ton/yr)** x Total VOC Weight Fraction

LPG Product Information			
Component	**Molecular Weight**	**Weight Fraction of LPG (%)**	**Mole Fraction of LPG (%)**
Propane	44.10	0.55	0.61
Butane	58.12	0.45	0.38
Pentane	72.15	0.002	0.00

Railcar Loading Operations

Emission Unit ID	Description	S, Saturation Factor [2]	P, psi [3]	MW (lb/lb-mol) [3]	Temperature (°F)	Temperature (°R)	L (lb/Mgal) [1]	Throughput (Mgal/hr) [4]	Throughput (Mgal/yr) [4]
640-RR-1	Gasoline Rail Car Loading	0.6	8.1621	60	60	520	7.05	30.11	5,214
640-RR-2	Diesel Rail Car Loading	0.6	0.0065	130	60	520	0.01	30.11	10,043

Emissions from Gasoline Railcar Loading Operations

Pollutant	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)	Loading Rack Collection Efficiency [5]	Enclosed Combustion Device Combustion Efficiency	Post-Control Max. Yearly Emissions (lb/hr) [6]	Post-Control Max. Yearly Emissions (tons/yr) [6]	Max. Hourly Emissions Not Collected by Loading Rack (lb/hr) [7]	Max. Annual Emissions Not Collected by Loading Rack (tons/yr) [7]
VOCs	212.13	18.37	0.992	0.98	4.21	0.36	1.70	0.15
HAPs	73.44	6.36	0.992	0.98	1.46	0.13	0.59	0.05
Benzene	1.32	0.11	0.992	0.98	0.03	<0.01	0.01	<0.01
Toluene	31.82	2.75	0.992	0.98	0.63	0.05	0.25	0.02
Ethylbenzene	8.49	0.73	0.992	0.98	0.17	0.01	0.07	<0.01
Xylene	31.82	2.75	0.992	0.98	0.63	0.05	0.25	0.02

Component	Gasoline Composition (Volume %) [8]	Diesel Composition (Volume %) [9]
HAPs	34.62	7.50
Benzene	0.62	
Toluene	15.00	
Ethylbenzene	4.00	1.50
Xylene	15.00	1.50
Naphthalene		1.50
Cumene		1.50
Biphenyl		1.50

Emissions from Diesel Railcar Loading Operations

Pollutant	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
VOCs	0.37	0.06
HAPs	0.03	<0.01
Benzene	<0.01	<0.01
Toluene	<0.01	<0.01
Ethylbenzene	<0.01	<0.01
Xylene	<0.01	<0.01

Notes:

1 - Loading loss emission factor in lb/Mgal calculated in accordance with Equation 1 in AP-42 Chapter 5.2 - Transportation and Marketing of Petroleum Liquids.

2 - Saturation factor of 0.6 used in the loading loss emission factor equation for submerged loading of dedicated normal service railcars from AP-42 Table 5.2-1.

3 - Gasoline (RVP 15) and diesel (Distillate No. 2) true vapor pressure (psia) and molecular weight (lb/lb-mol) at 60°F from AP-42 Table 7.1-2 Properties of Selected Petroleum Liquids.

4 - Gasoline and diesel fluid throughput for the railcar loading rack is the maximum amount of product that will be transported via rail from the facility according to Domestic Synthetic Fuels I operations.

5 - Minimum loading rack collection efficiency in accordance with NESHAP Subpart BBBBBB.

6 - Gasoline vapors from railcar loading operations are vapor-balanced to the liquid product storage tanks and are realized at the Storage Tank and Loadout Flare.

7 - Max hourly and annual emissions that are not collected by the railcar loading rack and are emitted to atmosphere.

8 - Gasoline product from the Domestic Synthetic Fuels I facility will have a composition representative to the gasoline compositions within the Global Companies, LLC Safety Data Sheet (SDS) for Unleaded Gasoline with Ethanol. The Global Companies, LLC SDS for unleaded gasoline is included as a part of this application.

9 - Diesel fuel product from the Domestic Synthetic Fuels I facility will have a composition representative to the gasoline compositions within the CITGO Petroluem Corpoartion Safety Data Sheet (SDS) for No.2 Diesel Fuel, Low Sulfur. The CITGO Petroluem Company SDS for diesel fuel is included as a part of this application.

Barge Loading Operations

Emission Unit ID	Description	S, Saturation Factor [2]	P, psi [3]	MW (lb/lb-mol) [3]	Temperature (°F)	Temperature (°R)	L (lb/Mgal) [1]	Throughput (Mgal/hr)	Throughput (Mgal/yr) [4]
640-BR-1	Gasoline Barge Loading	0.5	8.1621	60	60	520	5.87	108	5,214
640-BR-2	Diesel Barge Loading	0.5	0.0065	130	60	520	0.01	108	68,384

Emissions from Gasoline Barge Loading Operations

Pollutant	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)	Loading Rack Collection Efficiency [5]	Enclosed Combustion Device Combustion Efficiency	Post-Control Max. Yearly Emissions (lb/hr) [6]	Post-Control Max. Yearly Emissions (tons/yr) [6]	Max. Hourly Emissions Not Collected by Loading Rack (lb/hr) [7]	Max. Annual Emissions Not Collected by Loading Rack (tons/yr) [7]
VOCs	634.07	15.30	0.992	0.98	12.58	0.30	5.07	0.12
HAPs	219.52	5.30	0.992	0.98	4.36	0.11	1.76	0.04
Benzene	3.93	0.09	0.992	0.98	0.08	<0.01	0.03	<0.01
Toluene	95.11	2.30	0.992	0.98	1.89	0.05	0.76	0.02
Ethylbenzene	25.36	0.61	0.992	0.98	0.50	0.01	0.20	<0.01
Xylene	95.11	2.30	0.992	0.98	1.89	0.05	0.76	0.02

Component	Gasoline Composition (Volume %) [8]	Diesel Composition (Volume %) [9]
HAPs	34.62	7.50
Benzene	0.62	
Toluene	15.00	
Ethylbenzene	4.00	1.50
Xylene	15.00	1.50
Naphthalene		1.50
Cumene		1.50
Biphenyl		1.50

Emissions from Diesel Barge Loading Operations

Pollutant	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
VOCs	1.09	0.35
HAPs	0.08	0.03
Benzene	<0.01	<0.01
Toluene	<0.01	<0.01
Ethylbenzene	0.02	<0.01
Xylene	0.02	<0.01

Notes:

1 - Loading loss emission factor in lb/Mgal calculated in accordance with Equation 1 in AP-42 Chapter 5.2 - Transportation and Marketing of Petroleum Liquids.

2 - Saturation factor of 0.5 used in the loading loss emission factor equation for submerged loading of barges from AP-42 Table 5.2-1.

3 - Gasoline (RVP 15) and diesel (Distillate No. 2) true vapor pressure (psia) and molecular weight (lb/lb-mol) at 60°F from AP-42 Table 7.1-2 Properties of Selected Petroleum Liquids.

4 - Gasoline and diesel fluid throughput for the barge loading rack is the maximum amount of product that will be transported via barge from the facility according to Domestic Synthetic Fuels I operations.

5 - Minimum loading rack collection efficiency in accordance with NESHAP Subpart BBBBBB.

6 - Gasoline vapors from railcar loading operations are vapor-balanced to the liquid product storage tanks and are realized at the Storage Tank and Loadout Flare.

7 - Max hourly and annual emissions that are not collected by the barge loading rack and are emitted to atmosphere.

8 - Gasoline product from the Domestic Synthetic Fuels I facility will have a composition representative to the gasoline compositions within the Global Companies, LLC Safety Data Sheet (SDS) for Unleaded Gasoline with Ethanol. The Global Companies, LLC SDS for unleaded gasoline is included as a part of this application.

9 - Diesel fuel product from the Domestic Synthetic Fuels I facility will have a composition representative to the gasoline compositions within the CITGO Petroluem Corpoartion Safety Data Sheet (SDS) for No.2 Diesel Fuel, Low Sulfur. The CITGO Petroluem Company SDS for diesel fuel is included as a part of this application.

Liquid Product Loadout Flare (640-FL-1)

Emissions from Liquid Product Loadout Flare (640-FL-1)

Input to Enclosed Combustion Device	Pollutant	Amount of Vapor Sent to Liquid Product Loadout Flare (lb/hr)	Amount of Vapor Sent to Liquid Product Loadout Flare (ton/yr)	Liquid Product Loadout Flare Combustion Efficiency	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
Truck Loading Rack	VOCs	503.20	145.75	98%	10.06	2.92
	HAPs	174.21	50.46	98%	3.48	1.01
	Benzene	3.12	0.90	98%	0.06	0.02
	Toluene	75.48	21.86	98%	1.51	0.44
	Ethylbenzene	20.13	5.83	98%	0.40	0.12
	Xylene	75.48	21.86	98%	1.51	0.44
Railcar Loading Rack	VOCs	210.43	18.22	98%	4.21	0.36
	HAPs	72.85	6.31	98%	1.46	0.13
	Benzene	1.30	0.11	98%	0.03	<0.01
	Toluene	31.57	2.73	98%	0.63	0.05
	Ethylbenzene	8.42	0.73	98%	0.17	0.01
	Xylene	31.57	2.73	98%	0.63	0.05
Barge Loading Rack	VOCs	629.00	15.18	98%	12.58	0.30
	HAPs	217.76	5.26	98%	4.36	0.11
	Benzene	3.90	0.09	98%	0.08	<0.01
	Toluene	94.35	2.28	98%	1.89	0.05
	Ethylbenzene	25.16	0.61	98%	0.50	0.01
	Xylene	94.35	2.28	98%	1.89	0.05
Gasoline Storage Tanks	VOCs	2.88	12.63	98%	0.06	0.25
	HAPs	1.89	8.29	98%	0.04	0.17
	n-Hexane	0.06	0.26	98%	<0.01	<0.01
	Benzene	0.01	0.06	98%	<0.01	<0.01
	Toluene	0.38	1.65	98%	<0.01	0.03
	Ethylbenzene	0.72	3.16	98%	0.01	0.06
	Xylene	0.72	3.16	98%	0.01	0.06
Light Naphtha Storage Tanks	VOCs	1.29	5.66	98%	0.03	0.11
	HAPs	1.13	4.95	98%	0.02	0.10
	n-Hexane	0.39	1.70	98%	<0.01	0.03
	Benzene	0.05	0.23	98%	<0.01	<0.01
	Toluene	0.23	0.99	98%	<0.01	0.02
	Ethylbenzene	0.08	0.34	98%	<0.01	<0.01
	Xylene	0.39	1.70	98%	<0.01	0.03
Ethanol Storage Tanks	VOCs	0.06	0.27	98%	<0.01	<0.01
Totals	VOCs	1345.58	192.06	--	26.91	3.84
	HAPs	466.71	70.31	--	9.33	1.41
	n-Hexane	0.06	0.26	--	<0.01	<0.01
	Benzene	8.34	1.17	--	0.17	0.02
	Toluene	201.77	28.52	--	4.04	0.57
	Ethylbenzene	54.43	10.33	--	1.09	0.21
	Xylene	202.12	30.04	--	4.04	0.60

Liquid Product Loadout Flare (640-FL-1)

Emissions from firing Liquid Product Loadout Flare (640-FL-1)

Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factors (lb/MMBtu)	Max Hourly Relieving Rate (MMBtu/hr)	Max Annual Relieving Rate (MMBtu/yr)	Max Hourly Flow Rate to Flare (scf/hr)	Max Annual Flow Rate to Flare (scf/yr)	Heat Value of Fuel Gas (Btu/scf)	Loadout Flare Pilot Gas Rating (Btu/hr)	Pilot Max. Hourly Emissions (lb/yr)	Pilot Max. Hourly Emissions (tons/yr)	Burner Max.Hourly Emissions (lb/hr)	Burner Max.Hourly Emissions (tons/yr)	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
Hexane	1.80	--	28	7,546	4,988	1,460,080	712	30,000	<0.01	<0.01	<0.01	--	<0.01	<0.01
Formaldehyde	0.075	--	28	7,546	4,988	1,460,080	712	30,000	<0.01	<0.01	<0.01	--	<0.01	<0.01
CO	84	0.31	28	7,546	4,988	1,460,080	712	30,000	<0.01	<0.01	8.56	1.17	8.56	1.17
NO_x	100	0.07	28	7,546	4,988	1,460,080	712	30,000	<0.01	<0.01	1.88	0.26	1.88	0.26
$PM_{Condensable}$	5.70	--	28	7,546	4,988	1,460,080	712	30,000	<0.01	<0.01	0.03	<0.01	0.03	<0.01
$PM_{Filterable}$	1.90	--	28	7,546	4,988	1,460,080	712	30,000	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
PM_{Total}	7.60	--	28	7,546	4,988	1,460,080	712	30,000	<0.01	<0.01	0.04	<0.01	0.04	<0.01
SO_2	0.60	--	28	7,546	4,988	1,460,080	712	30,000	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total HAPs													<0.01	<0.01

Total Liquid Product Loadout Flare (640-FL-1) Emissions

Pollutant	Max. Hourly Emissions (lb/hr)	Max. Yearly Emissions (tons/yr)
VOCs	26.91	3.84
HAPs	9.34	1.41
Hexane	0.01	<0.01
Formaldehyde	<0.01	<0.01
CO	8.56	1.17
NO_x	1.88	0.26
$PM_{Condensable}$	0.03	<0.01
$PM_{Filterable}$	<0.01	<0.01
PM_{Total}	0.04	<0.01
SO_2	<0.01	<0.01

Notes:

- Emission Factors in $lb/10^6$ scf are from AP-42 Chapter 1.4, Table 1.4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion for combustion of facility fuel gas.
- Emission Factor for NO_x in lb/MMBtu is from AP-42 Chapter 13.5, Table 13.5-1 THC, NO_x, and Soot Emission for Flare Operations for Certain Chemical Manufacturing Processes (02/2018 Version)
- Emission Factor for CO in lb/MMBtu is from AP-42 Chapter 13.5, Table 13.5-2 Emission Factors for Elevated Flare Operations for Certain Refinery and Chemical Manufacturing Processes (02/2018 Version)

Example Calculations:

- Max Hourly emissions from Input Streams to Liquid Product Loadout Flare **(lb/hr)** = Amount of Gas sent to Liquid Product Loadout Flare **(lb/hr)** x (100 - Liquid Product Loadout Flare Combustion Efficiency **(%)**/100)
- Max Hourly Emissions from Liquid Product Loadout Flare **(lb/hr)** = [(Emission factor **($lb/10^6$ scf)** ÷ Heat Value of Fuel Gas Gas **(Btu/scf)** x Pilot Gas Rating **(Btu/hr)**)/10^6] + [(Emission factor **($lb/10^6$ scf)** ÷ Heat Value of Fuel Gas Gas **(Btu/scf)** x Liquid Product Loadout Flare Rating **(Btu/hr)**)/10^6]
- Max Hourly Emissions from Liquid Product Loadout Flare **(lb/hr)** = Emission Factor **(lb/MMBtu)** x Liquid Product Loadout Flare Heat Rating **(MMBtu/hr)**
- Max Yearly Emissions from Input Streams to Liquid Product Loadout Flare **(ton/yr)** = Amount of Gas sent to Liquid Product Loadout Flare **(ton/yr)** x (100 - Liquid Product Loadout Flare Combustion Efficiency **(%)**/100)

Hydrogen Reformer (700-HR-1) - Normal Operation

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heater Rating (MMBtu/hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
VOCs	0.0060	lb/MMBtu	Vendor Guarantee	537	918	8,700	3.23	14.04
Hexane	1.40	lb/10^6 scf	Engineering Estimate	537	918	8,700	0.82	3.56
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	537	918	8,700	0.04	0.19
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	537	918	8,700	<0.01	<0.01
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	537	918	8,700	<0.01	<0.01
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	537	918	8,700	<0.01	<0.01
CO	0.012	lb/MMBtu	Vendor Guarantee	537	918	8,700	6.60	28.70
NO_x	0.008	lb/MMBtu	Vendor Guarantee	537	918	8,700	4.13	17.95
$PM_{Filterable}$	1.9	lb/10^6 scf	AP-42 Chapter 1.4	537	918	8,700	1.11	4.83
$PM_{Condensable}$	5.7	lb/10^6 scf	AP-42 Chapter 1.4	537	918	8,700	3.33	14.50
PM_{Total}	7.6	lb/10^6 scf	AP-42 Chapter 1.4	537	918	8,700	4.45	19.34
SO_2	6.00E-01	lb/10^6 scf	AP-42 Chapter 1.4	537	918	8,700	0.35	1.53
Total HAPs							0.87	3.77

Notes:
- Emission rates displayed above represent the max. hourly and max. annual emissions for the Hydrogen Reformer (700-HR-1) in Unit 700 - Hydrogen Plant.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Hexane emission factor is an engineering estimate based on the ratio of n-Hexane in the VOC AP-42 Chapter 1.4 emission factor
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/10^6 scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating **(MMBtu/hr)**

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/MMBtu)** x Heater Rating **(MMBtu/hr)**

Max. Annual Emission Rate **(tpy)** = Max Hourly Emissions **(lb/hr)** x Annual Operating Hours **(hr/yr)** x **(1 ton/2000 lb)**

Hydrogen Reformer (700-HR-1) - Startup

Pollutant	Emission Factor	Emission Factor Units	Emission Factor Basis / Source	Heater Rating (MMBtu/hr)	Heat Value of Natural Gas (Btu/scf)	Annual Operating Hours	Max. Hourly Emissions (lb/hr)	Max. Annual Emissions (tpy)
VOCs	0.0060	lb/MMBtu	Vendor Guarantee	537	918	60	3.23	0.10
Hexane	1.40	lb/10^6 scf	Engineering Estimate	537	918	60	0.82	0.02
Formaldehyde	0.075	lb/10^6 scf	AP-42 Chapter 1.4	537	918	60	0.04	<0.01
Benzene	0.0021	lb/10^6 scf	AP-42 Chapter 1.4	537	918	60	<0.01	<0.01
Toluene	0.0034	lb/10^6 scf	AP-42 Chapter 1.4	537	918	60	<0.01	<0.01
Pb	0.0005	lb/10^6 scf	AP-42 Chapter 1.4	537	918	60	<0.01	<0.01
CO	0.012	lb/MMBtu	Vendor Guarantee	537	918	60	6.60	0.20
NO_x	0.064	lb/MMBtu	Vendor Guarantee	537	918	60	34.37	1.03
$PM_{Filterable}$	1.9	lb/10^6 scf	AP-42 Chapter 1.4	537	918	60	1.11	0.03
$PM_{Condensable}$	5.7	lb/10^6 scf	AP-42 Chapter 1.4	537	918	60	3.33	0.10
PM_{Total}	7.6	lb/10^6 scf	AP-42 Chapter 1.4	537	918	60	4.45	0.13
SO_2	6.00E-01	lb/10^6 scf	AP-42 Chapter 1.4	537	918	60	0.35	0.01
Total HAPs							0.87	0.03

Notes:
- Emission rates displayed above represent the max. hourly and max. annual emissions for the Hydrogen Reformer (700-HR-1) in Unit 700 - Hydrogen Plant.
- AP-42, Chapter 1.4 references are from the July 1998 revision.
- Hexane emission factor is an engineering estimate based on the ratio of n-Hexane in the VOC AP-42 Chapter 1.4 emission factor
- Max. Annual Emissions based upon Max. Hourly Emissions @ 8760 hr/yr.

Example Equations:

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/10^6 scf)** ÷ Heating Value of Natural Gas **(Btu/scf)** x Boiler Rating **(MMBtu/hr)**

Max. Hourly Emission Rate **(lb/hr) =** Emission Factor **(lb/MMBtu)** x Heater Rating **(MMBtu/hr)**

Max. Annual Emission Rate **(tpy)** = Max Hourly Emissions **(lb/hr)** x Annual Operating Hours **(hr/yr)** x **(1 ton/2000 lb)**

Fugitive Emissions from Paved Haul Roads

Constant	PM	PM-10	PM-2.5
k (lb/VMT)	0.011	0.0022	0.00054

where

k		Particle size multiplier [1]
$sL_{Liquids}$	0.6	Road surface silt loading (g/m^2) [2]
sL_{Solids}	8.2	Road surface silt loading (g/m^2) [3]
P	157	Number of days per year with precipitation >0.01 in. [4]

Haul Road Fugitive Emissions ID	Description	W Mean Vehicle Weight (tons)	Miles per Trip	Maximum Trips per Hour	Maximum Trips per Year	Control Device ID Number	Control Efficiency (%)[7]	PM Emissions (lbs/hr)	PM Emissions (tons/yr)	PM-10 Emissions (lbs/hr)	PM-10 Emissions (tons/yr)	PM-2.5 Emissions (lbs/hr)	PM-2.5 Emissions (tons/yr)
HR-1	Loaded Coal Delivery Trucks	43.0	0.13	6	15,330		75%	0.66	0.77	0.13	0.15	0.03	0.04
HR-2	Unloaded Coal Delivery Trucks	13.0	0.13	6	15,330		75%	0.19	0.23	0.04	0.05	<0.01	0.01
HR-3	Loaded Flaked Residue Trucks	40.0	0.55	10	8,282		75%	4.32	1.63	0.86	0.33	0.21	0.09
HR-4	Unloaded Flaked Residue Trucks	13.0	0.75	10	8,282		75%	1.87	0.71	0.37	0.14	0.09	0.04
HR-5	Loaded Sulfur Product Trucks	40.0	0.55	2	741		75%	0.86	0.15	0.17	0.03	0.04	<0.01
HR-6	Unloaded Sulfur Product Trucks	13.0	0.75	2	741		75%	0.37	0.06	0.07	0.01	0.02	<0.01
HR-7	Loaded Diesel Tanker Trucks	45.65	0.20	12	2,445		75%	0.20	0.02	0.04	<0.01	<0.01	<0.01
HR-8	Unloaded Diesel Tanker Trucks	13.0	1.10	12	2,445		75%	0.31	0.03	0.06	<0.01	0.01	<0.01
HR-9	Loaded Gasoline Tanker Trucks	42.1	0.22	8	5,840		75%	0.13	0.04	0.03	<0.01	<0.01	<0.01
HR-10	Unloaded Gasoline Tanker Trucks	13.0	1.08	8	5,840		75%	0.20	0.07	0.04	0.01	<0.01	<0.01
HR-11	Loaded LPG Tanker Trucks	20.1	0.40	2	3,731		75%	0.03	0.02	<0.01	<0.01	<0.01	<0.01
HR-12	Unloaded LPG Tanker Trucks	6.5	0.90	2	3,731		75%	0.02	0.02	<0.01	<0.01	<0.01	<0.01
HR-13	Loaded Ammonia Trucks	36.2	0.55	1	730		75%	0.04	0.01	<0.01	<0.01	<0.01	<0.01
HR-14	Unloaded Ammonia Trucks	13.0	0.75	1	730		75%	0.02	<0.01	<0.01	<0.01	<0.01	<0.01
HR-15	Loaded Ethanol Tank Trucks	42.6	0.40	2	869		75%	0.06	0.01	0.01	<0.01	<0.01	<0.01
HR-16	Unloaded Ethanol Tank Trucks	13.0	0.90	2	869		75%	0.04	<0.01	<0.01	<0.01	<0.01	<0.01
Totals:								**9.24**	**3.77**	**1.85**	**0.75**	**0.45**	**0.20**

Notes:

[1] - Particle Size Multiplier used from AP-42 Chapter 13.2.1 Table 13.2.1-1 Particle Size Multipliers for Paved Road Equation - 01/2011 Version

[2] - Finished liquid product road surface silt loading based on AP-42 Table 13.2.1-2 Ubiquitous Silt Loading Default Values with Hot Spot Contributions from Anti-Skid Abrasives, ADT Category <500 - 01/2011 Version

[3] - Raw materials and solid product road surface silt loading based on AP-42 Table 13.2.1-3 Typical Silt Content and Loading Values for Paved Roads at Industrial Facilities, Quarry Industry - 01/2011 Version

[4] - Number of days per year with precipitation >0.01 inches for Zone 1 - Western Plateau found in Table B - Precipitation Zones in West Virginia on Page 22 of the West Virginia G10-D Instructions and Forms document

[5] - Hourly Emissions equation from Equation 3 in AP-42 13.2.1 Paved Roads - 01/2011 Version. For an annual averaging period, N is equal to 8760 for the emission calcuations in this permit application.

[6] - Daily Emissions equation from Equation 2 in AP-42 13.2.1 Paved Roads - 01/2011 Version. For an annual averaging period, N is equal to 365 for the emission calcuations in this permit application.

7 - Control Efficiency of 75% is taken for the use of a street sweeper to control haul road PM emissions at the Domestic Synthetic Fuels I facility.

Example Calculations:

Hourly Emissions (lb/Vehicle Mile Traveled - VMT), $E_{hr} = [k \times (sL)^{0.91} x(W)^{1.02}] \times [1 - (1.2P/N)]$ [5]

Hourly Emissions (lb/hr) = E_{hr} (lb/VMT) x Maximum Trips per Hour (Trip/hr) x Distance of Trip (VMT/Trip)

Daily Emissions (lb/VMT), $E_{day} = [k \times (sL)^{0.91} x(W)^{1.02}] \times [1 - (P/4N)]$ [6]

Annual Emissions (ton/yr) = E_{day} (lb/VMT) x Maximum Trips per Year (Trip/yr) x Distance of Trip (VMT/Trip)

Domestic Synthetic Fuels I Facility Fugitive Leaks

Median Equipment Leak Component Counts for Small Refineries[1]

Process Unit	Valves			Connectors			Compress or Seals	Sampling Connections	Open-ended Lines	Pressure Relief Valves	Pumps	
	Gas	Light Liquid	Heavy Liquid	Gas	Light Liquid	Heavy Liquid				Gas	Light Liquid	Heavy Liquid
Unit 200 - H-Coal (Vacuum Distillation)	54	26	84	105	121	230	2	4	16	2	6	6
Unit 310 - Hydrocracking	300	375	306	1038	892	623	2	10	25	9	12	9
Unit 310 - Hydrotreating	100	208	218	290	456	538	2	6	20	5	5	5
Unit 320 - Catalytic Reforming	138	234	293	345	566	732	3	6	27	5	8	5
Unit 440 - Sulfur Recovery	58	96	127	165	240	345	3	3	50	3	6	6
Hydrogen Reformer	168	41	0	304	78	--	2	4	8	4	3	--

Equipment Specific Component Counts[2]

Equipment Type	Count on Site	Valves		Connectors		Open-Ended Lines		Pressure Relief Valves		Pump Seals
		Gas	Light Liquid	Gas	Light Liquid	Gas	Light Liquid	Gas	Liquid	
Deethanizer and Debutanizer Fractionation Tower	2	79	80	177	208		2	6		
Gas Sweetening: Amine	1	60	1	702	3	3		2		
Header Tie-in: Flow Line	2		3		10		1			
Header Tie-in: Gas Line	1	3		10		1				
Pump Station	1	7	227	22	647			2	17	2
Knockout Drum	2	3	1	26	20					
Separation Units	2									
Tank Farm Tank			3		12					
Utility Boiler	1	2		25						

Process Unit Equipment Specific Leak Component Counts

Process Unit	Valves			Connectors			Compress or Seals	Sampling Connections	Open-ended Lines	Pressure	Pumps	
	Gas	Light Liquid	Heavy Liquid	Gas	Light Liquid	Heavy Liquid				Gas	Light Liquid	Heavy Liquid
Unit 200 - H-Coal (Gas Sweetening - Amine)	60	702	0	702	3	--	--	--	3	2	--	--
Unit 410 - Gas Recovery Unit (Gas Header, GRU Stripper, Debutanizer, and Knockout Drum)	164	161	0	390	436	--	--	--	5	12	--	--
Unit 420 Amine Regeneration				--	--	--	--	--	--	--	--	--
Unit 430 - Sour Water Stripping	3	4	0	26	32	--	--	--	--	--	--	--
Unit 500 - Utilities	2	0	0	25	--	--	--	--	--	--	--	--
Unit 620 - Emergency Flare System	3	1		26	20	--	--	--	--	--	--	--
Unit 630 - Liquid Product Storage (LPG Header, Naphtha Header, and Tank Farm)		36		--	140	--	--	--	2	--	--	--
Unit 640 - Product Loadout and Shipping	7	227	0	22	647	--	--	--	--	2	2	--

Total Process Unit Component Counts

Process Unit	Valves			Connectors			Compress or Seals	Sampling Connections	Open-ended Lines	Pressure	Pumps	
	Gas	Light Liquid	Heavy Liquid	Gas	Light Liquid	Heavy Liquid				Gas	Light Liquid	Heavy Liquid
Unit 200 - H-Coal	114	728	84	807	124	230	2	4	19	4	6	6
Unit 310 - Hydrocracker	400	583	524	1328	1348	1161	4	16	45	14	17	14
Unit 320 - Catalytic Reforming	138	234	293	345	566	732	3	6	27	5	8	5
Unit 410 - Gas Recovery Unit	164	161	0	390	436	--	--	--	5	12	--	--
Unit 420 - Amine Regeneration	0	0	0	--	--	--	--	--	--	--	--	--
Unit 430 - Sour Water Stripping	3	4	0	26	32	--	--	--	--	--	--	--
Unit 440 - Sulfur Recovery	58	96	127	165	240	345	3	3	50	3	6	6
Unit 500 - Utilities	2	0	0	25	--	--	--	--	--	--	--	--
Unit 620 - Emergency Flare System	3	1	0	26	20	--	--	--	--	--	--	--
Unit 630 - Liquid Product Storage	0	36	0	--	140	--	--	--	2	--	--	--
Unit 640 - Product Loadout and Shipping	7	227	0	22	647	--	--	--	--	2	2	--
Hydrogen Reformer	168	41	0	304	78	--	2	4	8	4	3	--
Total	1057	2111	1028	3438	3631	2468	14	33	156	44	42	31

Fugitive Leak Control Efficiencies for Specific Equipment Components (%)

Source of Fugitive Leak Control Efficiency	Valves			Connectors			Compress or Seals	Sampling Connections	Open-ended Lines	Pressure Relief Valves			Pumps	
	Gas	Light Liquid	Heavy Liquid	Gas	Light Liquid	Heavy Liquid				Gas	Light Liquid	Heavy Liquid	Light Liquid	Heavy Liquid
EPA Fugitive Guidance - Quarterly Monitoring[3]	70%	61%	--	--	--	--	33%	--	--	44%	--	--	45%	--
EPA Fugitive Guidance - Monthly Monitoring[3]	88%	76%	--	--	--	--	--	--	--	--	--	--	68%	--
HON MACT[3]	96%	95%	--	81%	81%	--	--	--	--	--	--	--	88%	--
NSR Fugitive Guidance - 28 LAER[4]	97%	97%	0%	97%	97%	30%	95%	97%	97%	97%	--	--	93%	--

Stream Composition (mol %)

Process Stream	VOC	n-Hexane	Benzene	Toluene	Ethylbenzene	Xylene
Unit 320	100	3	1	15	25	25
Unit 630	100	30	4	17.50	6	30
Unit 640	100	2.03	0.46	13	25	25

Emissions from Fugitive Components

Facility Equipment Type		Total Count	Emission Rate (kg/hr /component)[5]	Hours of Operation (hr/yr)	Control Efficiency (%)	VOCs (lb/hr)	VOCs (ton/yr)	HAPs (lb/hr)	HAPs (ton/yr)	n-Hexane (lb/hr)	n-Hexane (ton/yr)	Benzene (lb/hr)	Benzene (ton/yr)	Toluene (lb/hr)	Toluene (ton/yr)	Ethylbenzene (lb/hr)	Ethylbenzene (ton/yr)	Xylene (lb/hr)	Xylene (ton/yr)
Valves	Gas	1,057	0.0268	8.760	96%	2.50	10.94	0.23	1.03	<0.01	0.04	<0.01	0.01	0.05	0.22	0.09	0.38	0.09	0.38
	Light Liquid	2,111	0.0109	8.760	95%	2.54	11.11	0.41	1.79	0.03	0.11	<0.01	0.03	0.09	0.37	0.14	0.62	0.15	0.66
	Heavy Liquid	1,028	0.00023	8.760	--	0.52	2.28	0.10	0.45	<0.01	0.02	<0.01	<0.01	0.02	0.10	0.04	0.16	0.04	0.16
Connectors	Gas	3,438	0.00025	8.760	--	1.90	8.30	0.17	0.73	<0.01	0.02	<0.01	<0.01	0.03	0.13	0.05	0.22	0.05	0.22
	Light Liquid	3,631	0.00025	8.760	--	2.00	8.77	0.52	2.26	0.04	0.17	<0.01	0.03	0.11	0.47	0.17	0.75	0.19	0.83
	Heavy Liquid	2,468	0.00025	8.760	--	1.36	5.96	0.28	1.21	0.01	0.04	<0.01	0.02	0.06	0.27	0.10	0.44	0.10	0.44
Compressor Seals[6]		14	0.636	8,760	100%	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sampling Connections		33	0.0150	8.760	--	1.09	4.78	0.14	0.60	<0.01	0.02	<0.01	<0.01	0.03	0.13	0.05	0.22	0.05	0.22
Open-ended Lines[7]		156	0.0023	8.760	100%	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pressure Relief Valves[8]		44	0.16	8.760	100%	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Pumps[9]	Light Liquid	42	0.114	8.760	100%	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Heavy Liquid	31	0.021	8.760	100%	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Total Emissions:						**11.91**	**52.15**	**1.84**	**8.06**	**0.10**	**0.42**	**0.03**	**0.12**	**0.39**	**1.69**	**0.64**	**2.79**	**0.67**	**2.92**

Notes:

[1] - Median equipment leak component counts from Table 4-14 in the US EPA Petroleum Refinery Source Characterization and Emission Model for Residual Risk Assessment (July 2002)

[2] - Schedule of default component counts per equipment type from Table 12 in the CAPP Update of Fugitive Equipment Leak Emission Factors (February 2014)

[3] - Fugitive emission control efficiencies from Table 4.2-3 in the US EPA Preferred and Alternative Methods for Estimating Fugitive Emissions from Equipment Leaks (November 1996)

[4] - Fugitive emission control efficiencies from NSR Guidance for Equipment Leak Fugitives - 28 LAER

[5] - Average refinery emission factors from Table 4.5-2 in the US EPA Preferred and Alternative Methods for Estimating Fugitive Emissions from Equipment Leaks (November 1996)

[6] - Compressors at the DSF facility will be of leakless design and are able to claim 100% control efficiency.

7 - OELs are required to be capped and sealed under 40CFR60.482-6A and are not subjec to LDAR monitoring. 100% control efficiency is taken for OELs.

[7]- Pressure Relief Valves at the DSF facility will be routed to a control device. Under 40CFR60.482-4a, PRVs routed to a control device are exempt from the LDAR Program. As such, 100% efficiency is claimed.

[8] - Pumps at the DSF facility will be of leakless design and are able to claim 100% control efficiency.

Example Equations:

Fugitive Emissions (lb/hr) = Count **(Components)** x Emission Rate **(kg/hr/component)** x 2.205 **lb/kg** x [1-Control Efficiency (%)] x Stream Composition **(mol %)**

Fugitive Emissions (ton/yr) = Fugitive Emissions **(lb/hr)** x Hours of Operation **(hr/yr)** x **1 ton/2000 lb**

PM Emissions from Initial Loading of Catalysts

Constant	PM	PM-10	PM-2.5
k	0.74	0.35	0.05

where
k — Particle size multiplier [1]
U — 7.0 — Wind Speed (mph) [2]

Catalyst Information			
Unit Catalyst Used Within	Catalyst Name	HAP Metals Composition (%)	HAP Metals in Catalyst
Unit 200	Axens HF 858	4	CoO, NiO
Unit 310	Axens HDK 786	3	NiO
Unit 310	Axens PR 156	0	
Unit 320	AxTrap 867	0	
Unit 440	Axens CR-3S	0	NiO
Unit 440	Axens CRS-31	0	
Unit 440	Axens TG 107	10	CoO

Transfer Point Number	Transfer Point Description	Material Moisture Content, M [4] (%)	Maximum Transfer Rate (ton/hr)	Maximum Transfer Rate (ton/yr)	Fan Flow Rate (scf/min)	Mechanical Vent Exhaust Concentration (grain/dscf)[5]	Control Device ID Number	Control Efficiency (%)	PM Emissions (lb/hr)	PM Emissions (ton/yr)	HAP Metals (lb/hr)	HAP Metals (ton/yr)	PM-10 Emissions (lb/hr)	PM-10 Emissions (ton/yr)	PM-2.5 Emissions (lbs/hr)[4]	PM-2.5 Emissions (ton/yr)
CTH-1	Axens HF 858 to Feed Catalyst Bins 200-D-204/205/206	0.9	177.50	177.50	1,200	0.01			0.10	<0.01	<0.01	<0.01	0.10	<0.01	0.05	<0.01
CTH-2	Axens HDK 786 Catalyst to Loading Hopper	0.9	180.00	180.00					2.02	<0.01	0.06	<0.01	0.95	<0.01	0.14	<0.01
CTH-3	Axens PR 156 Catalyst to Loading Hopper	0.9	10.35	10.35					0.12	<0.01	<0.01	<0.01	0.05	<0.01	<0.01	<0.01
CTH-4	AxTrap 867 Catalyst to Loading Hopper	0.9	2.50	2.50					0.03	<0.01	<0.01	<0.01	0.01	<0.01	<0.01	<0.01
CTH-5	Axens CR-3S Catalyst to Loading Hopper	0.9	11.57	11.57					0.13	<0.01	<0.01	<0.01	0.06	<0.01	<0.01	<0.01
CTH-6	Axens CRS-31 Catalyst to Loading Hopper	0.9	1.65	1.65					0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
CTH-7	Axens TG 107 to Loading Hopper	0.9	3.31	3.31					0.04	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01
Totals:									**2.45**	**<0.01**	**0.07**	**<0.01**	**1.21**	**<0.01**	**0.22**	**<0.01**

Notes:
1 - Particle Size Multiplier used from AP-42 Chapter 13.2.4 Particle Size Multipliers for Aggregate Handling and Storage Piles - 11/2006 Version
2 - Mean Wind Speed used from AP-42 Chapter 13.2.4 Particle Size Multipliers for Aggregate Handling and Storage Piles - 11/2006 Version
3 - Equation 1 from AP-42 13.2.4 Aggregate Handling and Storage Piles - 11/2006 Version
4 - Moisture content of pellets used from AP-42 Chapter 13.2.4-1 Typical Silt and Moisture Contents of Materials at Various Industries - 11/2006 Version
5 - Mechanical vent exhaust concentration per Domestic Synthetic Fuels I operations.

Example Calculations:
Emissions (lb PM/ton transferred) - E = $[k \times (0.0032 \times ((U/5)^{1.3}/(M/2)^{1.4}]$ [5]
If not equipped with mechanical vent
Emissions (lb/hr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton transferred/hr)
Emissions (ton/yr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton/yr) x (1 ton PM/2000 lb PM)
If equipped with mechanical vent
Emissions (lb/hr) = Mechanical Vent Exhaust Concentration (grain/scf) x Fan Flow Rate (scf/min) x (60 min/1 hr) x (1 lb/7000 grain)
Emissions (ton/yr) = Emissions (lb/hr) x (1 ton/2000 lb) x Annual Hours of Operation (1 hr/yr)
HAP Metal Emissions (lb/hr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton transferred/hr) x Percent Metal Composition (%)
HAP Metal Emissions (ton/yr) = E (lb PM/ton transferred) x Maximum Transfer Rate (ton transferred/yr) x Percent Metal Composition (%)

Description	Units	H-Coal (Slurry Feed)		H-Coal (H2 Feed)		H-Coal (VT Feed)		HyK Feed		HyK Frac Reboiler		Reformer		Total	
Design Heater Duty		200 - H - 102		200 - H-101		200 - H - 301		310 - H - 101		310 - H - 103		320 - H - 201/2/3/4			
APH System	Yes / No	No		No		No		No		No		No			
SCR System	Yes / No	No		No		No		No		No		No			
Excess Air	%	15	10	15	10	15	10	15	10	15	10	15	10	15	10
Absorbed Duty (Design)	MMBtu/hr	65.00	65.00	12.10	12.10	19.90	19.90	6.60	6.60	8.80	8.80	27.00	27.00	139.40	139.40
Process Inlet Temp.	°F	390	390	711	711	660	660	713	713	609	609	853	853		
Type of Fuel	-	Fuel Gas	Fuel Gas	Fuel Gas	Fuel Gas	Fuel Gas	Fuel Gas	Fuel Gas	Fuel Gas	Fuel Gas	Fuel Gas	Fuel Gas	Fuel Gas		
Fuel Gas LHV	Btu/lb	23,704.2	23,704.2	23,704.2	23,704.2	23,704.2	23,704.2	23,704.2	23,704.2	23,704.2	23,704.2	23,704.2	23,704.2		
Flue Gas per Fuel Flow	lb/lb	21.54	20.65	21.54	20.65	21.54	20.65	21.54	20.65	21.54	20.65	21.54	20.65		
Heat Loss (LHV)	%	1.5	1.5	2	2	2	2	2	2	2	2	2	2		
Flue Gas Temp for Efficiency	°F	490	490	811	811	760	760	813	813	709	709	1600	1620		
Net Calculated Fuel Efficiency (LHV)	%	87.82	88.22	78.90	79.61	80.26	80.92	78.85	79.56	81.62	82.23	56.77	57.72		
Fired Duty (LHV)	MMBtu/hr	74.02	73.68	15.34	15.20	24.79	24.59	8.37	8.30	10.78	10.70	47.56	46.78	180.86	179.25
Fuel Flowrate	lb/hr	3,122	3,108	647	641	1,046	1,037	353	350	455	451	2,006	1,973	7629.83	7561.83
Flue Gas Flowrate	lb/hr	67,258	64,187	13,935	13,240	22,530	21,423	7,606	7,227	9,798	9,323	43,220	40,752	164346.52	156151.75
Combustion Air Flowrate	lb/hr	64,135	61,079	13,288	12,599	21,484	20,386	7,253	6,877	9,343	8,872	41,213	38,778	156716.69	148589.92
NOx Emission	lb/MMBtu (LHV)	0.046	0.046	0.046	0.046	0.046	0.046	0.047	0.046	0.046	0.046	0.046	0.046		
	lb/hr	3.42	3.40	0.71	0.70	1.15	1.14	0.39	0.38	0.50	0.49	2.20	2.16	8.36	8.28
(Considering 8760 hr in a year)	lb/year	29,954.89	29,819.48	6,206.31	6,150.95	10,034.26	9,952.44	3,387.57	3,357.25	4,363.59	4,331.24	19,249.03	18,931.94	73195.65	72543.29
	tons(short)/year	14.98	14.91	3.10	3.08	5.02	4.98	1.69	1.68	2.18	2.17	9.62	9.47	36.60	36.27
CO Emission	lb/MMBtu (LHV)	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031	0.031		
	lb/hr	2.28	2.27	0.47	0.47	0.76	0.76	0.26	0.26	0.33	0.33	1.46	1.44	5.57	5.52
(Considering 8760 hr in a year)	lb/year	19,969.92	19,879.65	4,137.54	4,100.63	6,689.51	6,634.96	2,258.38	2,238.17	2,909.06	2,887.49	12,832.69	12,621.29	48797.10	48362.19
	tons(short)/year	9.98	9.94	2.07	2.05	3.34	3.32	1.13	1.12	1.45	1.44	6.42	6.31	24.40	24.18
PM10/2.5 Emission	lb/MMBtu (LHV)	0.006	0.006	0.005	0.005	0.006	0.006	0.006	0.006	0.006	0.006	0.005	0.006		
	lb/hr	0.41	0.41	0.08	0.08	0.14	0.14	0.05	0.05	0.06	0.06	0.26	0.26	0.99	0.99
(Considering 8760 hr in a year)	lb/year	3,566.06	3,549.94	738.85	732.26	1,194.56	1,184.81	403.28	399.67	519.48	515.62	2,291.55	2,253.80	8713.77	8636.11
	tons(short)/year	1.78	1.77	0.37	0.37	0.60	0.59	0.20	0.20	0.26	0.26	1.15	1.13	4.36	4.32
VOC Emission	lb/MMBtu (LHV)	0.0082	0.0083	0.0085	0.0086	0.0081	0.0081	0.0084	0.0084	0.0083	0.0084	0.0082	0.0083		
	lb/hr	0.61	0.61	0.13	0.13	0.20	0.20	0.07	0.07	0.09	0.09	0.39	0.39	1.49	1.48
(Considering 8760 hr in a year)	lb/year	5,349.09	5,324.91	1,108.27	1,098.38	1,791.83	1,777.22	604.92	599.51	779.21	773.44	3,437.33	3,380.70	13070.65	12954.16
	tons(short)/year	2.67	2.66	0.55	0.55	0.90	0.89	0.30	0.30	0.39	0.39	1.72	1.69	6.54	6.48

Heurtey Petrochem SOLUTIONS

Description	Normal Heater Duty	SCR System	Excess Air	Type of Fuel	Fired Duty (LHV)	NOx Emission	CO Emission	PM10/2.5 Emission	VOC Emission	SO2 Emission
Units		Yes / No	%	-	MMBtu/hr	tons(short)/year	tons(short)/year	tons(short)/year	tons(short)/year	tons(short)/year
Hydrogen Plant	**Reformer Furnace**	Yes	10	Fuel Gas	537.00	18.07	28.90		14.10	

SD500 | 15.2L | 500 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

Standby Power Rating

500 kW, 625 kVA, 60 Hz

Prime Power Rating*

450 kW, 563 kVA, 60 Hz

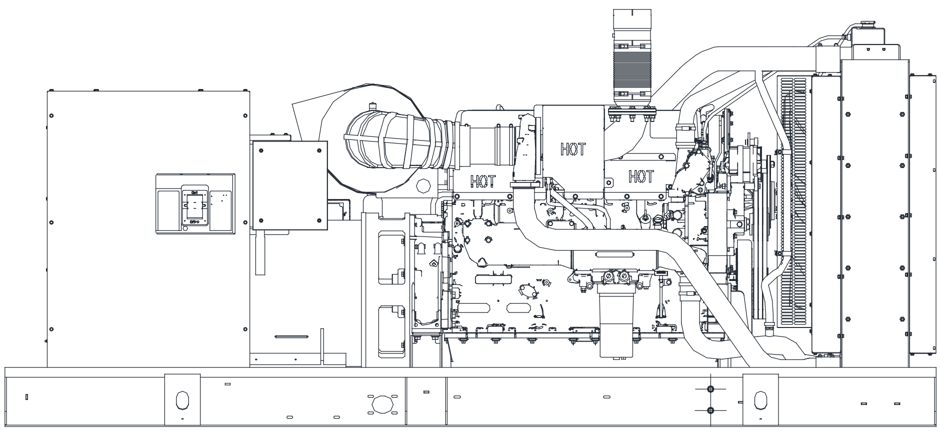


Image used for illustration purposes only

*Built in the USA using domestic and foreign parts

*EPA Certified Prime ratings are not available in the US or its Territories
*Built in the USA using domestic and foreign parts

Codes and Standards

Generac products are designed to the following standards:

UL2200, UL508, UL142, UL489

NFPA 37, 70, 99, 110

NEC700, 701, 702, 708

ISO 3046, 7637, 8528, 9001

NEMA ICS10, MG1, 250, ICS6, AB1

ANSI C62.41

IBC 2009, CBC 2010, IBC 2012, ASCE 7-05, ASCE 7-10, ICC-ES AC-156 (2012)

Powering Ahead

For over 50 years, Generac has provided innovative design and superior manufacturing.

Generac ensures superior quality by designing and manufacturing most of its generator components, including alternators, enclosures and base tanks, control systems and communications software.

Generac gensets utilize a wide variety of options, configurations and arrangements, allowing us to meet the standby power needs of practically every application.

Generac searched globally to ensure the most reliable engines power our generators. We choose only engines that have already been proven in heavy-duty industrial applications under adverse conditions.

Generac is committed to ensuring our customers' service support continues after their generator purchase.

SPEC SHEET

SD500 | 15.2L | 500 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

STANDARD OPTIONS

ENGINE SYSTEM

- Oil Drain Extension
- Air Cleaner
- Fan Guard
- Stainless Steel Flexible Exhaust Connection
- Critical Exhaust Silencer (Enclosed Only)
- Factory Filled Oil & Coolant
- Radiator Duct Adapter (Open Set Only)

Fuel System

- Primary Fuel Filter

Cooling System

- Closed Coolant Recovery System
- UV/Ozone Resistant Hoses
- Factory-Installed Radiator
- 50/50 Ethylene Glycol Antifreeze
- Radiator Drain Extension
- 120 VAC Coolant Heater

Electrical System

- Battery Charging Alternator
- Battery Cables
- Battery Tray
- Rubber-Booted Engine Electrical Connections
- Solenoid Activated Starter Motor

ALTERNATOR SYSTEM

- UL2200 GENprotect™
- Class H Insulation Material
- Vented Rotor
- 2/3 Pitch
- Skewed Stator
- Amortisseur Winding
- Permanent Magnet Excitation
- Sealed Bearings
- Full Load Capacity Alternator
- Protective Thermal Switch

GENERATOR SET

- Rust-Proof Fasteners with Nylon Washer to Protect Finish
- High Performance Sound-Absorbing Material
- Gasketed Doors
- Air Discharge Hoods for Radiator-Upward Pointing
- Stainless Steel Lift off Door Hinges
- Stainless Steel Lockable Handles
- Rhino Coat™ - Textured Polyester Powder Coat

ENCLOSURE (if selected)

- Rust-Proof Fasteners with Nylon Washers to Protect Finish
- High Performance Sound-Absorbing Material (L1 & L2)
- Gasketed Doors
- Stamped Air-Intake Louvers
- Air Discharge Hoods for Radiator-Upward Pointing
- Stainless Steel Lift Off Door Hinges
- Stainless Steel Lockable Handles
- Rhino Coat™ - Textured Polyester Powder Coat

TANK (if selected)

- UL 142
- Double Wall
- Vents
- Sloped Top
- Sloped Bottom
- Factory Pressure Tested (2 psi)
- Rupture Basin Alarm
- Fuel Level
- Check Valve in Supply and Return Lines
- Rhino Coat™ - Textured Polyester Powder Coat
- Stainless Hardware

CONTROL SYSTEM

Control Panel

- Digital H Control Panel - Dual 4x20 Display
- Programmable Crank Limiter
- 7-Day Programmable Exerciser
- Special Applications Programmable PLC
- RS-232/485
- All-Phase Sensing DVR
- Full System Status
- Utility Monitoring
- 2-Wire Start Compatible
- Power Output (kW)
- Power Factor
- kW Hours, Total & Last Run
- Real/Reactive/Apparent Power
- All Phase AC Voltage
- All Phase Currents
- Oil Pressure
- Coolant Temperature
- Coolant Level
- Engine Speed
- Battery Voltage
- Frequency
- Date/Time Fault History (Event Log)
- Isochronous Governor Control
- Waterproof/Sealed Connectors
- Audible Alarms and Shutdowns
- Not in Auto (Flashing Light)
- Auto/Off/Manual Switch
- E-Stop (Red Mushroom-Type)
- NFPA110 Level I and II (Programmable)
- Customizable Alarms, Warnings, and Events
- Modbus protocol
- Predictive Maintenance Algorithm
- Sealed Boards
- Password Parameter Adjustment Protection
- Single Point Ground
- 15 Channel Data Logging
- 0.2 msec High Speed Data Logging
- Alarm Information Automatically Comes Up On the Display

Alarms

- Oil Pressure (Pre-Programmable Low Pressure Shutdown)
- Coolant Temperature (Pre-Programmed High Temp Shutdown)
- Coolant Level (Pre-Programmed Low Level Shut-down)
- Low Fuel Alarm
- Engine Speed (Pre-Programmed Over Speed Shut-down)
- Battery Voltage Warning
- Alarms & Warnings Time and Date Stamped
- Alarms & Warnings for Transient and Steady State Conditions
- Snap Shots of Key Operation Parameters During Alarms & Warnings
- Alarms and Warnings Spelled Out (No Alarm Codes)

CONFIGURABLE OPTIONS

ENGINE SYSTEM

- Block Heater (Coolant)
- Crankcase Heater (Oil)
- Critical Grade Silencers
- Fan and Belt Guard (Optional)
- Flexible Fuel Lines Included with Base Tank
- Stone Guard (Open Set Only)

ELECTRICAL SYSTEM

- Battery
- 10A UL Battery Charger
- Battery Warmer

ALTERNATOR SYSTEM

- Alternator Upsizing
- Anti-Condensation Heater

CIRCUIT BREAKER OPTIONS

- Main Line Circuit Breaker
- 2nd Main Line Circuit Breaker
- Shunt Trip and Auxiliary Contact
- Electronic Trip Breakers

GENERATOR SET

- Gen-Link Communications Software (English Only)
- 8 Position Load Center
- Alarm Horn
- Extended Factory Testing
- 2 Year Extended Warranty
- 5 Year Warranty
- 5 Year Extended Warranty
- 7 Year Extended Warranty
- 10 Year Extended Warranty

ENCLOSURE

- Standard Enclosure (Weather)
- Level 1 Sound Attenuation
- Level 2 Sound Attenuation
- Steel Enclosure
- Aluminum Enclosure
- IBC Seismic Certification
- 180 MPH Wind Kit
- AC/DC Enclosure Lighting Kit

CONTROL SYSTEM

- 21-Light Remote Annunciator
- Ground Fault Indication and Protection Functions
- Engine Run Relay 10A (1-NO, 1- NC)
- 120 VAC GFCI outlet
- Oil Temperature Indication
- Remote Relay Panel (8 or 16)
- Remote E-Stop (Break Glass-Type, Surface Mount)
- Remote E-Stop (Red Mushroom-Type, Surface Mount)
- Remote E-Stop (Red Mushroom-Type, Flush Mount)
- Remote Communication - Modem

TANKS (Size On Last Page)

- Electronic Fuel Level
- Mechanical Fuel Level

ENGINEERED OPTIONS

ENGINE SYSTEM

- Fluid Containment Pans
- Coolant Heater Ball Valves

ALTERNATOR SYSTEM

- 3rd Breaker Systems
- Unit Mounted Load Banks

CONTROL SYSTEM

- Spare Inputs (x4) / Outputs (x4) - H Panel Only

GENERATOR SET

- Special Testing
- Battery Box

ENCLOSURE

- Motorized Dampers
- Intrusion Alert Door Switch
- Customer Color

TANKS

- Overfill Protection Valve
- UL 2085 Tank
- ULC S-601 Tank
- Stainless Steel Tank
- Special Fuel Tanks
- Vent Extensions
- 5 Gallon Spill Containment Box
- Dealer Supplied AHJ Requirements

RATING DEFINITIONS

Standby - Applicable for a varying emergency load for the duration of a utility power outage with no overload capability.

Prime - Applicable for supplying power to a varying load in lieu of utility for an unlimited amount of running time. A 10% overload capacity is available for 1 out of every 12 hours. The Prime Power option is only available on International applications. Power ratings in accordance with ISO 8528-1, Second Edition.

SD500 | 15.2L | 500 kW

INDUSTRIAL DIESEL GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

APPLICATION AND ENGINEERING DATA

ENGINE SPECIFICATIONS

General

Make	Perkins
Cylinder #	6
Type	In-Line
Displacement - L (cu in)	15.2 (927.56)
Bore - mm (in)	137 (5.39)
Stroke - mm (in)	171 (6.73)
Compression Ratio	16.0:1
Intake Air Method	Turbocharged/Aftercooled
Cylinder Head Type	4-Valve
Piston Type	Aluminum
Crankshaft Type	I-Beam Section

Engine Governing

Governor	Electronic Isochronous
Frequency Regulation (Steady State)	±0.25%

Lubrication System

Oil Pump Type	Gear
Oil Filter Type	Full Flow
Crankcase Capacity - L (qts)	45 (47.55)

Cooling System

Cooling System Type	Closed Recovery
Water Pump Type	Centrifugal Type, Belt-Driven
Fan Type	Pusher
Fan Speed (rpm)	1658
Fan Diameter - mm (in)	927 (36.5)
Coolant Heater Wattage	1500
Coolant Heater Standard Voltage	120 V

Fuel System

Fuel Type	Ultra Low Sulfur Diesel #2
Carburetor	ASTM
Fuel Filtering (microns)	Primary 10 - Secondary 2
Fuel Inject Pump Make	Electronic
Injector Type	MEUI
Engine Type	Pre-Combustion
Fuel Supply Line - mm (in)	12.7 (0.5) NPT
Fuel Return Line - mm (in)	12.7 (0.5) NPT

Engine Electrical System

System Voltage	24 VDC
Battery Charger Alternator	Standard
Battery Size	See Battery Index 0161970SBY
Battery Voltage	(2) 12 VDC
Ground Polarity	Negative

ALTERNATOR SPECIFICATIONS

Standard Model	WEG
Poles	4
Field Type	Revolving
Insulation Class - Rotor	H
Insulation Class - Stator	H
Total Harmonic Distortion	<3%
Telephone Interference Factor (TIF)	<50
Standard Excitation	Permanent Magnet
Bearings	Single Sealed Cartridge
Coupling	Direct, Flexible Disc
Prototype Short Circuit Test	Yes
Voltage Regulator Type	Full Digital
Number of Sensed Phases	All
Regulation Accuracy (Steady State)	±0.25%

OPERATING DATA

POWER RATINGS

		Standby
Three-Phase 120/208 VAC @0.8pf	500 kW	Amps: 1735
Three-Phase 120/240 VAC @0.8pf	500 kW	Amps: 1504
Three-Phase 277/480 VAC @0.8pf	500 kW	Amps: 752
Three-Phase 346/600 VAC @0.8pf	500 kW	Amps: 601

STARTING CAPABILITIES (sKVA)

sKVA vs. Voltage Dip

480 VAC								208/240 VAC							
Alternator	kW	10%	15%	20%	25%	30%	35%	Alternator	kW	10%	15%	20%	25%	30%	35%
Standard	500	457	686	914	1143	1371	1600	Standard	500	429	643	857	1071	1286	1500
Upsize 1	642	471	707	943	1179	1414	1650	Upsize 1	689	543	814	1086	1357	1629	1900
Upsize 2	832	757	1136	1514	1893	2271	2650	Upsize 2	723	571	857	1143	1429	1714	2000

FUEL CONSUMPTION RATES*

Fuel Pump Lift - ft (m)
12 (3.7)

Total Fuel Pump Flow (Combustion + Return) gph (lph)
121 (457)

Diesel - gph (lph)

Percent Load	Standby
25%	10.5 (39.7)
50%	19.5 (73.8)
75%	23.7 (89.7)
100%	31.2 (118.1)

* Fuel supply installation must accommodate fuel consumption rates at 100% load.

COOLING

		Standby
Coolant Flow per Minute	gpm (lpm)	114.1 (432)
Coolant System Capacity	gal (L)	264 (999)
Heat Rejection to Coolant	BTU/hr	1,198,080
Inlet Air	cfm (m^3/min)	30,582 (866)
Max. Operating Ambient Temperature (Before Derate)	°F (°C)	104 (40)
Maximum Radiator Backpressure	in H_2O	0.50

COMBUSTION AIR REQUIREMENTS

	Standby
Flow at Rated Power cfm (m^3/min)	1483 (42)

ENGINE

		Standby
Rated Engine Speed	rpm	1800
Horsepower at Rated kW**	hp	835
Piston Speed	ft/min	2020
BMEP	psi	366

EXHAUST

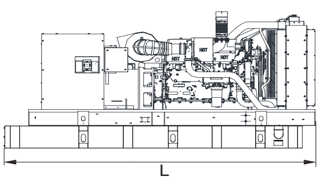
		Standby
Exhaust Flow (Rated Output)	cfm (m^3/min)	3400 (96)
Max. Backpressure (Post Silencer)	in Hg (Kpa)	2.01 (6.8)
Exhaust Temp (Rated Output - Post Silencer)	°F (°C)	1022 (550)
Exhaust Outlet Size (Open Set)	mm (in)	127 (5)

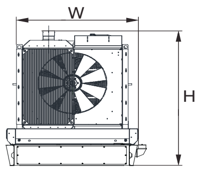
** Refer to "Emissions Data Sheet" for maximum bHP for EPA and SCAQMD permitting purposes.

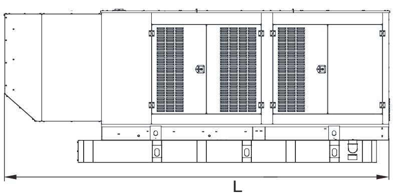
Deration – Operational characteristics consider maximum ambient conditions. Derate factors may apply under atypical site conditions.
Please consult a Generac Power Systems Industrial Dealer for additional details. All performance ratings in accordance with ISO3046, BS5514, ISO8528 and DIN6271 standards.

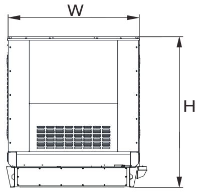
GENERAC INDUSTRIAL POWER

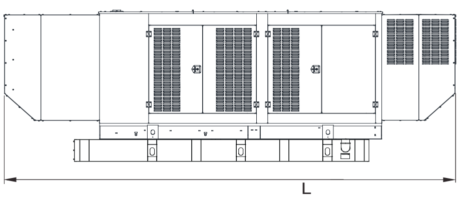
DIMENSIONS AND WEIGHTS*

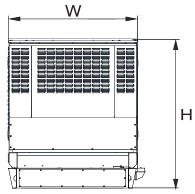


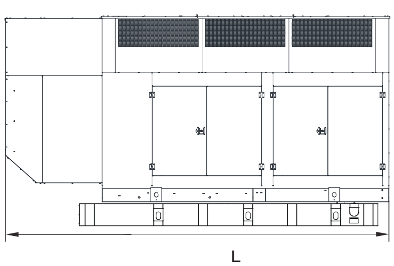


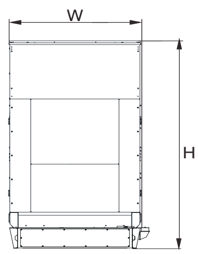












OPEN SET (Includes Exhaust Flex)

Run Time Hours	Usable Capacity Gal (L)	L x W x H (in (mm)	Weight lbs (kg)
No Tank	-	154.4 (3923) x 71 (1803) x 67 (1702)	10580 (4799)
10	334	158.5 (4026) x 71 (1803) x 81 (2057)	12255 (5559)
32	1001	158.5 (4026) x 71 (1803) x 103 (2616)	13180 (6228)
32	1001	228 (5791) x 71 (1803) x 103 (2616)	13730 (6228)
64	2002	290 (7366) x 71 (1803) x 103 (2616)	15430 (6999)

STANDARD ENCLOSURE

Run Time Hours	Usable Capacity Gal (L)	L x W x H (in (mm)	Weight lbs (kg) Enclosure Only	
			Steel	Aluminum
No Tank	-	207.4 (5268) x 71 (1803) x 80 (2032)	1999 (907)	869 (394)
10	334	207.4 (5268) x 71 (1803) x 94 (2388)		
32	1001	207.4 (5268) x 71 (1803) x 116 (2946)		
32	1001	228 (5791) x 71 (1803) x 105 (2667)		
64	2002	290 (7366) x 71 (1803) x 116 (2946)		

LEVEL 1 ACOUSTIC ENCLOSURE

Run Time Hours	Usable Capacity Gal (L)	L x W x H (in (mm)	Weight lbs (kg) Enclosure Only	
			Steel	Aluminum
No Tank	-	247.5 (6285) x 71 (1803) x 80 (2032)	2782 (1262)	1291 (586)
10	334	247.5 (6285) x 71 (1803) x 94 (2388)		
32	1001	247.5 (6285) x 71 (1803) x 116 (2946)		
32	1001	247.5 (6285) x 71 (1803) x 105 (2667)		
64	2002	290 (7366) x 71 (1803) x 116 (2946)		

LEVEL 2 ACOUSTIC ENCLOSURE

Run Time Hours	Usable Capacity Gal (L)	L x W x H (in (mm)	Weight lbs (kg) Enclosure Only	
			Steel	Aluminum
No Tank	-	207.4 (5268) x 71 (1803) x 114 (2899)	3330 (1510)	1522 (692)
10	334	207.4 (5268) x 71 (1803) x 128 (3251)		
32	1001	207.4 (5268) x 71 (1803) x 150 (3810)		
32	1001	228 (5791) x 71 (1803) x 139 (3531)		
64	2002	290 (7366) x 71 (1803) x 150 (3810)		

* All measurements are approximate and for estimation purposes only.

YOUR FACTORY RECOGNIZED GENERAC INDUSTRIAL DEALER

Specification characteristics may change without notice. Dimensions and weights are for preliminary purposes only. Please consult a Generac Power Systems Industrial Dealer for detailed installation drawings.

SPEC SHEET

Part No 0197160SBY
Rev. D 09/21/15

Attachment O

Attachment O

Monitoring, Recordkeeping, Reporting, and Testing Plans

DSF will comply with the monitoring, recordkeeping, reporting, and testing requirements of the federal and state regulations as outlined in Sections 4 and 5 of the permit application. DSF will additionally comply with the conditions of the issued R13 permit.

Attachment P

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that Domestic Synthetic Fuels I, LLC has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Rule 13 Minor Source Construction Permit for a Direct Liquefaction Coal to Liquids Refining Operation to be located West of State Route 62, North of Point Pleasant, Mason County, West Virginia. The latitude and longitude coordinates are: 39.92554, -82.10807.

The applicant estimates the potential to discharge the following Regulated Air Pollutants will be:

Nitrogen Oxides (NOx): 82.27 tons per year
Sulfur Dioxide (SO2): 27.03 tons per year
Carbon Monoxide (CO): 71.35 tons per year
Volatile Organic Compounds (VOCs): 86.35 tons per year
Total Particulate Matter (PM): 84.14 tons per year
Particulate Matter <10 microns (PM_{10}): 56.11 tons per year
Particulate Matter <2.5 microns ($PM_{2.5}$): 32.65 tons per year
Particulate Matter Condensable (PM_{Con}): 22.69 tons per year
Total Hazardous Air Pollutants (HAPs): 17.17 tons per year

Startup of operation is planned to begin on or about October 2021. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 1250, during normal business hours.

Dated this the 11th day of January, 2019.

By: Domestic Synthetic Fuels I, LLC
Kevin Whited
President
19 Gemini Way
Summit Point, WV 25446