STANDARD AIR CONTAMINANT DISCHARGE PERMIT APPLICATION (REVISION 2)

NEXT RENEWABLE FUELS OREGON, LLC
CLATSKANIE, OREGON

Prepared for

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY

STATE NEW SOURCE REVIEW PERMITTING PROGRAM

December 22, 2020 (Revision 2—September 17, 2021)

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TABLES AND FIGURES

ACRONYMS AND ABBREVIATIONS

ACDP	Air Contaminant Discharge Permit
AP-42	USEPA Compilation of Air Pollutant Emission Factors
bbl/day	barrels per day
BE	bleaching earth
CAO	Cleaner Air Oregon
CI	compression ignition
40 CFR	Title 40 Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
DAF	dissolved air flotation
DEQ	Oregon Department of Environmental Quality
FA	filter aid
FCAA	Federal Clean Air Act
GHG	greenhouse gases
HAP	hazardous air pollutant
hp	horsepower
H_2S	hydrogen sulfide
km	kilometer
NESHAP	national emissions standards for hazardous air pollutants
NEXT	NEXT Renewable Fuels Oregon, LLC
NFPA	National Fire Protection Association
NO_X	nitrogen oxides
NSPS	new source performance standards
NSR	new source review
MERPS	modeled emission rates for precursors
MFA	Maul Foster & Alongi, Inc.
MMBtu/hr	million British thermal units per hour
OAR	Oregon Administrative Rules
Portland AQMA	Portland-Vancouver Interstate Air Quality Maintenance Area
PSA	pressure-swing absorption
PSD	Prevention of Significant Deterioration
PSEL	plant site emission limit
psia	pounds per square inch actual
PM	particulate matter
PM_{10}	particulate matter with aerodynamic diameter less than 10 micrometers
$PM_{2.5}$	particulate matter with aerodynamic diameter less than 2.5 micrometers
PTE	potential to emit
RAWP	Risk Assessment Work Plan

ACRONYMS AND ABBREVIATIONS (CONTINUED)

RICE	reciprocating internal combustion engine
SBR	sequencing batch reactor
SCR	selective catalytic reduction
SER	significant emission rate
SIL	significant impact level
SMR	steam methane reforming
SO_2	sulfur dioxide
TAC	toxic air contaminant
tons/yr	tons per year
USEPA	United States Environmental Protection Agency
VCU	vapor combustion unit
VOC	volatile organic compound
WWT	wastewater treatment

1 INTRODUCTION

NEXT Renewable Fuels Oregon, LLC (NEXT) is proposing to construct a renewable diesel, naphtha, and jet fuel manufacturing facility in Clatskanie, Oregon (proposed facility). The proposed facility will receive and process raw oil feedstocks including vegetable oils and animal fats, to produce renewable fuel products. Maul Foster & Alongi, Inc. (MFA) has been retained by NEXT to prepare a Standard Air Contaminant Discharge Permit (ACDP) application for the proposed facility. The purpose of this revised Standard ACDP application (revised application) is to incorporate final design changes to the proposed facility that have been identified subsequent to submittal of the original application on December 22, 2020.

Table 1-1 presents the calculated potential to emit (PTE) for the proposed facility. NEXT is requesting that Plant Site Emission Limits (PSELs) be established at the facility as federally enforceable limits on PTE. Supporting details including emission factors and data references used to calculate proposed facility emission rates are provided in the emissions inventory presented in Appendix A. As shown in Table 1-1, the proposed facility PTE will exceed the significant emission rates (SER) for particulates (PM, PM_{10}, and $PM_{2.5}$), volatile organic compounds (VOC), and greenhouse gases (GHG).

Table 1-1. Summary of PTE and SER Analysis

Parameter	Annual Emissions Estimate (tons/yr)							
	PM	PM_{10}	$PM_{2.5}$	NO_X	CO	VOC	SO_2	GHG
Potential to Emit	26.6	26.6	26.6	34.2	60.6	69.4	23.9	1,152,905
SER	25.0	15.0	10.0	40.0	100	40.0	40.0	75,000
Potential to Emit above SER?	*Yes*	*Yes*	*Yes*	No	No	*Yes*	No	*Yes*

NOTES:
CO = carbon monoxide.
NO_x = nitrogen oxides.
PM = particulate matter.
PM_{10} = particulate matter with aerodynamic diameters less than 10 micrometers.
$PM_{2.5}$ = particulate matter with aerodynamic diameters less than 2.5 micrometers.
SO_2 = sulfur dioxide.
tons/yr = tons per year.

The proposed facility must obtain a Standard ACDP prior to commencing construction. Additional information on permitting applicability is provided in Section 4. The applicable Oregon Department of Environmental Quality (DEQ) ACDP application forms are provided in Appendix B.

NEXT plans to submit a revised combined modeling protocol and Risk Assessment Work Plan (RAWP) to the DEQ for review in compliance with the Cleaner Air Oregon (CAO) permitting program subsequent to the submittal of this revised application. The original combined modeling protocol and RAWP was submitted on December 22, 2020, and re-submitted incorporating initial comments from the DEQ on July 2, 2021.

MFA looks forward to working with the DEQ throughout the permitting process for the proposed facility. If there are any questions or comments regarding the information submitted in this Standard ACDP application, please contact Gene Cotten, President of NEXT at (661) 201-2653, or Brian Snuffer Zukas, P.E. of MFA at (971) 254-8077.

2 FACILITY DESCRIPTION

2.1 Facility Location

The proposed facility will be located in Columbia County, Oregon 4.75 miles to the north of Clatskanie town center, just south of the Columbia River. An aerial image of the proposed facility location and property boundary is shown in Figure 2-1.

The area immediately surrounding the proposed facility is characterized primarily by flat terrain with a mixture of land-use zoning including residential, industrial, and exclusive farm use designations. The topography of the area immediately surrounding the proposed facility is presented in Figure 2-2.

2.2 Process Description

A process flow diagram of the renewable fuels manufacturing process is presented in Figure 2-3. The proposed facility will receive raw oil feedstocks by railcar or from the Columbia Pacific Biorefinery by pipeline. The raw oil feedstocks will include vegetable oils (i.e., mixture of soybean oil, distillers corn oil, and used cooking oil) and animal fats (i.e., mixture of beef tallows, choice white grease/pork oil, and yellow grease). Raw oil feedstocks will be unloaded and routed to designated raw oil storage tanks prior to entering the pretreatment trains.

NEXT proposes to install three pretreatment trains at the proposed facility that will treat a total of up to 51,500 barrels per day (bbl/day) of raw oils. The equipment manufacturer previously specified four pretreatment trains would be required to meet the 51,500 bbl/day demand as stated in the original application, however, the most current pretreatment train design will be able to meet this demand using only three pretreatment trains. Each pretreatment train will include a series of holding tanks, mixing vessels, citric acid or caustic dosing tanks, cyclonic (washing) separators, and filter aid (FA) and bleaching earth (BE) silos, day tanks, and hoppers, among other miscellaneous support equipment. FA and BE will be delivered to the proposed facility by rail. Two pretreatment trains will be dedicated to the pretreatment of vegetable oils, and one will be dedicated to the pretreatment of animal fats. The original application included off-specification raw oils as one of the potential raw oil feedstocks planned for use at the proposed facility which is no longer in the scope of the project.

Pretreatment trains no. 1 and 2 will be identical and each will contain a two-stage refining system. The pretreatment process will begin with the degumming and washing stage, where raw oils will be mixed with citric acid and caustic for pH control. Following caustic dosing, the raw oil will be routed to parallel, closed-loop cyclonic separators for removal of gums, soaps, phospholipids and metals (primarily iron, calcium, magnesium, and phosphorous) resulting in "degummed oil." The degummed oil is then further polished, via washing separators, before being routed into the bleaching stage.

Degummed oil will be pumped from holding tanks into the bleaching stage, where FA will be injected and mixed into the degummed oil to precoat the bleaching stage filter screens. After the precoat has been established, mixing of the degummed oil and BE (along with citric acid as needed) will be injected to help remove any additional impurities before final polishing via filtration. Following filtration, the pretreated oil will be routed to treated feed oil storage tanks for use in the downstream Ecofining Unit trains.

Pretreatment train no. 3 will contain the same degumming/washing and bleaching stage equipment as pretreatment trains no. 1 and 2. However, due to the potential presence of polyethene in animal fats, an additional polyethylene removal stage is required upstream of the degumming stage. The polyethylene removal stage is similar to the bleaching process. Raw oil will be pumped from holding tanks into the polyethylene removal system, where FA will be injected and mixed into the degummed oil to precoat the bleaching stage filter screens. After the filter precoat has been established, degummed oil and BE will be mixed at a controlled temperature to remove polyethylene contaminants before final polishing via filtration. Following filtration, the treated oil will be routed to the degumming stage to continue the pretreatment process as described above. Note the overall purpose of each pretreatment train will be to remove elements that may foul the catalysts in the Ecofining Unit trains.

After completing the pretreatment process, treated feed oil will be routed to one of three identical Ecofining Unit trains. Similar to the pretreatment trains, the equipment manufacturer previously specified four Ecofining Unit trains would be required to meet the renewable fuel production goals at the proposed facility as stated in the original application, however, the most current design will be able to meet these goals using just three Ecofining Unit trains. Each Ecofining Unit train will consist of a Feed Heater and an Isomerization Heater, both heated by natural gas-fired combustion, and other ancillary equipment to support the hydroprocessing of treated feed oil into renewable fuel products (i.e., conversion of oxygen containing triglycerides to branched alkane molecules, renewable diesel, and lighter renewable fuel products, propane and renewable naphtha).

The Feed Heater will be used to indirectly heat treated feed oil to the temperature required for removal of oxygen molecules from triglycerides in the hydroprocessing catalyst system (producing straight chain alkane molecules). In the Isomerization Heater, the straight chain alkane molecules will be indirectly heated to the temperature required to enable the specialized catalyst to selectively rearrange the straight chain into branched chain alkane molecules and to crack a portion of the molecules into lighter renewable products.

Each Feed Heater and Isomerization Heater, for each Ecofining Unit train, will have a maximum heat input capacity of approximately 35.2 million British thermal units per hour (MMBtu/hr) and 5.3 MMBtu/hr, respectively. Exhaust from the Feed Heater and Isomerization Heater (on each train) will be combined and routed to a Selective Catalytic Reduction (SCR) control device with an oxidation catalyst for control of NO_X and CO emissions prior to emitting to atmosphere. Each Ecofining Unit train will be controlled by a separate SCR, so there will be three SCRs in total.

The Jet Fractionator is designed to receive the Ecofining Unit train renewable diesel product for re-fractionation (i.e., a separation process) into two different finished products, renewable jet fuel and diesel. The Jet Fractionator will have a maximum heat input capacity of 125 MMBtu/hr. The exhaust from the Jet Fractionator will be routed to an SCR control device with an oxidation catalyst for control of NO_X and CO emissions prior to emitting to atmosphere.

The Ecofining Unit trains will require large volumes of hydrogen to support hydroprocessing. In order to meet this hydrogen demand, the proposed facility will install a hydrogen production and compression facility collectively referred to as the "Hydrogen Plant". The Hydrogen Plant will contain a steam methane reforming (SMR) furnace and associated catalytic reactor vessels, among other ancillary equipment.

Ecofiner offgas, generated by the Ecofining Unit trains and Jet Fractionator, will be combined with natural gas, steam and heat in the SMR furnace to produce a syngas (composed primarily of hydrogen CO, and water, along with trace amounts of organic impurities). This syngas will be fed to the downstream high temperature shift reactor, passing through a catalyst bed to convert CO and water vapor to hydrogen and carbon dioxide (CO_2). A downstream pressure-swing absorption (PSA) gas purification unit will be used to separate CO, CO_2, and unconverted hydrocarbons, collectively referred to as the PSA tail gas, from hydrogen in the exhaust stream.

The high purity hydrogen (99.9% or more) exhaust stream generated by the PSA gas purification unit will be routed to the Ecofining Unit trains. The PSA tail gas will be routed back to the SMR furnace and combusted as fuel gas due to the presence of methane and other minor constituents with fuel value. The Hydrogen Plant will have a total heat input capacity of 700 MMBtu/hr. NEXT expects 586 MMBtu/hr will be from PSA tail gas combustion, and 114 MMBtu/hr will be from natural gas-fired combustion. The single exhaust from the Hydrogen Plant will route to an SCR control device with an oxidation catalyst for control of NO_X and CO emissions prior to emitting to atmosphere.

Two equally-sized natural gas-fired boilers will be utilized to generate steam for use in the Ecofining Unit trains, Jet Fractionator, Hydrogen Plant and other plant infrastructure. The two boilers will have a total combined heat input capacity of 155 MMBtu/hr. The exhaust from each boiler will be combined and routed to a single SCR control device with an oxidation catalyst for control of NO_X and CO emissions prior to emitting to atmosphere. The original application previously included only one natural gas-fired boiler at the proposed facility. During final design, it was determined that a second boiler will be needed in order to meet steam demands during startup of the Ecofining Unit trains while the Hydrogen Plant is not at operating design capacity.

Renewable fuel products from the Ecofining Unit trains and Jet Fractionator will be routed to specific product storage tanks prior to loadout to offsite customers. The renewable diesel product storage tanks will primarily be piped to a third-party terminaling provider for marine shipment[1]. Renewable diesel product can also be loaded onto railcars or, in limited quantities, trucks for shipment. Emissions generated by rail and truck loadout activities will be controlled by a natural gas-fired vapor combustion

[1] Product will be transferred via pipeline from the site to a third-party terminaling provider with existing infrastructure at the dock. The logistics provider will take control of the product at the pipeline confluence for loading of ships and barges at the existing dock.

unit (VCU). The renewable naphtha and jet fuel product storage tanks can only be unloaded to the offsite third-party terminaling provider for distribution. The third-party terminaling provider has developed infrastructure and business operations for the storage and transfer of liquid fuel products, including marine loading equipment and operations as shown on Figure 2-1. Renewable fuel products will be stored in four large product storage tanks and three smaller product storage tanks.

The proposed maximum production rates for individual renewable fuel products are presented in Table 2-1.

Table 2-1. Proposed Maximum Total Fuel Production Rates

Renewable Fuel Product	Production Rates by Production Scenario			
	Maximum Diesel		Maximum Jet Fuel	
	Daily (bbl/day)	Annual (bbl/yr)	Daily (bbl/day)	Annual (bbl/yr)
Renewable Diesel	49,469	17,709,902	38,733	13,866,414
Renewable Naphtha	974	348,692	2,370	848,460
Renewable Jet Fuel	0	0	8,443	3,022,594
Total Renewable Fuel	--	18,058,594	--	17,737,468

When producing the maximum amount of renewable diesel, only renewable diesel and naphtha will be produced. Since renewable jet fuel will not be produced, use of the jet fractionator stripper is not required when producing the maximum amount of renewable diesel.

Renewable jet fuel and naphtha are produced by re-fractionating renewable diesel, so producing the maximum amount of renewable jet fuel and naphtha will limit the renewable diesel production capacity. As a result, less renewable diesel can be produced when producing renewable jet fuel and naphtha. The maximum renewable jet fuel and naphtha production scenario represents the highest potential VOC and TAC emissions scenario (primarily due to use of the jet fractionator).

As a result, the proposed facility PTE, shown in Table 1-1, is based on the maximum renewable jet fuel and naphtha production rates. Although, it is expected the proposed facility will alternate between maximum diesel production and maximum jet fuel and naphtha production operating modes for extended campaigns.

Rich amines (i.e., a mixture of hydrogen sulfide (H_2S), CO_2, and amines in solution) generated by the Ecofining process will be routed to the Acid Gas Regenerator unit for amine regeneration. The Acid Gas Regenerator will produce a concentrated acid gas which will route to a natural gas-fired incinerator. Controlled exhaust from the incinerator will route to a waste heat recovery section followed by a temperature conditioning section which will lower the flue gas temperature prior to entering the downstream baghouse. Bicarbonate sorbent will be injected upstream of the baghouse to react with sulfur oxide components in the exhaust, forming sodium sulfate particulates. These particulates will be removed from the exhaust stream by the baghouse. Exhaust from the baghouse will route to an SCR control device with an oxidation catalyst for control of NO_X and CO emissions prior to emitting to atmosphere.

A sour water stripper will be required to process sour water produced during the Ecofining process. The sour water will contain H_2S and ammonia. The H_2S and ammonia will be stripped from the sour water and routed to the incinerator (and associated downstream control devices) for control of emissions. The stripped sour water containing trace amounts of H_2S and ammonia will be routed to the wastewater treatment (WWT) system, along with other miscellaneous influents discussed in more detail in the following section. A raw water treatment system will be installed to clean collected river water for use in process equipment at the proposed facility. A two-cell cooling tower will be installed to provide heat transfer capacity to cooling water recirculation.

The proposed facility will require an elevated emergency flare. The pilot light for the emergency flare will be fueled by natural gas and will operate continuously. Flaring of waste gases will only be required during startup (initial unit commissioning) of the Ecofining Unit train, annual shutdown of each Ecofining Unit train (once per year per train) for maintenance purposes, and emergency scenarios. The proposed facility will also utilize two emergency generators and an emergency fire water pump, each of which will be fueled by renewable diesel manufactured onsite.

3 PROPOSED EMISSION UNITS & EMISSION ESTIMATES

The emissions inventory, containing criteria pollutant, GHG, hazardous air pollutant (HAP), and toxic air contaminant (TAC) emission estimates for the proposed facility is presented in Appendix A. A detailed description of each proposed emissions unit included in this Standard ACDP application is provided in the following subsections. An aerial photograph showing the proposed location for each emissions unit stack or vent where regulated pollutants will be emitted is shown in Figure 3-1. Application forms for each proposed emissions unit and air pollution control device are provided in Appendix B.

3.1 Dry Material Handling

The proposed Dry Material Handling emission unit represents a collection of FA and BE material transfer points along each pretreatment train. A process flow diagram presenting the dry material handling operation is shown in Figure 3-2 (attached). FA and BE will be received by railcars (up to 200,000-pound capacity). The railcars will be pneumatically unloaded and transferred to FA or BE storage silos, then to downstream day tanks and hoppers for use in the pretreatment process.

Each silo and day tank will have an associated exhaust. Each vent will be equipped with a dedicated high-efficiency filter bag rated at 99.9% control efficiency for control of $PM_{2.5}$ emissions prior to exhausting to atmosphere. Particulate emissions generated during loading of the hoppers will be routed to an associated day tank vent. Emissions are estimated assuming representative emission factors obtained from the USEPA Compilation of Air Pollutant Emission Factors (AP-42) Chapter 11.12 "Concrete Batching."

3.2 Boilers

There will be two natural gas-fired boilers at the proposed facility. Each 77.5 MMBtu/hr natural gas-fired boiler will be rated for a maximum steam production rate of 50,000 pounds per hour. Exhaust from each boiler will be combined into a single duct and routed to a single SCR control device with an oxidation catalyst for control of NO_X and CO emissions prior to emitting to atmosphere. Emission estimates for NO_X and CO are derived using the design flowrate and outlet concentrations specified by the equipment manufacturer. The equipment manufacturer also provided a vendor guaranteed outlet emission factor for PM_{10} and $PM_{2.5}$. Emission estimates for other criteria pollutants, GHGs, and HAPs are based on emission factors obtained from publicly-available standard references.

3.3 Ecofining Unit Train—Feed and Isomerization Heaters no. 1-3

Each Feed and Isomerization Heater will have a maximum heat input capacity of 35.2 MMBtu/hr and 5.3 MMBtu/hr, respectively. On each individual ecofining unit train, the Feed Heater exhaust will combine with the Isomerization Heater exhaust prior to routing to an SCR control device with an oxidation catalyst for control of NO_X and CO emissions. An SCR will be utilized for each ecofining unit train exhaust (i.e., a total of three SCRs). Emission estimates for NO_X and CO were derived using design outlet concentrations and the design flowrate derived from data supplied by the equipment manufacturer. Emission estimates for other criteria pollutants, GHGs, and HAPs are based on emission factors obtained from publicly-available standard references.

3.4 Jet Fractionator

The 125 MMBtu/hr Jet Fractionator will be indirectly heated by natural gas combustion, and the natural gas combustion emissions will be routed to an SCR control device with an oxidation catalyst for control of NO_X and CO emissions prior to emitting to atmosphere. Emission estimates for NO_X and CO are derived using a design flowrate provided by NEXT and design outlet concentrations. Design outlet concentrations for NO_X and CO are based on representative facility permitting in California and vendor guarantees, respectively. Emission estimates for other criteria pollutants, GHGs, and HAPs are based on emission factors obtained from publicly-available standard references.

3.5 Hydrogen Plant

The 700 MMBtu/hr SMR furnace in the Hydrogen Plant will be assumed to combust 114 MMBtu/hr natural gas and 586 MMBtu/hr PSA tail gas based on information supplied by the equipment manufacturer. The Hydrogen Plant exhaust will be routed to an SCR control device with an oxidation catalyst for control of NO_X and CO emissions prior to emitting to atmosphere. Emission estimates for NO_X and CO are derived using a design flowrate provided by the equipment manufacturer and design outlet concentrations. Design outlet concentrations for NO_X and CO are based on representative facility permitting in California.

Natural gas combustion emission estimates for other criteria pollutants, GHGs, and HAPs are based on emission factors obtained from publicly-available standard references. PSA tail gas combustion emission estimates for other criteria pollutants, GHGs, and HAPs were derived using the PSA tail gas composition provided by the equipment manufacturer. The CO and methane content in the PSA tail gas is assumed to be the only components in the PSA tail gas that contributes to potential criteria pollutant, GHG, and HAP combustion emissions. The CO_2 content in the PSA tail gas is assumed to "pass through" the combustion zone without reacting.

3.6 Incinerator

The 18 MMBtu/hr natural gas-fired incinerator will be utilized to control acid gases from the Acid Gas Regenerator unit and the sour water stripper. Controlled exhaust from the incinerator will route to a waste heat recovery section, temperature conditioning section, a baghouse with dry sorbent injection, followed by an SCR prior to emitting to atmosphere. Emission estimates for NO_X, CO, SO_2, and CO_2 are derived using the design flowrate and outlet concentrations provided by the equipment manufacturer. Emission estimates for H_2S are derived using the design waste gas flowrates from the Acid Gas Regeneration unit and sour water stripper and design inlet concentrations (to the incinerator) provided by the equipment manufacturer. Emission estimates for other criteria pollutants, GHGs, and HAPs are based on emission factors obtained from publicly-available standard references.

3.7 Flare

An elevated flare will be used to control waste gases generated during startup, shutdown, and emergency scenarios (such as failure of equipment) at the proposed facility. The startup scenario represents the initial Ecofining Unit train commissioning event when waste gases will be purged (during depressuring of the unit) and routed to the flare for control. Only the initial Ecofining Unit train commissioning event will produce waste gases that will require flaring. During routine startups, such as those that occur after a maintenance outage, waste gases will not be produced that require flaring.

The shutdown scenario represents the turndown of an Ecofining Unit train for annual maintenance purposes when waste gases will be routed to the flare for control. Shutdown will occur once per year for each Ecofining Unit train (e.g., a total of three shutdown events per year), and only one Ecofining Unit train will be shut down in a day.

The typical normal operation of the flare will be to have the pilot light active in case of potential emergency scenarios. The pilot light burners will be located and evenly spaced around the outer diameter of the flare tip. The pilot light will be natural gas-fired and will have a maximum heat input capacity of 1.4 MMBtu/hr.

Natural gas combustion emission estimates for the flare pilot light are based on emission factors obtained from publicly-available standard references. Startup and shutdown scenario waste gas combustion emission estimates for CO, SO_2, and GHGs are derived from composition and waste gas throughput data provided by the equipment manufacturer. Other criteria pollutant emission estimates are calculated using emission factors obtained from AP-42 Chapter 13 "Industrial Flares."

3.8 Vapor Combustion Unit (Rail/Truck Product Loadout)

The 1.7 MMBtu/hr natural gas-fired VCU will be utilized to control VOC and HAP emissions generated during rail and truck product loadout activities. The VCU will be designed to capture at least 98.7% of VOC and HAP emissions and to achieve a 98% control efficiency for control of captured emissions. Both captured/controlled, and fugitive product loadout emissions are included in the emissions inventory presented in Appendix A.

The proposed facility will also transfer renewable diesel, naphtha and jet fuel to an offsite third-party via pipeline. Emissions resulting from activities beyond the third-party confluence point are not included in the emissions inventory presented in Appendix A because the product will be within the third-party's control and infrastructure.

Natural gas combustion emissions associated with operating the VCU are derived from emission factors obtained from publicly-available standard references. Product loadout VOC emission estimates are based on the methodologies presented in AP-42 Chapter 5.2 "Transportation and Marketing of Petroleum Liquids." HAP emission estimates from rail and truck product loadout are calculated using vapor mass fractions developed following the methodologies shown in AP-42 Chapter 7.1 "Organic Liquid Storage Tanks." The HAP vapor mass fractions were derived from representative liquid sampling of renewable fuel products obtained by NEXT.

3.9 Equipment Leaks

It is assumed that equipment components, such as valves, flanges, pressure relief valves and pumps, may occasionally have leaks resulting in air emissions. Conservative VOC emission estimates are derived following the USEPA methodology outlined in the "Preferred and Alternative Methods for Estimating Fugitive Emissions from Equipment Leaks Final Report" published in November of 1996. Proposed equipment component counts provided by NEXT are based on a review of similar facility pipe networks or data supplied by equipment manufacturers.

Monitoring of components will be conducted by facility personnel consistent with the Leak Detection and Repair maintenance program. Most of the piping will be welded together, including elbow locations along pipe racks, at the proposed facility. As a result, potential for leaking components will be primarily located adjacent to process equipment and/or tanks.

HAP emission estimates from potential equipment leaks will be dependent upon the service type for the specific component. Several different service types representing the renewable fuel products and other miscellaneous process liquids and gases generated at the proposed facility are included in the emissions inventory. Vapor mass fractions, calculated following the methodologies shown in AP-42 Chapter 7.1 "Organic Liquid Storage Tanks", and estimated weight fractions provided by NEXT and equipment manufacturers are used to estimate HAP emissions as shown in the emissions inventory presented in Appendix A.

3.10 Storage Tanks

The proposed facility will have several onsite storage tanks that will have VOC and HAP emissions, as applicable based on service type. The onsite storage tanks will include the following, among other miscellaneous tanks discussed in more detail below:

- three large-diameter renewable diesel product storage tanks;
- one large-diameter swing renewable diesel or renewable jet fuel product storage tank;
- three smaller-diameter swing renewable jet fuel or renewable naphtha product storage tanks,
- six raw vegetable oil/animal fat feedstock storage tanks;
- one hydrocarbon slop storage tank;
- one oil-water separator slop storge tank; and,
- two citric acid storage tanks.

The three large-diameter renewable diesel product storage tanks will be fixed-roof and will not be heated. The one large-diameter swing renewable diesel or jet fuel product storage tank will be an internal floating roof tank and will not be heated. This tank will be interchangeable between renewable diesel and jet fuel product storage as needed. There will be three product storage internal floating roof tanks dedicated for either renewable naphtha or jet fuel product storage that will be interchangeable as needed. Up to two tanks will be used for either renewable naphtha or jet fuel product storage at any given time.

The raw oil feedstock storage tanks will be fixed roof and heated above ambient temperature to prevent solidification during transfer. Although the raw oil feedstock storage tanks are included in the emissions inventory presented in Appendix A, NEXT anticipates negligible VOC emissions from these tanks. The raw oil feedstocks do not contain HAPs based on a review of similar facility air permits.

The hydrocarbon slop tank and oil-water separator slop tank will be internal floating roof tanks. The hydrocarbon slop tank will be used to store oil drainage resulting from maintenance and other routine work on process equipment. The oil-water separator slop tank will be used to store wash down of infrequent oil spills that will be cleaned off of containment pads as needed.

Storage tanks represent potential sources of VOC and/or HAP emissions. VOC emission estimates for each storage tank are based on the methodologies detailed in AP-42 Chapter 7.1 "Organic Liquid Storage Tanks." HAP emission estimates are calculated using vapor mass fractions derived using the formulas presented in AP-42 Chapter 7.1. In order to calculate the vapor mass fractions, NEXT collected representative liquid samples of renewable diesel and naphtha from similar facilities. Due to the absence of representative jet fuel sampling data, HAP emission estimates for the jet fuel product storage tank assume the renewable diesel sampling composition as a surrogate. Renewable jet fuel will be produced by re-fractionating the renewable diesel, meaning the chemical make-up will be similar between these two renewable fuel products.

There will also be multiple miscellaneous intermediate tanks located on each pretreatment train. These intermediate tanks and/or open top vessels will be much smaller in volume than the raw oil and product storage tanks. The intermediate tanks are not expected to have emissions of VOCs or TACs based on the raw vegetable oil and animal fat feedstocks stored in the units (with negligible vapor pressures and non HAP-based composition).

3.11 Cooling Tower

The proposed cooling tower will be induced draft, counter flow design with a water circulation rate of 20,000 gallons per minute. The cooling tower will have two cells, each with an induced draft fan and ultra-high efficiency drift eliminators. The cooling tower will also be equipped with an in-line hydrocarbon monitor to detect unanticipated hydrocarbon leaks in the cooling water lines.

PM emission estimates are based on the total dissolved solids concentration of groundwater (representative of the Columbia River Basin), the water recirculation rate, the number of cycles and the estimated drift loss as shown in the emissions inventory in Appendix A. PM_{10} emission estimates are based on the methodologies presented in the technical paper "Calculating Realistic PM_{10} Emissions from Cooling Towers[2]." The $PM_{2.5}$ fraction of PM_{10} is assumed to be 0.6 per the California Emission Inventory Data and Reporting System[3].

Conservative fugitive VOC emission estimates from the cooling tower are based on an emission factor obtained from AP-42 Chapter 5.1 "Petroleum Refining." NEXT intends to utilize chemical additives as biocides and corrosion inhibitors in the cooling water. The proposed chemical additives do not contain chromium-based compounds or HAPs.

3.12 Wastewater Treatment

The proposed facility will utilize an onsite WWT system to treat process wastewater and collected process surface water and stormwater prior to discharge to the Columbia River. Influents to the WWT system will include the following:

- Blowdown from the cooling tower, boilers, and Hydrogen Plant.
- Reverse osmosis reject, ultra-filtration backwash, demineralization system regeneration from the raw water treatment process.
- Wastewater from the sour water stripper, oily sewer water sump, and pretreatment trains.
- Collected process surface water and stormwater from pads.

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[2] Reisman J, and Frisbee G. Calculating Realistic PM_{10} Emissions from Cooling Towers. Greystone Environmental Consultants, Inc. Abstract No. 216, Session No. AM-1b.

[3] Krause M, and Smith S (October 2006). Final –Methodology to Calculate [$PM_{2.5}$] and $PM_{2.5}$ Significance Thresholds. See Appendix A "Updated CEIDARS Table List with $PM_{2.5}$ Fractions."

The WWT system may produce VOC and HAP emissions because some tanks/equipment will be open top and exposed to atmosphere, as noted below. However, most of the storage tanks and treating equipment in the proposed WWT system will be fully enclosed. Applicable enclosed equipment with the potential to generate VOC and HAP emissions will be connected to the odor abatement system. The odor abatement system will be similar in function to a biofilter, and will be composed of a cooler, mist filter, and associated blower system. Controlled VOC and HAP emissions from the odor abatement system will be routed into the sequencing batch reactors (SBRs) as feed for microorganisms.

The oily sewer water sump and pretreatment train wastewater influents will be routed to two parallel equalization tanks prior to entering the dissolved air flotation (DAF) units. The purpose of the DAF units is to separate oily float, suspended solids, and wastewater. Suspended solids leaving the DAF units will be recycled to the influent DAF stream, while the oily float effluent will be routed to a float holding tank followed by two downstream decanters. Extracted oils from the decanters will be sent for waste disposal. The wastewater effluent from the DAF units will be routed to a lift station tank prior to routing into three parallel primary anaerobic digesters for breakdown of organic matter. Digested sludge from each anaerobic digester will be routed to a secondary anaerobic digester for further processing.

Wastewater effluents from the primary and secondary anaerobic digesters will be routed to the anaerobic post equalization tank. Each additional wastewater, process surface water, and stormwater influent stream (as noted above) will bypass the initial WWT equipment and be routed directly into the anaerobic post equalization tank and mixed. The commingled effluent from the anaerobic post equalization tank will be routed to three parallel aerobic SBRs for further breakdown of organic matter via aeration (i.e., via the controlled emissions from the odor abatement system).

Waste activated sludge from each SBR will be routed back to the influent stream of the anaerobic digesters. Wastewater effluent from each SBR will be routed to the SBR post equalization tank for final clarification prior to tertiary filtration by parallel iso-disc filters. Filtered solids from the iso-disc filters will be recycled to the influent of the anaerobic post equalization tank. Filtered effluent from the iso-disc filters will be routed to a final effluent holding tank, followed by coolers, prior to discharging to the Columbia River. Note each SBR, the SBR post equalization tank, and iso-disc filters (which will be located inside the WWT building) are exposed to atmospheric conditions, and represent the only potential tanks and treating equipment in the WWT system with the potential to emit VOC and/or HAPs to atmosphere.

VOC and HAP emissions are estimated using the TOXCHEM version 4.4 model, the USEPA-approved and DEQ-approved software for water treatment systems. Proposed influent flowrates, temperatures, total dissolved solids concentrations, pollutant concentrations, and equipment sizes were provided by the equipment manufacture and used as input data in TOXCHEM. Most of the controlled VOC and HAP emissions routed into the SBRs will likely be consumed by microorganisms, and will not be emitted to atmosphere. However, to be conservative, it is assumed that 100% of the controlled VOC and HAP emissions will be emitted to atmosphere as shown in the emissions inventory presented in Appendix A.

3.13 Emergency Fire Water Pump

The emergency fire water pump will provide water for firefighting activities if needed during an emergency. The emergency fire water pump will be limited to 100 hours per year for non-emergency operation and readiness testing, and will be fueled by renewable diesel manufactured at the proposed facility. The emergency fire water pump will have a maximum brake horsepower (hp) rating of 410 hp. The installed emergency fire water pump will meet USEPA Tier 4 certification emission standards. As a result, criteria pollutant emission estimates are based on Tier 4 standards for applicable pollutants as shown in the emissions inventory presented in Appendix A.

3.14 Emergency Generator nos. 1-2

The proposed facility will utilize two emergency generators to provide power to critical equipment during power outages. Each emergency generator will be limited to 100 hours per year for non-emergency operation and readiness testing, and will be fueled by renewable diesel manufactured at the proposed facility. The emergency generators will be limited to only 6 hours per day between 10:00AM to 4:00PM for non-emergency use, and only one emergency generator will be utilized in any given day. Each emergency generator will have a maximum brake hp rating of 2,000 hp per engine. Both emergency generators will meet USEPA Tier 4 certification emission standards. As a result, criteria pollutant emission estimates are based on Tier 4 standards for applicable pollutants as shown in the emissions inventory presented in Appendix A.

4 REGULATORY APPLICABILITY ANALYSIS

The following subsections present the state and federal air quality regulatory applicability analysis for the proposed facility.

4.1 OAR 340-216—Air Contaminant Discharge Permit

Sources listed in any category under Oregon Administrative Rule (OAR) 340-216-8010 are required to obtain a permit under Division 216 prior to commencing construction of the source. NEXT is proposing to construct a new source that will be covered by a listed category. Specifically, the proposed facility will have a potential to emit greater than 10 tons/yr for one or more criteria pollutants, which meets the permit applicability criteria for category number 85 in Part B of OAR 340-216-8010.

According to OAR 340-216-0025(6)(a)(A), "The owner or operator of a source listed in Part C of OAR 340-216-8010 must obtain a Standard ACDP." The proposed facility is requesting a PSEL that is equal to or greater than the SER for several regulated pollutants, satisfying criteria (4) in Part C. Therefore, the proposed facility must obtain a Standard ACDP. This application is being submitted to request a Standard ACDP for the proposed facility.

4.2 OAR 340-222—Stationary Source Plant Site Emission Limits

As shown in Table 1-1, proposed facility emissions for all criteria pollutants, except for NO_X, CO, and SO_2, are greater than the SER per OAR 340-200-0020(161). Because the proposed facility is a new source, the netting basis is zero according to OAR 340-222-0046. Therefore, the proposed PSEL for applicable pollutants will also exceed the netting basis by more than the SER.

In order to obtain the requested PSEL for particulate matter (PM, PM_{10}, and $PM_{2.5}$), VOC and GHG, as required by OAR 340-222-0041(4)(b), the facility must satisfy the applicable requirements of Major NSR or State NSR of OAR 340 Division 224 (discussed in the following subsection).

4.3 OAR 340-224—Major NSR and State NSR Applicability

The proposed facility will not be a federal major source, as defined under OAR 340-200-0020(66), with respect to NSR because its PTE, taking into account physical and operational constraints as well as federally enforceable limitations on the use of control devices, is less than the major source threshold for all NSR-regulated pollutants.[4] The proposed facility will be in a location that is designated as attainment or unclassifiable for all regulated pollutants.

Major NSR applicability for the construction of a new source is determined according to OAR 340-224-0010(1)(A). As noted above, the proposed facility will not be a federal major source so Major NSR will not apply. Note that for a source to be subject to the Prevention of Significant Deterioration (PSD) requirements under Major NSR for GHG, the source must first be subject to PSD for a regulated pollutant other than GHG, per OAR 340-224-0010(1)(c). Although the proposed facility will have the potential to emit GHG greater than the SER, since it is not subject to Major NSR (including PSD requirements) for any other pollutant it will not be subject to PSD for GHG.

State NSR, for sources located in attainment or unclassifiable areas, applies to the construction of a new source with a pollutant PTE greater than or equal to an SER according to OAR 340-224-0010(2)(b)(A). As shown in Table 1-1, the proposed facility PTE is greater than the SER for several regulated pollutants. Therefore, the proposed facility is subject to the requirements of State NSR. Specifically, the source will be subject to Type B State NSR because it is in an area designated as attainment or unclassifiable. Note that GHG emissions are not subject to State NSR per OAR 340-224-0010(2)(c).

4.3.1 Air Quality Analysis

Sources subject to State NSR that are located in designated attainment or unclassified areas must comply with the air quality analysis requirements per OAR 340-224-0270(1). On December 22, 2020, NEXT submitted the original combined modeling protocol and RAWP to the DEQ outlining the proposed modeling methodologies and specific information meant to satisfy the applicable air quality analysis requirements under OAR 340 Division 225. NEXT plans to submit a revised combined

[4] "Guidance on Limiting Potential to Emit in New Source Permitting," from Terrell E. Hunt to John S. Seitz, United States Environmental Protection Agency, June 13, 1989.

modeling protocol and RAWP that incorporates comments provided by the DEQ and final design changes for the proposed facility subsequent to submittal of this revised ACDP application.

4.3.2 Net Air Quality Benefit

Per OAR 340-224-0270(2)(a), any source emitting an ozone precursor (VOC or NO_X) at or above the SER over the netting basis is considered to have a significant impact if located within 100 kilometers (km) of a designated ozone area. As shown in Table 1-1, the proposed facility will have the potential to emit VOC as an ozone precursor at a rate greater than the SER above the netting basis. The proposed facility will also be located within 100 km of the Portland-Vancouver Interstate Air Quality Maintenance Area (Portland AQMA), which is designated as an ozone maintenance area. Therefore, the proposed facility is required to demonstrate a net air quality benefit for the Portland AQMA.

Per OAR 340-224-0520(1), offsets for VOC and NO_X emissions are required for sources with an ozone impact distance that is greater than the distance to the nearest boundary of an ozone designated area. The ozone impact distance is calculated using the Formula Method per OAR 340-224-0520(2)(a)(A):

$$Ozone\ impact\ distance\ (km) = \frac{69.4\ (tons\ VOC)}{40}\ x\ 30\ (km) =\ 52.1\ km$$

The proposed facility will be located 60 km from the nearest boundary of the Portland AQMA as shown in Figure 4-1. Because the ozone impact distance is less than the distance to the nearest boundary of the Portland AQMA, the proposed facility is not considered to have a significant impact on the designated area. Therefore, the proposed facility is not required to obtain any emission offsets to demonstrate a net air quality benefit per OAR 340-224-0520(2)(a)(D).

It is also important to note significant terrain features exist between the proposed facility location to the nearest boundary of the Portland AQMA. MFA reviewed meteorological data for the summer months, when potential ozone formation is at its height, and typical winds do not blow in the direction of the nearest boundary. Moreover, the highest-emitting VOC emission units (VOC emissions from potential equipment leaks and product storage tank losses) are poorly-dispersed, ground-level releases. All of the preceding factors will minimize the potential for transport of proposed facility emissions to the Portland AQMA such that the proposed facility will have no material effect on the Portland AQMA.

4.4 Additional State Regulatory Analysis

4.4.1 OAR 340-208—Visible Emissions and Nuisance Requirements

Emission units at the proposed facility, excluding fugitive emission units, will be subject to the visible emission limits of OAR 340-208-0110(4). Specifically, the emission units shall not cause or allow visible emissions to equal or exceed an average of 20 percent opacity.

The proposed facility will not include any fugitive particulate emission sources. However, the proposed facility as a whole will be subject to the general fugitive emission requirements in

OAR 340-208-0210 through 0300 to prevent fugitive emissions and nuisance conditions, and OAR 340-208-0400 through 0450 to prevent emissions masking and particle fallout.

Per OAR 340-208-0550(1), the proposed facility will be required to use the highest and best practicable treatment to reduce to odor-bearing gases since the proposed facility is located in Columbia County. The proposed facility will comply with this requirement.

4.4.2 OAR 340-210—Stationary Source Notification Requirements

OAR 340 Division 210 establishes notification requirements for sources of air contaminants prior to constructing a new source. NEXT is satisfying the Division 210 notification requirements with the submittal of this Standard ACDP application.

4.4.3 OAR 340-214—Stationary Source Reporting Requirements

OAR 340 Division 214 establishes reporting requirements for all stationary sources in Oregon, and will be applicable to the proposed facility upon issuance of a Standard ACDP. The proposed facility will comply with all applicable reporting and recordkeeping requirements under this division in accordance with the conditions contained in the issued Standard ACDP.

4.4.4 OAR 340-215—Oregon GHG Reporting Program

The requirements of OAR 340 Division 215 apply to listed source categories that emit GHG. Division 215 establishes registration, reporting and recordkeeping for applicable sources with annual direct GHG emissions of 2,500 metric tonnes or greater, determined as carbon dioxide equivalent (CO_2e). The proposed facility will be a listed source per OAR 340-215-0030(2)(b), since it is required to obtain an ACDP. The proposed facility will comply with the applicable registration, reporting, and recordkeeping requirements in this division after construction and commencing operation.

4.4.5 OAR 340-218—Oregon Title V Operating Permit

The requirement to obtain a Title V operating permit under OAR 340 Division 218 applies to sources that meet one of the following criteria:

a) Any major source;

b) Any source, including an area source, subject to a standard, limitation, or other requirement under section 111 of the Federal Clean Air Act (FCAA);

c) Any source, including an area source, subject to a standard or other requirement under section 112 of the FCAA, except that a source is not required to obtain a permit solely because it is subject to regulations or requirements under section 112(r) of the FCAA;

d) Any affected source under Title IV, and;

e) Any source in a source category designated by the EQC under this rule.

As stated in OAR 340-200-0020(91), a major source for Title V purposes is a facility that has the potential to emit more than 100 tons/yr of any criteria pollutant, or 10 tons/yr of a single HAP, or 25 tons/yr of total HAPs. As shown in the emissions inventory in Appendix A, the proposed facility potential to emit criteria pollutants or HAPs is less than 100 tons/yr and 10 tons/yr, respectively. The proposed facility will not be a major source with respect to Title V. Therefore, criteria (a) is not applicable.

As discussed in more detail in sections 4.5, the proposed facility will be subject to requirements under section 111 of the FCAA. Specifically, Title 40 Code of Federal Regulations (40 CFR) Part 60 Subparts Dc, Kb and IIII will be applicable. Subpart Dc was originally promulgated on September 12, 1990, Subpart Kb was promulgated on April 8, 1987, and Subpart IIII was promulgated on July 11, 2006. Per OAR 340-218-0020(4)(a), non-major sources subject to section 111 or section 112 standards are only required to obtain a Title V operating permit if the section 111 or section 112 standard was promulgated after July 21, 1992, unless the section 111 or section 112 standard specifically exempts the affected source from the requirement to obtain a Title V operating permit. Subparts Dc and Kb were promulgated prior to the applicability date, and Subpart IIII exempts non-major sources from obtaining a Title V operating permit at §60.4200(c). Therefore, criteria (b) is not applicable.

The proposed facility will be subject to section 112 standards, namely, 40 CFR Part 61 Subpart FF and 40 CFR Part 63 Subpart ZZZZ (discussed in more detail in Section 4.6). Subpart FF was originally promulgated on March 7, 1990, which is prior to the Title V applicability date (July 21, 1992) in OAR 340-218-0020(4)(a). Subpart ZZZZ specifically exempts non-major sources from the requirements to obtain a Title V operating permit under §63.6585(d). Therefore, criteria (c) is not applicable.

The facility will not be subject to the Acid Rain program under Title IV, and neither is the proposed facility in a designated source category. Therefore, criteria (d) and (e) are not applicable.

As discussed above, the proposed facility does not meet any of the criteria and will not be required to obtain a Title V operating permit under Division 218.

4.4.6 OAR 340-226—General Emission Standards

Emission units at the proposed facility, excluding fugitive emission units and fuel combustion units, will be subject to the grain loading standards under OAR 340-226-0210(2)(c). Specifically, emission units shall not cause PM emissions in excess of 0.10 grains per dry standard cubic foot.

The process weight standards (OAR 340-226-0300 through 0320) will not be applicable to any emission unit at the proposed facility because the proposed facility will not utilize any of the listed process equipment. The proposed dry material handling units will be inertial separators, but each will have an attached fabric filter for $PM_{2.5}$ emissions control. As a result, the process equipment listing at OAR 340-226-0300(1) for "inertial separators without baghouses" is not applicable to the proposed dry material handling units.

4.4.7 OAR 340-228—Requirements for Fuel Burning Equipment

Combustion units at the proposed facility will be subject to the grain loading standards under OAR 340-228-0210(2)(c). Specifically, the emission units shall not cause PM emissions in excess of 0.10 grains per dry standard cubic foot since the emission units will burn gaseous fuels and will be constructed after April 16, 2015.

The fuel sulfur content limits for distillate fuel oils under OAR 340-228-0110 will apply to the proposed emergency fire water pump and emergency generators. NEXT will comply with the applicable standards by using fuels that meet or exceed ultra-low sulfur diesel fuel standards. SO_2 emission standards under OAR 340-228-0200 will not apply to the proposed emergency fire water pump or emergency generators because the maximum heat input capacity for the units is less than 150 MMBtu/hr.

For all other combustion units at the proposed facility, the fuel sulfur content limits and SO_2 emission standards in OAR 340-228-0100 through 0200 will not apply because the proposed combustion units will not burn the types of fuels regulated under those provisions. Specifically, the proposed combustion units will burn only gaseous fuels and will not combust liquid or solid fuels.

4.4.8 OAR 340-232—Emission Standards for VOC Point Sources

OAR 340 Division 232 establishes VOC emission standards for new and existing facilities located in select designated air quality areas of the state. The proposed facility is not located in the areas identified in OAR 340-232-0020(1). Therefore, the proposed facility is exempt from the requirements of Division 232.

4.4.9 OAR 340-245—Cleaner Air Oregon

OAR 340 Division 245, the CAO program, establishes a risk-based permitting program for new and existing sources. The proposed facility will be a new source with respect to CAO since construction will commence after November 16, 2018 as defined under OAR 340-245-0020.

Per OAR 340-245-0050(2)(a)(A), all proposed new sources required to obtain a Standard ACDP must also perform a risk assessment to satisfy the requirements set forth under the CAO permitting program. As a result, NEXT is required to comply with applicable requirements under the CAO permitting program. To date, NEXT has submitted the combined emissions inventory to the DEQ on December 7, 2020 (revision 1 submitted on June 24, 2021), and the combined CAO modeling protocol and RAWP on December 22, 2020 (revision 1 submitted on July 2, 2021). These submittals represent the preliminary steps for the CAO permit application process. Updates to the combined emissions inventory and modeling protocol and RAWP will be re-submitted for purposes of CAO compliance subsequent to submittal of this revised application.

4.5 New Source Performance Standards

New Source Performance Standards (NSPS), 40 CFR Part 60, establish emission controls for new, modified, or reconstructed equipment or operations as defined in the regulations. Equipment and operations subject to these regulations are required to comply with the pollution control technologies, and other provisions, specified in the regulations.

4.5.1 40 CFR 60 Subpart Db—Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units

Subpart Db applies to steam-generating units for which construction, modification, or reconstruction began after June 19, 1984, and which have a maximum design heat input capacity greater than 100 MMBtu/hr. The Hydrogen Plant and Jet Fractionator will be designed to have heat input capacities greater than 100 MMBtu/hr. The other combustion units at the proposed facility do not meet this design size criteria and will not be discussed further.

Steam-generating units are defined as a combustion device that produces "steam or heats water or heats any heat transfer medium" per §60.41(b). Note the steam generating unit definition specifically excludes process heaters. Process heaters are defined as "a device that is primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst." The Hydrogen Plant and Jet Fractionator will meet the definition of process heater and will not be subject to Subpart Db. Therefore, no equipment at the proposed facility will be subject to Subpart Db.

4.5.2 40 CFR 60 Subpart Dc—Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

Subpart Dc applies to steam-generating units for which construction, modification, or reconstruction began after June 9, 1989, and which have a maximum design heat input capacity between 10 to 100 MMBtu/hr. Steam-generating units are defined as a combustion device that produces "steam or heats water or heats any heat transfer medium" per §60.41(c). Note that the steam generating unit definition specifically excludes process heaters. Process heaters are defined as "a device that is primarily used to heat a material to initiate or promote a chemical reaction in which the material participates as a reactant or catalyst."

The boilers will be steam-generating units and will have a maximum heat input capacity of 77.5 MMBtu/hr each. Therefore, the boilers will be subject to Subpart Dc requirements.

The Hydrogen Plant and Jet Fractionator do not meet the size criteria for Subpart Dc since each will have a maximum heat input capacity greater than 100 MMBtu/hr. Similarly, each Isomerization Heater will not meet the size criteria as the maximum heat input capacity of each unit will be less than 10 MMBtu/hr. Therefore, the Hydrogen Plant, Jet Fractionator, and each Isomerization Heater will not be subject to Subpart Dc requirements.

Each Feed Heater and the Incinerator will have a maximum heat input capacity of 35.2 MMBtu/hr (per unit) and 18 MMBtu/hr, respectively, meeting the size criteria for Subpart Dc applicability. However, each Feed Heater and the Incinerator will meet the definition of process heater under this subpart. Process heaters are not considered steam generating units. As a result, each Feed Heater and the Incinerator will not be subject to Subpart Dc.

The boilers will not be subject to the standards for SO_2 and PM identified in §60.42c(a) to §60.42c(j) and §60.43c(a) to §60.43c(e), respectively, because the boilers will combust only natural gas. The boilers will not combust coal, wood, or oil, alone or in combination with other fuels, which are the fuels subject to Subpart Dc requirements. No performance tests or emissions monitoring will be required to demonstrate compliance with the standards for SO_2 and PM. Therefore, only the reporting and recordkeeping requirements set forth under §60.48c will be required of the proposed facility.

4.5.3 40 CFR 60 Subpart Ja—Standards of Performance for Petroleum Refineries

The provisions of this subpart apply to various types of equipment which commence construction, reconstruction or modification after May 14, 2007 at a petroleum refinery. Subpart Ja defines a petroleum refinery as a "facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuels oils, lubricants, asphalt (bitumen) or other products through distillation of petroleum or through redistillation, cracking or reforming of unfinished petroleum derivatives" per §60.101(a). Additionally, petroleum is defined as "crude oil removed from the earth and the oils derived from tar sands, shale, and coal." The proposed facility will utilize only raw oil feedstocks (vegetable oils and animal fats) and not petroleum. Therefore, the proposed facility does not meet the petroleum refinery definition and Subpart Ja will not apply.

4.5.4 40 CFR 60 Subpart Kb—Standards of Performance for Volatile Organic Liquid Storage Vessels

This subpart applies to any storage vessel with a capacity of greater than or equal to 19,813 gallons (75 cubic meters) that stores volatile organic liquids and was constructed, reconstructed or modified after July 23, 1984. The applicability thresholds for volatile organic liquids under Subpart Kb include the following:

- storage capacity greater than or equal to 39,890 gallons (151 cubic meters) storing a liquid with a maximum true vapor pressure less than 0.51 pounds per square inch actual (psia) (3.5 kilopascals), or,
- storage capacity greater than or equal to 19,813 gallons (75 cubic meters) storing a liquid with a maximum true vapor pressure less than 2.18 psia (15 kilopascals).

The proposed facility will include several storage tanks that meet the capacity criteria. However, the stored materials in many of these tanks will have true vapor pressures less than the applicable thresholds for volatile organic liquids. This includes the following proposed storage tanks:

- each renewable diesel product storage tank (vapor pressure estimated to be 0.011 psia);
- each renewable jet fuel product storage tank (vapor pressure estimated to be 0.16 psia);
- each raw oil feedstock storage tank (vapor pressure estimated to be 0.0001 psia);
- the hydrocarbon slop storage tank (vapor pressure estimated to be 0.038 psia); and,
- the oil-water separator slop storge tank (vapor pressure estimated to be 0.011 psia).

Note each citric acid storage tank will not meet the capacity requirements for this subpart. Therefore, Subpart Kb will not apply to the citric acid storage tanks.

The proposed renewable naphtha product storage tanks (up to three tanks in total with only two storing renewable naphtha at any given time) will have capacities in excess of 39,890 gallons and store a liquid with a vapor pressure above 0.51 psia. Accordingly, the renewable naphtha product storage tanks will be subject to the requirements of Subpart Kb. Each proposed renewable naphtha product storage tank will be an internal floating roof tank equipped with tandem seals (liquid-mounted) per §60.112b(a)(1) to meet the standards under Subpart Kb.

4.5.5 40 CFR 60 Subpart VVa—Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemical Manufacturing Industry

Facilities potentially subject to this subpart are those in the Synthetic Organic Chemical Manufacturing Industry that were constructed, reconstructed or modified after November 7, 2006. Synthetic Organic Chemical Manufacturing Industry is defined as the industry that produces one or more of the chemicals listed at §60.489, either as intermediates or final products. The proposed facility will not produce any of the listed chemicals and will, therefore, not meet the definition of a Synthetic Organic Chemical Manufacturing Industry facility. The facility will not be subject to the provisions of Subpart VVa.

4.5.6 40 CFR 60 Subpart GGGa—Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries

The provisions of this subpart apply to affected facilities in petroleum refineries, where the affected facilities include a compressor and defined process units that commence construction, reconstruction or modification after November 7, 2006. Subpart GGGa defines a petroleum refinery as a "facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuels oils, lubricants, or other products through distillation of petroleum or through the redistillation, cracking or reforming of unfinished petroleum derivatives." Additionally, petroleum is defined as "crude oil removed from the earth and the oils derived from tar sands, shale, and coal." The proposed facility will utilize only raw oil feedstocks (primarily vegetable oils and animal fats) and not petroleum. Therefore, the proposed facility does not meet the petroleum refinery definition and Subpart GGGa will not apply.

4.5.7 40 CFR 60 Subpart QQQ—Standards of Performance for VOC Emissions from Petroleum Refinery Wastewater Systems

Subpart QQQ applies to WWT systems at petroleum refineries that commence construction, reconstruction or modification after November May 4, 1987.

A petroleum refinery is defined in Subpart QQQ as a "facility engaged in producing gasoline, kerosene, distillate fuel oils, residual fuels oils, lubricants, or other products through distillation of petroleum, or through the redistillation, cracking or reforming of unfinished petroleum derivatives." Additionally, petroleum is defined as "crude oil removed from the earth and the oils derived from tar sands, shale, and coal." The proposed facility will utilize only raw oil feedstocks (vegetable oils and animal fats) and not petroleum. Therefore, the proposed facility does not meet the petroleum refinery definition and Subpart QQQ requirements will not apply.

4.5.8 40 CFR 60 Subpart IIII—Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

Subpart IIII applies to owners and operators of stationary compression ignition (CI) internal combustion engines that commence construction after July 11, 2005, where the following conditions are met per §60.4200(a)(2):

(i) Manufactured after April 1, 2006, and are not fire pump engines, or

(ii) Manufactured as a certified National Fire Protection Association (NFPA) fire pump engine after July 1, 2006.

The proposed facility will include two diesel-powered CI emergency generators that meet the applicability criteria (i), each rated for 2,000 hp. The proposed facility will also have one certified NFPA diesel-powered fire water pump rated for 410 hp that meets the applicability criteria (ii) above. Therefore, the proposed facility will be subject to the requirements of Subpart IIII.

Each emergency generator will be certified to meet the USEPA Tier 4 Final emission standards for non-road diesel engines and will have displacement of less than 10 liters per cylinder. Each engine will be operated in compliance with the emissions standards of Subpart IIII, and according to the emergency use requirements of §60.4211(f). NEXT will install the units and perform maintenance according to the manufacturer's emission-related written instructions.

NEXT will install a NFPA-certified fire water pump engine that meets the USEPA Tier 4 certification emission standards and will operate the engine to meet the applicable emission standards in Table 4 to Subpart IIII. The emergency fire water pump will operate in accordance with the emergency use criteria in §60.4211(f). NEXT will maintain the unit in accordance with the manufacturer's emission-related written instructions.

4.6 National Emission Standards for Hazardous Air Pollutant Analysis

National Emission Standards for Hazardous Air Pollutants (NESHAP), defined in 40 CFR Part 61 and 63, regulate specific HAP or specific stationary sources that emit (or have the potential to emit) HAPs. Some NESHAP apply only to major sources of HAP, those sources that have a PTE of 10 tons/yr or more of any single HAP or 25 tons/yr or more of any aggregated HAPs. The proposed facility PTE for HAP emissions will be below this major source threshold, so the proposed facility is considered an area source for the purposes of NESHAP per §63.2.

4.6.1 40 CFR 61 Subpart J—National Emission Standards for Equipment Leaks of Benzene

This subpart applies to fugitive emission sources that operate in benzene service. In benzene service is defined as equipment contacting or containing a fluid (liquid or gas) that is at least 10 percent benzene by weight per §61.111. The proposed facility will not contain any equipment that operates in benzene service. Therefore, Subpart J will not be applicable.

4.6.2 40 CFR 61 Subpart V—National Emission Standards for Equipment Leaks

Subpart V applies to fugitive emission sources that operate in volatile HAP service after the promulgation date of Subpart V. Volatile HAP service is defined as equipment contacting or containing a fluid (liquid or gas) that is 10 percent or greater by weight benzene or vinyl chloride. There will be no equipment or piping operating in volatile HAP service at the proposed facility and so the requirements of Subpart J will not be applicable.

4.6.3 40 CFR 61 Subpart FF—National Emission Standards for Benzene Waste Operations

This subpart applies to benzene-containing hazardous waste operations at chemical manufacturing plants, coke by-product recovery plants and petroleum refineries. A chemical manufacturing plant is defined as "any facility engaged in the production of chemicals by chemical, thermal, physical, or biological processes for use as a product, co-product, by-product, or intermediate including but not limited to industrial organic chemicals, organic pesticide products, pharmaceutical preparations, paint and allied products, fertilizers, and agricultural products" under §61.341. The proposed facility operation will meet this definition of a "chemical manufacturing plant." Therefore, the proposed facility will be subject to Subpart FF requirements.

The specific control standards and operating requirements under Subpart FF are applicable to the handling of benzene-containing hazardous waste streams where the total annual benzene quantity from facility waste is greater than 11 tons/yr. Facilities with a total annual benzene quantity of less than 11 tons/yr are only subject to the recordkeeping and reporting requirements of Subpart FF. Where total annual benzene quantity is less than 1.1 tons/yr, facilities are only required to submit an initial report, and each time a change is made to a process generating waste. NEXT will comply with the applicable provisions of Subpart FF based on the calculated total annual benzene quantity.

4.6.4 40 CFR 63 Subpart F—National Emission Standards for Organic HAPs from the Synthetic Organic Chemical Manufacturing Industry

Subpart F establishes emission standards for facilities that are located at major HAP sources that manufacture or use the regulated chemicals defined in the subpart. Because the proposed facility will be an area source with respect to HAP emissions, Subpart F will not be applicable.

Per §63.100(b), applicability for Subpart F also determines applicability of Title 40 Part 63 Subparts G and H. Since Subpart F will not be applicable to the proposed facility, neither will the requirements of Subparts G and H.

4.6.5 40 CFR 63 Subpart Y—National Emission Standards for Organic HAPs for Marine Tank Vessel Loading Operations

This subpart applies to any source location with at least one dock or loading berth that is used for bulk loading onto marine vessels, except for offshore drilling platforms and lightering operations. Marine tank vessel loading includes any operation in which a commodity is bulk loaded onto a marine tank vessel from a terminal, but does not include refueling of marine tank vessels. The proposed facility will load final product by rail or tanker truck for shipment offsite, or final product will be transported via pipeline to a nearby third-party offsite terminal provider to distribute into commerce. Therefore, the proposed facility will not be performing marine tank vessel loading operations, and will not be subject to Subpart Y.

4.6.6 40 CFR 63 Subpart CC—National Emission Standards for HAPs from Petroleum Refineries

Subpart CC applies to petroleum refining process units and to related emission points that emit HAP or have equipment that contain or contact HAPs. This subpart applies to major sources of HAP emissions. The proposed facility is not a major source of HAP emissions. Additionally, the proposed facility is not a petroleum refinery and will contain no petroleum refining process units as defined in the subpart. Therefore, the requirements of Subpart CC will not be applicable to the proposed facility.

4.6.7 40 CFR 63 Subpart UUU—National Emission Standards for HAPs from Petroleum Refineries: Catalytic Cracking Units, Catalytic Reforming Units, and Sulfur Recovery Units

The requirements of Subpart UUU apply to petroleum refineries located at a major source of HAP emissions. The proposed facility is not a petroleum refinery and will not be a major source of HAP emissions. Therefore, the requirements of Subpart UUU will not be applicable to the proposed facility.

4.6.8 40 CFR 63 Subpart EEEE—National Emission Standards for HAPs for Organic Liquids Distribution (Non-Gasoline)

The requirements of this subpart apply to organic liquids distribution operations located at major sources of HAP emissions. The affected source is composed of all storage tanks storing organic liquids, all transfer racks loading or unloading organic liquids, equipment leaks in organic liquid service, and all transport vehicles loading or unloading organic liquids at transfer racks. Because the proposed facility will not be a major source of HAP emissions, Subpart EEEE will not be applicable.

4.6.9 40 CFR 63 Subpart FFFF—National Emission Standards for HAPs for Miscellaneous Organic Chemical Manufacturing

Subpart FFFF applies to miscellaneous organic chemical manufacturing process units that are located at a major source of HAP emissions. As mentioned above, the proposed facility will not be a major source of HAP emissions. Therefore, the proposed facility will not be subject to the requirements of Subpart FFFF.

4.6.10 40 CFR 63 Subpart ZZZZ—National Emission Standards for HAPs for Stationary Reciprocating Internal Combustion Engines

Subpart ZZZZ applies to stationary reciprocating internal combustion engines (RICE) at both major and area sources of HAP emissions. In accordance with §63.6590(a)(2)(iii), the proposed emergency generators and fire water pump engine will be new stationary RICE since each unit will be located at an area source of HAP emissions and will commence construction after June 12, 2006. The proposed new stationary RICE will be subject to the requirements of Subpart ZZZZ. As noted in Section 4.5.8, the proposed emergency generators and fire water pump engine will be subject to 40 CFR 60 Subpart IIII. Per §63.6590(c)(1), new stationary RICE located at an area source must comply with the requirements of Subpart ZZZZ by meeting the compliance requirements of 40 CFR 60 Subpart IIII, and no further requirements apply.

4.6.11 40 CFR 63 Subpart JJJJJJ—National Emission Standards for HAPs for Industrial, Commercial, and Institutional Boilers at Area Sources

Subpart JJJJJJ applies to boilers at area sources of HAP emissions, where boilers are defined as "an enclosed device using controlled flame combustion in which water is heated to recover thermal energy in the form of steam and/or hot water…Waste heat boilers, process heaters, and autoclaves are excluded from the definition of boiler" per §63.11237. The proposed boilers will combust solely natural gas fuel and will be categorized as gas-fired boilers under this subpart. According to §63.11195(e), gas-fired boilers are not subject to Subpart JJJJJJ and do not have any applicable requirements.

The Hydrogen Plant, the Feed and Isomerization Heaters, and the Jet Fractionator will be considered process heaters under Subpart JJJJJJ. Because process heaters are specifically excluded from the definition of boiler, these units are not subject to the requirements of Subpart JJJJJJ. Therefore, Subpart JJJJJJ will not be applicable to the proposed facility.

4.6.12 40 CFR 63 Subpart VVVVVV—National Emission Standards for HAPs for Chemical Manufacturing Area Sources

The requirements of Subpart VVVVVV apply to chemical manufacturing process units that are located at an area source of HAP emissions, and which process, use or produce the HAPs identified in Table 1 of Subpart VVVVVV. The proposed facility will not operate any chemical manufacturing process units that process, use or produce regulated HAPs determined according to §63.11494(a)(2)(i) through (iv). Therefore, the requirements of Subpart VVVVVV will not be applicable to the proposed facility.

4.7 40 CFR Part 64—Compliance Assurance Monitoring

The Compliance Assurance Monitoring requirements of 40 CFR Part 64 apply to pollutant-specific emission units at a major source that is required to obtain a Title V operating permit, and which meets the criteria at §64.2(a)(1) through (3). As stated in Section 4.4.5, the proposed facility is not subject to Title V permitting and therefore, 40 CFR Part 64 is not applicable.

4.8 40 CFR Part 68—Chemical Accident Prevention Provisions

This regulation applies to owners or operators of stationary sources that have more than a threshold quantity of a regulated substance at the facility, including quantities of a regulated substance in process at the facility. Sources subject to the regulation are required to develop and implement a Risk Management Plan to prevent accidental releases from regulated substances that exceed the threshold quantity. Regulated substances and associated threshold quantities are defined at §68.130.

The proposed facility will not store any Risk Management Plan substances over the applicable threshold quantity. As a result, the proposed facility will not be required to develop a Risk Management Plan and no requirements of this rule will be applicable.

Note the proposed facility will utilize aqueous ammonia as a reagent in the SCR control devices. The threshold quantity for ammonia (with concentrations greater than or equal to 20%) is 20,000 pounds per §68.130. The proposed storage capacity for aqueous ammonia for use in the SCR control devices will exceed 20,000 pounds. However, the threshold quantity for aqueous ammonia applies to solutions of 20% concentration or greater. NEXT will only use aqueous ammonia with concentrations less than 20% so the threshold quantity is not applicable. NEXT will also not utilize or store anhydrous ammonia onsite.

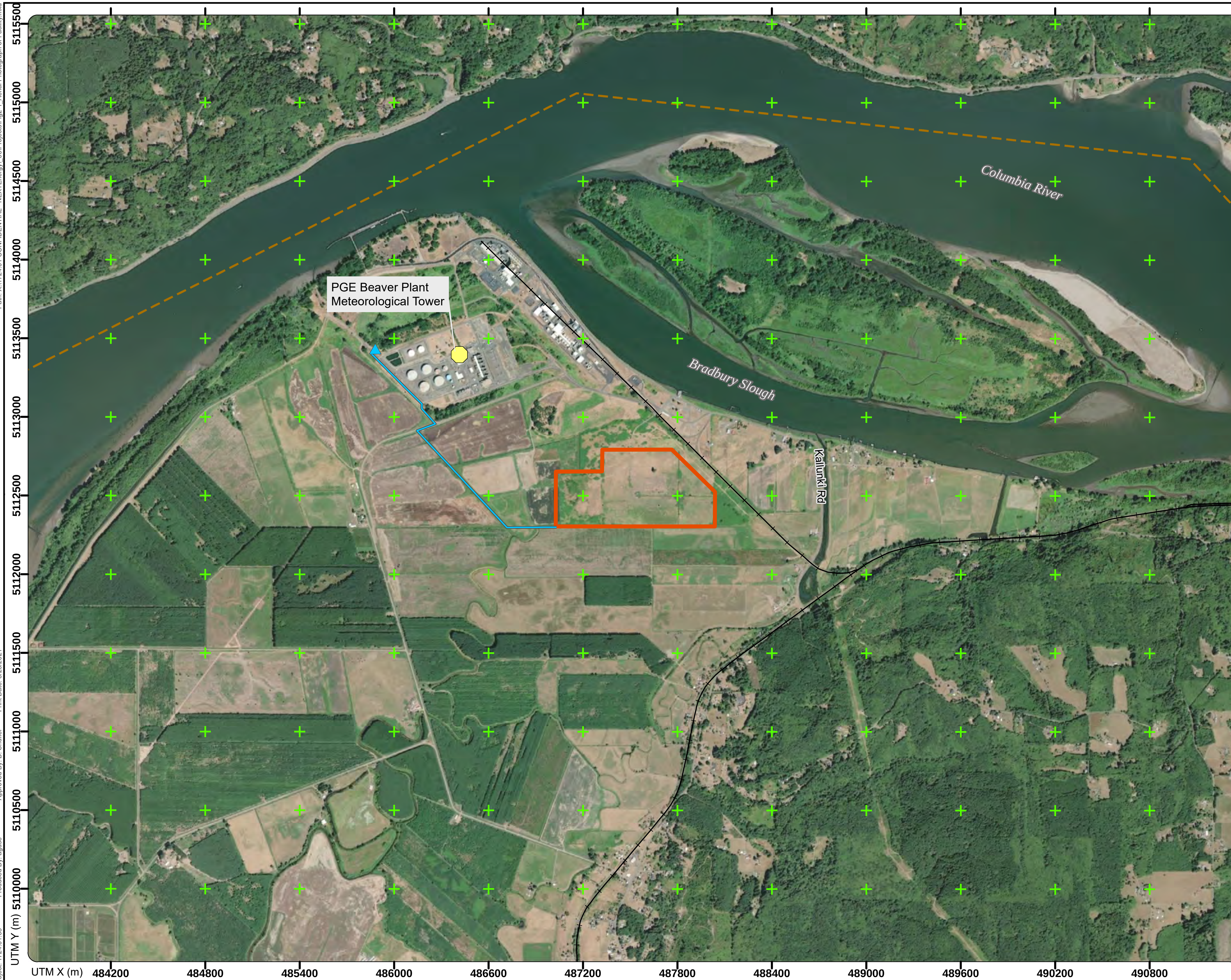
LIMITATIONS

The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

FIGURES

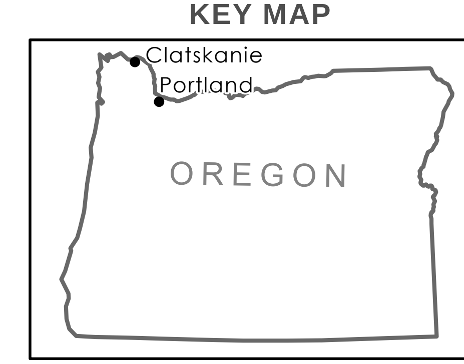
Figure 2-1
Aerial Photograph of Facility
NEXT Renewable Fuels Oregon, LLC
Clatskanie, Oregon



Legend

- Proposed Take-Off Point Location
- PGE Beaver Plant Meteorological Tower
- UTM Grid Guideline
- Proposed Pipeline
- Proposed Property Boundary
- Existing Railroad
- State Boundary

KEY MAP



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Meters

Source: Aerial photograph obtained from Esri ArcGIS Online

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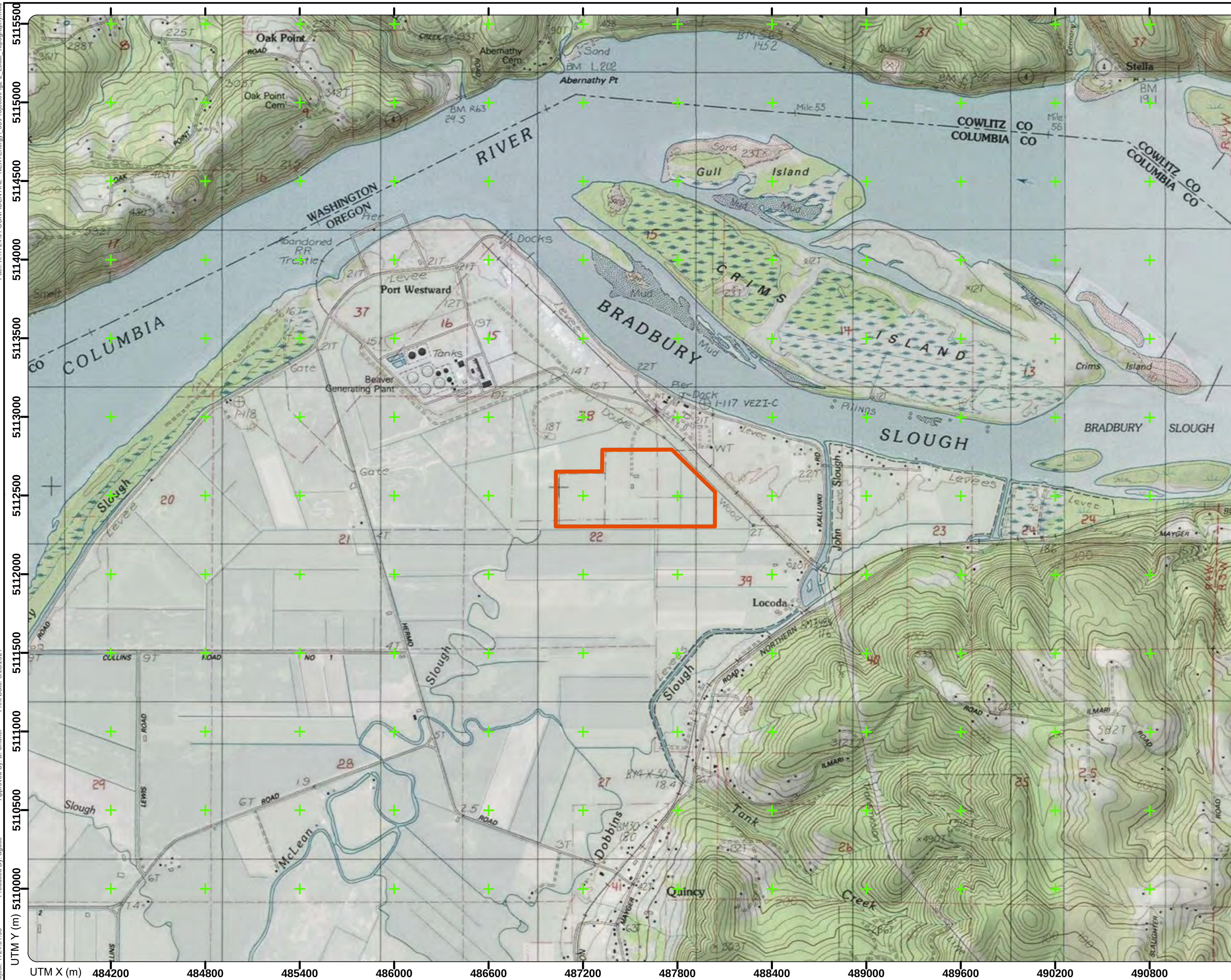
Project: 1724.01.03 Produced By: aguse Approved By: B. Snuffer Print Date: 6/23/2021

Figure 2-2
Local Topography

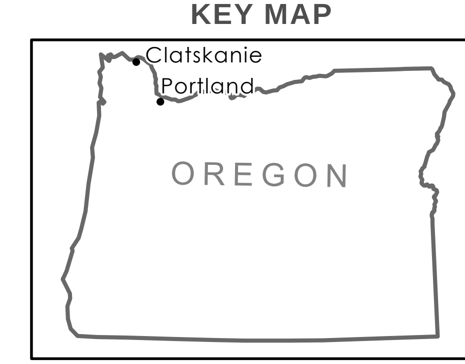
NEXT Renewable Fuels Oregon, LLC
Clatskanie, Oregon



Legend

- UTM Grid Guideline
- Proposed Property Boundary

KEY MAP



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Meters

Source: Topographic map obtained from USGS.

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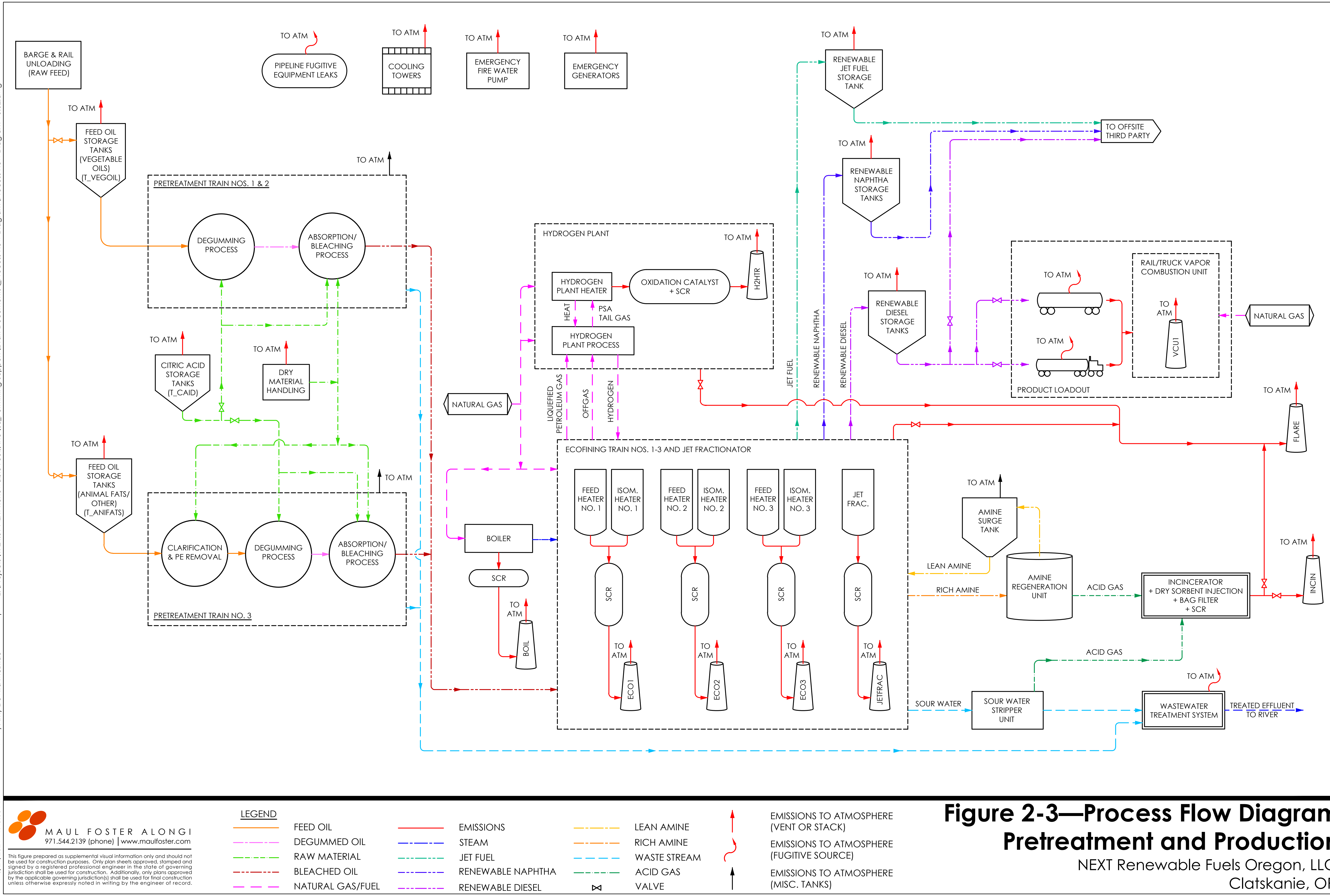

Figure 2-3—Process Flow Diagram Pretreatment and Production

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Clatskanie, OR

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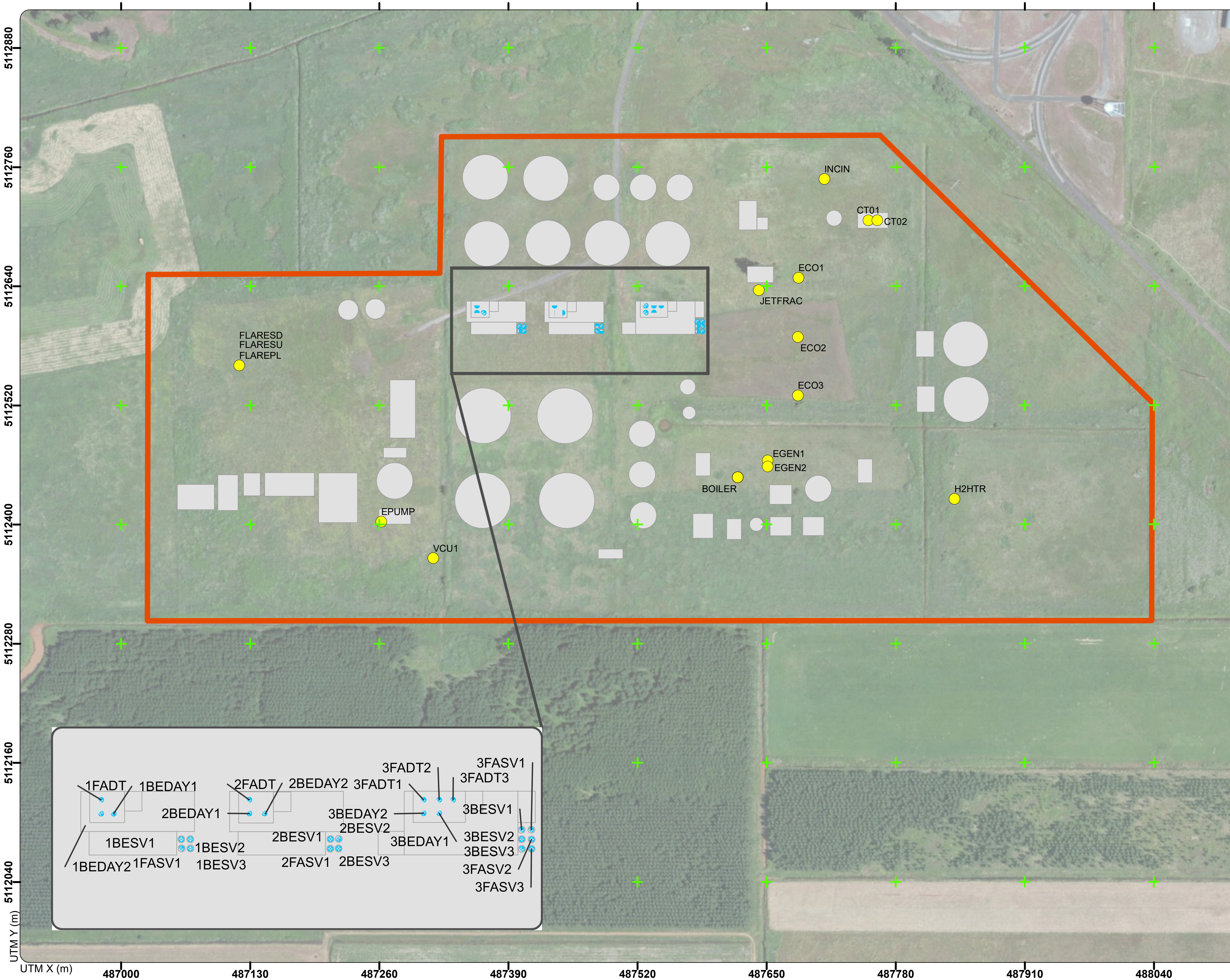
Figure 3-1
Proposed Emission Unit Locations

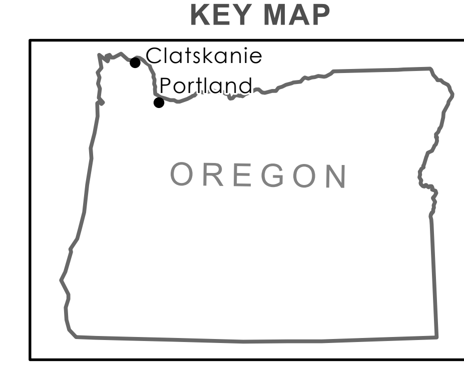
NEXT Renewable Fuels Oregon, LLC
Clatskanie, Oregon



Legend

- Proposed Point Source Location
- Proposed Volume Source Location
- UTM Grid Guideline
- Proposed Downwash Structure
- Proposed Property Boundary

KEY MAP



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Meters

Source: Aerial photograph obtained from Esri ArcGIS Online

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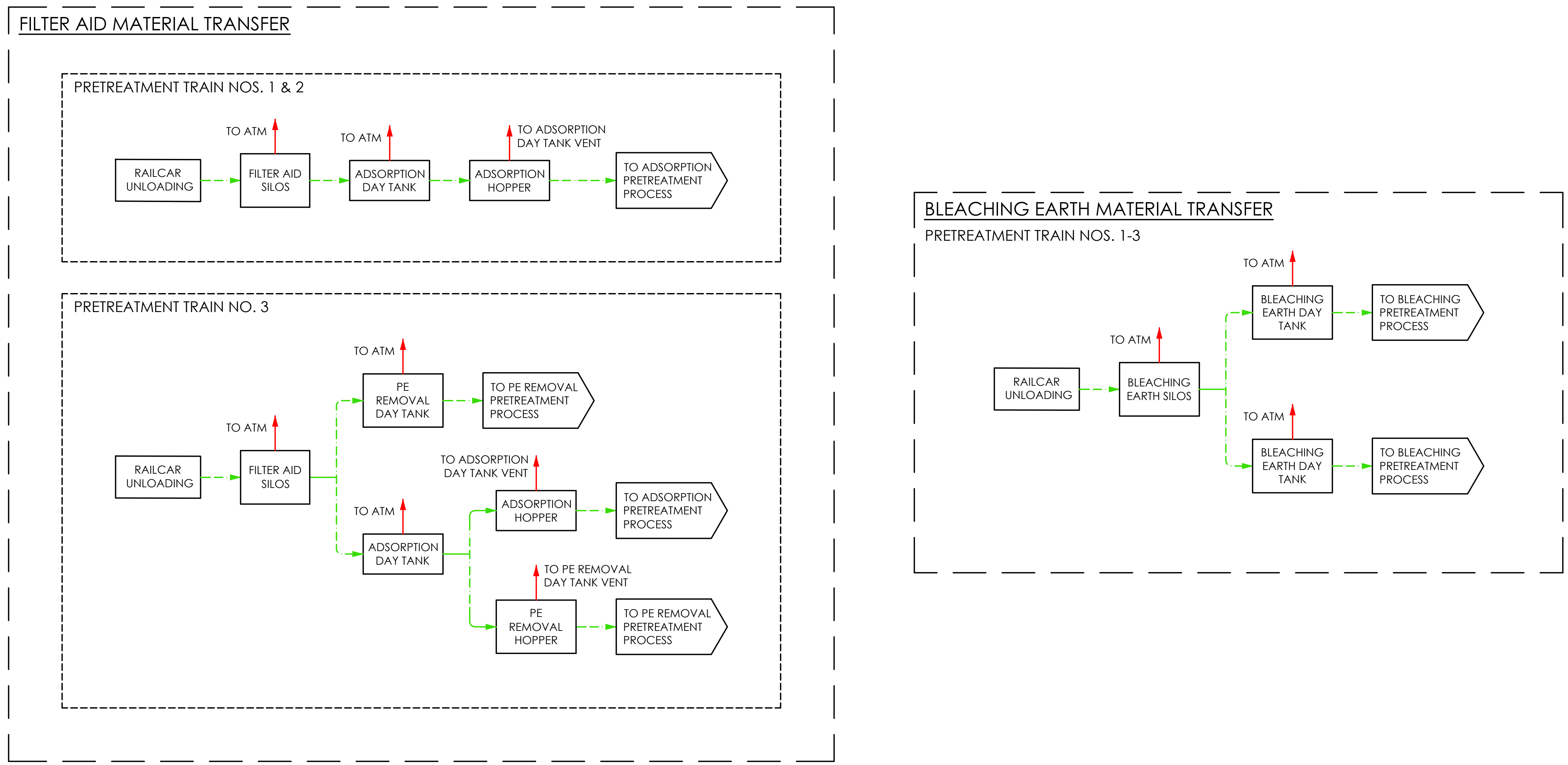
Approved By: B. Snuffer
Produced By: aguse
Project: 1724.01.03



LEGEND

RAW MATERIAL

EMISSIONS TO ATMOSPHERE (VENT OR STACK)

Figure 3-2—Process Flow Diagram Dry Material Handling

NEXT Renewable Fuels Oregon, LLC
Clatskanie, OR

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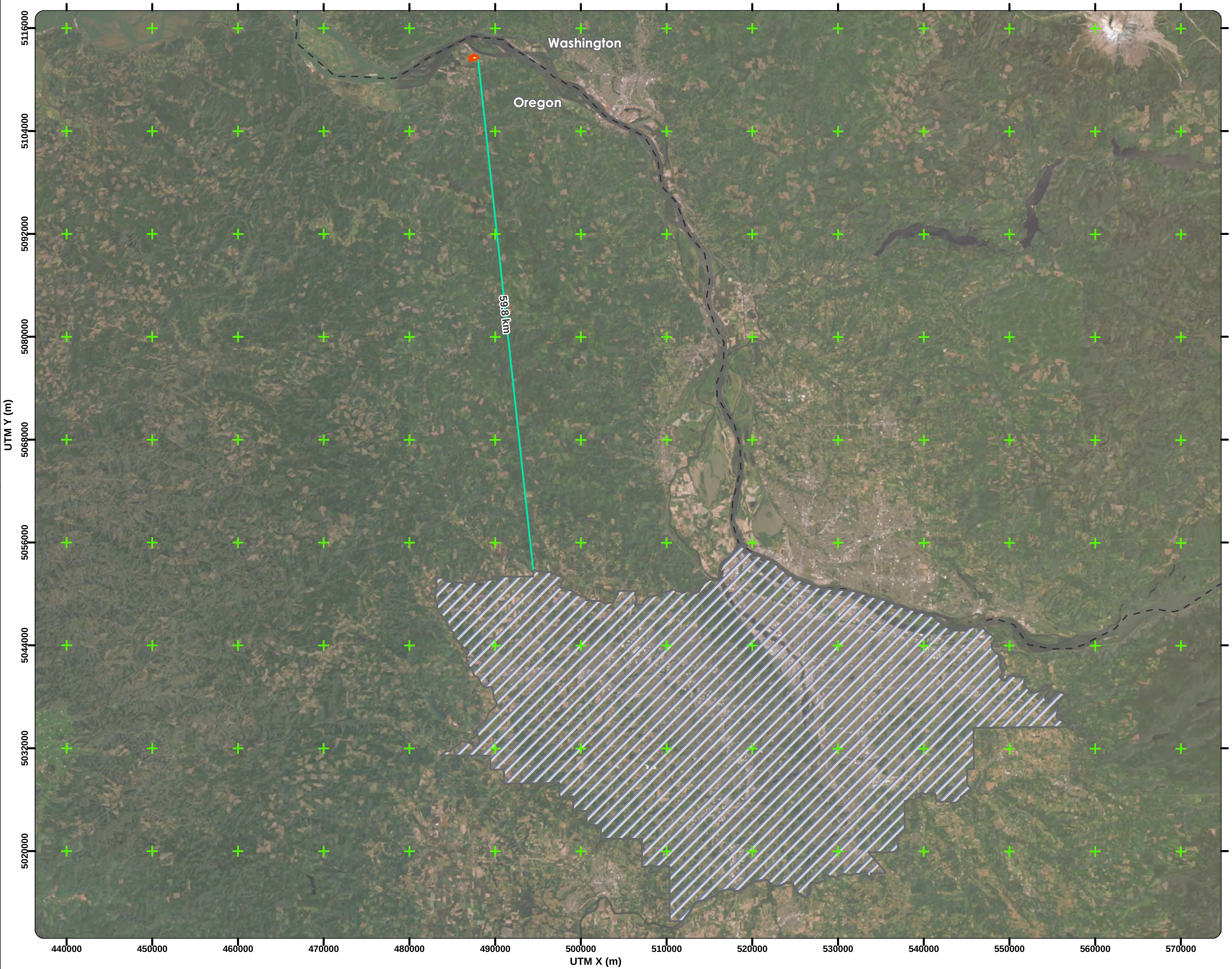
Printed by:Amy DeVita-McBride
Filepath:L:\Projects\1724.01 NEXT Renewable Fuels, Inc\03_Permitting Support\Draft Documents_Process Flow Diagram\Process Flow Diagram V0.02.dwg

Figure 4-1
Proposed Facility Distance to Portland AQMA

NEXT Renewable Fuels Oregon, LLC
Clatskanie, Oregon



Legend

- Distance to Nearest Boundary
- Proposed Property Boundary
- Portland Air Quality Maintenance Area
- State Boundary
- UTM Grid Guideline

1. Portland Air Quality Maintenance Area data obtained from the Oregon Spatial Data Library.

0 2.5 5
Kilometers

Source: Aerial photograph obtained from Esri ArcGIS Online

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Project: 1724.01.03 Produced By: aguse Approved By: Print Date: 12/15/2020 Path: X:\1724.01 CONFIDENTIAL - NEXTEnergy_03\Projects\Fig4-1 Proposed Facility Distance to PDX.mxd

APPENDIX A
EMISSIONS INVENTORY (REVISION 2)

Table of Contents
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Table 1
Input Assumptions and Parameters
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter	Facility Operation			Total Number of Units	Throughput or Production Rate (Units)		
	Daily (hrs/day)	Annual (days/yr)	Annual (hrs/yr)		Hourly	Daily	Annual
Facility-Wide Hours of Operation	24 0 [1]	358 [2]	8 592 [a]	--	--	--	--
PRETREATMENT TRAINS							
Feed Oil Throughput	--	--	--	--	2 146 (bbl/hr) [b]	51 500 (bbl/day) [redacted]	18 437 000 (bbl/yr) [d]
Filter Aid Dry Material Handling							
Total Railcar Unloading to FA Silos	--	--	--	--	47 059 (lb/hr) [b]	400 000 (lb/day) [4]	9 183 (tons/yr) [4]
Train nos. 1-2—Railcar Unloading to FA Silos	8.5 [3]	--	--	--	23 529 (lb/hr) [b]	200 000 (lb/day) [4]	3 061 (tons/yr) [4]
Train no. 3—Railcar Unloading to FA Silos	8.5 [3]	--	--	--	23 529 (lb/hr) [b]	200 000 (lb/day) [4]	6 122 (tons/yr) [4]
Total Material Transfer from FA Silos to FA Day Tanks	--	--	--	--	2 138 (lb/hr) [b]	51 300 (lb/day) [4]	9 183 (tons/yr) [4]
Train nos. 1-2—FA Silo to Absorption FA Day Tank	--	--	--	--	713 (lb/hr) [b]	17 100 (lb/day) [4]	3 061 (tons/yr) [4]
Train no. 3—FA Silo to Absorption FA Day Tank	--	--	--	--	602 (lb/hr) [b]	14 450 (lb/day) [4]	2 586 (tons/yr) [4]
Train no. 3—FA Silo to PE Removal FA Day Tanks	--	--	--	--	823 (lb/hr) [b]	19 751 (lb/day) [4]	3 535 (tons/yr) [4]
Total Material Transfer from FA Day Tanks to FA Hoppers	--	--	--	--	1 315 (lb/hr) [b]	31 550 (lb/day) [4]	5 647 (tons/yr) [4]
Train nos. 1-2—FA Absorption Day Tank to Absorption Hopper	--	--	--	--	713 (lb/hr) [b]	17 100 (lb/day) [4]	3 061 (tons/yr) [4]
Train no. 3—FA Absorption Day Tank to Absorption Hopper	--	--	--	--	356 (lb/hr) [b]	8 550 (lb/day) [4]	1 530 (tons/yr) [4]
Train no. 3—FA Absorption Day Tank to PE Removal Hopper	--	--	--	--	246 (lb/hr) [b]	5 900 (lb/day) [4]	1 056 (tons/yr) [4]
Bleaching Earth Dry Material Handling							
Total Railcar Unloading to BE Silos	--	--	--	--	24 691 (lb/hr) [b]	400 000 (lb/day) [4]	45 994 (tons/yr) [4]
Train nos. 1-3—Railcar Unloading to BE Silos	16 2 [5]	--	--	--	24 691 (lb/hr) [b]	400 000 (lb/day) [4]	45 994 (tons/yr) [4]
Total Material Transfer from BE Silos to BE Day Tanks	--	--	--	--	10 706 (lb/hr) [b]	256 950 (lb/day) [4]	45 994 (tons/yr) [4]
Train nos. 1-3—BE Silo to Bleaching Day Tank (wet)	--	--	--	--	5 353 (lb/hr) [b]	128 475 (lb/day) [4]	22 997 (tons/yr) [4]
Train nos. 1-3—BE Silo to Bleaching Day Tank (dry)	--	--	--	--	5 353 (lb/hr) [b]	128 475 (lb/day) [4]	22 997 (tons/yr) [4]
BOILERS							
Total Boiler Heat Input	--	--	--	2 [4]	155 (MMBtu/hr) [4]	3 720 (MMBtu/day) [e]	1 331 760 (MMBtu/yr) [f]
Total Boiler Natural Gas Usage	--	--	--	--	0.14 (MMcf/hr) [g]	3.42 (MMcf/day) [e]	1 224 (MMcf/yr) [f]
Boiler no. 1 Heat Input	--	--	--	--	77 5 (MMBtu/hr) [6]	1 860 (MMBtu/day) [e]	665 880 (MMBtu/yr) [f]
Boiler no. 1 Natural Gas Usage	--	--	--	--	0.071 (MMcf/hr) [g]	1.71 (MMcf/day) [e]	612 (MMcf/yr) [f]
Boiler no. 2 Heat Input	--	--	--	--	77 5 (MMBtu/hr) [6]	1 860 (MMBtu/day) [e]	665 880 (MMBtu/yr) [f]
Boiler no. 2 Natural Gas Usage	--	--	--	--	0.071 (MMcf/hr) [g]	1.71 (MMcf/day) [e]	612 (MMcf/yr) [f]
HYDROGEN PLANT PROCESS							
Total Heater Heat Input (PSA Tail Gas and Natural Gas)	--	--	--	--	700 (MMBtu/hr) [4]	16 800 (MMBtu/day) [e]	6 014 400 (MMBtu/yr) [f]
Heater PSA Tail Gas Heat Input	--	--	--	--	586 (MMBtu/hr) [g]	14 056 (MMBtu/day) [e]	5 032 120 (MMBtu/yr) [f]
Heater PSA Tail Gas Fuel Usage	--	--	--	--	2 60 (MMcf/hr) [4]	62.5 (MMcf/day) [e]	22 365 (MMcf/yr) [f]
Heater Natural Gas Heat Input	--	--	--	--	114 (MMBtu/hr) [g]	2 742 (MMBtu/day) [e]	981 550 (MMBtu/yr) [f]
Heater Natural Gas Fuel Usage	--	--	--	--	0.11 (MMcf/hr) [4]	2.52 (MMcf/day) [e]	902 (MMcf/yr) [f]
ECOFINING UNITS							
Total Feed Heater Natural Gas Heat Input	--	--	--	3 [4]	106 (MMBtu/hr) [4]	2 534 (MMBtu/day) [e]	907 315 (MMBtu/yr) [f]
Total Feed Heater Natural Gas Usage	--	--	--	--	0.097 (MMcf/hr) [g]	2.33 (MMcf/day) [e]	834 (MMcf/yr) [f]
Feed Heater no. 1 Natural Gas Usage	--	--	--	--	0.032 (MMcf/hr) [6]	0.78 (MMcf/day) [e]	278 (MMcf/yr) [f]
Feed Heater no. 2 Natural Gas Usage	--	--	--	--	0.032 (MMcf/hr) [6]	0.78 (MMcf/day) [e]	278 (MMcf/yr) [f]
Feed Heater no. 3 Natural Gas Usage	--	--	--	--	0.032 (MMcf/hr) [6]	0.78 (MMcf/day) [e]	278 (MMcf/yr) [f]
Total Isomerization Heater Natural Gas Heat Input	--	--	--	3 [4]	16 0 (MMBtu/hr) [4]	384 (MMBtu/day) [e]	137 472 (MMBtu/yr) [f]
Total Isomerization Heater Natural Gas Usage	--	--	--	--	0.015 (MMcf/hr) [g]	0.35 (MMcf/day) [e]	126 (MMcf/yr) [f]
Isomerization Heater no. 1 Natural Gas Usage	--	--	--	--	4.9E-03 (MMcf/hr) [6]	0.12 (MMcf/day) [e]	42.1 (MMcf/yr) [f]
Isomerization Heater no. 2 Natural Gas Usage	--	--	--	--	4.9E-03 (MMcf/hr) [6]	0.12 (MMcf/day) [e]	42.1 (MMcf/yr) [f]
Isomerization Heater no. 3 Natural Gas Usage	--	--	--	--	4.9E-03 (MMcf/hr) [6]	0.12 (MMcf/day) [e]	42.1 (MMcf/yr) [f]
Jet Fractionator Natural Gas Heat Input	--	--	--	1 [4]	125.0 (MMBtu/hr) [4]	3 000 (MMBtu/day) [e]	1 074 000 (MMBtu/yr) [f]
Jet Fractionator Natural Gas Usage	--	--	--	--	0.11 (MMcf/hr) [g]	2.76 (MMcf/day) [e]	987 (MMcf/yr) [f]
INCINERATOR							
Incinerator Natural Gas Heat Input	--	--	--	--	18 0 (MMBtu/hr) [4]	432 (MMBtu/day) [e]	154 656 (MMBtu/yr) [f]
Incinerator Natural Gas Usage	--	--	--	--	0.017 (MMcf/hr) [g]	0.40 (MMcf/day) [e]	142 (MMcf/yr) [f]
Acid Gas Routed to Incinerator	--	--	--	--	0.12 (MMcf/hr) [4]	2.80 (MMcf/day) [e]	1 001 (MMcf/yr) [f]
SWS Offgas Routed to Incinerator	--	--	--	--	0.024 (MMcf/hr) [4]	0.57 (MMcf/day) [e]	205 (MMcf/yr) [f]
FLARE							
Pilot Light Natural Gas Usage	--	--	8 760 [1]	--	1 3E-03 (MMcf/hr) [b]	0 030 (MMcf/day) [4]	11 0 (MMcf/yr) [f]
Ecofiner Startup Commissioning (Waste Gas to Flare)	[redacted]						
Ecofiner Shutdown (Waste Gas to Flare)							
VAPOR COMBUSTION UNIT							
Rail/Truck Vapor Combustion Unit Natural Gas Usage	--	--	--	--	1 6E-03 (MMcf/hr) [b]	0 038 (MMcf/day) [4]	13.4 (MMcf/yr) [f]
PRODUCT LOADOUT							
Renewable Diesel Throughput (barrels)	--	--	--	--	1 614 (bbl/hr) [b]	38 733 (bbl/day) [7]	13 866 414 (bbl/yr) [d]
Renewable Diesel Throughput (Mgal)	--	--	--	--	67 8 (Mgal/hr) [b]	1 627 (Mgal/day) [j]	582 389 (Mgal/yr) [d]
Renewable Diesel—Rail Loadout	--	--	--	--	11 6 (Mgal/hr) [k]	278 (Mgal/day) [e]	99 360 (Mgal/yr) [l]
Renewable Diesel—Truck Loadout	--	--	--	--	0 70 (Mgal/hr) [k]	16.9 (Mgal/day) [e]	6 048 (Mgal/yr) [l]
Renewable Naphtha Throughput (barrels)	--	--	--	--	99 (bbl/hr) [b]	2 370 (bbl/day) [7]	848 460 (bbl/yr) [d]
Renewable Naphtha Throughput (Mgal)	--	--	--	--	4.15 (Mgal/hr) [b]	100 (Mgal/day) [j]	35 635 (Mgal/yr) [d]
Renewable Jet Fuel Throughput (barrels)	--	--	--	--	352 (bbl/hr) [b]	8 443 (bbl/day) [7]	3 022 594 (bbl/yr) [d]
Renewable Jet Fuel Throughput (Mgal)	--	--	--	--	14 8 (Mgal/hr) [b]	355 (Mgal/day) [j]	126 949 (Mgal/yr) [d]
EMERGENCY ENGINES							
Fire Water Pump (Diesel Fueled)	6 00 [10]	--	100 [11]	--	23 5 (gal/hr) [12]	141 (gal/day) [e]	2 350 (gal/yr) [f]
Emergency Generator 1 (Diesel Fueled)	6 00 [10]	--	100 [11]	--	90.1 (gal/hr) [13]	541 (gal/day) [e]	9 009 (gal/yr) [f]
Emergency Generator 2 (Diesel Fueled)	6 00 [10]	--	100 [11]	--	90.1 (gal/hr) [13]	541 (gal/day) [e]	9 009 (gal/yr) [f]

All notes and references are provided on the following page See Table 1 (Continued) Input Assumptions and Parameters

Table 1 (Continued)
Input Assumptions and Parameters
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

NOTES:

bbl = barrels
BE = bleaching earth
FA = filter aid
MMBtu = million British thermal units
MMcf = million cubic feet
Mgal = thousand gallons
PE = polyethylene
PSA = pressure-swing adsorption

(a) Annual hours of operation (hrs/yr) = (daily hours of operation [hrs/day]) x (annual days of operation [days/yr])
b) Hourly throughput or fuel usage (unit /hr) = (daily throughput or fuel usage [unit /day]) / (daily hours of operation [hrs/day])

[redacted]

(d) Annual throughput heat input or fuel usage (unit /yr) = (daily throughput heat input or fuel usage [unit /day]) x (annual days of operation [days/yr])
(e) Daily throughput heat input or fuel usage (unit /day) = (hourly throughput heat input or fuel usage [unit /hr]) x (daily hours of operation [hrs/day])
(f) Annual throughput heat input or fuel usage (unit /yr) = hourly throughput heat input or fuel usage [unit /hr]) x (annual hours of operation [hrs/yr])
(g) Hourly fuel usage (MMcf/hr) = (hourly fuel heat input [MMBtu/hr]) / (fuel high heat content [Btu/scf])

PSA tail gas high heat content (Btu/scf) =	225	(14)
Natural gas high heat content (Btu/scf) =	1 088	(14)

[redacted]

(j) Daily throughput (Mgal/day) = (daily throughput [bbl/day]) x (42 gal/bbl) x (Mgal/1 000 gal)
(k) Hourly throughput (Mgal/hr) = (annual throughput [Mgal/yr]) / (annual hours of operation [hrs/yr])
(l) Annual rail or truck throughput (Mgal/yr) = (railcar or truck capacity [Mgal/railcar or truck]) x (monthly number of product loadout railcars or trucks [railcar or truck/mo]) x (12 mo/yr)

Railcar capacity (Mgal/railcar) =	35	(m)
Truck capacity (Mgal/truck) =	8 40	(m)
Monthly number of product loadout railcars (railcar/mo) =	240	(4)
Monthly number of product loadout trucks (truck/mo) =	60 0	(4)

(m) Product loadout capacity (Mgal/ unit) = (barrel capacity [bbl/ unit]) x (42 gal/bbl) x (Mgal/1 000 gal)

Railcar capacity - renewable diesel (bbl/railcar) =	821	(15)
Truck capacity - renewable diesel bbl/truck) =	200	(15)

REFERENCES:

(1) Assumes continuous daily and annual operation to calculate potential to emit emissions scenario
(2) Information provided by NEXT Renewable Fuels Oregon LLC Assumes the facility will be down for one week (i e 7 days) during the calendar year
(3) Information provided by NEXT Renewable Fuels Oregon LLC A railcar will unload to storage silos for up to 8 5 hours per day and delivery will be scheduled for every third day
(4) Information provided by NEXT Renewable Fuels Oregon LLC
(5) Information provided by NEXT Renewable Fuels Oregon LLC A railcar will unload to storage silos for up to 16 2 hours per day throughout the year
(6) Information provided by NEXT Renewable Fuels Oregon LLC Assumes total natural gas usage is equally divided among combustion devices
(7) Information provided by NEXT Renewable Fuels Oregon LLC There will be two production scenarios at the proposed facility; maximum renewable diesel production or maximum renewable jet fuel production During maximum renewable diesel production only renewable diesel (49 469 bbl/day) and naphtha (974 bbl/day) will be produced During maximum jet fuel production 38 733 bbl/day of renewable diesel 2 370 bbl/day of renewable naphtha and 8 443 bbl/day of renewable jet fuel will be produced The maximum renewable jet fuel production scenario shown in the table represents the highest emissions scenario for volatile organic compounds and hazardous air pollutants/toxic air contaminants

[redacted]

(10) Information provided by NEXT Renewable Fuels Oregon LLC The fire water pump will be tested once per year for insurance purposes to confirm capacity The emergency generators are a backup system and only one verification test will occur in any given day to ensure the system is functioning properly
(11) Assumes emergency engines will be limited to 100 hours per year for non-emergency operation
(12) See Cummins CFP9E-F85 Fire Pump Drive Engine specification sheet
(13) See Cummins Diesel Generator Set QSK50 Series specification sheet dated July 2018 Fuel consumption based on prime rating at 100% load
(14) See Table 3 Miscellaneous—Input Assumptions and Parameters
(15) Typical hauling capacities for trucks and railcars Assumes standard US DOT-111 railcar maximum capacity of 34 500 US gallons

Table 2
Storage Tank—Input Assumptions and Parameters
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Tank ID	Description	Stored Material/Product Basis	Tank Location In Production Line	Number of Tanks	Tank Heated? (Yes/No)	Tank Temp. (°F)	Tank Information — Physical Parameter: Roof Type?	Orientation? (Vert./Hor.)	Paint Shade?	Tank Cond.?	Emissions Controlled or Fugitive?	Tank Dimensions: Diameter (ft)	Height (ft)	Maximum Liquid Height (ft)	Tank Size: Barrels (bbl/tank)	1,000 Gallons (Mgal/tank)	Annual Material/Product Throughput — Total: Barrels (bbl/yr)	Per Tank: Barrels (bbl/yr)	Per Tank: 1,000 Gallons (Mgal/yr)	Daily Material/Product Throughput — Total: Barrels (bbl/day)	Per Tank: Barrels (bbl/day)	Per Tank: 1,000 Gallons (Mgal/day)
RAW OIL FEEDSTOCK TANKS																						
T_VEGOIL	Vegetable Oils	Vegetable Oils	Raw Oil Feedstock	3 (1)	Yes (1)	120 (2)	FR (1)	Vertical (3)	White (3)	New (1)	Fugitive (1)	150 (1)	48 0 (1)	47 0 (4)	125 000 (1)	5 250 (a)	11 062 200 [redacted]	3 687 400 (c)	154 871 (d)	30 900 (e)	10 300 (c)	433 (f)
T_ANIFATS	Animal Fats	Animal Fats	Raw Oil Feedstock	3 (1)	Yes (1)	120 (2)	FR (1)	Vertical (3)	White (3)	New (1)	Fugitive (1)	150 (1)	48 0 (1)	47 0 (4)	125 000 (1)	5 250 (a)	7 374 800 [redacted]	2 458 267 (c)	103 247 (d)	20 600 (e)	6 867 (c)	288 (f)
PRODUCT STORAGE TANKS—DEDICATED																						
T_RNWDSL	Renewable Diesel	Renewable Diesel	Product Storage	3 (1)	No (1)	77.0 (5)	FR (1)	Vertical (3)	White (3)	New (1)	Fugitive (1)	184 (1)	48 0 (1)	47 0 (4)	225 000 (1)	9 450 (a)	13 866 414 (6)	4 622 138 (c)	194 130 (d)	38 733 (1)	12 911 (c)	542 (f)
PRODUCT STORAGE TANKS—SWING																						
T_RDRJ	Renewable Diesel OR Jet Fuel	Renewable Jet Fuel	Product Storage	1 (1)	No (1)	77.0 (5)	IFRT (1)	Vertical (3)	White (3)	New (1)	Fugitive (1)	184 (1)	48 0 (1)	47 0 (4)	225 000 (1)	9 450 (a)	1 511 297 (6)	1 511 297 (c)	63 474 (d)	4 222 (1)	4 222 (c)	177.3 (f)
T_RNRJ1	Renewable Naphtha OR Jet Fuel	Renewable Jet Fuel	Product Storage	1 (1)	No (1)	77.0 (5)	IFRT (1)	Vertical (3)	White (3)	New (1)	Fugitive (1)	88 0 (1)	48 0 (1)	47 0 (4)	50 000 (1)	2 100 (a)	1 511 297 (6)	1 511 297 (c)	63 474 (d)	4 222 (1)	4 222 (c)	177.3 (f)
T_RNRJ2	Renewable Naphtha OR Jet Fuel	Renewable Naphtha	Product Storage	1 (1)	No (1)	77.0 (5)	IFRT (1)	Vertical (3)	White (3)	New (1)	Fugitive (1)	88 0 (1)	48 0 (1)	47 0 (4)	50 000 (1)	2 100 (a)	424 230 (6)	424 230 (c)	17 818 (d)	1 185 (1)	1 185 (c)	49 8 (f)
T_RNRJ3	Renewable Naphtha OR Jet Fuel	Renewable Naphtha	Product Storage	1 (1)	No (1)	77.0 (5)	IFRT (1)	Vertical (3)	White (3)	New (1)	Fugitive (1)	88 0 (1)	48 0 (1)	47 0 (4)	50 000 (1)	2 100 (a)	424 230 (6)	424 230 (c)	17 818 (d)	1 185 (1)	1 185 (c)	49 8 (f)
MISCELLANEOUS TANKS																						
T_HCSLOP	Hydrocarbon Slop	Hydrocarbon Slop	Maintenance Slop	1 (1)	Yes (1)	120.0 (5)	IFRT (1)	Vertical (3)	White (3)	New (1)	Fugitive (1)	52 0 (1)	40 0 (1)	39 0 (4)	15 000 (1)	630 (a)	368 740 (g)	368 740 (c)	15 487 (d)	1 030 (e)	1 030 (c)	43 3 (f)
T_OWSSLP	Oil Water Separator Slop	Oil Water Separator Slop	Spraydown Wash	1 (1)	No (1)	77.0 (5)	IFRT (1)	Vertical (3)	White (3)	New (1)	Fugitive (1)	43 0 (1)	40 0 (1)	39 0 (4)	10 000 (1)	420 (a)	368 740 (g)	368 740 (c)	15 487 (d)	1 030 (e)	1 030 (c)	43 3 (f)
T_CACID	Citric Acid (50% sol) Storage	Citric Acid (50% sol.)	Pretreat-Bleaching	2 (1)	No (1)	77.0 (1)	FR (1)	Vertical (3)	White (3)	New (1)	Fugitive (1)	10 0 (1)	30 0 (1)	29 0 (4)	--	16.0 (1)	--	--	895 (h)	--	--	2.50 (1)

NOTES:

FR = fixed-roof tank type

IFR = internal floating roof tank type

(a) Tank size (Mgal/tank) = (tank size [bbl/tank]) x (42 gal/bbl) x (Mgal/1 000 gal)

[redacted]

(c) Annual or daily tank throughput (bbl/ unit) =(total annual or daily throughput [bbl/ unit]) / (number of tanks)

(d) Annual tank throughput (Mgal/yr) = (annual tank throughput [bbl/yr]) x (42 gal/bbl) x (Mgal/1 000 gal)

(e) Total daily throughput bbl/day) = (total annual throughput [bbl/yr]) / (annual days of operation [days/yr])

Annual days of operation (days/yr) = 358 (6)

(f) Daily tank throughput (Mgal/day) = (daily tank throughput [bbl/day]) x (42 gal/bbl) x (Mgal/1 000 gal)

(g) Total annual or daily throughput (bbl/ unit) = (total annual or daily feed oil throughput [bbl/ unit]) x (slop percentage of feed oil throughput [%] / 100)

Slop percentage of feed oil throughput (%) = 2 00 (1)

h) Annual tank throughput (Mgal/yr) = (daily tank throughput [Mgal/day]) x (annual days of operation [days/yr])

Annual days of operation (day/yr) = 358 (6)

REFERENCES:

(1) Information provided by NEXT Renewable Fuels Oregon LLC

(2) Information provided by NEXT Renewable Fuels Oregon LLC Assumes raw oils will be stored at 120°F based on a review of representative facility air quality permits

(3) Engineering judgement based on typical bulk storage tank design for representative industries

(4) AP-42 Chapter 7 (June 2020); see equation 1-36 notes For vertical tanks value is set to one minus the tank shell height For horizontal tanks value is set to $(\pi/4)D_E$

(5) Assumes standard ambient temperature of 25°C (77°F) since the storage tank will not be heated

(6) See Table 1 Input Assumptions and Parameters

[redacted]

Table 3
Miscellaneous—Input Assumptions and Parameters
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter	Value (Units)		
GENERAL			
Average Feed Oil Specific Gravity	[redacted]		
Soybean Specific Gravity	[redacted]		
Corn Oil Distiller Specific Gravity	[redacted]		
Used Cooking Oil Specific Gravity	[redacted]		
Tallow Specific Gravity	[redacted]		
Choice White Greases Specific Gravity	[redacted]		
Yellow Greases Specific Gravity	[redacted]		
Water Density (Standard)	62 4	(lb/scf)	
Feed Oil Density	[redacted]		
Waste Gas Density (to Flare)	[redacted]		
PSA Tail Gas (Hydrogen Plant) High Heat Content	225	(Btu/scf)	(1)
Natural Gas Facility-Wide) High Heat Content	1 088	(Btu/scf)	(1)
Waste Gas (Flare Shutdown) High Heat Content	[redacted]		
RAW OIL FEEDSTOCK			
Vegetable Oil Distribution Percentage	[redacted]		
Soybean Oil	[redacted]		
Distillers Corn Oil	[redacted]		
Used Cooking Oil	[redacted]		
Animal Fats Distribution Percentage	[redacted]		
Beef Tallow	[redacted]		
Choice White Grease (Pork Oil)	[redacted]		
Yellow Grease	[redacted]		
AIR POLLUTION CONTROL DEVICES			
Material Transfer Filter Particulate Control Efficiency	99 9	(%)	(2)
Acid Gas Incinerator VOC Control Efficiency	99 5	(%)	(3)
Flare Control Efficiency	98 0	(%)	(4)
Vapor Combustion Unit VOC Capture Efficiency	98 7	(%)	(5)
Vapor Combustion Unit VOC Control Efficiency	98 0	(%)	(6)
ACID GAS INCINERATOR			
Acid Gas H_2S Concentration to Incinerator Inlet	[redacted]		
Sour Water Stripper Offgas H_2S Concentration to Incinerator Inlet	[redacted]		
COOLING TOWER			
Number of Cells	2		(1)
Cooling Tower Water Circulation Rate	20 000	(gpm)	(1)
Drift Loss of Circulating Water	0 0005	(%)	(1)
Cycles of Concentration	6		(1)
Total Dissolved Solids Concentration	105	(ppm)	(8)
EMERGENCY ENGINES			
Fire Water Pump Power Rating	410	(hp)	(9)
Fire Water Pump Power Rating	306	(kW)	(9)
Emergency Generator 1 Power Rating	2 000	(hp)	(10)
Emergency Generator 1 Power Rating	1 491	(kW)	(10)
Emergency Generator 2 Power Rating	2 000	(hp)	(10)
Emergency Generator 2 Power Rating	1 491	(kW)	(10)

NOTES:

Btu/scf = British thermal unit per standard cubic feet

gpm = gallons per minute

hp = horsepower

lb/ft^3 = pound per cubic feet

ppm = parts per million

PSA = pressure-swing adsorption

[redacted]

REFERENCES:

(1) Information provided by NEXT Renewable Fuels Oregon LLC

(2) See Kice Industries Inc   Standard Filter Efficiency Statement dated March 19 2019 Standard filter bags are rated for at least 99 9% control of $PM_{2.5}$ emissions

(3) Information provided by NEXT Renewable Fuels Oregon LLC Assumes design parameter provided by incinerator vendor

(4) Texas Commission on Environmental Quality publication RG-360   Appendix A Technical Supplement 4: Flares   (January 2020) See Table A-8
Represents control efficiency for VOC and H_2S

(5) AP-42 Chapter 5 2 (June 2008) Assumes NSPS-level capture efficiency consistent with similar facility permitting

(6) USEPA Air Pollution Control Technology Fact Sheet EPA-452/F-03-022) dated July 15 2003 Assumes minimum end of range provided

[redacted]

(8) Water Quality of the Lower Columbia River Basin: Analysis of Burrent and Historical Water-Quality Data through 1994 prepared by the US Geological Survey dated 1996 See Table 25 Distribution of Major-Ion Concentrations in Filtered and Unfiltered Water Lower Columbia Basin Oregon and Washington 1994   Assumes maximum total dissolved solids for Beaver location

(9) See Cummins CFP9E-F85 Fire Pump Drive Engine specification sheet

(10) See Cummins Diesel Generator Set QSK50 Series specification sheet dated July 2018

Table 4
Criteria Pollutants and Greenhouse Gas Annual Emission Estimates Summary
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Emission Unit	Annual Emissions Estimate (tons/yr)									
	PM	PM_{10}	$PM_{2.5}$	NO_X	CO	VOC	SO_2	CO_2e		
								Fossil Fuels	Renewables	Total
Filter Aid Silo Dry Material Handling	3.4E-03	2 2E-03	2.2E-03	--	--	--	--	--	--	--
Filter Aid Day Tank Dry Material Handling	3.4E-03	2 2E-03	2.2E-03	--	--	--	--	--	--	--
Filter Aid Hopper Silo Dry Material Handling	2.1E-03	1 3E-03	1.3E-03	--	--	--	--	--	--	--
Bleaching Earth Dry Material Handling	0.034	0.022	0 022	--	--	--	--	--	--	--
Boiler nos. 1-2 (Natural Gas-Fired Combustion)	3 66	3.66	3.66	3.60	8.76	3 37	0 37	73 523	--	73 523
Ecofining Unit Trains	3 65	3.65	3.65	3.07	7.47	2 64	0 29	57 680	--	57 680
Feed Heater nos. 1-3	3.17	3.17	3.17	2.66	6.48	2.29	0.25	50,091	--	50,091
Isomerization Heater nos. 1-3	0.48	0.48	0.48	0.41	0.99	0.35	0.038	7,589	--	7,589
Jet Fractionator	3.75	3.75	3.75	4.91	11.9	2.71	0.30	59,293	--	59,293
Hydrogen Plant Heater	14.8	14.8	14.8	19 5	23 7	10 7	1.16	54 189	847 186	901 375
Natural Gas-Fired Combustion	3.43	3.43	3.43	--	--	2.48	0.27	54,189	--	54,189
PSA Tail Gas Combustion	11.3	11.3	11.3	--	--	8.20	0.89	--	847,186	847,186
Incinerator	0 54	0.54	0.54	1.84	6.23	0 39	21.4	58 716	--	58 716
Flare	0.056	0.056	0 056	0.77	0.67	2.19	0.47	1 281	--	1 281
Pilot Light (Natural Gas-Fired Combustion)	0.042	0.042	0.042	0.55	0.46	0.030	3.3E-03	658	--	658
Ecofining Unit Startup (Commissioning)	9.0E-03	9.0E-03	9.0E-03	0.14	0.13	1.36	0.29	394	--	394
Ecofining Unit Shutdown (Waste Gas Combustion)	5.2E-03	5.2E-03	5.2E-03	0.082	0.076	0.80	0.17	230	--	230
Rail/Truck Vapor Combustion Unit	0.051	0.051	0 051	0.34	0.56	7.4E-04	4.0E-03	806	--	806
Product Loadout (Captured/Controlled)	--	--	--	--	--	0 022	--	--	--	--
Product Loadout (Fugitive)	--	--	--	--	--	0 014	--	--	--	--
Equipment Leaks	--	--	--	--	--	24 7	--	--	--	--
Storage Tanks	--	--	--	--	--	18 8	--	--	--	--
Raw Oil Feedstock (Vegetable Oil) Storage Tanks	--	--	--	--	--	0.070	--	--	--	--
Raw Oil Feedstock (Animal Fats) Storage Tanks	--	--	--	--	--	0.047	--	--	--	--
Product Storage Tank nos. 1-3—Dedicated RD	--	--	--	--	--	12.9	--	--	--	--
Product Storage Tank no. 4—Swing RD vs. RJET	--	--	--	--	--	0.41	--	--	--	--
Product Storage Tank no. 1—Swing RN vs. RJET	--	--	--	--	--	0.51	--	--	--	--
Product Storage Tank no. 2—Swing RN vs. RJET	--	--	--	--	--	2.19	--	--	--	--
Product Storage Tank no. 3—Swing RN vs. RJET	--	--	--	--	--	2.19	--	--	--	--
Hydrocarbon Slop Storage Tank	--	--	--	--	--	0.19	--	--	--	--
Oil Water Separator Slop Storage Tank	--	--	--	--	--	0.22	--	--	--	--
Citric Acid Storage Tank	--	--	--	--	--	0.11	--	--	--	--
Cooling Towers	0.14	0.12	0 072	--	--	3 61	--	--	--	--
Wastewater Treatment System	--	--	--	--	--	0.14	--	--	--	--
Emergency Fire Pump	--	1 8E-03	1.8E-03	0 013	0.12	6.4E-03	2.5E-04	--	26 5	26.5
Emergency Generators	--	0.021	0 021	0.22	1.15	0 062	1.9E-03	--	203	203
Total Facility	**26.6**	**26.6**	**26.6**	**34.2**	**60.6**	**69.4**	**23.9**	**305,488**	**847,416**	**1,152,905**
REGULATORY ANALYSIS										
Proposed Plant Site Emission Limit (PSEL)	26.6	26.6	26.6	34 2	60 6	69.4	23.9	305 488	847 416	1 152 905
Significant Emission Rate (SER) [1]	25.0	15.0	10.0	40 0	100	40 0	40 0	--	--	75 000
Proposed PSEL Exceeds SER?	Yes	Yes	Yes	No	No	Yes	No	--	--	Yes

REFERENCES:

(1) See Oregon Administrative Rule 340-200-0020(161)

Table 5
Toxic Air Contaminant Annual Emissions Estimate Summary
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Annual Emission Estimates (tons/yr)

Toxic Air Contaminant	CAS	DEQ Sequence No.	Regulatory Category (Yes/No): HAP	TAC	RBC	Boilers (Total)	Ecofining Units: Feed Heaters	Ecofining Units: Isom. Heaters	Jet. Frac.	Hydrogen Plant (Total)	Acid Gas Incinerator	Flare: Pilot (Natural Gas)	Flare: Startup (Commiss.)	Flare: Shutdown	Rail/ Truck VCU	Renew. Diesel Loadout: Controlled	Renew. Diesel Loadout: Fugitive	Equipment Leaks: Renew. Diesel	Renew. Naphtha	Renew. Jet Fuel	Natural Gas	Offgas	Amines	Acid Gas	Waste Gas	Storage Tanks: Dedicated RD Tank nos. 1-3	Swing Tank 4 (JET)	Swing Tank 1 (JET)	Swing Tank 2 (RN)	Swing Tank 3 (RN)	Hydro-Carbon Slop	OWS Slop	WWT	Emergency Fire Water Pump	Emergency Generator nos. 1-2	Facility Total
SPECIATED ORGANIC/INORGANIC COMPOUNDS																																				
Acetaldehyde	75-07-0	1	Yes	Yes	Yes	1.9E-03	1.3E-03	2.7E-04	4.4E-04	1.7E-03	2.2E-04	2.4E-05	--	--	5.8E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.2E-04	7.1E-03	**0.014**
Acrolein	107-02-8	5	Yes	Yes	Yes	1.7E-03	1.1E-03	1.7E-04	3.9E-04	1.6E-03	1.9E-04	1.5E-05	--	--	3.6E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.0E-05	3.1E-04	**5.4E-03**
Ammonia	7664-41-7	26	No	Yes	Yes	4.62	6.26	0.95	5.21	15.9	0.98	0.018	--	--	4.3E-04	--	--	--	--	--	--	--	--	0.082	--	--	--	--	--	--	--	--	1.2E-04	1.6E-03	0.013	**34.0**
Benzene	71-43-2	46	Yes	Yes	Yes	3.5E-03	2.4E-03	5.1E-04	8.4E-04	3.3E-03	4.1E-04	4.4E-05	--	--	1.1E-06	4.7E-06	3.1E-06	3.4E-03	--	1.3E-05	--	--	--	--	--	2.8E-03	5.4E-06	6.6E-06	--	--	3.3E-05	4.7E-05	2.6E-03	2.2E-04	1.7E-03	**0.022**
1,3-Butadiene	106-99-0	75	Yes	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.6E-04	2.0E-03	**2.2E-03**
Chlorobenzene	108-90-7	108	Yes	Yes	Yes	--	--	--	--	--	--	--	--	--	--	3.7E-06	2.5E-06	2.7E-03	--	1.0E-05	--	--	--	--	--	2.2E-03	4.2E-06	5.3E-06	--	--	3.2E-05	3.7E-05	7.1E-03	--	--	**0.012**
Ethylbenzene	100-41-4	229	Yes	Yes	Yes	4.2E-03	2.9E-03	6.0E-04	9.9E-04	3.9E-03	4.9E-04	5.2E-05	--	--	1.3E-06	1.7E-05	1.1E-05	0.012	--	4.6E-05	--	--	--	--	--	0.010	2.0E-05	2.4E-05	--	--	1.6E-04	1.7E-04	0.053	1.3E-05	9.8E-05	**0.089**
Formaldehyde	50-00-0	250	Yes	Yes	Yes	7.5E-03	5.1E-03	1.1E-03	1.8E-03	7.0E-03	8.7E-04	9.3E-05	--	--	2.3E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.0E-03	0.016	**0.041**
Hexane	110-54-3	289	Yes	Yes	Yes	2.8E-03	1.9E-03	4.0E-04	6.4E-04	2.5E-03	3.3E-04	3.4E-05	--	--	8.5E-07	--	--	--	--	--	1.9E-04	2.6E-03	--	--	--	--	--	--	--	--	--	--	--	3.2E-05	2.4E-04	**0.012**
Hydrochloric acid	7647-01-0	292	Yes	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.2E-04	1.7E-03	**1.9E-03**
Hydrogen sulfide	7783-06-4	293	No	Yes	Yes	--	--	--	--	--	1.35	--	3.2E-03	1.9E-03	--	--	--	--	--	--	--	2.3E-06	0.062	6.2E-03	4.1E-04	--	--	--	--	--	--	--	0.20	--	--	**1.63**
Phenol	108-95-2	497	Yes	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.1E-04	--	--	**5.1E-04**
Toluene	108-88-3	600	Yes	Yes	Yes	0.016	0.011	2.3E-03	3.8E-03	0.015	1.9E-03	2.0E-04	--	--	4.9E-06	1.4E-05	9.2E-06	0.010	9.2E-07	3.7E-05	--	--	--	--	--	8.2E-03	1.6E-05	2.0E-05	1.8E-06	1.8E-06	1.1E-04	1.4E-04	0.018	1.2E-04	9.5E-04	**0.089**
1,2,4-Trimethylbenzene	95-63-6	614	No	Yes	Yes	--	--	--	--	--	--	--	--	--	--	3.1E-06	2.1E-06	2.3E-03	--	8.4E-06	--	--	--	--	--	1.9E-03	3.6E-06	4.4E-06	--	--	3.4E-05	3.2E-05	9.8E-03	--	--	**0.014**
1,3,5-Trimethylbenzene	108-67-8	615	No	Yes	Yes	--	--	--	--	--	--	--	--	--	--	1.2E-06	7.8E-07	8.6E-04	--	3.2E-06	--	--	--	--	--	7.0E-04	1.3E-06	1.7E-06	--	--	1.3E-05	1.2E-05	8.9E-03	--	--	**0.010**
m-Xylene & p-Xylene	108-38-3	629	Yes	Yes	Yes	--	--	--	--	--	--	--	--	--	--	9.1E-06	6.0E-06	6.6E-03	--	2.4E-05	--	--	--	--	--	5.4E-03	1.0E-05	1.3E-05	--	--	8.3E-05	9.1E-05	0.027	--	--	**0.039**
o-Xylene	95-47-6	630	Yes	Yes	Yes	--	--	--	--	--	--	--	--	--	--	3.2E-06	2.1E-06	2.3E-03	--	8.7E-06	--	--	--	--	--	1.9E-03	3.7E-06	4.5E-06	--	--	3.0E-05	3.2E-05	0.013	--	--	**0.018**
Xylene (mixed isomers)	1330-20-7	628	Yes	Yes	Yes	0.012	8.2E-03	1.7E-03	2.9E-03	0.011	1.4E-03	1.5E-04	--	--	3.7E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5.0E-05	3.8E-04	**0.038**
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)																																				
PAHs (excluding Naphthalene)	PAHs	401	Yes	Yes	Yes	6.1E-05	4.2E-05	6.3E-06	4.9E-05	1.9E-04	7.1E-06	5.5E-07	--	--	1.3E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.3E-05	3.3E-04	**7.3E-04**
Acenaphthene	83-32-9	402	Yes	Yes	No	--	--	--	--	--	--	--	--	--	--	6.5E-09	4.3E-09	4.7E-06	--	1.7E-08	--	--	--	--	--	3.8E-06	7.4E-09	9.1E-09	--	--	1.3E-07	6.5E-08	2.8E-04	--	--	**2.9E-04**
Benzo(a)pyrene	50-32-8	406	Yes	Yes	Yes	7.3E-07	5.0E-07	7.6E-08	5.9E-07	2.3E-06	8.5E-08	6.6E-09	--	--	1.6E-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.2E-11	3.2E-10	**4.3E-06**
Fluorene	86-73-7	425	Yes	Yes	No	--	--	--	--	--	--	--	--	--	--	3.0E-09	2.0E-09	2.2E-06	--	8.0E-09	--	--	--	--	--	1.8E-06	3.4E-09	4.2E-09	--	--	4.1E-08	3.0E-08	3.1E-05	--	--	**3.5E-05**
Naphthalene	91-20-3	428	Yes	Yes	Yes	1.8E-04	1.3E-04	1.9E-05	1.5E-04	5.8E-04	2.1E-05	1.6E-06	--	--	4.0E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.3E-05	1.8E-04	**1.3E-03**
Pyrene	129-00-0	431	Yes	Yes	No	--	--	--	--	--	--	--	--	--	--	3.8E-13	2.5E-13	2.8E-10	--	1.0E-12	--	--	--	--	--	2.3E-10	4.3E-13	5.4E-13	--	--	1.3E-11	3.8E-12	3.6E-07	--	--	**3.6E-07**
2-Methylnaphthalene	91-57-6	427	Yes	Yes	No	--	--	--	--	--	--	--	--	--	--	1.8E-08	1.2E-08	1.3E-05	--	4.9E-08	--	--	--	--	--	1.1E-05	2.1E-08	2.6E-08	--	--	2.9E-07	1.8E-07	2.2E-05	--	--	**4.6E-05**
TRACE METALS																																				
Arsenic	7440-38-2	37	Yes	Yes	Yes	1.2E-04	8.3E-05	1.3E-05	9.9E-05	9.0E-05	1.4E-05	1.1E-06	--	--	1.3E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.9E-06	1.4E-05	**4.4E-04**
Barium	7440-39-3	45	No	Yes	No	2.7E-03	1.8E-03	2.8E-04	2.2E-03	2.0E-03	3.1E-04	2.4E-05	--	--	3.0E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**9.3E-03**
Beryllium	7440-41-7	58	Yes	Yes	Yes	7.3E-06	5.0E-06	7.6E-07	5.9E-06	5.4E-06	8.5E-07	6.6E-08	--	--	8.1E-08	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**2.5E-05**
Cadmium	7440-43-9	83	Yes	Yes	Yes	6.7E-04	4.6E-04	6.9E-05	5.4E-04	5.0E-04	7.8E-05	6.0E-06	--	--	7.4E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.8E-06	1.4E-05	**2.3E-03**
Hexavalent Chromium	18540-29-9	136	Yes	Yes	Yes	8.6E-04	5.8E-04	8.8E-05	6.9E-04	6.3E-04	1.0E-04	7.7E-06	--	--	9.4E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1.2E-07	9.0E-07	**3.0E-03**
Cobalt	7440-48-4	146	Yes	Yes	Yes	5.1E-05	3.5E-05	5.3E-06	4.1E-05	3.8E-05	6.0E-06	4.6E-07	--	--	5.6E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**1.8E-04**
Copper	7440-50-8	149	No	Yes	Yes	5.2E-04	3.5E-04	5.4E-05	4.2E-04	3.8E-04	6.0E-05	4.7E-06	--	--	5.7E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.8E-06	3.7E-05	**1.8E-03**
Lead	7439-92-1	305	Yes	Yes	Yes	3.1E-04	2.1E-04	3.2E-05	2.5E-04	2.3E-04	3.6E-05	2.7E-06	--	--	3.4E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9.8E-06	7.5E-05	**1.1E-03**
Manganese	7439-96-5	312	Yes	Yes	Yes	2.3E-04	1.6E-04	2.4E-05	1.9E-04	1.7E-04	2.7E-05	2.1E-06	--	--	2.6E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	3.6E-06	2.8E-05	**8.4E-04**
Mercury	7439-97-6	316	Yes	Yes	Yes	1.6E-04	1.1E-04	1.6E-05	1.3E-04	1.2E-04	1.8E-05	1.4E-06	--	--	1.7E-06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.4E-06	1.8E-05	**5.7E-04**
Molybdenum trioxide	1313-27-5	361	No	Yes	No	1.0E-03	6.9E-04	1.0E-04	8.1E-04	7.4E-04	1.2E-04	9.0E-06	--	--	1.1E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**3.5E-03**
Nickel	7440-02-0	364	Yes	Yes	Yes	1.3E-03	8.8E-04	1.3E-04	1.0E-03	9.5E-04	1.5E-04	1.1E-05	--	--	1.4E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4.6E-06	3.5E-05	**4.5E-03**
Selenium	7782-49-2	575	Yes	Yes	Yes	1.5E-05	1.0E-05	1.5E-06	1.2E-05	1.1E-05	1.7E-06	1.3E-07	--	--	1.6E-07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.6E-06	2.0E-05	**7.3E-05**
Vanadium	7440-62-2	620	No	Yes	Yes	1.4E-03	9.6E-04	1.5E-04	1.1E-03	1.0E-03	1.6E-04	1.3E-05	--	--	1.5E-05	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**4.9E-03**
Zinc	7440-66-6	632	No	Yes	No	0.018	0.012	1.8E-03	0.014	0.013	2.1E-03	1.6E-04	--	--	1.9E-04	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	**0.061**
DIESEL PARTICULATE MATTER (DPM)																																				
DPM	DPM	200	No	Yes	Yes	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.3E-03	0.074	**0.081**
Total TAC Emission Estimates						**4.70**	**6.31**	**0.96**	**5.25**	**15.9**	**2.35**	**0.018**	**3.2E-03**	**1.9E-03**	**7.4E-04**	**5.6E-05**	**3.7E-05**	**0.041**	**9.2E-07**	**1.5E-04**	**1.9E-04**	**2.6E-03**	**0.062**	**0.088**	**4.1E-04**	**0.033**	**6.4E-05**	**7.9E-05**	**1.8E-06**	**1.8E-06**	**4.9E-04**	**5.6E-04**	**0.34**	**0.013**	**0.12**	**36.2**
Total HAP Emission Estimates						**0.054**	**0.037**	**7.5E-03**	**0.015**	**0.050**	**6.3E-03**	**6.5E-04**	**--**	**--**	**5.6E-05**	**5.2E-05**	**3.4E-05**	**0.038**	**9.2E-07**	**1.4E-04**	**1.9E-04**	**2.6E-03**	**--**	**--**	**--**	**0.031**	**5.9E-05**	**7.3E-05**	**1.8E-06**	**1.8E-06**	**4.4E-04**	**5.2E-04**	**0.12**	**4.0E-03**	**0.031**	**0.40**
Maximum Single Highest HAP (Ethylbenzene) Emissions Estimate						**4.2E-03**	**2.9E-03**	**6.0E-04**	**9.9E-04**	**3.9E-03**	**4.9E-04**	**5.2E-05**	**--**	**--**	**1.3E-06**	**1.7E-05**	**1.1E-05**	**0.012**	**--**	**4.6E-05**	**--**	**--**	**--**	**--**	**--**	**0.010**	**2.0E-05**	**2.4E-05**	**--**	**--**	**1.6E-04**	**1.7E-04**	**0.053**	**1.3E-05**	**9.8E-05**	**0.089**
Total RBC Emission Estimates						**4.68**	**6.30**	**0.96**	**5.23**	**15.9**	**2.35**	**0.018**	**3.2E-03**	**1.9E-03**	**5.1E-04**	**5.6E-05**	**3.7E-05**	**0.041**	**9.2E-07**	**1.5E-04**	**1.9E-04**	**2.6E-03**	**0.062**	**0.088**	**4.1E-04**	**0.033**	**6.4E-05**	**7.9E-05**	**1.8E-06**	**1.8E-06**	**4.9E-04**	**5.6E-04**	**0.34**	**0.013**	**0.12**	**36.1**
Total Non-RBC Emission Estimates						**0.021**	**0.015**	**2.2E-03**	**0.017**	**0.016**	**2.5E-03**	**1.9E-04**	**--**	**--**	**2.4E-04**	**2.8E-08**	**1.8E-08**	**2.0E-05**	**--**	**7.4E-08**	**--**	**--**	**--**	**--**	**--**	**1.6E-05**	**3.1E-08**	**3.9E-08**	**--**	**--**	**4.6E-07**	**2.8E-07**	**3.3E-04**	**--**	**--**	**0.075**

Table 6
Facility Gas Compositions
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Compound	Symbol	VOC? (Yes/No)	Molar Percent (%)	Molecular Weight (lb/lb-mol)	Molar Weight Basis [a]	Weight Fraction [b]
PSA TAIL GAS						
Hydrogen	H_2	No	[redacted]			
Nitrogen	N_2	No				
Carbon Monoxide	CO	No				
Carbon Dioxide	CO_2	No				
Water	H_2O	No				
Methane	CH_4	No				
PSA Tail Gas Total	--	--				
WASTE GAS TO FLARE						
Hydrogen	H_2	No	[redacted]			
Methane	CH_4	No				
Propane	C3	Yes				
Butanes	C4	Yes				
Pentanes	C5+	Yes				
Water	H_2O	No				
Carbon Monoxide	CO	No				
Carbon Dioxide	CO_2	No				
Nitrogen	N_2	No				
Hydrogen Sulfide	H_2S	No				
Waste Gas Total	--	--				
NATURAL GAS						
Nitrogen	N_2	No	0.30 [1]	28 013	8.40	4 8E-03
Carbon Dioxide	CO_2	No	0.29 [1]	44 009	12.8	7 2E-03
Methane	C1	No	91.13 [1]	16 042	1 462	0.83
Ethane	C2	No	6.35 [1]	30 069	191	0.11
Propane	C3	Yes	1.43 [1]	44 096	63.1	0.036
Iso-Butane	IC4	Yes	0.20 [1]	58.122	11.6	6 6E-03
Normal Butane	nC4	Yes	0.22 [1]	58.122	12.8	7 2E-03
Iso-Pentane	IC5	Yes	0.04 [1]	72.149	2 89	1 6E-03
Normal Pentane	nC5	Yes	0.03 [1]	72.149	2.16	1 2E-03
Normal Hexane	nC6	Yes	0.02 [1]	86.175	1 72	9 7E-04
Natural Gas Total	--	--	**100.0**	--	**1,768**	**1.00**
COMBINED OFFGAS						
Carbon Monoxide	CO	No	[redacted]			
Carbon Dioxide	CO_2	No				
Nitrogen	N_2	No				
Methane	C1	No				
Ethane	C2	No				
Propane	C3	Yes				
Iso-Butane	IC4	Yes				
Normal Butane	NC4	Yes				
Iso-Pentane	IC5	Yes				
Normal Pentane	NC5	Yes				
Normal Hexanes plus	C6+	Yes				
Water	H_2O	No				
Hydrogen	H_2	No				
Hydrogen Sulfide	H_2S	No				
Offgas Total	--	--				

NOTES:

Btu = British thermal unit

lb/ft^3 = pounds per cubic feet

lb/lb-mol = pounds per pound mole

VOC = volatile organic compound

(a) Molar weight basis = (molar percent [%]) x (molecular weight [lb/lb-mol])

(b) Weight fraction = (molar weight basis) / (total molar weight basis per composition)

(c) Total molecular weight (lb/lb-mol) = Σ (compound molecular weight [lb/lb-mol]) x (molar percent [%] / 100)

REFERENCES:

(1) Information provided by NEXT Renewable Fuels Oregon LLC

[redacted]

Table 7
Renewable Diesel and Naphtha Sample Compositions
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

[redacted]

All notes and references are provided on the following page See Table 7 (Continued) Renewable Diesel and Naphtha Sample Compositions

Table 7 (Continued)
Renewable Diesel and Naphtha Sample Compositions
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

[redacted]

MAUL FOSTER ALONGI

Table 8
Boiler nos. 1-2 (Natural Gas-Fired) TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Boiler nos. 1-2 (Natural Gas-Fired)
Hourly Natural Gas Usage (MMcf/hr)	(1)	0.14
Daily Natural Gas Usage (MMcf/day)	(1)	3.42
Annual Natural Gas Usage (MMcf/yr)	(1)	1 224
EXHAUST PARAMETERS		
Exhaust Outlet Flowrate (dscfm)	(2)	23 476
Ammonia Slip Outlet Concentration (ppm)	(3)	10
GENERAL		
Density of Air (lb/ft³ at 70°F and 14.7 psi)		0.07487
MW of Dry Air (lb/lb-mol)		28.9647
MW of Ammonia (lb/lb-mol)		17 031

Toxic Air Contaminant	CAS No.	DEQ Sequence No.	Regulatory Category (Yes/No)			Emission Factor (lb/MMscf)	Emission Estimates		
			HAP	TAC	RBC		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
SPECIATED ORGANIC/INORGANIC COMPOUNDS									
Acetaldehyde	75-07-0	1	Yes	Yes	Yes	3.1E-03 (4)	4.4E-04 (a)	0.011 (a)	1.9E-03 (b)
Acrolein	107-02-8	5	Yes	Yes	Yes	2.7E-03 (4)	3.8E-04 (a)	9.2E-03 (a)	1.7E-03 (b)
Ammonia (From Combustion)	--	--	--	--	--	3.20 (4)	0.46 (a)	10.9 (a)	1.96 (b)
Ammonia (Slip)	--	--	--	--	--	--	0.62 (c)	14.9 (d)	2.66 (e)
Ammonia (Total)	7664-41-7	26	No	Yes	Yes	--	1.08 (5)	25.8 (5)	4.62 (5)
Benzene	71-43-2	46	Yes	Yes	Yes	5.8E-03 (4)	8.3E-04 (a)	0.020 (a)	3.5E-03 (b)
Ethylbenzene	100-41-4	229	Yes	Yes	Yes	6.9E-03 (4)	9.8E-04 (a)	0.024 (a)	4.2E-03 (b)
Formaldehyde	50-00-0	250	Yes	Yes	Yes	0.012 (4)	1.8E-03 (a)	0.042 (a)	7.5E-03 (b)
Hexane	110-54-3	289	Yes	Yes	Yes	4.6E-03 (4)	6.6E-04 (a)	0.016 (a)	2.8E-03 (b)
Toluene	108-88-3	600	Yes	Yes	Yes	0.027 (4)	3.8E-03 (a)	0.091 (a)	0.016 (b)
Xylene (mixture)	1330-20-7	628	Yes	Yes	Yes	0.020 (4)	2.8E-03 (a)	0.067 (a)	0.012 (b)
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)									
PAHs (excluding Naphthalene)	PAHs	401	Yes	Yes	Yes	1.0E-04 (4)	1.4E-05 (a)	3.4E-04 (a)	6.1E-05 (b)
Benzo(a)pyrene	50-32-8	406	Yes	Yes	Yes	< 1.2E-06 (6)	1.7E-07 (a)	4.1E-06 (a)	7.3E-07 (b)
Naphthalene	91-20-3	428	Yes	Yes	Yes	3.0E-04 (4)	4.3E-05 (a)	1.0E-03 (a)	1.8E-04 (b)
TRACE METALS									
Arsenic	7440-38-2	37	Yes	Yes	Yes	2.0E-04 (7)	2.8E-05 (a)	6.8E-04 (a)	1.2E-04 (b)
Barium	7440-39-3	45	No	Yes	No	4.4E-03 (7)	6.3E-04 (a)	0.015 (a)	2.7E-03 (b)
Beryllium	7440-41-7	58	Yes	Yes	Yes	< 1.2E-05 (7)	1.7E-06 (a)	4.1E-05 (a)	7.3E-06 (b)
Cadmium	7440-43-9	83	Yes	Yes	Yes	1.1E-03 (7)	1.6E-04 (a)	3.8E-03 (a)	6.7E-04 (b)
Chromium VI	18540-29-9	136	Yes	Yes	Yes	1.4E-03 (8)	2.0E-04 (a)	4.8E-03 (a)	8.6E-04 (b)
Cobalt	7440-48-4	146	Yes	Yes	Yes	8.4E-05 (7)	1.2E-05 (a)	2.9E-04 (a)	5.1E-05 (b)
Copper	7440-50-8	149	No	Yes	Yes	8.5E-04 (7)	1.2E-04 (a)	2.9E-03 (a)	5.2E-04 (b)
Lead	7439-92-1	305	Yes	Yes	Yes	5.0E-04 (9)	7.1E-05 (a)	1.7E-03 (a)	3.1E-04 (b)
Manganese	7439-96-5	312	Yes	Yes	Yes	3.8E-04 (7)	5.4E-05 (a)	1.3E-03 (a)	2.3E-04 (b)
Mercury	7439-97-6	316	Yes	Yes	Yes	2.6E-04 (7)	3.7E-05 (a)	8.9E-04 (a)	1.6E-04 (b)
Molybdenum trioxide	1313-27-5	361	No	Yes	No	1.7E-03 (f)	2.4E-04 (a)	5.6E-03 (a)	1.0E-03 (b)
Nickel	7440-02-0	364	Yes	Yes	Yes	2.1E-03 (7)	3.0E-04 (a)	7.2E-03 (a)	1.3E-03 (b)
Selenium	7782-49-2	575	Yes	Yes	Yes	< 2.4E-05 (7)	3.4E-06 (a)	8.2E-05 (a)	1.5E-05 (b)
Vanadium (fume or dust)	7440-62-2	620	No	Yes	Yes	2.3E-03 (7)	3.3E-04 (a)	7.9E-03 (a)	1.4E-03 (b)
Zinc	7440-66-6	632	No	Yes	No	0.029 (7)	4.1E-03 (a)	0.099 (a)	0.018 (b)
Total TAC Emission Estimates							**1.09**	**26.3**	**4.70**
Total HAP Emission Estimates							**0.013**	**0.30**	**0.054**
Total RBC Emission Estimates							**1.09**	**26.1**	**4.68**
Total Non-RBC Emission Estimates							**5.0E-03**	**0.12**	**0.021**

Color Key
MFA-Specific CAS number.

NOTES:

HAP = hazardous air pollutant.

MMscf = million standard cubic feet.

MW = molecular weight.

RBC = risk-based concentration.

SCR = selective catalytic reduction.

TAC = toxic air contaminant.

Emission factors preceded by a less-than (<) symbol are based on method detection limits.

(a) Hourly or daily emissions estimate (lb/"unit") = (emission factor [lb/MMscf]) x (hourly or daily natural gas usage [MMcf/hr or MMcf/day])

(b) Annual emissions estimate (tons/yr) = (emission factor [lb/MMscf]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

(c) Hourly emissions estimate (lb/hr) = (ammonia slip concentration [ppm] / 10^6) x (exhaust flowrate [dscfm]) x (60 min/hr) x (density of air [lb/ft³]) / (mw of dry air [lb/lb-mol]) x (mw of ammonia [lb/lb-mol])

(d) Daily emissions estimate (lb/day) = (outlet concentration [ppm] / 10^6) x (exhaust flowrate [dscfm]) x (60 min/hr) x (density of air [lb/ft³]) / (mw of dry air [lb/lb-mol]) x (mw of pollutant [lb/lb-mol]) / (hourly natural gas usage [MMcf/hr]) x (daily natural gas usage [MMcf/day])

(e) Annual emissions estimate (tons/yr) = (outlet concentration [ppm] / 10^6) x (exhaust flowrate [dscfm]) x (60 min/hr) x (density of air [lb/ft³]) / (mw of dry air [lb/lb-mol]) x (mw of pollutant [lb/lb-mol]) / (hourly natural gas usage [MMcf/hr]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

(f) Molybdenum trioxide emission factor (lb/MMscf) = (elemental molybdenum emission factor [lb/MMscf]) x (MW of molybdenum trioxide [g/mol]) / (MW of elemental molybdenum [g/mol])

Elemental molybdenum emission factor (lb/MMscf) = 1.1E-03 (7)

MW of molybdenum trioxide (g/mol) = 143.94

MW of elemental molybdenum (g/mol) = 95.95

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters.

(2) See Table 43 Boiler nos. 1-2 (Natural Gas-Fired) Criteria Pollutant and GHG Emission Estimates.

(3) See Victory Energy 50 000 PPH Voyager Series Package Boiler proposal dated May 12 2021. See section 4 0. Ammonia slip limit corrected to 3% oxygen content.

(4) Reporting Procedures for AB2588 Facilities for Reporting their Quadrennial Air Toxics Emissions Inventory published by the South Coast Air Quality Management District (SCAQMD) in December 2016. See Appendix B Table B-1 "Default Emission Factors for Natural Gas Combustion" for external combustion equipment between 10-100 MMBtu/hr. Ammonia emission factor represents no control.

(5) Value represents the sum total of ammonia emissions estimates from natural gas-fired combustion and ammonia slip from SCR control device.

(6) AP-42 Chapter 1.4 (July 1998) Table 1.4-3 "Emission Factors for Speciated Organic Compounds from Natural Gas Combustion."

(7) AP-42 Chapter 1.4 (July 1998) Table 1.4-4 "Emission Factors for Metals from Natural Gas Combustion."

(8) AP-42 Chapter 1.4 (July 1998) Table 1.4-4 "Emission Factors for Metals from Natural Gas Combustion." Emission factor representative of total chromium. For CAO purposes the total chromium emission factor is conservatively assumed to be equal to hexavalent chromium.

(9) AP-42 Chapter 1.4 (July 1998) Table 1.4-2 "Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion."

Table 9
Feed Heaters TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Ecofining Units—Feed Heaters		
		Train no. 1	Train no. 2	Train no. 3
Hourly Natural Gas Usage (MMcf/hr)	[1]	0 032	0 032	0 032
Daily Natural Gas Usage (MMcf/day)	[1]	0 78	0 78	0 78
Annual Natural Gas Usage (MMcf/yr)	[1]	278	278	278
EXHAUST PARAMETERS				
Exhaust Outlet Flowrate (dscfm)	[2]	5 785	5 785	5 785
Ammonia Slip Outlet Concentration (ppm)	[3]	25	25	25
GENERAL				
Density of Air lb/ft^3 at 70°F and 14 7 psi)		0 07487		
MW of Dry Air (lb/lb-mol)		28 9647		
MW of Ammonia lb/lb-mol)		17 031		

Toxic Air Contaminant	CAS No.	DEQ Sequence No.	Regulatory Category (Yes/No)			Emission Factor (lb/MMscf)	Ecofining Units—Feed Heaters Emission Estimates											
							Train no. 1			Train no. 2			Train no. 3			Total		
			HAP	TAC	RBC		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
SPECIATED ORGANIC/INORGANIC COMPOUNDS																		
Acetaldehyde	75-07-0	1	Yes	Yes	Yes	3 1E-03 [4]	1 0E-04 [a]	2 4E-03 [a]	4 3E-04 [b]	1 0E-04 [a]	2 4E-03 [a]	4 3E-04 [b]	1 0E-04 [a]	2 4E-03 [a]	4 3E-04 [b]	**3.0E-04**	**7.2E-03**	**1.3E-03**
Acrolein	107-02-8	5	Yes	Yes	Yes	2 7E-03 [4]	8 7E-05 [a]	2 1E-03 [a]	3 8E-04 [b]	8 7E-05 [a]	2 1E-03 [a]	3 8E-04 [b]	8 7E-05 [a]	2 1E-03 [a]	3 8E-04 [b]	**2.6E-04**	**6.3E-03**	**1.1E-03**
Ammonia (From Combustion)	--	--	--	--	--	3 20 [4]	0 10 [a]	2 48 [a]	0 44 [b]	0 10 [a]	2 48 [a]	0 44 [b]	0 10 [a]	2 48 [a]	0 44 [b]	**0.31**	**7.45**	**1.33**
Ammonia (Slip)	--	--	--	--	--	--	0 38 [c]	9 17 [d]	1 64 [e]	0 38 [c]	9 17 [d]	1 64 [e]	0 38 [c]	9 17 [d]	1 64 [e]	**1.15**	**27.5**	**4.92**
Ammonia (Total)	7664-41-7	26	No	Yes	Yes	--	0 49 [5]	11 7 [5]	2 09 [5]	0 49 [5]	11 7 [5]	2 09 [5]	0 49 [5]	11 7 [5]	2 09 [5]	**1.46**	**35.0**	**6.26**
Benzene	71-43-2	46	Yes	Yes	Yes	5 8E-03 [4]	1 9E-04 [a]	4 5E-03 [a]	8 1E-04 [b]	1 9E-04 [a]	4 5E-03 [a]	8 1E-04 [b]	1 9E-04 [a]	4 5E-03 [a]	8 1E-04 [b]	**5.6E-04**	**0.014**	**2.4E-03**
Ethylbenzene	100-41-4	229	Yes	Yes	Yes	6 9E-03 [4]	2 2E-04 [a]	5 4E-03 [a]	9 6E-04 [b]	2 2E-04 [a]	5 4E-03 [a]	9 6E-04 [b]	2 2E-04 [a]	5 4E-03 [a]	9 6E-04 [b]	**6.7E-04**	**0.016**	**2.9E-03**
Formaldehyde	50-00-0	250	Yes	Yes	Yes	0 012 [4]	4 0E-04 [a]	9 6E-03 [a]	1 7E-03 [b]	4 0E-04 [a]	9 6E-03 [a]	1 7E-03 [b]	4 0E-04 [a]	9 6E-03 [a]	1 7E-03 [b]	**1.2E-03**	**0.029**	**5.1E-03**
Hexane	110-54-3	289	Yes	Yes	Yes	4 6E-03 [4]	1 5E-04 [a]	3 6E-03 [a]	6 4E-04 [b]	1 5E-04 [a]	3 6E-03 [a]	6 4E-04 [b]	1 5E-04 [a]	3 6E-03 [a]	6 4E-04 [b]	**4.5E-04**	**0.011**	**1.9E-03**
Toluene	108-88-3	600	Yes	Yes	Yes	0 027 [4]	8 6E-04 [a]	0 021 [a]	3 7E-03 [b]	8 6E-04 [a]	0 021 [a]	3 7E-03 [b]	8 6E-04 [a]	0 021 [a]	3 7E-03 [b]	**2.6E-03**	**0.062**	**0.011**
Xylene (mixture)	1330-20-7	628	Yes	Yes	Yes	0 020 [4]	6 4E-04 [a]	0 015 [a]	2 7E-03 [b]	6 4E-04 [a]	0 015 [a]	2 7E-03 [b]	6 4E-04 [a]	0 015 [a]	2 7E-03 [b]	**1.9E-03**	**0.046**	**8.2E-03**
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)																		
PAHs (excluding Naphthalene)	PAHs	401	Yes	Yes	Yes	1 0E-04 [4]	3 2E-06 [a]	7 8E-05 [a]	1 4E-05 [b]	3 2E-06 [a]	7 8E-05 [a]	1 4E-05 [b]	3 2E-06 [a]	7 8E-05 [a]	1 4E-05 [b]	**9.7E-06**	**2.3E-04**	**4.2E-05**
Benzo(a)pyrene	50-32-8	406	Yes	Yes	Yes	< 1 2E-06 [6]	3 9E-08 [a]	9 3E-07 [a]	1 7E-07 [b]	3 9E-08 [a]	9 3E-07 [a]	1 7E-07 [b]	3 9E-08 [a]	9 3E-07 [a]	1 7E-07 [b]	**1.2E-07**	**2.8E-06**	**5.0E-07**
Naphthalene	91-20-3	428	Yes	Yes	Yes	3 0E-04 [4]	9 7E-06 [a]	2 3E-04 [a]	4 2E-05 [b]	9 7E-06 [a]	2 3E-04 [a]	4 2E-05 [b]	9 7E-06 [a]	2 3E-04 [a]	4 2E-05 [b]	**2.9E-05**	**7.0E-04**	**1.3E-04**
TRACE METALS																		
Arsenic	7440-38-2	37	Yes	Yes	Yes	2 0E-04 [7]	6 5E-06 [a]	1 6E-04 [a]	2 8E-05 [b]	6 5E-06 [a]	1 6E-04 [a]	2 8E-05 [b]	6 5E-06 [a]	1 6E-04 [a]	2 8E-05 [b]	**1.9E-05**	**4.7E-04**	**8.3E-05**
Barium	7440-39-3	45	No	Yes	No	4 4E-03 [7]	1 4E-04 [a]	3 4E-03 [a]	6 1E-04 [b]	1 4E-04 [a]	3 4E-03 [a]	6 1E-04 [b]	1 4E-04 [a]	3 4E-03 [a]	6 1E-04 [b]	**4.3E-04**	**0.010**	**1.8E-03**
Beryllium	7440-41-7	58	Yes	Yes	Yes	< 1 2E-05 [7]	3 9E-07 [a]	9 3E-06 [a]	1 7E-06 [b]	3 9E-07 [a]	9 3E-06 [a]	1 7E-06 [b]	3 9E-07 [a]	9 3E-06 [a]	1 7E-06 [b]	**1.2E-06**	**2.8E-05**	**5.0E-06**
Cadmium	7440-43-9	83	Yes	Yes	Yes	1 1E-03 [7]	3 6E-05 [a]	8 5E-04 [a]	1 5E-04 [b]	3 6E-05 [a]	8 5E-04 [a]	1 5E-04 [b]	3 6E-05 [a]	8 5E-04 [a]	1 5E-04 [b]	**1.1E-04**	**2.6E-03**	**4.6E-04**
Chromium VI	18540-29-9	136	Yes	Yes	Yes	1 4E-03 [8]	4 5E-05 [a]	1 1E-03 [a]	1 9E-04 [b]	4 5E-05 [a]	1 1E-03 [a]	1 9E-04 [b]	4 5E-05 [a]	1 1E-03 [a]	1 9E-04 [b]	**1.4E-04**	**3.3E-03**	**5.8E-04**
Cobalt	7440-48-4	146	Yes	Yes	Yes	8 4E-05 [7]	2 7E-06 [a]	6 5E-05 [a]	1 2E-05 [b]	2 7E-06 [a]	6 5E-05 [a]	1 2E-05 [b]	2 7E-06 [a]	6 5E-05 [a]	1 2E-05 [b]	**8.2E-06**	**2.0E-04**	**3.5E-05**
Copper	7440-50-8	149	No	Yes	Yes	8 5E-04 [7]	2 8E-05 [a]	6 6E-04 [a]	1 2E-04 [b]	2 8E-05 [a]	6 6E-04 [a]	1 2E-04 [b]	2 8E-05 [a]	6 6E-04 [a]	1 2E-04 [b]	**8.3E-05**	**2.0E-03**	**3.5E-04**
Lead	7439-92-1	305	Yes	Yes	Yes	5 0E-04 [9]	1 6E-05 [a]	3 9E-04 [a]	6 9E-05 [b]	1 6E-05 [a]	3 9E-04 [a]	6 9E-05 [b]	1 6E-05 [a]	3 9E-04 [a]	6 9E-05 [b]	**4.9E-05**	**1.2E-03**	**2.1E-04**
Manganese	7439-96-5	312	Yes	Yes	Yes	3 8E-04 [7]	1 2E-05 [a]	3 0E-04 [a]	5 3E-05 [b]	1 2E-05 [a]	3 0E-04 [a]	5 3E-05 [b]	1 2E-05 [a]	3 0E-04 [a]	5 3E-05 [b]	**3.7E-05**	**8.9E-04**	**1.6E-04**
Mercury	7439-97-6	316	Yes	Yes	Yes	2 6E-04 [7]	8 4E-06 [a]	2 0E-04 [a]	3 6E-05 [b]	8 4E-06 [a]	2 0E-04 [a]	3 6E-05 [b]	8 4E-06 [a]	2 0E-04 [a]	3 6E-05 [b]	**2.5E-05**	**6.1E-04**	**1.1E-04**
Molybdenum trioxide	1313-27-5	361	No	Yes	No	1 7E-03 [f]	5 3E-05 [a]	1 3E-03 [a]	2 3E-04 [b]	5 3E-05 [a]	1 3E-03 [a]	2 3E-04 [b]	5 3E-05 [a]	1 3E-03 [a]	2 3E-04 [b]	**1.6E-04**	**3.8E-03**	**6.9E-04**
Nickel	7440-02-0	364	Yes	Yes	Yes	2 1E-03 [7]	6 8E-05 [a]	1 6E-03 [a]	2 9E-04 [b]	6 8E-05 [a]	1 6E-03 [a]	2 9E-04 [b]	6 8E-05 [a]	1 6E-03 [a]	2 9E-04 [b]	**2.0E-04**	**4.9E-03**	**8.8E-04**
Selenium	7782-49-2	575	Yes	Yes	Yes	< 2 4E-05 [7]	7 8E-07 [a]	1 9E-05 [a]	3 3E-06 [b]	7 8E-07 [a]	1 9E-05 [a]	3 3E-06 [b]	7 8E-07 [a]	1 9E-05 [a]	3 3E-06 [b]	**2.3E-06**	**5.6E-05**	**1.0E-05**
Vanadium (fume or dust)	7440-62-2	620	No	Yes	Yes	2 3E-03 [7]	7 4E-05 [a]	1 8E-03 [a]	3 2E-04 [b]	7 4E-05 [a]	1 8E-03 [a]	3 2E-04 [b]	7 4E-05 [a]	1 8E-03 [a]	3 2E-04 [b]	**2.2E-04**	**5.4E-03**	**9.6E-04**
Zinc	7440-66-6	632	No	Yes	No	0 029 [7]	9 4E-04 [a]	0 023 [a]	4 0E-03 [b]	9 4E-04 [a]	0 023 [a]	4 0E-03 [b]	9 4E-04 [a]	0 023 [a]	4 0E-03 [b]	**2.8E-03**	**0.068**	**0.012**
Total TAC Emission Estimates							**0.49**	**11.8**	**2.10**	**0.49**	**11.8**	**2.10**	**0.49**	**11.8**	**2.10**	**1.47**	**35.3**	**6.31**
Total HAP Emission Estimates							**2.8E-03**	**0.068**	**0.012**	**2.8E-03**	**0.068**	**0.012**	**2.8E-03**	**0.068**	**0.012**	**8.5E-03**	**0.21**	**0.037**
Total RBC Emission Estimates							**0.49**	**11.7**	**2.10**	**0.49**	**11.7**	**2.10**	**0.49**	**11.7**	**2.10**	**1.47**	**35.2**	**6.30**
Total Non-RBC Emission Estimates							**1.1E-03**	**0.027**	**4.9E-03**	**1.1E-03**	**0.027**	**4.9E-03**	**1.1E-03**	**0.027**	**4.9E-03**	**3.4E-03**	**0.082**	**0.015**

Color Key
MFA-Specific CAS number

NOTES:

HAP = hazardous air pollutant

MMscf = million standard cubic feet

MW = molecular weight

RBC = risk-based concentration

SCR = selective catalytic reduction

TAC = toxic air contaminant

Emission factors preceded by a less-than (<) symbol are based on method detection limits

(a) Hourly or daily emissions estimate (lb/ unit) = (emission factor [lb/MMscf]) x (hourly or daily natural gas usage [MMcf/hr or MMcf/day])

b) Annual emissions estimate (tons/yr) = (emission factor [lb/MMscf]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

(c) Hourly emissions estimate lb/hr) = (ammonia slip concentration [ppm] / 10^6) x (exhaust flowrate [dscfm]) x (60 min/hr) x (density of air [lb/ft^3]) / (mw of dry air [lb/lb-mol) x (mw of ammonia [lb/lb-mol)

(d) Daily emissions estimate lb/day) = (outlet concentration [ppm] / 10^6) x (exhaust flowrate [dscfm]) x (60 min/hr) x (density of air [lb/ft^3]) / (mw of dry air [lb/lb-mol) x (mw of pollutant [lb/lb-mol) / (hourly natural gas usage [MMcf/hr]) x (daily natural gas usage [MMcf/day])

(e) Annual emissions estimate (tons/yr) = (outlet concentration [ppm] / 10^6) x (exhaust flowrate [dscfm]) x (60 min/hr) x (density of air [lb/ft^3]) / (mw of dry air [lb/lb-mol) x (mw of pollutant [lb/lb-mol) / (hourly natural gas usage [MMcf/hr]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

(f) Molybdenum trioxide emission factor (lb/MMscf) = (elemental molybdenum emission factor [lb/MMscf]) x (MW of molybdenum trioxide [g/mol]) / (MW of elemental molybdenum [g/mol])

Elemental molybdenum emission factor lb/MMscf) =	1 1E-03	(7)
MW of molybdenum trioxide (g/mol) =	143 94	
MW of elemental molybdenum (g/mol) =	95 95	

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters

(2) See Table 44 Feed Heaters Criteria Pollutant and GHG Emission Estimates

(3) Engineering judgement based on equipment size and historical permitted ammonia slip limits

(4) Reporting Procedures for AB2588 Facilities for Reporting their Quadrennial Air Toxics Emissions Inventory published by the South Coast Air Quality Management District (SCAQMD) in December 2016 See Appendix B Table B-1 Default Emission Factors for Natural Gas Combustion for external combustion equipment between 10-100 MMBtu/hr Ammonia emission factor represents no control

(5) Value represents the sum total of ammonia emissions estimates from natural gas-fired combustion and ammonia slip from SCR control device

(6) AP-42 Chapter 1 4 (July 1998) Table 1 4-3 Emission Factors for Speciated Organic Compounds from Natural Gas Combustion

(7) AP-42 Chapter 1 4 (July 1998) Table 1 4-4 Emission Factors for Metals from Natural Gas Combustion

(8) AP-42 Chapter 1 4 (July 1998) Table 1 4-4 Emission Factors for Metals from Natural Gas Combustion Emission factor representative of total chromium For CAO purposes the total chromium emission factor is conservatively assumed to be equal to hexavalent chromium

(9) AP-42 Chapter 1 4 (July 1998) Table 1 4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion

Table 10
Isomerization Heaters TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Ecofining Units—Isomerization Heaters		
		Train no. 1	Train no. 2	Train no. 3
Hourly Natural Gas Usage (MMcf/hr)	(1)	4 9E-03	4 9E-03	4 9E-03
Daily Natural Gas Usage (MMcf/day)	(1)	0 12	0 12	0 12
Annual Natural Gas Usage (MMcf/yr)	(1)	42 1	42 1	42 1
EXHAUST PARAMETERS				
Exhaust Outlet Flowrate (dscfm)	(2)	882	882	882
Ammonia Slip Outlet Concentration (ppm)	(3)	25	25	25
GENERAL				
Density of Air (lb/ft³ at 70°F and 14 7 psi)		0 07487		
MW of Dry Air (lb/lb-mol)		28 9647		
MW of Ammonia (lb/lb-mol)		17 031		

Toxic Air Contaminant	CAS No.	DEQ Sequence No.	Regulatory Category (Yes/No)			Emission Factor (lb/MMscf)	Ecofining Units—Isomerization Heaters Emission Estimates											
							Train no. 1			Train no. 2			Train no. 3			Total		
			HAP	TAC	RBC		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
SPECIATED ORGANIC/INORGANIC COMPOUNDS																		
Acetaldehyde	75-07-0	1	Yes	Yes	Yes	4 3E-03 (5)	2 1E-05 (a)	5 1E-04 (a)	9 1E-05 (b)	2 1E-05 (a)	5 1E-04 (a)	9 1E-05 (b)	2 1E-05 (a)	5 1E-04 (a)	9 1E-05 (b)	**6.3E-05**	**1.5E-03**	**2.7E-04**
Acrolein	107-02-8	5	Yes	Yes	Yes	2 7E-03 (5)	1 3E-05 (a)	3 2E-04 (a)	5 7E-05 (b)	1 3E-05 (a)	3 2E-04 (a)	5 7E-05 (b)	1 3E-05 (a)	3 2E-04 (a)	5 7E-05 (b)	**4.0E-05**	**9.5E-04**	**1.7E-04**
Ammonia From Combustion)	--	--	--	--	--	3 20 (5)	0 016 (a)	0 38 (a)	0 067 (b)	0 016 (a)	0 38 (a)	0 067 (b)	0 016 (a)	0 38 (a)	0 067 (b)	**0.047**	**1.13**	**0.20**
Ammonia (Slip)	--	--	--	--	--	--	0 058 (c)	1 40 (d)	0 25 (e)	0 058 (c)	1 40 (d)	0 25 (e)	0 058 (c)	1 40 (d)	0 25 (e)	**0.17**	**4.19**	**0.75**
Ammonia (Total)	7664-41-7	26	No	Yes	Yes	--	0 074 (6)	1 77 (6)	0 32 (6)	0 074 (6)	1 77 (6)	0 32 (6)	0 074 (6)	1 77 (6)	0 32 (6)	**0.22**	**5.32**	**0.95**
Benzene	71-43-2	46	Yes	Yes	Yes	8 0E-03 (5)	3 9E-05 (a)	9 4E-04 (a)	1 7E-04 (b)	3 9E-05 (a)	9 4E-04 (a)	1 7E-04 (b)	3 9E-05 (a)	9 4E-04 (a)	1 7E-04 (b)	**1.2E-04**	**2.8E-03**	**5.1E-04**
Ethylbenzene	100-41-4	229	Yes	Yes	Yes	9 5E-03 (5)	4 7E-05 (a)	1 1E-03 (a)	2 0E-04 (b)	4 7E-05 (a)	1 1E-03 (a)	2 0E-04 (b)	4 7E-05 (a)	1 1E-03 (a)	2 0E-04 (b)	**1.4E-04**	**3.4E-03**	**6.0E-04**
Formaldehyde	50-00-0	250	Yes	Yes	Yes	0 017 (5)	8 3E-05 (a)	2 0E-03 (a)	3 6E-04 (b)	8 3E-05 (a)	2 0E-03 (a)	3 6E-04 (b)	8 3E-05 (a)	2 0E-03 (a)	3 6E-04 (b)	**2.5E-04**	**6.0E-03**	**1.1E-03**
Hexane	110-54-3	289	Yes	Yes	Yes	6 3E-03 (5)	3 1E-05 (a)	7 4E-04 (a)	1 3E-04 (b)	3 1E-05 (a)	7 4E-04 (a)	1 3E-04 (b)	3 1E-05 (a)	7 4E-04 (a)	1 3E-04 (b)	**9.3E-05**	**2.2E-03**	**4.0E-04**
Toluene	108-88-3	600	Yes	Yes	Yes	0 037 (5)	1 8E-04 (a)	4 3E-03 (a)	7 7E-04 (b)	1 8E-04 (a)	4 3E-03 (a)	7 7E-04 (b)	1 8E-04 (a)	4 3E-03 (a)	7 7E-04 (b)	**5.4E-04**	**0.013**	**2.3E-03**
Xylene (mixture)	1330-20-7	628	Yes	Yes	Yes	0 027 (5)	1 3E-04 (a)	3 2E-03 (a)	5 7E-04 (b)	1 3E-04 (a)	3 2E-03 (a)	5 7E-04 (b)	1 3E-04 (a)	3 2E-03 (a)	5 7E-04 (b)	**4.0E-04**	**9.6E-03**	**1.7E-03**
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)																		
PAHs (excluding Naphthalene)	PAHs	401	Yes	Yes	Yes	1 0E-04 (5)	4 9E-07 (a)	1 2E-05 (a)	2 1E-06 (b)	4 9E-07 (a)	1 2E-05 (a)	2 1E-06 (b)	4 9E-07 (a)	1 2E-05 (a)	2 1E-06 (b)	**1.5E-06**	**3.5E-05**	**6.3E-06**
Benzo(a)pyrene	50-32-8	406	Yes	Yes	Yes	< 1 2E-06 (7)	5 9E-09 (a)	1 4E-07 (a)	2 5E-08 (b)	5 9E-09 (a)	1 4E-07 (a)	2 5E-08 (b)	5 9E-09 (a)	1 4E-07 (a)	2 5E-08 (b)	**1.8E-08**	**4.2E-07**	**7.6E-08**
Naphthalene	91-20-3	428	Yes	Yes	Yes	3 0E-04 (5)	1 5E-06 (a)	3 5E-05 (a)	6 3E-06 (b)	1 5E-06 (a)	3 5E-05 (a)	6 3E-06 (b)	1 5E-06 (a)	3 5E-05 (a)	6 3E-06 (b)	**4.4E-06**	**1.1E-04**	**1.9E-05**
TRACE METALS																		
Arsenic	7440-38-2	37	Yes	Yes	Yes	2 0E-04 (8)	9 8E-07 (a)	2 4E-05 (a)	4 2E-06 (b)	9 8E-07 (a)	2 4E-05 (a)	4 2E-06 (b)	9 8E-07 (a)	2 4E-05 (a)	4 2E-06 (b)	**2.9E-06**	**7.1E-05**	**1.3E-05**
Barium	7440-39-3	45	No	Yes	No	4 4E-03 (8)	2 2E-05 (a)	5 2E-04 (a)	9 3E-05 (b)	2 2E-05 (a)	5 2E-04 (a)	9 3E-05 (b)	2 2E-05 (a)	5 2E-04 (a)	9 3E-05 (b)	**6.5E-05**	**1.6E-03**	**2.8E-04**
Beryllium	7440-41-7	58	Yes	Yes	Yes	< 1 2E-05 (8)	5 9E-08 (a)	1 4E-06 (a)	2 5E-07 (b)	5 9E-08 (a)	1 4E-06 (a)	2 5E-07 (b)	5 9E-08 (a)	1 4E-06 (a)	2 5E-07 (b)	**1.8E-07**	**4.2E-06**	**7.6E-07**
Cadmium	7440-43-9	83	Yes	Yes	Yes	1 1E-03 (8)	5 4E-06 (a)	1 3E-04 (a)	2 3E-05 (b)	5 4E-06 (a)	1 3E-04 (a)	2 3E-05 (b)	5 4E-06 (a)	1 3E-04 (a)	2 3E-05 (b)	**1.6E-05**	**3.9E-04**	**6.9E-05**
Chromium VI	18540-29-9	136	Yes	Yes	Yes	1 4E-03 (9)	6 9E-06 (a)	1 6E-04 (a)	2 9E-05 (b)	6 9E-06 (a)	1 6E-04 (a)	2 9E-05 (b)	6 9E-06 (a)	1 6E-04 (a)	2 9E-05 (b)	**2.1E-05**	**4.9E-04**	**8.8E-05**
Cobalt	7440-48-4	146	Yes	Yes	Yes	8 4E-05 (8)	4 1E-07 (a)	9 9E-06 (a)	1 8E-06 (b)	4 1E-07 (a)	9 9E-06 (a)	1 8E-06 (b)	4 1E-07 (a)	9 9E-06 (a)	1 8E-06 (b)	**1.2E-06**	**3.0E-05**	**5.3E-06**
Copper	7440-50-8	149	No	Yes	Yes	8 5E-04 (8)	4 2E-06 (a)	1 0E-04 (a)	1 8E-05 (b)	4 2E-06 (a)	1 0E-04 (a)	1 8E-05 (b)	4 2E-06 (a)	1 0E-04 (a)	1 8E-05 (b)	**1.3E-05**	**3.0E-04**	**5.4E-05**
Lead	7439-92-1	305	Yes	Yes	Yes	5 0E-04 (10)	2 5E-06 (a)	5 9E-05 (a)	1 1E-05 (b)	2 5E-06 (a)	5 9E-05 (a)	1 1E-05 (b)	2 5E-06 (a)	5 9E-05 (a)	1 1E-05 (b)	**7.4E-06**	**1.8E-04**	**3.2E-05**
Manganese	7439-96-5	312	Yes	Yes	Yes	3 8E-04 (8)	1 9E-06 (a)	4 5E-05 (a)	8 0E-06 (b)	1 9E-06 (a)	4 5E-05 (a)	8 0E-06 (b)	1 9E-06 (a)	4 5E-05 (a)	8 0E-06 (b)	**5.6E-06**	**1.3E-04**	**2.4E-05**
Mercury	7439-97-6	316	Yes	Yes	Yes	2 6E-04 (8)	1 3E-06 (a)	3 1E-05 (a)	5 5E-06 (b)	1 3E-06 (a)	3 1E-05 (a)	5 5E-06 (b)	1 3E-06 (a)	3 1E-05 (a)	5 5E-06 (b)	**3.8E-06**	**9.2E-05**	**1.6E-05**
Molybdenum trioxide	1313-27-5	361	No	Yes	No	1 7E-03 (f)	8 1E-06 (a)	1 9E-04 (a)	3 5E-05 (b)	8 1E-06 (a)	1 9E-04 (a)	3 5E-05 (b)	8 1E-06 (a)	1 9E-04 (a)	3 5E-05 (b)	**2.4E-05**	**5.8E-04**	**1.0E-04**
Nickel	7440-02-0	364	Yes	Yes	Yes	2 1E-03 (8)	1 0E-05 (a)	2 5E-04 (a)	4 4E-05 (b)	1 0E-05 (a)	2 5E-04 (a)	4 4E-05 (b)	1 0E-05 (a)	2 5E-04 (a)	4 4E-05 (b)	**3.1E-05**	**7.4E-04**	**1.3E-04**
Selenium	7782-49-2	575	Yes	Yes	Yes	< 2 4E-05 (8)	1 2E-07 (a)	2 8E-06 (a)	5 1E-07 (b)	1 2E-07 (a)	2 8E-06 (a)	5 1E-07 (b)	1 2E-07 (a)	2 8E-06 (a)	5 1E-07 (b)	**3.5E-07**	**8.5E-06**	**1.5E-06**
Vanadium (fume or dust)	7440-62-2	620	No	Yes	Yes	2 3E-03 (8)	1 1E-05 (a)	2 7E-04 (a)	4 8E-05 (b)	1 1E-05 (a)	2 7E-04 (a)	4 8E-05 (b)	1 1E-05 (a)	2 7E-04 (a)	4 8E-05 (b)	**3.4E-05**	**8.1E-04**	**1.5E-04**
Zinc	7440-66-6	632	No	Yes	No	0 029 (8)	1 4E-04 (a)	3 4E-03 (a)	6 1E-04 (b)	1 4E-04 (a)	3 4E-03 (a)	6 1E-04 (b)	1 4E-04 (a)	3 4E-03 (a)	6 1E-04 (b)	**4.3E-04**	**0.010**	**1.8E-03**
Total TAC Emission Estimates							**0.075**	**1.79**	**0.32**	**0.075**	**1.79**	**0.32**	**0.075**	**1.79**	**0.32**	**0.22**	**5.38**	**0.96**
Total HAP Emission Estimates							**5.8E-04**	**0.014**	**2.5E-03**	**5.8E-04**	**0.014**	**2.5E-03**	**5.8E-04**	**0.014**	**2.5E-03**	**1.7E-03**	**0.042**	**7.5E-03**
Total RBC Emission Estimates							**0.075**	**1.79**	**0.32**	**0.075**	**1.79**	**0.32**	**0.075**	**1.79**	**0.32**	**0.22**	**5.37**	**0.96**
Total Non-RBC Emission Estimates							**1.7E-04**	**4.1E-03**	**7.4E-04**	**1.7E-04**	**4.1E-03**	**7.4E-04**	**1.7E-04**	**4.1E-03**	**7.4E-04**	**5.2E-04**	**0.012**	**2.2E-03**

Color Key
MFA-Specific CAS number

NOTES:

HAP = hazardous air pollutant

MMscf = million standard cubic feet

MW = molecular weight

RBC = risk-based concentration

SCR = selective catalytic reduction

TAC = toxic air contaminant

Emission factors preceded by a less-than (<) symbol are based on method detection limits

(a) Hourly or daily emissions estimate (lb/ unit) = (emission factor [lb/MMscf]) x (hourly or daily natural gas usage [MMcf/hr or MMcf/day])

b) Annual emissions estimate (tons/yr) = (emission factor [lb/MMscf]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

(c) Hourly emissions estimate (lb/hr) = (ammonia slip concentration [ppm] / 10^6) x (exhaust flowrate [dscfm]) x (60 min/hr) x (density of air [lb/ft³]) / (mw of dry air [lb/lb-mol) x (mw of ammonia [lb/lb-mol)

(d) Daily emissions estimate (lb/day) = (outlet concentration [ppm] / 10^6) x (exhaust flowrate [dscfm]) x (60 min/hr) x (density of air [lb/ft³]) / (mw of dry air [lb/lb-mol) x (mw of pollutant [lb/lb-mol) / (hourly natural gas usage [MMcf/hr]) x (daily natural gas usage [MMcf/day])

(e) Annual emissions estimate (tons/yr) = (outlet concentration [ppm] / 10^6) x (exhaust flowrate [dscfm]) x (60 min/hr) x (density of air [lb/ft³]) / (mw of dry air [lb/lb-mol) x (mw of pollutant [lb/lb-mol) / (hourly natural gas usage [MMcf/hr]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

(f) Molybdenum trioxide emission factor lb/MMscf) = (elemental molybdenum emission factor [lb/MMscf]) x (MW of molybdenum trioxide [g/mol]) / (MW of elemental molybdenum [g/mol])

Elemental molybdenum emission factor (lb/MMscf) =	1 1E-03	(8)
MW of molybdenum trioxide (g/mol) =	143 94	
MW of elemental molybdenum (g/mol) =	95 95	

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters

(2) See Table 45 Isomerization Unit Heaters Criteria Pollutant and GHG Emission Estimates

(3) Engineering judgement based on equipment size and historical permitted ammonia slip limits

(4) Information provided by NEXT Renewable Fuels Oregon LLC

(5) Reporting Procedures for AB2588 Facilities for Reporting their Quadrennial Air Toxics Emissions Inventory published by the South Coast Air Quality Management District (SCAQMD) in December 2016 See Appendix B Table B-1 Default Emission Factors for Natural Gas Combustion for external combustion equipment less than 10 MMBtu/hr Ammonia emission factor represents no control

(6) Value represents the sum total of ammonia emissions estimates from natural gas-fired combustion and ammonia slip from SCR control device

(7) AP-42 Chapter 1 4 (July 1998) Table 1 4-3 Emission Factors for Speciated Organic Compounds from Natural Gas Combustion

(8) AP-42 Chapter 1 4 (July 1998) Table 1 4-4 Emission Factors for Metals from Natural Gas Combustion

(9) AP-42 Chapter 1 4 (July 1998) Table 1 4-4 Emission Factors for Metals from Natural Gas Combustion Emission factor representative of total chromium For CAO purposes the total chromium emission factor is conservatively assumed to be equal to hexavalent chromium

(10) AP-42 Chapter 1 4 (July 1998) Table 1 4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion

Table 11
Jet Fractionator TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Jet Fractionator
Hourly Natural Gas Usage (MMcf/hr)	[1]	0.11
Daily Natural Gas Usage (MMcf/day)	[1]	2.76
Annual Natural Gas Usage (MMcf/yr)	[1]	987
EXHAUST PARAMETERS		
Exhaust Outlet Flowrate (dscfm)	[2]	32 009
Ammonia Slip Outlet Concentration (ppm)	[3]	10
GENERAL		
Density of Air (lb/ft^3 at 70°F and 14.7 psi)		0.07487
MW of Dry Air (lb/lb-mol)		28.9647
MW of Ammonia (lb/lb-mol)		17 031

Toxic Air Contaminant	CAS No.	DEQ Sequence No.	Regulatory Category (Yes/No)			Emission Factor (lb/MMscf)	Emission Estimates		
			HAP	TAC	RBC		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
SPECIATED ORGANIC/INORGANIC COMPOUNDS									
Acetaldehyde	75-07-0	1	Yes	Yes	Yes	9.0E-04 [4]	1.0E-04 [a]	2.5E-03 [a]	4.4E-04 [b]
Acrolein	107-02-8	5	Yes	Yes	Yes	8.0E-04 [4]	9.2E-05 [a]	2.2E-03 [a]	3.9E-04 [b]
Ammonia (From Combustion)	--	--	--	--	--	3.20 [4]	0.37 [a]	8 82 [a]	1.58 [b]
Ammonia (Slip)	--	--	--	--	--	--	0.85 [c]	20.3 [d]	3.63 [e]
Ammonia (Total)	7664-41-7	26	No	Yes	Yes	--	1.21 [5]	29.1 [5]	5.21 [5]
Benzene	71-43-2	46	Yes	Yes	Yes	1.7E-03 [4]	2.0E-04 [a]	4.7E-03 [a]	8.4E-04 [b]
Ethylbenzene	100-41-4	229	Yes	Yes	Yes	2.0E-03 [4]	2.3E-04 [a]	5.5E-03 [a]	9.9E-04 [b]
Formaldehyde	50-00-0	250	Yes	Yes	Yes	3.6E-03 [4]	4.1E-04 [a]	9.9E-03 [a]	1.8E-03 [b]
Hexane	110-54-3	289	Yes	Yes	Yes	1.3E-03 [4]	1.5E-04 [a]	3.6E-03 [a]	6.4E-04 [b]
Toluene	108-88-3	600	Yes	Yes	Yes	7.8E-03 [4]	9.0E-04 [a]	0.022 [a]	3.8E-03 [b]
Xylene (mixture)	1330-20-7	628	Yes	Yes	Yes	5.8E-03 [4]	6.7E-04 [a]	0.016 [a]	2.9E-03 [b]
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)									
PAHs (excluding Naphthalene)	PAHs	401	Yes	Yes	Yes	1.0E-04 [4]	1.1E-05 [a]	2.8E-04 [a]	4.9E-05 [b]
Benzo(a)pyrene	50-32-8	406	Yes	Yes	Yes	< 1.2E-06 [6]	1.4E-07 [a]	3.3E-06 [a]	5.9E-07 [b]
Naphthalene	91-20-3	428	Yes	Yes	Yes	3.0E-04 [4]	3.4E-05 [a]	8.3E-04 [a]	1.5E-04 [b]
TRACE METALS									
Arsenic	7440-38-2	37	Yes	Yes	Yes	2.0E-04 [7]	2.3E-05 [a]	5.5E-04 [a]	9.9E-05 [b]
Barium	7440-39-3	45	No	Yes	No	4.4E-03 [7]	5.1E-04 [a]	0.012 [a]	2.2E-03 [b]
Beryllium	7440-41-7	58	Yes	Yes	Yes	< 1.2E-05 [7]	1.4E-06 [a]	3.3E-05 [a]	5.9E-06 [b]
Cadmium	7440-43-9	83	Yes	Yes	Yes	1.1E-03 [7]	1.3E-04 [a]	3.0E-03 [a]	5.4E-04 [b]
Chromium VI	18540-29-9	136	Yes	Yes	Yes	1.4E-03 [8]	1.6E-04 [a]	3.9E-03 [a]	6.9E-04 [b]
Cobalt	7440-48-4	146	Yes	Yes	Yes	8.4E-05 [7]	9.7E-06 [a]	2.3E-04 [a]	4.1E-05 [b]
Copper	7440-50-8	149	No	Yes	Yes	8.5E-04 [7]	9.8E-05 [a]	2.3E-03 [a]	4.2E-04 [b]
Lead	7439-92-1	305	Yes	Yes	Yes	5.0E-04 [9]	5.7E-05 [a]	1.4E-03 [a]	2.5E-04 [b]
Manganese	7439-96-5	312	Yes	Yes	Yes	3.8E-04 [7]	4.4E-05 [a]	1.0E-03 [a]	1.9E-04 [b]
Mercury	7439-97-6	316	Yes	Yes	Yes	2.6E-04 [7]	3.0E-05 [a]	7.2E-04 [a]	1.3E-04 [b]
Molybdenum trioxide	1313-27-5	361	No	Yes	No	1.7E-03 [f]	1.9E-04 [a]	4.6E-03 [a]	8.1E-04 [b]
Nickel	7440-02-0	364	Yes	Yes	Yes	2.1E-03 [7]	2.4E-04 [a]	5.8E-03 [a]	1.0E-03 [b]
Selenium	7782-49-2	575	Yes	Yes	Yes	< 2.4E-05 [7]	2.8E-06 [a]	6.6E-05 [a]	1.2E-05 [b]
Vanadium (fume or dust)	7440-62-2	620	No	Yes	Yes	2.3E-03 [7]	2.6E-04 [a]	6.3E-03 [a]	1.1E-03 [b]
Zinc	7440-66-6	632	No	Yes	No	0.029 [7]	3.3E-03 [a]	0.080 [a]	0.014 [b]
Total TAC Emission Estimates							**1.22**	**29.3**	**5.25**
Total HAP Emission Estimates							**3.5E-03**	**0.084**	**0.015**
Total RBC Emission Estimates							**1.22**	**29.2**	**5.23**
Total Non-RBC Emission Estimates							**4.0E-03**	**0.097**	**0.017**

Color Key
MFA-Specific CAS number.

NOTES:

HAP = hazardous air pollutant.

MMscf = million standard cubic feet.

MW = molecular weight.

RBC = risk-based concentration.

TAC = toxic air contaminant.

Emission factors preceded by a less-than (<) symbol are based on method detection limits.

(a) Hourly or daily emissions estimate (lb/"unit") = (emission factor [lb/MMscf]) x (hourly or daily natural gas usage [MMcf/hr or MMcf/day])

(b) Annual emissions estimate (tons/yr) = (emission factor [lb/MMscf]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

(c) Hourly emissions estimate (lb/hr) = (ammonia slip concentration [ppm] / 10^6) x (exhaust flowrate [dscfm]) x (60 min/hr) x (density of air [lb/ft^3]) / (mw of dry air [lb/lb-mol]) x (mw of ammonia [lb/lb-mol])

(d) Daily emissions estimate (lb/day) = (outlet concentration [ppm] / 10^6) x (exhaust flowrate [dscfm]) x (60 min/hr) x (density of air [lb/ft^3]) / (mw of dry air [lb/lb-mol]) x (mw of pollutant [lb/lb-mol]) / (hourly natural gas usage [MMcf/hr]) x (daily natural gas usage [MMcf/day])

(e) Annual emissions estimate (tons/yr) = (outlet concentration [ppm] / 10^6) x (exhaust flowrate [dscfm]) x (60 min/hr) x (density of air [lb/ft^3]) / (mw of dry air [lb/lb-mol]) x (mw of pollutant [lb/lb-mol]) / (hourly natural gas usage [MMcf/hr]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

(f) Molybdenum trioxide emission factor (lb/MMscf) = (elemental molybdenum emission factor [lb/MMscf]) x (MW of molybdenum trioxide [g/mol]) / (MW of elemental molybdenum [g/mol])

Elemental molybdenum emission factor (lb/MMscf) = 1.1E-03 (7)

MW of molybdenum trioxide (g/mol) = 143.94

MW of elemental molybdenum (g/mol) = 95.95

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters.

(2) See Table 46 Jet Fractionator Criteria Pollutant and GHG Emission Estimates.

(3) See Victory Energy 50 000 PPH Voyager Series Package Boiler proposal dated May 12 2021. See section 4 0. Ammonia slip limit corrected to 3% oxygen content.

(4) Reporting Procedures for AB2588 Facilities for Reporting their Quadrennial Air Toxics Emissions Inventory published by the South Coast Air Quality Management District (SCAQMD) in December 2016. See Appendix B Table B-1 "Default Emission Factors for Natural Gas Combustion" for external combustion equipment >100 MMBtu/hr. Ammonia emission factor represents no control.

(5) Value represents the sum total of ammonia emissions estimates from natural gas-fired combustion and ammonia slip from SCR control device.

(6) AP-42 Chapter 1.4 (July 1998) Table 1.4-3 "Emission Factors for Speciated Organic Compounds from Natural Gas Combustion."

(7) AP-42 Chapter 1.4 (July 1998) Table 1.4-4 "Emission Factors for Metals from Natural Gas Combustion."

(8) AP-42 Chapter 1.4 (July 1998) Table 1.4-4 "Emission Factors for Metals from Natural Gas Combustion." Emission factor representative of total chromium. For purposes of Cleaner Air Oregon the total chromium emission factor is conservatively assumed to be equal to hexavalent chromium.

(9) AP-42 Chapter 1.4 (July 1998) Table 1.4-2 "Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion."

Table 12
Hydrogen Plant Heater TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Hydrogen Plant Heater		
		Natural Gas-Fired Combustion	PSA Tail Gas Only	Total
Hourly Fuel Usage (MMcf/hr)	(1)	0.11	2.60	--
Daily Fuel Usage (MMcf/day)	(1)	2.52	62 5	--
Annual Fuel Usage (MMcf/yr)	(1)	902	22 365	--
[redacted]				--
EXHAUST PARAMETERS				
Exhaust Outlet Flowrate (dscfm)	(3)	--	--	126 983
Ammonia Slip Outlet Concentration (ppm)	(4)	--	--	10
GENERAL				
Density of Air (lb/ft^3 at 70°F and 14 7 psi)		--	--	0.07487
MW of Dry Air (lb/lb-mol)		--	--	28.9647
MW of Ammonia (lb/lb-mol)		--	--	17.031

Toxic Air Contaminant	CAS No.	DEQ Sequence No.	Regulatory Category (Yes/No)			Emission Factor (lb/MMscf)	Emission Estimates								
							Natural Gas-Fired Combustion			PSA Tail Gas Combustion			Total		
			HAP	TAC	RBC		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
SPECIATED ORGANIC/INORGANIC COMPOUNDS															
Acetaldehyde	75-07-0	1	Yes	Yes	Yes	9.0E-04 (5)	9.5E-05 (a)	2.3E-03 (a)	4.1E-04 (b)	3.1E-04 [redacted]	7.5E-03 [redacted]	1.3E-03 [redacted]	4.1E-04 (6)	9.8E-03 (6)	1.7E-03 (6)
Acrolein	107-02-8	5	Yes	Yes	Yes	8.0E-04 (5)	8.4E-05 (a)	2.0E-03 (a)	3.6E-04 (b)	2.8E-04 [redacted]	6.7E-03 [redacted]	1.2E-03 [redacted]	3.6E-04 (6)	8.7E-03 (6)	1.6E-03 (6)
Ammonia (From Combustion)	--	--	--	--	--	3 20 (5)	0.34 (a)	8.06 (a)	1.44 (b)	--	--	--	0.34 (6)	8.06 (6)	1.44 (6)
Ammonia (Slip)	--	--	--	--	--	--	--	--	--	--	--	--	3.35 (f)	80 5 (g)	14.4 (h)
Ammonia (Total)	7664-41-7	26	No	Yes	Yes	--	0.34 (7)	8.06 (7)	1.44 (7)	--	--	--	3.69 (7)	88 6 (7)	15.9 (7)
Benzene	71-43-2	46	Yes	Yes	Yes	1.7E-03 (5)	1.8E-04 (a)	4.3E-03 (a)	7.7E-04 (b)	5.9E-04 [redacted]	0 014 [redacted]	2.5E-03 [redacted]	7.7E-04 (6)	0 018 (6)	3.3E-03 (6)
Ethylbenzene	100-41-4	229	Yes	Yes	Yes	2.0E-03 (5)	2.1E-04 (a)	5.0E-03 (a)	9.0E-04 (b)	6.9E-04 [redacted]	0 017 [redacted]	3.0E-03 [redacted]	9.0E-04 (6)	0 022 (6)	3.9E-03 (6)
Formaldehyde	50-00-0	250	Yes	Yes	Yes	3.6E-03 (5)	3.8E-04 (a)	9.1E-03 (a)	1.6E-03 (b)	1.2E-03 [redacted]	0 030 [redacted]	5.4E-03 [redacted]	1.6E-03 (6)	0 039 (6)	7.0E-03 (6)
Hexane	110-54-3	289	Yes	Yes	Yes	1.3E-03 (5)	1.4E-04 (a)	3.3E-03 (a)	5.9E-04 (b)	4.5E-04 [redacted]	0 011 [redacted]	1.9E-03 [redacted]	5.9E-04 (6)	0 014 (6)	2.5E-03 (6)
Toluene	108-88-3	600	Yes	Yes	Yes	7.8E-03 (5)	8.2E-04 (a)	0 020 (a)	3.5E-03 (b)	2.7E-03 [redacted]	0 065 [redacted]	0 012 [redacted]	3.5E-03 (6)	0 085 (6)	0 015 (6)
Xylene (mixture)	1330-20-7	628	Yes	Yes	Yes	5.8E-03 (5)	6.1E-04 (a)	0 015 (a)	2.6E-03 (b)	2.0E-03 [redacted]	0 048 [redacted]	8.6E-03 [redacted]	2.6E-03 (6)	0 063 (6)	0 011 (6)
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)															
PAHs (excluding Naphthalene)	PAHs	401	Yes	Yes	Yes	1.0E-04 (5)	1.1E-05 (a)	2.5E-04 (a)	4.5E-05 (b)	3.5E-05 [redacted]	8.3E-04 [redacted]	1.5E-04 [redacted]	4.5E-05 (6)	1.1E-03 (6)	1.9E-04 (6)
Benzo(a)pyrene	50-32-8	406	Yes	Yes	Yes	< 1.2E-06 (8)	1.3E-07 (a)	3.0E-06 (a)	5.4E-07 (b)	4.2E-07 [redacted]	1.0E-05 [redacted]	1.8E-06 [redacted]	5.4E-07 (6)	1.3E-05 (6)	2.3E-06 (6)
Naphthalene	91-20-3	428	Yes	Yes	Yes	3.0E-04 (5)	3.2E-05 (a)	7.6E-04 (a)	1.4E-04 (b)	1.0E-04 [redacted]	2.5E-03 [redacted]	4.5E-04 [redacted]	1.4E-04 (6)	3.3E-03 (6)	5.8E-04 (6)
TRACE METALS															
Arsenic	7440-38-2	37	Yes	Yes	Yes	2.0E-04 (9)	2.1E-05 (a)	5.0E-04 (a)	9.0E-05 (b)	--	--	--	2.1E-05 (6)	5.0E-04 (6)	9.0E-05 (6)
Barium	7440-39-3	45	No	Yes	No	4.4E-03 (9)	4.6E-04 (a)	0 011 (a)	2.0E-03 (b)	--	--	--	4.6E-04 (6)	0 011 (6)	2.0E-03 (6)
Beryllium	7440-41-7	58	Yes	Yes	Yes	< 1.2E-05 (9)	1.3E-06 (a)	3.0E-05 (a)	5.4E-06 (b)	--	--	--	1.3E-06 (6)	3.0E-05 (6)	5.4E-06 (6)
Cadmium	7440-43-9	83	Yes	Yes	Yes	1.1E-03 (9)	1.2E-04 (a)	2.8E-03 (a)	5.0E-04 (b)	--	--	--	1.2E-04 (6)	2.8E-03 (6)	5.0E-04 (6)
Chromium VI	18540-29-9	136	Yes	Yes	Yes	1.4E-03 (10)	1.5E-04 (a)	3.5E-03 (a)	6.3E-04 (b)	--	--	--	1.5E-04 (6)	3.5E-03 (6)	6.3E-04 (6)
Cobalt	7440-48-4	146	Yes	Yes	Yes	8.4E-05 (9)	8.8E-06 (a)	2.1E-04 (a)	3.8E-05 (b)	--	--	--	8.8E-06 (6)	2.1E-04 (6)	3.8E-05 (6)
Copper	7440-50-8	149	No	Yes	Yes	8.5E-04 (9)	8.9E-05 (a)	2.1E-03 (a)	3.8E-04 (b)	--	--	--	8.9E-05 (6)	2.1E-03 (6)	3.8E-04 (6)
Lead	7439-92-1	305	Yes	Yes	Yes	5.0E-04 (11)	5.3E-05 (a)	1.3E-03 (a)	2.3E-04 (b)	--	--	--	5.3E-05 (6)	1.3E-03 (6)	2.3E-04 (6)
Manganese	7439-96-5	312	Yes	Yes	Yes	3.8E-04 (9)	4.0E-05 (a)	9.6E-04 (a)	1.7E-04 (b)	--	--	--	4.0E-05 (6)	9.6E-04 (6)	1.7E-04 (6)
Mercury	7439-97-6	316	Yes	Yes	Yes	2.6E-04 (9)	2.7E-05 (a)	6.6E-04 (a)	1.2E-04 (b)	--	--	--	2.7E-05 (6)	6.6E-04 (6)	1.2E-04 (6)
Molybdenum trioxide	1313-27-5	361	No	Yes	No	1.7E-03 (h)	1.7E-04 (a)	4.2E-03 (a)	7.4E-04 (b)	--	--	--	1.7E-04 (6)	4.2E-03 (6)	7.4E-04 (6)
Nickel	7440-02-0	364	Yes	Yes	Yes	2.1E-03 (9)	2.2E-04 (a)	5.3E-03 (a)	9.5E-04 (b)	--	--	--	2.2E-04 (6)	5.3E-03 (6)	9.5E-04 (6)
Selenium	7782-49-2	575	Yes	Yes	Yes	< 2.4E-05 (9)	2.5E-06 (a)	6.0E-05 (a)	1.1E-05 (b)	--	--	--	2.5E-06 (6)	6.0E-05 (6)	1.1E-05 (6)
Vanadium (fume or dust)	7440-62-2	620	No	Yes	Yes	2.3E-03 (9)	2.4E-04 (a)	5.8E-03 (a)	1.0E-03 (b)	--	--	--	2.4E-04 (6)	5.8E-03 (6)	1.0E-03 (6)
Zinc	7440-66-6	632	No	Yes	No	0 029 (9)	3.0E-03 (a)	0 073 (a)	0 013 (b)	--	--	--	3.0E-03 (6)	0 073 (6)	0 013 (6)
Total TAC Emission Estimates							**0.34**	**8.24**	**1.47**	**8.4E-03**	**0.20**	**0.036**	**3.71**	**88.9**	**15.9**
Total HAP Emission Estimates							**3.2E-03**	**0.077**	**0.014**	**8.4E-03**	**0.20**	**0.036**	**0.012**	**0.28**	**0.050**
Total RBC Emission Estimates							**0.34**	**8.15**	**1.46**	**8.4E-03**	**0.20**	**0.036**	**3.70**	**88.8**	**15.9**
Total Non-RBC Emission Estimates							**3.7E-03**	**0.088**	**0.016**	**--**	**--**	**--**	**3.7E-03**	**0.088**	**0.016**

Color Key
MFA-Specific CAS number

NOTES:

HAP = hazardous air pollutant

MMscf = million standard cubic feet

MW = molecular weight

PSA = pressure-swing adsorption

RBC = risk-based concentration

TAC = toxic air contaminant

Emission factors preceded by a less-than (<) symbol are based on method detection limits

(a) Hourly or daily emissions estimate lb/ unit) = (emission factor [lb/MMscf]) x (hourly or daily natural gas usage [MMcf/hr or MMcf/day])

(b) Annual emissions estimate (tons/yr) = (emission factor [lb/MMscf]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

[redacted]

(f) Hourly emissions estimate (lb/hr) = (ammonia slip concentration [ppm] / 10^6) x (exhaust flowrate [dscfm]) x (60 min/hr) x (density of air [lb/ft^3]) / (mw of dry air [lb/lb-mol) x (mw of ammonia [lb/lb-mol)

(g) Daily emissions estimate lb/day) = (outlet concentration [ppm] / 10^6) x (exhaust flowrate [dscfm]) x (60 min/hr) x (density of air [lb/ft^3]) / (mw of dry air [lb/lb-mol) x (mw of pollutant [lb/lb-mol) / (hourly natural gas usage [MMcf/hr]) x (daily natural gas usage [MMcf/day])

(h) Annual emissions estimate (tons/yr) = (outlet concentration [ppm] / 10^6) x (exhaust flowrate [dscfm]) x (60 min/hr) x (density of air [lb/ft^3]) / (mw of dry air [lb/lb-mol) x (mw of pollutant [lb/lb-mol) / (hourly natural gas usage [MMcf/hr]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

(h) Molybdenum trioxide emission factor (lb/MMscf) = (elemental molybdenum emission factor [lb/MMscf]) x (MW of molybdenum trioxide [g/mol]) / (MW of elemental molybdenum [g/mol])

Elemental molybdenum emission factor (lb/MMscf) = 1 1E-03 (9)

MW of molybdenum trioxide (g/mol) = 143 94

MW of elemental molybdenum (g/mol) = 95 95

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters

[redacted]

(3) See Table 47 Hydrogen Plant Heater Criteria Pollutant and GHG Emission Estimates

(4) See Victory Energy 50 000 PPH Voyager Series Package Boiler proposal dated May 12 2021 See section 4 0 Ammonia slip limit corrected to 3% oxygen content

(5) Reporting Procedures for AB2588 Facilities for Reporting their Quadrennial Air Toxics Emissions Inventory published by the South Coast Air Quality Management District (SCAQMD) in December 2016 See Appendix B Table B-1 Default Emission Factors for Natural Gas Combustion for external combustion equipment between >100 MMBtu/hr Ammonia emission factor represents no control

(6) Value represents the sum total of natural gas-fired combustion and PSA tail gas emissions estimates

(7) Value represents the sum total of ammonia emissions estimates from natural gas-fired combustion and ammonia slip from SCR control device

(8) AP-42 Chapter 1 4 (July 1998) Table 1 4-3 Emission Factors for Speciated Organic Compounds from Natural Gas Combustion

(9) AP-42 Chapter 1 4 (July 1998) Table 1 4-4 Emission Factors for Metals from Natural Gas Combustion

(10) AP-42 Chapter 1 4 (July 1998) Table 1 4-4 Emission Factors for Metals from Natural Gas Combustion Emission factor representative of total chromium For CAO purposes the total chromium emission factor is conservatively assumed to be equal to hexavalent chromium

(11) AP-42 Chapter 1 4 (July 1998) Table 1 4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion

Table 13
Incinerator TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Incinerator			
		Natural Gas-Fired Combustion	Acid Gas	Sour Water Stripper Offgas	Total
Hourly Natural Gas Usage or Waste Gas Flowrate (MMcf/hr)	[1]	0 017	0 12	0 024	--
Daily Natural Gas Usage or Waste Gas Flowrate (MMcf/day)	[1]	0 40	2 80	0 57	--
Annual Natural Gas Usage or Waste Gas Flowrate (MMcf/yr)	[1]	142	1 001	205	--
EXHAUST PARAMETERS					
Exhaust Outlet Flowrate (dscfm)	[2]	--	--	--	6 672
Ammonia Slip Outlet Concentration (ppm)	[3]	--	--	--	10
GENERAL					
VOC Control Efficiency (%)	[4]	--	--	--	99 5
Density of Air (lb/ft^3 at 70°F and 14 7 psi)		--	--	--	0 07487
Molecular Weight of Dry Air (lb/lb-mol)		--	--	--	28 9647
Molecular Weight of Ammonia (lb/lb-mol)		--	--	--	17 031
Molecular Weight of Hydrogen Sulfide lb/lb-mol)		--	--	--	34 081

Toxic Air Contaminant	CAS No.	DEQ Sequence Number	Regulatory Category (Yes/No)			Emission Factor (lb/MMscf)	Emission Estimates											
							Natural Gas-Fired Combustion			Acid Gas			Sour Water Stripper Offgas			Total		
			HAP	TAC	RBC		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
SPECIATED ORGANIC/INORGANIC COMPOUNDS																		
Acetaldehyde	75-07-0	1	Yes	Yes	Yes	3 1E-03 [5]	5 1E-05 [a]	1 2E-03 [a]	2 2E-04 [b]	--	--	--	--	--	--	5 1E-05 [6]	1 2E-03 [6]	2 2E-04 [6]
Acrolein	107-02-8	5	Yes	Yes	Yes	2 7E-03 [5]	4 5E-05 [a]	1 1E-03 [a]	1 9E-04 [b]	--	--	--	--	--	--	4 5E-05 [6]	1 1E-03 [6]	1 9E-04 [6]
Ammonia (From Combustion)	--	--	--	--	--	3 20 [5]	0 053 [a]	1 27 [a]	0 23 [b]	--	--	--	--	--	--	0 053 [6]	1 27 [6]	0 23 [6]
Ammonia (Slip)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0 18 [c]	4 23 [d]	0 76 [e]
Ammonia (Total)	7664-41-7	26	No	Yes	Yes	--	0 053 [7]	1 27 [7]	0 23 [7]	--	--	--	--	--	--	0 23 [7]	5 50 [7]	0 98 [7]
Benzene	71-43-2	46	Yes	Yes	Yes	5 8E-03 [5]	9 6E-05 [a]	2 3E-03 [a]	4 1E-04 [b]	--	--	--	--	--	--	9 6E-05 [6]	2 3E-03 [6]	4 1E-04 [6]
Ethylbenzene	100-41-4	229	Yes	Yes	Yes	6 9E-03 [5]	1 1E-04 [a]	2 7E-03 [a]	4 9E-04 [b]	--	--	--	--	--	--	1 1E-04 [6]	2 7E-03 [6]	4 9E-04 [6]
Formaldehyde	50-00-0	250	Yes	Yes	Yes	0 012 [5]	2 0E-04 [a]	4 9E-03 [a]	8 7E-04 [b]	--	--	--	--	--	--	2 0E-04 [6]	4 9E-03 [6]	8 7E-04 [6]
Hexane	110-54-3	289	Yes	Yes	Yes	4 6E-03 [5]	7 6E-05 [a]	1 8E-03 [a]	3 3E-04 [b]	--	--	--	--	--	--	7 6E-05 [6]	1 8E-03 [6]	3 3E-04 [6]
Hydrogen sulfide	7783-06-4	293	No	Yes	Yes	--	--	--	--	0 29 [f]	7 07 ( )	1 27 [g]	0 021 [f]	0 49 [f]	0 088 [g]	0 32 [6]	7 57 [6]	1 35 [6]
Toluene	108-88-3	600	Yes	Yes	Yes	0 027 [5]	4 4E-04 [a]	0 011 [a]	1 9E-03 [b]	--	--	--	--	--	--	4 4E-04 [6]	0 011 [6]	1 9E-03 [6]
Xylene (mixture)	1330-20-7	628	Yes	Yes	Yes	0 020 [5]	3 3E-04 [a]	7 8E-03 [a]	1 4E-03 [b]	--	--	--	--	--	--	3 3E-04 [6]	7 8E-03 [6]	1 4E-03 [6]
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)																		
PAHs (excluding Naphthalene)	PAHs	401	Yes	Yes	Yes	1 0E-04 [5]	1 7E-06 [a]	4 0E-05 [a]	7 1E-06 [b]	--	--	--	--	--	--	1 7E-06 [6]	4 0E-05 [6]	7 1E-06 [6]
Benzo(a)pyrene	50-32-8	406	Yes	Yes	Yes	< 1 2E-06 [8]	2 0E-08 [a]	4 8E-07 [a]	8 5E-08 [b]	--	--	--	--	--	--	2 0E-08 [6]	4 8E-07 [6]	8 5E-08 [6]
Naphthalene	91-20-3	428	Yes	Yes	Yes	3 0E-04 [5]	5 0E-06 [a]	1 2E-04 [a]	2 1E-05 [b]	--	--	--	--	--	--	5 0E-06 [6]	1 2E-04 [6]	2 1E-05 [6]
TRACE METALS																		
Arsenic	7440-38-2	37	Yes	Yes	Yes	2 0E-04 [9]	3 3E-06 [a]	7 9E-05 [a]	1 4E-05 [b]	--	--	--	--	--	--	3 3E-06 [6]	7 9E-05 [6]	1 4E-05 [6]
Barium	7440-39-3	45	No	Yes	No	4 4E-03 [9]	7 3E-05 [a]	1 7E-03 [a]	3 1E-04 [b]	--	--	--	--	--	--	7 3E-05 [6]	1 7E-03 [6]	3 1E-04 [6]
Beryllium	7440-41-7	58	Yes	Yes	Yes	< 1 2E-05 [9]	2 0E-07 [a]	4 8E-06 [a]	8 5E-07 [b]	--	--	--	--	--	--	2 0E-07 [6]	4 8E-06 [6]	8 5E-07 [6]
Cadmium	7440-43-9	83	Yes	Yes	Yes	1 1E-03 [9]	1 8E-05 [a]	4 4E-04 [a]	7 8E-05 [b]	--	--	--	--	--	--	1 8E-05 [6]	4 4E-04 [6]	7 8E-05 [6]
Chromium VI	18540-29-9	136	Yes	Yes	Yes	1 4E-03 [10]	2 3E-05 [a]	5 6E-04 [a]	1 0E-04 [b]	--	--	--	--	--	--	2 3E-05 [6]	5 6E-04 [6]	1 0E-04 [6]
Cobalt	7440-48-4	146	Yes	Yes	Yes	8 4E-05 [9]	1 4E-06 [a]	3 3E-05 [a]	6 0E-06 [b]	--	--	--	--	--	--	1 4E-06 [6]	3 3E-05 [6]	6 0E-06 [6]
Copper	7440-50-8	149	No	Yes	Yes	8 5E-04 [9]	1 4E-05 [a]	3 4E-04 [a]	6 0E-05 [b]	--	--	--	--	--	--	1 4E-05 [6]	3 4E-04 [6]	6 0E-05 [6]
Lead	7439-92-1	305	Yes	Yes	Yes	5 0E-04 [11]	8 3E-06 [a]	2 0E-04 [a]	3 6E-05 [b]	--	--	--	--	--	--	8 3E-06 [6]	2 0E-04 [6]	3 6E-05 [6]
Manganese	7439-96-5	312	Yes	Yes	Yes	3 8E-04 [9]	6 3E-06 [a]	1 5E-04 [a]	2 7E-05 [b]	--	--	--	--	--	--	6 3E-06 [6]	1 5E-04 [6]	2 7E-05 [6]
Mercury	7439-97-6	316	Yes	Yes	Yes	2 6E-04 [9]	4 3E-06 [a]	1 0E-04 [a]	1 8E-05 [b]	--	--	--	--	--	--	4 3E-06 [6]	1 0E-04 [6]	1 8E-05 [6]
Molybdenum trioxide	1313-27-5	361	No	Yes	No	1 7E-03 [h]	2 7E-05 [a]	6 6E-04 [a]	1 2E-04 [b]	--	--	--	--	--	--	2 7E-05 [6]	6 6E-04 [6]	1 2E-04 [6]
Nickel	7440-02-0	364	Yes	Yes	Yes	2 1E-03 [9]	3 5E-05 [a]	8 3E-04 [a]	1 5E-04 [b]	--	--	--	--	--	--	3 5E-05 [6]	8 3E-04 [6]	1 5E-04 [6]
Selenium	7782-49-2	575	Yes	Yes	Yes	< 2 4E-05 [9]	4 0E-07 [a]	9 5E-06 [a]	1 7E-06 [b]	--	--	--	--	--	--	4 0E-07 [6]	9 5E-06 [6]	1 7E-06 [6]
Vanadium (fume or dust)	7440-62-2	620	No	Yes	Yes	2 3E-03 [9]	3 8E-05 [a]	9 1E-04 [a]	1 6E-04 [b]	--	--	--	--	--	--	3 8E-05 [6]	9 1E-04 [6]	1 6E-04 [6]
Zinc	7440-66-6	632	No	Yes	No	0 029 [9]	4 8E-04 [a]	0 012 [a]	2 1E-03 [b]	--	--	--	--	--	--	4 8E-04 [6]	0 012 [6]	2 1E-03 [6]
Total TAC Emission Estimates							**0.055**	**1.32**	**0.24**	**0.29**	**7.07**	**1.27**	**0.021**	**0.49**	**0.088**	**0.55**	**13.1**	**2.35**
Total HAP Emission Estimates							**1.5E-03**	**0.035**	**6.3E-03**	**--**	**--**	**--**	**--**	**--**	**--**	**1.5E-03**	**0.035**	**6.3E-03**
Total RBC Emission Estimates							**0.054**	**1.31**	**0.23**	**0.29**	**7.07**	**1.27**	**0.021**	**0.49**	**0.088**	**0.55**	**13.1**	**2.35**
Total Non-RBC Emission Estimates							**5.8E-04**	**0.014**	**2.5E-03**	**--**	**--**	**--**	**--**	**--**	**--**	**5.8E-04**	**0.014**	**2.5E-03**

NOTES

HAP hazardous air pollutant.

b/ft^3 pounds per cubic foot.

b/lb-mol pound per pound-mole.

MMscf million standard cubic feet.

ppm parts per m llion.

psi pounds per square inch.

RBC r sk-based concentration.

TAC toxic air contaminant.

VOC volat le organic compound.

Emission factors preceded by a less-than (<) symbol are based on method detect on limits.

(a) Hourly or daily emissions estimate (lb/ unit) (emission factor [lb/MMscf]) x (hourly or daily natural gas usage [MMcf/ unit])

(b) Annual emissions estimate (ton/yr) (em ssion factor [lb/MMscf]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

(c) Hourly emissions est mate (lb/hr) (outlet concentration [ppm] / 10^6) x (exhaust flowrate [dscfm]) x (60 min/hr) x (density of air [lb/ft^3]) / (molecular weight of dry air [lb/lb-mol) x (pollutant molecular weight [lb/lb-mol)

(d) Daily emiss ons estimate (lb/day) (outlet concentration [ppm] / 10^6) x (exhaust flowrate [dscfm]) x (60 min/hr) x (density of air [lb/ft^3]) / (molecular weight of dry air [lb/lb-mol) x (pollutant molecular weight [lb/lb-mol) x (daily natural gas usage [MMcf/day]) / (hourly natural gas usage [MMcf/hr])

(e) Annual emissions estimate (tons/yr) (outlet concentration [ppm] / 10^6) x (exhaust flowrate [dscfm]) x (60 min/hr) x (density of air [lb/ft^3]) / (molecular weight of dry air [lb/lb-mol) x (pollutant molecular weight [lb/lb-mol) x (annual natural gas usage [MMcf/yr]) / (hourly natural gas usage [MMcf/hr]) x (ton/2 000 lb)

(f) Hourly or daily emissions estimate (lb/hr or lb/day) (outlet concentration [ppm]) x (hourly or daily waste gas usage [MMcf/hr or MMcf/day]) x (density of air [lb/ft^3]) / (molecular weight of dry air [lb/lb-mol]) x (pollutant molecular weight [lb/lb-mol]) x (1 - [control efficiency {%} / 100])

(g) Annual emissions estimate (tons/yr) (outlet concentration [ppm]) x (annual waste gas usage [MMcf/yr]) x (density of air [lb/ft^3]) / (molecular weight of dry air [lb/lb-mol]) x (pollutant molecular weight [lb/lb-mol]) x (1 - [control effic ency {%} / 100]) x (ton/2 000 lb)

(h) Molybdenum trioxide em ssion factor (lb/MMscf) (elemental molybdenum emiss on factor [b/MMscf]) x (molecular weight of molybdenum trioxide [g/mol]) / (molecular weight of elemental molybdenum [g/mol])

Elemental molybdenum emission factor (lb/MMscf)	1.1E-03	(9)
Molecular weight of molybdenum trioxide (g/mol)	143.94	
Molecular weight of elemental molybdenum (g/mol)	95.95	

REFERENCES

(1) See Table 1 Input Assumptions and Parameters.

(2) Value derived from vendor des gn documents provided by NEXT Renewable Fuels Oregon LLC.

(3) See Honeywell UOP Prel m nary Utility Summary (Revision 1) dated May 14 2021. Ammon a slip limit corrected to 3% oxygen content.

(4) See Table 3 Miscellaneous—Input Assumptions and Parameters.

(5) Reporting Procedures for AB2588 Facilities for Report ng their Quadrennial Air Toxics Emissions Inventory published by the South Coast Air Quality Management District (SCAQMD) in December 2016. See Appendix B Table B-1 Default Emission Factors for Natural Gas Combustion for external combust on equipment between 10-100 MMBtu/hr. Ammonia emission factor assumes no SNCR or SCR control.

(6) Value represents the sum total of natural gas-fired combustion and acid gas/sour water stripper offgas emissions est mates.

(7) Value represents the sum total of ammonia emissions estimates from natural gas-fired combustion and ammonia sl p from SCR control device.

(8) AP-42 Chapter 1.4 (July 1998) Table 1.4-3 Emiss on Factors for Speciated Organ c Compounds from Natural Gas Combustion .

(9) AP-42 Chapter 1.4 (July 1998) Table 1.4-4 Emiss on Factors for Metals from Natural Gas Combustion .

(10) AP-42 Chapter 1.4 (July 1998) Table 1.4-4 Emiss on Factors for Metals from Natural Gas Combustion . Emission factor representative of total chromium. For purposes of Cleaner Air Oregon the total chromium emission factor is conservatively assumed to be equal to hexavalent chromium.

(11) AP-42 Chapter 1.4 (July 1998) Table 1.4-2 Emiss on Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion .

Table 14
Flare—Pilot Light TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Toxic Air Contaminant	CAS No.	DEQ Sequence No.	Regulatory Category (Yes/No)			Emission Factor (lb/MMscf)	Emission Estimates		
			HAP	TAC	RBC		Hourly [a] (lb/hr)	Daily [a] (lb/day)	Annual [b] (tons/yr)
SPECIATED ORGANIC/INORGANIC COMPOUNDS									
Acetaldehyde	75-07-0	1	Yes	Yes	Yes	4 3E-03 (1)	5 4E-06	1 3E-04	2 4E-05
Acrolein	107-02-8	5	Yes	Yes	Yes	2 7E-03 (1)	3 4E-06	8 1E-05	1 5E-05
Ammonia	7664-41-7	26	No	Yes	Yes	3 20 (1)	4 0E-03	0 096	0 018
Benzene	71-43-2	46	Yes	Yes	Yes	8 0E-03 (1)	1 0E-05	2 4E-04	4 4E-05
Ethylbenzene	100-41-4	229	Yes	Yes	Yes	9 5E-03 (1)	1 2E-05	2 9E-04	5 2E-05
Formaldehyde	50-00-0	250	Yes	Yes	Yes	0 017 (1)	2 1E-05	5 1E-04	9 3E-05
Hexane	110-54-3	289	Yes	Yes	Yes	6 3E-03 (1)	7 9E-06	1 9E-04	3 4E-05
Toluene	108-88-3	600	Yes	Yes	Yes	0 037 (1)	4 6E-05	1 1E-03	2 0E-04
Xylene (mixture)	1330-20-7	628	Yes	Yes	Yes	0 027 (1)	3 4E-05	8 2E-04	1 5E-04
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)									
PAHs (excluding Naphthalene)	PAHs	401	Yes	Yes	Yes	1 0E-04 (1)	1 3E-07	3 0E-06	5 5E-07
Benzo(a)pyrene	50-32-8	406	Yes	Yes	Yes	< 1 2E-06 (2)	1 5E-09	3 6E-08	6 6E-09
Naphthalene	91-20-3	428	Yes	Yes	Yes	3 0E-04 (1)	3 8E-07	9 0E-06	1 6E-06
TRACE METALS									
Arsenic	7440-38-2	37	Yes	Yes	Yes	2 0E-04 (3)	2 5E-07	6 0E-06	1 1E-06
Barium	7440-39-3	45	No	Yes	No	4 4E-03 (3)	5 5E-06	1 3E-04	2 4E-05
Beryllium	7440-41-7	58	Yes	Yes	Yes	< 1 2E-05 (3)	1 5E-08	3 6E-07	6 6E-08
Cadmium	7440-43-9	83	Yes	Yes	Yes	1 1E-03 (3)	1 4E-06	3 3E-05	6 0E-06
Chromium VI	18540-29-9	136	Yes	Yes	Yes	1 4E-03 (4)	1 8E-06	4 2E-05	7 7E-06
Cobalt	7440-48-4	146	Yes	Yes	Yes	8 4E-05 (3)	1 1E-07	2 5E-06	4 6E-07
Copper	7440-50-8	149	No	Yes	Yes	8 5E-04 (3)	1 1E-06	2 6E-05	4 7E-06
Lead	7439-92-1	305	Yes	Yes	Yes	5 0E-04 (5)	6 3E-07	1 5E-05	2 7E-06
Manganese	7439-96-5	312	Yes	Yes	Yes	3 8E-04 (3)	4 8E-07	1 1E-05	2 1E-06
Mercury	7439-97-6	316	Yes	Yes	Yes	2 6E-04 (3)	3 3E-07	7 8E-06	1 4E-06
Molybdenum trioxide	1313-27-5	361	No	Yes	No	1 7E-03 (c)	2 1E-06	5 0E-05	9 0E-06
Nickel	7440-02-0	364	Yes	Yes	Yes	2 1E-03 (3)	2 6E-06	6 3E-05	1 1E-05
Selenium	7782-49-2	575	Yes	Yes	Yes	< 2 4E-05 (3)	3 0E-08	7 2E-07	1 3E-07
Vanadium (fume or dust)	7440-62-2	620	No	Yes	Yes	2 3E-03 (3)	2 9E-06	6 9E-05	1 3E-05
Zinc	7440-66-6	632	No	Yes	No	0 029 (3)	3 6E-05	8 7E-04	1 6E-04
Total TAC Emission Estimates							**4.2E-03**	**0.10**	**0.018**
Total HAP Emission Estimates							**1.5E-04**	**3.5E-03**	**6.5E-04**
Total RBC Emission Estimates							**4.2E-03**	**0.100**	**0.018**
Total Non-RBC Emission Estimates							**4.4E-05**	**1.1E-03**	**1.9E-04**

Color Key
MFA-Specific CAS number

NOTES:

HAP = hazardous air pollutant

MMscf = million standard cubic feet

MW = molecular weight

RBC = risk-based concentration

TAC = toxic air contaminant

Emission factors preceded by a less-than (<) symbol are based on method detection limits

(a) Hourly or daily emissions estimate lb/hr or lb/day) = (emission factor [lb/MMscf]) x (hourly or daily natural gas usage [MMcf/hr or MMcf/day])

Hourly natural gas usage (MMcf/hr) = 1 3E-03 (6)

Daily natural gas usage (MMcf/day) = 0 030 (6)

(b) Annual emissions estimate (tons/yr) = (emission factor [lb/MMscf]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

Annual natural gas usage (MMscf/yr) = 11 0 (6)

(c) Molybdenum trioxide emission factor (lb/MMscf) = (elemental molybdenum emission factor [lb/MMscf]) x (MW of molybdenum trioxide [g/mol]) / (MW of elemental molybdenum [g/mol])

Elemental molybdenum emission factor lb/MMscf) = 1 1E-03 (3)

MW of molybdenum trioxide (g/mol) = 143 94

MW of elemental molybdenum (g/mol) = 95 95

REFERENCES:

(1) Reporting Procedures for AB2588 Facilities for Reporting their Quadrennial Air Toxics Emissions Inventory published by the South Coast Air Quality Management District (SCAQMD) in December 2016 See Appendix B Table B-1 Default Emission Factors for Natural Gas Combustion for external combustion equipment between less than 10 MMBtu/hr

(2) AP-42 Chapter 1 4 (July 1998) Table 1 4-3 Emission Factors for Speciated Organic Compounds from Natural Gas Combustion

(3) AP-42 Chapter 1 4 (July 1998) Table 1 4-4 Emission Factors for Metals from Natural Gas Combustion

(4) AP-42 Chapter 1 4 (July 1998) Table 1 4-4 Emission Factors for Metals from Natural Gas Combustion Emission factor representative of total chromium For purposes of Cleaner Air Oregon the total chromium emission factor is conservatively assumed to be equal to hexavalent chromium

(5) AP-42 Chapter 1 4 (July 1998) Table 1 4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion

(6) See Table 1 Input Assumptions and Parameters

Table 15
Flare—SUSD Criteria Pollutant, GHG, and TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter	Flare-Startup Only (Waste Gas)	Flare-Shutdown Only (Waste Gas)
Maximum Hourly Waste Gas Throughput (MMcf/hr)	[redacted]	
Daily Waste Gas Throughput (MMcf/day)		
Annual Waste Gas Throughput (MMcf/yr)		
Waste Gas Density (lb/ft^3)		
Waste Gas High Heat Content (Btu/scf)		
Flare Control Efficiency (%) (3)	98 0	98 0
GENERAL		
SO_2 Molecular Weight [lb/b-mol])	64 066	
H_2S Molecular Weight [lb/b-mol])	34 081	
CH_4 global warming potential (4)	25	
N_2O global warming potential (4)	298	

Pollutant	CAS	DEQ Sequence No.	Regulatory Category (Yes/No)			Weight Fraction	Emission Factor		Emission Estimates					
									Flare-Startup Only (Waste Gas)			Flare-Shutdown Only (Waste Gas)		
			HAP	TAC	RBC		(lb/MMBtu)	(µg/L)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
PM	--	--	No	No	No	--	--	40 0 (5)	3 00 (a)	5 99 (a)	9 0E-03 (b)	1 75 (a)	3 50 (a)	5 2E-03 (b)
PM_{10}	--	--	No	No	No	--	--	40 0 (5)	3 00 (a)	5 99 (a)	9 0E-03 (b)	1 75 (a)	3 50 (a)	5 2E-03 (b)
$PM_{2.5}$	--	--	No	No	No	--	--	40 0 (5)	3 00 (a)	5 99 (a)	9 0E-03 (b)	1 75 (a)	3 50 (a)	5 2E-03 (b)
NO_X	--	--	No	No	No	--	0 068 (5)	--	46 9 (c)	93 7 (c)	0 14 (d)	27 3 (c)	54 7 (c)	0 082 (d)
CO	--	--	No	No	No	[redacted]	--	--	43 5 [redacted]	86 9 [redacted]	0 13 [redacted]	25 3 [redacted]	50 7 [redacted]	0 076 [redacted]
VOC	--	--	No	No	No	--	0 66 (6)	--	455 (c)	910 (c)	1 36 (d)	265 (c)	531 (c)	0 80 (d)
SO_2	--	--	No	No	No	(7)	--	--	97 4 [redacted]	195 [redacted]	0 29 [redacted]	56 8 [redacted]	114 [redacted]	0 17 [redacted]
H_2S	7783-06-4	293	No	Yes	Yes	[redacted]	--	--	1 06 [redacted]	2 11 [redacted]	3 2E-03 [redacted]	0 62 [redacted]	1 23 [redacted]	1 9E-03 [redacted]
CO_2	--	--	No	No	No	[redacted]	--	--	68 3 [redacted]	136 5 [redacted]	0 20 [redacted]	39 8 [redacted]	79 7 [redacted]	0 12 [redacted]
CH_4	--	--	No	No	No	[redacted]	--	--	4 729 [redacted]	9 457 [redacted]	14 2 [redacted]	2 758 [redacted]	5 517 [redacted]	8 3 [redacted]
N_2O	--	--	No	No	No	[redacted]	--	--	43 5 [redacted]	86 9 [redacted]	0 13 [redacted]	25 4 [redacted]	50 7 [redacted]	0 08 [redacted]
CO_2e	--	--	No	No	No	--	--	--	131 236 (k)	262 472 (k)	394 ( )	76 554 (k)	153 109 (k)	230 (l)

NOTES

Btu/scf British thermal units per standard cubic feet.

lb/ b-mol pound per pound-mole.

lb/ft^3 pound per cubic feet.

HAP hazardous air po lutant.

MMBtu mi lion British thermal units.

MMcf million cubic feet.

RBC risk-based concentration.

TAC toxic air contaminant.

µg - microgram.

(a) Hourly or daily emissions estimate (lb/hr or lb/day) (part culate emission factor [µg/L]) x (b/453.59 g) x (28.32 L/ft³) x (hourly or daily waste gas throughput [MMcf/hr or MMcf/day])

(b) Annual emissions est mate (tons/yr) (particulate em ssion factor [µg/L]) x (lb/453.59 g) x (28.32 L/ft³) x (annual waste gas throughput [MMcf/yr]) x (ton/2 000 b)

(c) Hourly or daily emissions estimate (lb/hr or lb/day) (emission factor [lb/MMcf]) x (hourly or daily waste gas throughput [MMcf/hr or MMcf]) x (waste gas high heat content [Btu/scf])

(d) Annual emissions est mates (tons/yr) (em ssion factor [lb/MMcf]) x (annual waste gas throughput [MMcf/yr]) x (waste gas high heat content [Btu/scf]) x (ton/2 000 lb)

[redacted]

(k) Hourly or daily CO_2e emiss ons est mate (lb/hr or lb/day) (hourly or daily CO_2 emissions estimate [lb/hr or b/day]) + (hourly or da ly CH_4 emiss ons est mate [b/hr or lb/day]) x (CH_4 global warming potential) + (hourly or daily N_2O emissions estimate [lb/hr or lb/day]) x (N_2O global warming potential)

(l) Annual CO_2e emissions estimate (tons/yr) (annual CO_2 emissions estimate [tons/yr]) + (annual CH_4 emissions estimate [tons/yr]) x (CH4 global warming potential) + (annual N_2O emissions estimate [tons/yr]) x (N_2O global warming potential)

REFERENCES

[redacted]

(4) 40 CFR Part 98 Subpart A Table A-1 Global Warming Potentials.

(5) AP-42 Chapter 13 (February 2018) Table 13.5-1 THC NO_X and Soot Emissions Factors for Flare Operations for Certain Chemical Manufacturing Processes. Assumes elevated light smok ng flare as representative.

(6) AP-42 Chapter 13 (February 2018) Table 13.5-2 VOC and CO Emissions Factors for Elevated Flare Operations for Certain Refinery and Chemical Manufactur ng Processes. Em ssion factor representative of well operated flare achieving at least 98% destruction efficiency with net heating values greater than 300 Btu/scf.

(7) Texas Commission on Environmental Quality publication (RG-360/18) dated January 2019. See Appendix A Technical Supplement 4 Flares. SO2 is not a component of the waste gas composition but is generated during destruction of H_2S.

[redacted]

Table 16
VCU TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Rail/Truck VCU
Hourly Natural Gas Usage (MMcf/hr)	(1)	1.6E-03
Daily Natural Gas Usage (MMcf/day)	(1)	0.04
Annual Natural Gas Usage (MMcf/yr)	(1)	13.425
Vapor Combustion Unit Control Efficiency (%)	(2)	98.0

Toxic Air Contaminant	CAS No.	DEQ Sequence No.	Regulatory Category (Yes/No)			Emission Factor (lb/MMscf)	Emission Estimates Rail/Truck VCU		
			HAP	TAC	RBC		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
SPECIATED ORGANIC/INORGANIC COMPOUNDS									
Acetaldehyde	75-07-0	1	Yes	Yes	Yes	4.3E-03 (3)	1.3E-07 (a)	3.2E-06 (a)	5.8E-07 (b)
Acrolein	107-02-8	5	Yes	Yes	Yes	2.7E-03 (3)	8.4E-08 (a)	2.0E-06 (a)	3.6E-07 (b)
Ammonia	7664-41-7	26	No	Yes	Yes	3.20 (3)	1.0E-04 (a)	2.4E-03 (a)	4.3E-04 (b)
Benzene	71-43-2	46	Yes	Yes	Yes	8.0E-03 (3)	2.5E-07 (a)	6.0E-06 (a)	1.1E-06 (b)
Ethylbenzene	100-41-4	229	Yes	Yes	Yes	9.5E-03 (3)	3.0E-07 (a)	7.1E-06 (a)	1.3E-06 (b)
Formaldehyde	50-00-0	250	Yes	Yes	Yes	0.017 (3)	5.3E-07 (a)	1.3E-05 (a)	2.3E-06 (b)
Hexane	110-54-3	289	Yes	Yes	Yes	6.3E-03 (3)	2.0E-07 (a)	4.7E-06 (a)	8.5E-07 (b)
Toluene	108-88-3	600	Yes	Yes	Yes	0.037 (3)	1.1E-06 (a)	2.7E-05 (a)	4.9E-06 (b)
Xylene (mixture)	1330-20-7	628	Yes	Yes	Yes	0.027 (3)	8.5E-07 (a)	2.0E-05 (a)	3.7E-06 (b)
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)									
PAHs (excluding Naphthalene)	PAHs	401	Yes	Yes	Yes	1.0E-04 (3)	3.1E-09 (a)	7.5E-08 (a)	1.3E-08 (b)
Benzo(a)pyrene	50-32-8	406	Yes	Yes	Yes	< 1.2E-06 (4)	3.8E-11 (a)	9.0E-10 (a)	1.6E-10 (b)
Naphthalene	91-20-3	428	Yes	Yes	Yes	3.0E-04 (3)	9.4E-09 (a)	2.3E-07 (a)	4.0E-08 (b)
TRACE METALS									
Arsenic	7440-38-2	37	Yes	Yes	Yes	2.0E-04 (5)	3.1E-07 (c)	7.5E-06 (c)	1.3E-06 (d)
Barium	7440-39-3	45	No	Yes	No	4.4E-03 (5)	6.9E-06 (c)	1.7E-04 (c)	3.0E-05 (d)
Beryllium	7440-41-7	58	Yes	Yes	Yes	< 1.2E-05 (5)	1.9E-08 (c)	4.5E-07 (c)	8.1E-08 (d)
Cadmium	7440-43-9	83	Yes	Yes	Yes	1.1E-03 (5)	1.7E-06 (c)	4.1E-05 (c)	7.4E-06 (d)
Chromium VI	18540-29-9	136	Yes	Yes	Yes	1.4E-03 (6)	2.2E-06 (c)	5.3E-05 (c)	9.4E-06 (d)
Cobalt	7440-48-4	146	Yes	Yes	Yes	8.4E-05 (5)	1.3E-07 (c)	3.2E-06 (c)	5.6E-07 (d)
Copper	7440-50-8	149	No	Yes	Yes	8.5E-04 (5)	1.3E-06 (c)	3.2E-05 (c)	5.7E-06 (d)
Lead	7439-92-1	305	Yes	Yes	Yes	5.0E-04 (7)	7.8E-07 (c)	1.9E-05 (c)	3.4E-06 (d)
Manganese	7439-96-5	312	Yes	Yes	Yes	3.8E-04 (5)	5.9E-07 (c)	1.4E-05 (c)	2.6E-06 (d)
Mercury	7439-97-6	316	Yes	Yes	Yes	2.6E-04 (5)	4.1E-07 (c)	9.8E-06 (c)	1.7E-06 (d)
Molybdenum trioxide	1313-27-5	361	No	Yes	No	1.7E-03 (e)	2.6E-06 (c)	6.2E-05 (c)	1.1E-05 (d)
Nickel	7440-02-0	364	Yes	Yes	Yes	2.1E-03 (5)	3.3E-06 (c)	7.9E-05 (c)	1.4E-05 (d)
Selenium	7782-49-2	575	Yes	Yes	Yes	< 2.4E-05 (5)	3.8E-08 (c)	9.0E-07 (c)	1.6E-07 (d)
Vanadium (fume or dust)	7440-62-2	620	No	Yes	Yes	2.3E-03 (5)	3.6E-06 (c)	8.6E-05 (c)	1.5E-05 (d)
Zinc	7440-66-6	632	No	Yes	No	0.029 (5)	4.5E-05 (c)	1.1E-03 (c)	1.9E-04 (d)
Total TAC Emission Estimates							**1.7E-04**	**4.1E-03**	**7.4E-04**
Total HAP Emission Estimates							**1.3E-05**	**3.1E-04**	**5.6E-05**
Total RBC Emission Estimates							**1.2E-04**	**2.8E-03**	**5.1E-04**
Total Non-RBC Emission Estimates							**5.5E-05**	**1.3E-03**	**2.4E-04**

Color Key
MFA-Specific CAS number.

NOTES:

HAP = hazardous air pollutant.

MMscf = million standard cubic feet.

MW = molecular weight.

RBC = risk-based concentration.

TAC = toxic air contaminant.

VCU = vapor combustion unit.

Emission factors preceded by a less-than (<) symbol are based on method detection limits.

(a) Hourly or daily emissions estimate (lb/hr or lb/day) = (emission factor [lb/MMscf]) x (hourly or daily natural gas usage [MMcf/hr or MMcf/day]) x (1 - [VOC control efficiency {%} / 100])

(b) Annual emissions estimate (tons/yr) = (emission factor [lb/MMscf]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb) x (1 - [VOC control efficiency {%} / 100])

(c) Hourly or daily emissions estimate (lb/hr or lb/day) = (emission factor [lb/MMscf]) x (hourly or daily natural gas usage [MMcf/hr or MMcf/day])

(d) Annual emissions estimate (tons/yr) = (emission factor [lb/MMscf]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

(e) Molybdenum trioxide emission factor (lb/MMscf) = (elemental molybdenum emission factor [lb/MMscf]) x (MW of molybdenum trioxide [g/mol]) / (MW of elemental molybdenum [g/mol])

Elemental molybdenum emission factor (lb/MMscf) =	1.1E-03	(5)
MW of molybdenum trioxide (g/mol) =	143.94	
MW of elemental molybdenum (g/mol) =	95.95	

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters.

(2) See Table 3 Miscellaneous—Input Assumptions and Parameters.

(3) Reporting Procedures for AB2588 Facilities for Reporting their Quadrennial Air Toxics Emissions Inventory published by the South Coast Air Quality Management District (SCAQMD) in December 2016. See Appendix B Table B-1 "Default Emission Factors for Natural Gas Combustion" for external combustion equipment between less than 10 MMBtu/hr.

(4) AP-42 Chapter 1.4 (July 1998) Table 1.4-3 "Emission Factors for Speciated Organic Compounds from Natural Gas Combustion."

(5) AP-42 Chapter 1.4 (July 1998) Table 1.4-4 "Emission Factors for Metals from Natural Gas Combustion."

(6) AP-42 Chapter 1.4 (July 1998) Table 1.4-4 "Emission Factors for Metals from Natural Gas Combustion." Emission factor representative of total chromium. For purposes of Cleaner Air Oregon the total chromium emission factor is conservatively assumed to be equal to hexavalent chromium.

(7) AP-42 Chapter 1.4 (July 1998) Table 1.4-2 "Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion."

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Table 17
Product Loadout VOC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Product Loadout	Product Throughput [1]			Saturation Factor	True Vapor Pressure (psi)	Molecular Weight (lb/lb-mol)	Bulk Liquid Loading Temp. [2] (°R)	Loading Loss [a] (lb/Mgal)	Efficiency [4]		VOC Emission Estimates					
											Captured/Controlled			Fugitive		
	Hourly (Mgal/hr)	Daily (Mgal/day)	Annual (Mgal/yr)						Capture (%)	Control (%)	Hourly [b] (lb/hr)	Daily [c] (lb/day)	Annual [d] (tons/yr)	Hourly [e] (lb/hr)	Daily [f] (lb/day)	Annual [g] (tons/yr)
RENEWABLE DIESEL																
Rail	11.6	278	99 360	0.60 [5]	0.011 [6]	130 [6]	537	0.020	98.7	98.0	4.6E-03	0.11	0.020	3.0E-03	0.073	0.013
Truck	0 70	16.89	6 048	1.00 [7]	0.011 [6]	130 [6]	537	0.034	98.7	98.0	4.7E-04	0 011	2.0E-03	3.1E-04	7.4E-03	1.3E-03
Total Product Loadout VOC Emissions Estimate											**5.1E-03**	**0.12**	**0.022**	**3.3E-03**	**0.080**	**0.014**

NOTES:

lb/lb-mol = pound per pound mole.

Mgal = thousand gallons.

psi = pounds per square inch.

°R = degree rankine.

VCU = vapor combustion unit.

(a) Emission factor (lb/Mgal) = (12.46) x (saturation factor) x (true vapor pressure [psi]) x (molecular weight [lb/lb-mol]) / (bulk liquid loading temperature [°R]) see reference (3).

(b) Hourly emissions estimate (lb/hr) = (emission factor [lb/Mgal]) x (hourly product throughput [Mgal/hr]) x (VCU capture efficiency [%] / 100) x (1 - [VCU control efficiency {%} / 100])

(c) Daily emissions estimate (lb/hr) = (emission factor [lb/Mgal]) x (daily product throughput [Mgal/day]) x (VCU capture efficiency [%] / 100) x (1 - [VCU control efficiency {%} / 100])

(d) Annual emissions estimate (tons/yr) = (emission factor [lb/Mgal]) x (annual product throughput [Mgal/yr]) x (ton/2 000 lb) x (VCU capture efficiency [%] / 100) x (1- [VCU control efficiency {%} / 100])

(e) Hourly emissions estimate (lb/hr) = (emission factor [lb/Mgal]) x (hourly product throughput [Mgal/hr]) x (1 - [VCU capture efficiency {%} / 100])

(f) Daily emissions estimate (lb/hr) = (emission factor [lb/Mgal]) x (daily product throughput [Mgal/day]) x (1 - [VCU capture efficiency {%} / 100])

(g) Annual emissions estimate (tons/yr) = (emission factor [lb/Mgal]) x (annual product throughput [Mgal/yr]) x (ton/2 000 lb) x (1 - [VCU capture efficiency {%} / 100])

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters.

(2) See Table 2 Storage Tank—Input Assumptions and Parameters. Assumes the product storage tank temperature is representative of the product loadout temperature.

(3) AP-42 Chapter 5.2 (June 2008) "Transportation and Marketing of Petroleum Liquids." See equation 1.

(4) See Table 3 Miscellaneous—Input Assumptions and Parameters.

(5) AP-42 Chapter 5.2 (June 2008) Table 5.2-1 "Saturation (S) Factors For Calculating Petroleum Liquid Loading Losses." Assumes submerged loading with dedicated normal service.

(6) See Table 29 Product Storage Tank nos. 1-3—VOC/TAC Emission Estimates—Dedicated RD.

(7) AP-42 Chapter 5.2 (June 2008) Table 5.2-1 "Saturation (S) Factors For Calculating Petroleum Liquid Loading Losses." Assumes submerged loading with dedicated vapor balance service.

Table 18
Controlled Product Loadout (Renewable Diesel Only) TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Pollutant	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			Vapor Mass Fraction [1]	Controlled Product Loadout (Renewable Diesel Only) Emission Estimates								
							Rail			Truck			Total		
			HAP	TAC	RBC		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
Volatile Organic Compounds	--	--	--	--	--	--	4.6E-03 [2]	0.11 [2]	0.020 [2]	4 7E-04 [2]	0.011 [2]	2 0E-03 [2]	**5.1E-03**	**0.12**	**0.022**
TOXIC AIR CONTAMINANT															
Benzene	71-43-2	46	Yes	Yes	Yes	2 2E-04	1.0E-06 [a]	2.4E-05 [a]	4 3E-06 [b]	1 0E-07 [a]	2.4E-06 [a]	4.4E-07 [b]	**1.1E-06**	**2.6E-05**	**4.7E-06**
Chlorobenzene	108-90-7	108	Yes	Yes	Yes	1 7E-04	7.9E-07 [a]	1.9E-05 [a]	3.4E-06 [b]	8 0E-08 [a]	1.9E-06 [a]	3.4E-07 [b]	**8.7E-07**	**2.1E-05**	**3.7E-06**
Ethylbenzene	100-41-4	229	Yes	Yes	Yes	7.9E-04	3.6E-06 [a]	8.7E-05 [a]	1 6E-05 [b]	3 7E-07 [a]	8.9E-06 [a]	1 6E-06 [b]	**4.0E-06**	**9.6E-05**	**1.7E-05**
Acenaphthene	83-32-9	402	Yes	Yes	No	3 0E-07	1.4E-09 [a]	3.3E-08 [a]	5.9E-09 [b]	1.4E-10 [a]	3 3E-09 [a]	6 0E-10 [b]	**1.5E-09**	**3.6E-08**	**6.5E-09**
Fluorene	86-73-7	425	Yes	Yes	No	1.4E-07	6.3E-10 [a]	1.5E-08 [a]	2 7E-09 [b]	6.4E-11 [a]	1 5E-09 [a]	2 7E-10 [b]	**6.9E-10**	**1.7E-08**	**3.0E-09**
2-Methylnaphthalene	91-57-6	427	Yes	Yes	No	8 3E-07	3.8E-09 [a]	9.2E-08 [a]	1 6E-08 [b]	3.9E-10 [a]	9 3E-09 [a]	1 7E-09 [b]	**4.2E-09**	**1.0E-07**	**1.8E-08**
Pyrene	129-00-0	431	Yes	Yes	No	1 7E-11	8.1E-14 [a]	1.9E-12 [a]	3 5E-13 [b]	8 2E-15 [a]	2 0E-13 [a]	3 5E-14 [b]	**8.9E-14**	**2.1E-12**	**3.8E-13**
Toluene	108-88-3	600	Yes	Yes	Yes	6.4E-04	2.9E-06 [a]	7.0E-05 [a]	1 3E-05 [b]	3 0E-07 [a]	7.1E-06 [a]	1 3E-06 [b]	**3.2E-06**	**7.8E-05**	**1.4E-05**
1 2 4-Trimethylbenzene	95-63-6	614	No	Yes	Yes	1.4E-04	6.6E-07 [a]	1.6E-05 [a]	2 8E-06 [b]	6 7E-08 [a]	1 6E-06 [a]	2.9E-07 [b]	**7.3E-07**	**1.8E-05**	**3.1E-06**
1 3 5-Trimethylbenzene	108-67-8	615	No	Yes	Yes	5.4E-05	2.5E-07 [a]	6.0E-06 [a]	1.1E-06 [b]	2 5E-08 [a]	6.1E-07 [a]	1.1E-07 [b]	**2.8E-07**	**6.6E-06**	**1.2E-06**
m-Xylene & p-Xylene	108-38-3	629	Yes	Yes	Yes	4 2E-04	1.9E-06 [a]	4.6E-05 [a]	8 2E-06 [b]	1.9E-07 [a]	4 7E-06 [a]	8.4E-07 [b]	**2.1E-06**	**5.1E-05**	**9.1E-06**
o-Xylene	95-47-6	630	Yes	Yes	Yes	1 5E-04	6.8E-07 [a]	1.6E-05 [a]	2.9E-06 [b]	6.9E-08 [a]	1 7E-06 [a]	3 0E-07 [b]	**7.5E-07**	**1.8E-05**	**3.2E-06**
Total TAC Emission Estimates							**1.2E-05**	**2.9E-04**	**5.1E-05**	**1.2E-06**	**2.9E-05**	**5.2E-06**	**1.3E-05**	**3.1E-04**	**5.6E-05**
Total HAP Emission Estimates							**1.1E-05**	**2.6E-04**	**4.7E-05**	**1.1E-06**	**2.7E-05**	**4.8E-06**	**1.2E-05**	**2.9E-04**	**5.2E-05**
Total RBC Emission Estimates							**1.2E-05**	**2.9E-04**	**5.1E-05**	**1.2E-06**	**2.9E-05**	**5.2E-06**	**1.3E-05**	**3.1E-04**	**5.6E-05**
Total Non-RBC Emission Estimates							**5.8E-09**	**1.4E-07**	**2.5E-08**	**5.9E-10**	**1.4E-08**	**2.5E-09**	**6.4E-09**	**1.5E-07**	**2.8E-08**

NOTES:

HAP = hazardous air pollutant.

RBC = risk-based concentration.

TAC = toxic air contaminant.

(a) Hourly and daily emissions estimate (lb/"unit") = (total organic compound hourly or daily emissions estimate [lb/"unit"]) x (TAC vapor mass fraction)

(b) Annual emissions estimate (tons/yr) = (total organic compound annual emissions estimate [tons/yr]) x (TAC vapor mass fraction)

REFERENCES:

(1) See Table 29 Product Storage Tank nos. 1-3—VOC/TAC Emission Estimates—Dedicated RD. Only TACs are presented.

(2) See Table 17 Product Loadout VOC Emission Estimates.

Table 19
Fugitive Product Loadout (Renewable Diesel Only) TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Pollutant	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			Vapor Mass Fraction [1]	Fugitive Product Loadout (Renewable Diesel Only) Emission Estimates								
							Rail			Truck			Total		
			HAP	TAC	RBC		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
Volatile Organic Compounds	--	--	--	--	--	--	3.0E-03 [2]	0.073 [2]	0.013 [2]	3.1E-04 [2]	7.4E-03 [2]	1 3E-03 [2]	**3.3E-03**	**0.080**	**0.014**
TOXIC AIR CONTAMINANT															
Benzene	71-43-2	46	Yes	Yes	Yes	2 2E-04	6.6E-07 [a]	1.6E-05 [a]	2 8E-06 [b]	6 7E-08 [a]	1 6E-06 [a]	2.9E-07 [b]	**7.2E-07**	**1.7E-05**	**3.1E-06**
Chlorobenzene	108-90-7	108	Yes	Yes	Yes	1 7E-04	5.2E-07 [a]	1.2E-05 [a]	2 2E-06 [b]	5 3E-08 [a]	1 3E-06 [a]	2 3E-07 [b]	**5.7E-07**	**1.4E-05**	**2.5E-06**
Ethylbenzene	100-41-4	229	Yes	Yes	Yes	7.9E-04	2.4E-06 [a]	5.8E-05 [a]	1 0E-05 [b]	2.4E-07 [a]	5 8E-06 [a]	1 0E-06 [b]	**2.6E-06**	**6.3E-05**	**1.1E-05**
Acenaphthene	83-32-9	402	Yes	Yes	No	3 0E-07	9.0E-10 [a]	2.2E-08 [a]	3.9E-09 [b]	9 2E-11 [a]	2 2E-09 [a]	3.9E-10 [b]	**9.9E-10**	**2.4E-08**	**4.3E-09**
Fluorene	86-73-7	425	Yes	Yes	No	1.4E-07	4.1E-10 [a]	9.9E-09 [a]	1 8E-09 [b]	4 2E-11 [a]	1 0E-09 [a]	1 8E-10 [b]	**4.6E-10**	**1.1E-08**	**2.0E-09**
2-Methylnaphthalene	91-57-6	427	Yes	Yes	No	8 3E-07	2.5E-09 [a]	6.1E-08 [a]	1.1E-08 [b]	2 6E-10 [a]	6.1E-09 [a]	1.1E-09 [b]	**2.8E-09**	**6.7E-08**	**1.2E-08**
Pyrene	129-00-0	431	Yes	Yes	No	1 7E-11	5.3E-14 [a]	1.3E-12 [a]	2 3E-13 [b]	5.4E-15 [a]	1 3E-13 [a]	2 3E-14 [b]	**5.8E-14**	**1.4E-12**	**2.5E-13**
Toluene	108-88-3	600	Yes	Yes	Yes	6.4E-04	1.9E-06 [a]	4.6E-05 [a]	8 3E-06 [b]	2 0E-07 [a]	4 7E-06 [a]	8.4E-07 [b]	**2.1E-06**	**5.1E-05**	**9.2E-06**
1 2 4-Trimethylbenzene	95-63-6	614	No	Yes	Yes	1.4E-04	4.4E-07 [a]	1.0E-05 [a]	1.9E-06 [b]	4.4E-08 [a]	1.1E-06 [a]	1.9E-07 [b]	**4.8E-07**	**1.2E-05**	**2.1E-06**
1 3 5-Trimethylbenzene	108-67-8	615	No	Yes	Yes	5.4E-05	1.6E-07 [a]	4.0E-06 [a]	7.1E-07 [b]	1 7E-08 [a]	4 0E-07 [a]	7 2E-08 [b]	**1.8E-07**	**4.4E-06**	**7.8E-07**
m-Xylene & p-Xylene	108-38-3	629	Yes	Yes	Yes	4 2E-04	1.3E-06 [a]	3.0E-05 [a]	5.4E-06 [b]	1 3E-07 [a]	3.1E-06 [a]	5 5E-07 [b]	**1.4E-06**	**3.3E-05**	**6.0E-06**
o-Xylene	95-47-6	630	Yes	Yes	Yes	1 5E-04	4.5E-07 [a]	1.1E-05 [a]	1.9E-06 [b]	4 6E-08 [a]	1.1E-06 [a]	2 0E-07 [b]	**5.0E-07**	**1.2E-05**	**2.1E-06**
Total TAC Emission Estimates							**7.8E-06**	**1.9E-04**	**3.4E-05**	**7.9E-07**	**1.9E-05**	**3.4E-06**	**8.6E-06**	**2.1E-04**	**3.7E-05**
Total HAP Emission Estimates							**7.2E-06**	**1.7E-04**	**3.1E-05**	**7.3E-07**	**1.8E-05**	**3.1E-06**	**8.0E-06**	**1.9E-04**	**3.4E-05**
Total RBC Emission Estimates							**7.8E-06**	**1.9E-04**	**3.4E-05**	**7.9E-07**	**1.9E-05**	**3.4E-06**	**8.6E-06**	**2.1E-04**	**3.7E-05**
Total Non-RBC Emission Estimates							**3.8E-09**	**9.2E-08**	**1.7E-08**	**3.9E-10**	**9.4E-09**	**1.7E-09**	**4.2E-09**	**1.0E-07**	**1.8E-08**

NOTES:

HAP = hazardous air pollutant.

RBC = risk-based concentration.

TAC = toxic air contaminant.

(a) Hourly and daily emissions estimate (lb/"unit") = (total organic compound hourly or daily emissions estimate [lb/"unit"]) x (TAC vapor mass fraction)

(b) Annual emissions estimate (tons/yr) = (total organic compound annual emissions estimate [tons/yr]) x (TAC vapor mass fraction)

REFERENCES:

(1) See Table 29 Product Storage Tank nos. 1-3—VOC/TAC Emission Estimates—Dedicated RD. Only TACs are presented.

(2) See Table 17 Product Loadout VOC Emission Estimates.

Table 20
Equipment Leak Fugitive VOC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Component Data			Default Zero Factor (Non-Leaker)			Correlation Equation (Leaker)						Pegged Factor (Pegged Leaker)			Total Leak Emission Estimates	
Source Type	Service Type	Count Estimate	Emission Factor [1] (kg/hr-comp.)	Number of Comp. [a]	Emissions Estimate [b] (lb/hr)	Constant [1]	Screening Value [2] (ppm_V)	Exponent [1]	Emission Factor [c] (kg/hr-comp.)	Number of Comp. [d]	Emissions Estimate [b] (lb/hr)	Emission Factor [3] (kg/hr-comp.)	Number of Comp. [4]	Emissions Estimate [b] (lb/hr)	Daily [e] (lb/day)	Annual [f] (tons/yr)
RENEWABLE DIESEL SERVICE																
Valve	LL/HL	288 [5]	4 9E-07	282	3 0E-04	6 41E-06	5 000	0 797	5 69E-03	5	0 063	0 036	1	0 079	1 67	0 30
Connectors/Flanges	All	448 [5]	6 1E-07	440	5 9E-04	3 05E-06	5 000	0 885	5 73E-03	7	0 09	0 044	1	0 10	2 33	0 43
Pressure Relief Valves	All	6 [5]	7 5E-06	4	6 6E-05	1 90E-05	5 000	0 824	0 021	1	0 047	0 14	1	0 31	1 74	0 32
Pumps/Other	All	8 [5]	7 5E-06	6	9 9E-05	1 90E-05	5 000	0 824	0 021	1	0 047	0 14	1	0 31	1 74	0 32
Total Count =		**750** [6]												**Total Leak TOC Emissions Estimate =**	**7.49**	**1.37**
RENEWABLE NAPHTHA SERVICE																
Valve	LL/HL	165 [5]	4 9E-07	161	1 7E-04	6 41E-06	5 000	0 797	5 69E-03	3	0 038	0 036	1	0 079	1 07	0 19
Connectors/Flanges	All	249 [5]	6 1E-07	244	3 3E-04	3 05E-06	5 000	0 885	5 73E-03	4	0 05	0 044	1	0 10	1 41	0 26
Pressure Relief Valves	All	3 [5]	7 5E-06	1	1 7E-05	1 90E-05	5 000	0 824	0 021	1	0 047	0 14	1	0 31	1 74	0 32
Pumps/Other	All	4 [5]	7 5E-06	2	3 3E-05	1 90E-05	5 000	0 824	0 021	1	0 047	0 14	1	0 31	1 74	0 32
Total Count =		**421** [6]												**Total Leak TOC Emissions Estimate =**	**5.96**	**1.09**
RENEWABLE JET FUEL SERVICE																
Valve	LL/HL	123 [5]	4 9E-07	120	1 3E-04	6 41E-06	5 000	0 797	5 69E-03	2	0 025	0 036	1	0 079	0 76	0 14
Connectors/Flanges	All	199 [5]	6 1E-07	195	2 6E-04	3 05E-06	5 000	0 885	5 73E-03	3	0 04	0 044	1	0 10	1 11	0 20
Pressure Relief Valves	All	3 [5]	7 5E-06	1	1 7E-05	1 90E-05	5 000	0 824	0 021	1	0 047	0 14	1	0 31	1 74	0 32
Pumps/Other	All	2 [5]	7 5E-06	0	0	1 90E-05	5 000	0 824	0 021	1	0 047	0 14	1	0 31	1 74	0 32
Total Count =		**327** [6]												**Total Leak TOC Emissions Estimate =**	**5.35**	**0.98**
NATURAL GAS SERVICE																
Valve	Gas	63 [5]	6 6E-07	61	8 9E-05	1 87E-06	5 000	0 873	3 17E-03	1	7 0E-03	0 024	1	0 053	0 28	0 050
Connectors/Flanges	All	75 [5]	6 1E-07	72	9 7E-05	3 05E-06	5 000	0 885	5 73E-03	2	0 025	0 044	1	0 10	0 80	0 15
Total Count =		**138** [6]												**Total Leak TOC Emissions Estimate =**	**1.08**	**0.20**
ECOFINER OFFGAS SERVICE																
Valve	Gas	42 [5]	6 6E-07	40	5 8E-05	1 87E-06	5 000	0 873	3 17E-03	1	7 0E-03	0 024	1	0 053	0 27	0 050
Connectors/Flanges	All	50 [5]	6 1E-07	48	6 5E-05	3 05E-06	5 000	0 885	5 73E-03	1	0 013	0 044	1	0 10	0 50	0 091
Total Count =		**92** [6]												**Total Leak TOC Emissions Estimate =**	**0.77**	**0.14**
AMINE SERVICE																
Valve	LL/HL	42 [5]	4 9E-07	40	4 3E-05	6 41E-06	5 000	0 797	5 69E-03	1	0 013	0 036	1	0 079	0 46	0 084
Connectors/Flanges	All	50 [5]	6 1E-07	48	6 5E-05	3 05E-06	5 000	0 885	5 73E-03	1	0 013	0 044	1	0 10	0 50	0 091
Total Count =		**92** [6]												**Total Leak TOC Emissions Estimate =**	**0.96**	**0.18**
ACID GAS SERVICE																
Valve	Gas	105 [5]	6 6E-07	102	1 5E-04	1 87E-06	5 000	0 873	3 17E-03	2	1 4E-02	0 024	1	0 053	0 44	0 081
Valve	LL/HL	21 [5]	4 9E-07	19	2 1E-05	6 41E-06	5 000	0 797	5 69E-03	1	0 013	0 036	1	0 079	0 46	0 084
Connectors/Flanges	All	150 [5]	6 1E-07	146	2 0E-04	3 05E-06	5 000	0 885	5 73E-03	3	0 038	0 044	1	0 10	1 11	0 20
Pressure Relief Valves	All	1 [5]	7 5E-06	0	0	1 90E-05	5 000	0 824	0 021	1	0 047	0 14	0	0	1 12	0 20
Total Count =		**277** [6]												**Total Leak TOC Emissions Estimate =**	**3.14**	**0.57**
WASTE GAS SERVICE																
Valve	Gas	12 [5]	6 6E-07	10	1 5E-05	1 87E-06	5 000	0 873	3 17E-03	1	7 0E-03	0 024	1	0 053	0 27	0 050
Connectors/Flanges	All	28 [5]	6 1E-07	26	3 5E-05	3 05E-06	5 000	0 885	5 73E-03	1	0 013	0 044	1	0 10	0 50	0 091
Total Count =		**40** [6]												**Total Leak TOC Emissions Estimate =**	**0.77**	**0.14**
SRU OFFGAS SERVICE																
Valve	Gas	21 [5]	6 6E-07	19	2 8E-05	1 87E-06	5 000	0 873	3 17E-03	1	7 0E-03	0 024	1	0 053	0 27	0 050
Connectors/Flanges	All	25 [5]	6 1E-07	23	3 1E-05	3 05E-06	5 000	0 885	5 73E-03	1	0 013	0 044	1	0 10	0 50	0 091
Pressure Relief Valves	All	1 [5]	7 5E-06	0	0	1 90E-05	5 000	0 824	0 021	1	0 047	0 14	0	0	1 12	0 20
Total Count =		**47** [6]												**Total Leak TOC Emissions Estimate =**	**1.89**	**0.35**
PRETREATMENT UNIT																
Valve	LL/HL	581 [5]	4 9E-07	571	6 2E-04	6 41E-06	5 000	0 797	5 69E-03	9	0 11	0 036	1	0 079	2 88	0 53
Connectors/Flanges	All	1 073 [5]	6 1E-07	1 055	1 4E-03	3 05E-06	5 000	0 885	5 73E-03	17	0 21	0 044	1	0 10	5 38	0 98
Pumps/Other	All	9 [5]	7 5E-06	7	1 2E-04	1 90E-05	5 000	0 824	0 021	1	0 047	0 14	1	0 31	1 74	0 32
Total Count =		**1,663** [6]												**Total Leak TOC Emissions Estimate =**	**10.0**	**1.83**
UOP ECOFINING																
Valve	LL/HL	5 004 [redacted]	4 9E-07	4 927	5 3E-03	6 41E-06	5 000	0 797	5 69E-03	76	0 95	0 036	1	0 079	23 2	4 23
Connectors/Flanges	All	10 844	6 1E-07	10 680	0 014	3 05E-06	5 000	0 885	5 73E-03	163	2 06	0 044	1	0 097	49 9	9 1
Pressure Relief Valves	All	93 [5]	7 5E-06	90	1 5E-03	1 90E-05	5 000	0 824	0 021	2	0 094	0 14	1	0 31	2 90	0 53
Pumps/Other	All	87 [5]	7 5E-06	84	1 4E-03	1 90E-05	5 000	0 824	0 021	2	0 094	0 14	1	0 31	2 90	0 53
Total Count =		**16,028** [6]												**Total Leak TOC Emissions Estimate =**	**79**	**14.4**
AMINE UNIT																
Valve	LL/HL	376 [redacted]	4 9E-07	369	4 0E-04	6 41E-06	5 000	0 797	5 69E-03	6	0 08	0 036	1	0 079	1 97	0 36
Connectors/Flanges	All	814	6 1E-07	800	1 1E-03	3 05E-06	5 000	0 885	5 73E-03	13	0 16	0 044	1	0 097	4 16	0 76
Pressure Relief Valves	All	5	7 5E-06	3	5 0E-05	1 90E-05	5 000	0 824	0 021	1	0 047	0 14	1	0 31	1 74	0 32
Pumps/Other	All	5	7 5E-06	3	5 0E-05	1 90E-05	5 000	0 824	0 021	1	0 047	0 14	1	0 31	1 74	0 32
Total Count =		**1,200** [6]												**Total Leak TOC Emissions Estimate =**	**9.6**	**1.76**
SOUR WATER STRIPPER UNIT																
Valve	LL/HL	376 [redacted]	4 9E-07	369	4 0E-04	6 41E-06	5 000	0 797	5 69E-03	6	0 08	0 036	1	0 079	1 97	0 36
Connectors/Flanges	All	814	6 1E-07	800	1 1E-03	3 05E-06	5 000	0 885	5 73E-03	13	0 16	0 044	1	0 097	4 16	0 76
Pressure Relief Valves	All	5	7 5E-06	3	5 0E-05	1 90E-05	5 000	0 824	0 021	1	0 047	0 14	1	0 31	1 74	0 32
Pumps/Other	All	5	7 5E-06	3	5 0E-05	1 90E-05	5 000	0 824	0 021	1	0 047	0 14	1	0 31	1 74	0 32
Total Count =		**1,200** [6]												**Total Leak TOC Emissions Estimate =**	**9.6**	**1.76**
Total Facility Count =		**22,275** [7]												**Total Facility Leak TOC Emissions Estimate =**	**136** [7]	**24.7** [7]

NOTES:

HL = heavy liquid

LL = light liquid

SOCMI = Synthetic Organic Chemical Manufacturing Industry

TOC = total organic compounds

(a) Default zero number of components = (total component count estimate) - (correlation equation number of components) - (pegged factor number of components)

(b) Emissions estimate (lb/hr) = (emission factor [kg/hr-component]) x (number of components) x (2 205 lb/kg)

(c) Emission factor kg/hr-source) = (correlation equation constant) x (screening value [ppm])^(correlation equation exponent); see reference (1)

(d) Correlation equation number of components = (total component count estimate) x (leaking component percentage [%] / 100)

Leaking component percentage estimate (%) = 1 5 (8)

(e) Daily emissions estimate lb/day) = ([default zero factor hourly emissions estimate {lb/hr}] + [correlation equation hourly emissions estimate {lb/hr}]) x (daily hours of typical operation [hrs/day]) + (pegged factor hourly emissions estimate [lb/hr]) x (daily hours of pegged operation [hrs/day])

Daily hours of typical operation (hrs/day) = 24 (9)

Daily hours of pegged operation (hrs/day) = 2 (10)

(f) Annual emissions estimate (tons/yr) = ([default zero factor hourly emissions estimate {lb/hr}] + [correlation equation hourly emissions estimate {lb/hr}]) x (annual hours of typical operation [hrs/yr]) x (ton/2 000 lb) + (pegged factor hourly emissions estimate [lb/hr]) x (annual hours of pegged operation [hrs/yr]) x (ton/2 000 lb)

Annual hours of operation (hrs/yr) = 8 760 (9)

Annual hours of pegged operation (hrs/yr) = 730 (10)

[redacted]

REFERENCES:

(1) Preferred and Alternative Methods for Estimating Fugitive Emissions from Equipment Leaks Final Report published in November 1996 See Table 4 4-3 Correlation Equations Default Zero Emission Rates and Pegged Emission Rates for Estimating SOCMI TOC Emission Rates Assumes data for SOCMI as representative which is consistent with similar facility permitting

(2) Assumes screening valve permitted for use by a representative facility in the state of Louisiana

(3) Preferred and Alternative Methods for Estimating Fugitive Emissions from Equipment Leaks Final Report published in November 1996 See Table 4 4-3 Correlation Equations Default Zero Emission Rates and Pegged Emission Rates for Estimating SOCMI TOC Emission Rates Assumes data for SOCMI as representative which is consistent with similar facility permitting Also the majority of facility service is dedicated to components serving low vapor pressure materials Therefore the 10 000 ppm_V pegged factor is considered to be conservative for emissions estimate purposes

(4) Information provided by NEXT Renewable Fuels Oregon LLC Fugitive component leaks will be monitored by the leak detection and repair (LDAR) maintenance program It is assumed that pegged leakers will be inspected with a monitoring device immediately upon a potential release

(5) Information provided by NEXT Renewable Fuels Oregon LLC

(6) Value represents the sum of individual components per source type

(7) Value represents the estimated sum total of components or leak emission estimates at the facility

(8) Assumes 1 5 percent of components are assumed to be leaking at any one time which is consistent with similar facility permitting

(9) Assumes continuous daily and annual operation

(10) Fugitive component leaks will be monitored by the LDAR maintenance program As a result a single leaking component is assumed to be pegged at 10 000 ppm_V for two hours in a day for any given year which is consistent with similar facility permitting

[redacted]

Table 21
Equipment Leak (Renewable Diesel Only) TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Pollutant	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			Renewable Diesel Vapor Mass Fraction	Emission Estimates								
							Renewable Diesel Storage/Loadout			UOP Ecofining Unit			Total (Renewable Diesel Only)		
			HAP	TAC	RBC		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
Total Organic Compounds	--	--	--	--	--	--	0 33 [1]	7.49 [1]	1 37 [1]	4 01 [2]	78.9 [2]	14.4 [2]	--	--	--
TOXIC AIR CONTAMINANT															
Benzene	71-43-2	46	Yes	Yes	Yes	2.2E-04 [3]	7.1E-05 [a]	1.6E-03 [a]	3.0E-04 [b]	8.7E-04 [a]	0.017 [a]	3.1E-03 [b]	9.4E-04	0 019	3.4E-03
Chlorobenzene	108-90-7	108	Yes	Yes	Yes	1.7E-04 [3]	5.6E-05 [a]	1.3E-03 [a]	2.3E-04 [b]	6.9E-04 [a]	0.014 [a]	2.5E-03 [b]	7.4E-04	0 015	2 7E-03
Ethylbenzene	100-41-4	229	Yes	Yes	Yes	7.9E-04 [3]	2.6E-04 [a]	5.9E-03 [a]	1.1E-03 [b]	3.2E-03 [a]	0.062 [a]	0.011 [b]	3.4E-03	0 068	0.012
Acenaphthene	83-32-9	402	Yes	Yes	No	3.0E-07 [3]	9.8E-08 [a]	2.2E-06 [a]	4.1E-07 [b]	1.2E-06 [a]	2.3E-05 [a]	4.3E-06 [b]	1.3E-06	2.6E-05	4 7E-06
Fluorene	86-73-7	425	Yes	Yes	No	1.4E-07 [3]	4.5E-08 [a]	1.0E-06 [a]	1.9E-07 [b]	5.5E-07 [a]	1.1E-05 [a]	2.0E-06 [b]	5.9E-07	1.2E-05	2 2E-06
2-Methylnaphthalene	91-57-6	427	Yes	Yes	No	8.3E-07 [3]	2.7E-07 [a]	6.2E-06 [a]	1.1E-06 [b]	3.3E-06 [a]	6.6E-05 [a]	1.2E-05 [b]	3.6E-06	7.2E-05	1 3E-05
Pyrene	129-00-0	431	Yes	Yes	No	1.7E-11 [3]	5.7E-12 [a]	1.3E-10 [a]	2.4E-11 [b]	7.0E-11 [a]	1.4E-09 [a]	2.5E-10 [b]	7.6E-11	1.5E-09	2 8E-10
Toluene	108-88-3	600	Yes	Yes	Yes	6.4E-04 [3]	2.1E-04 [a]	4.8E-03 [a]	8.7E-04 [b]	2.6E-03 [a]	0.050 [a]	9.2E-03 [b]	2.8E-03	0 055	0.010
1 2 4-Trimethylbenzene	95-63-6	614	No	Yes	Yes	1.4E-04 [3]	4.7E-05 [a]	1.1E-03 [a]	2.0E-04 [b]	5.8E-04 [a]	0.011 [a]	2.1E-03 [b]	6.2E-04	0 012	2 3E-03
1 3 5-Trimethylbenzene	108-67-8	615	No	Yes	Yes	5.4E-05 [3]	1.8E-05 [a]	4.1E-04 [a]	7.4E-05 [b]	2.2E-04 [a]	4.3E-03 [a]	7.8E-04 [b]	2.4E-04	4.7E-03	8 6E-04
m-Xylene & p-Xylene	108-38-3	629	Yes	Yes	Yes	4.2E-04 [3]	1.4E-04 [a]	3.1E-03 [a]	5.7E-04 [b]	1.7E-03 [a]	0.033 [a]	6.0E-03 [b]	1.8E-03	0 036	6 6E-03
o-Xylene	95-47-6	630	Yes	Yes	Yes	1.5E-04 [3]	4.9E-05 [a]	1.1E-03 [a]	2.0E-04 [b]	5.9E-04 [a]	0.012 [a]	2.1E-03 [b]	6.4E-04	0 013	2 3E-03
Total TAC Emission Estimates							**8.5E-04**	**0.019**	**3.5E-03**	**0.010**	**0.20**	**0.037**	**0.011**	**0.22**	**0.041**
Total HAP Emission Estimates							**7.8E-04**	**0.018**	**3.3E-03**	**9.6E-03**	**0.19**	**0.034**	**0.010**	**0.21**	**0.038**
Total RBC Emission Estimates							**8.5E-04**	**0.019**	**3.5E-03**	**0.010**	**0.20**	**0.037**	**0.011**	**0.22**	**0.041**
Total Non-RBC Emission Estimates							**4.2E-07**	**9.5E-06**	**1.7E-06**	**5.1E-06**	**1.0E-04**	**1.8E-05**	**5.5E-06**	**1.1E-04**	**2.0E-05**

NOTES:

HAP = hazardous air pollutant.

RBC = risk-based concentration.

TAC = toxic air contaminant.

(a) Hourly and daily emissions estimate (lb/"unit") = (total organic compound hourly or daily emissions estimate [lb/"unit"]) x (TAC vapor mass fraction)

(b) Annual emissions estimate (tons/yr) = (total organic compound annual emissions estimate [tons/yr]) x (TAC vapor mass fraction)

REFERENCES:

(1) See Table 20 Equipment Leak Fugitive VOC Emission Estimates.

(2) See Table 20 Equipment Leak Fugitive VOC Emission Estimates. Conservatively assumes the UOP ecofining composition is renewable diesel.

(3) See Table 29 Product Storage Tank nos. 1-3—VOC/TAC Emission Estimates—Dedicated RD.

Table 22
Equipment Leak (Renewable Naphtha Only) TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Pollutant	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			Renewable Naphtha Vapor Mass Fraction	Emission Estimates		
							Renewable Naphtha Storage/Loadout		
			HAP	TAC	RBC		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
Total Organic Compounds	--	--	--	--	--	--	0.27 (1)	5.96 (1)	1.09 (1)
TOXIC AIR CONTAMINANT									
Toluene	108-88-3	600	Yes	Yes	Yes	8.4E-07 (2)	2.2E-07 (a)	5.0E-06 (a)	9.2E-07 (b)
Total TAC Emission Estimates							**2.2E-07**	**5.0E-06**	**9.2E-07**
Total HAP Emission Estimates							**2.2E-07**	**5.0E-06**	**9.2E-07**
Total RBC Emission Estimates							**2.2E-07**	**5.0E-06**	**9.2E-07**
Total Non-RBC Emission Estimates							**0**	**0**	**0**

NOTES:

HAP = hazardous air pollutant.

RBC = risk-based concentration.

TAC = toxic air contaminant.

(a) Hourly and daily emissions estimate (lb/"unit") = (total organic compound hourly or daily emissions estimate [lb/"unit"]) x (TAC vapor mass fraction)

(b) Annual emissions estimate (tons/yr) = (total organic compound annual emissions estimate [tons/yr]) x (TAC vapor mass fraction)

REFERENCES:

(1) See Table 20, Equipment Leak Fugitive VOC Emission Estimates.

(2) See Table 33, Product Storage Tank no. 3—VOC/TAC Emission Estimates—Swing RN vs. RJET.

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Table 23
Equipment Leak (Renewable Jet Fuel Only) TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Pollutant	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			Renewable Jet Fuel Vapor Mass Fraction	Emission Estimates		
							Renewable Jet Fuel Storage/Loadout		
			HAP	TAC	RBC		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
Total Organic Compounds	--	--	--	--	--	--	0.95 (1)	5.35 (1)	0.98 (1)
TOXIC AIR CONTAMINANT									
Benzene	71-43-2	46	Yes	Yes	Yes	1.3E-05 (2)	1.2E-05 (a)	7.0E-05 (a)	1.3E-05 (b)
Chlorobenzene	108-90-7	108	Yes	Yes	Yes	1.0E-05 (2)	9.8E-06 (a)	5.5E-05 (a)	1.0E-05 (b)
Ethylbenzene	100-41-4	229	Yes	Yes	Yes	4.7E-05 (2)	4.5E-05 (a)	2.5E-04 (a)	4.6E-05 (b)
Acenaphthene	83-32-9	402	Yes	Yes	No	1.8E-08 (2)	1.7E-08 (a)	9.6E-08 (a)	1.7E-08 (b)
Fluorene	86-73-7	425	Yes	Yes	No	8.2E-09 (2)	7.8E-09 (a)	4.4E-08 (a)	8.0E-09 (b)
2-Methylnaphthalene	91-57-6	427	Yes	Yes	No	5.0E-08 (2)	4.8E-08 (a)	2.7E-07 (a)	4.9E-08 (b)
Pyrene	129-00-0	431	Yes	Yes	No	1.1E-12 (2)	1.0E-12 (a)	5.6E-12 (a)	1.0E-12 (b)
Toluene	108-88-3	600	Yes	Yes	Yes	3.8E-05 (2)	3.6E-05 (a)	2.0E-04 (a)	3.7E-05 (b)
1,2,4-Trimethylbenzene	95-63-6	614	No	Yes	Yes	8.6E-06 (2)	8.2E-06 (a)	4.6E-05 (a)	8.4E-06 (b)
1,3,5-Trimethylbenzene	108-67-8	615	No	Yes	Yes	3.3E-06 (2)	3.1E-06 (a)	1.7E-05 (a)	3.2E-06 (b)
m-Xylene & p-Xylene	108-38-3	629	Yes	Yes	Yes	2.5E-05 (2)	2.4E-05 (a)	1.3E-04 (a)	2.4E-05 (b)
o-Xylene	95-47-6	630	Yes	Yes	Yes	8.9E-06 (2)	8.5E-06 (a)	4.8E-05 (a)	8.7E-06 (b)
Total TAC Emission Estimates							**1.5E-04**	**8.3E-04**	**1.5E-04**
Total HAP Emission Estimates							**1.4E-04**	**7.7E-04**	**1.4E-04**
Total RBC Emission Estimates							**1.5E-04**	**8.3E-04**	**1.5E-04**
Total Non-RBC Emission Estimates							**7.2E-08**	**4.1E-07**	**7.4E-08**

NOTES:

HAP = hazardous air pollutant.

RBC = risk-based concentration.

TAC = toxic air contaminant.

(a) Hourly and daily emissions estimate (lb/"unit") = (total organic compound hourly or daily emissions estimate [lb/"unit"]) x (TAC vapor mass fraction)

(b) Annual emissions estimate (tons/yr) = (total organic compound annual emissions estimate [tons/yr]) x (TAC vapor mass fraction)

REFERENCES:

(1) See Table 20 Equipment Leak Fugitive VOC Emission Estimates.

(2) See Table 31 Product Storage Tank no. 1—VOC/TAC Emission Estimates—Swing RN vs. RJET.

Table 24
Equipment Leak (Natural Gas Only) TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Pollutant	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			[redacted]	Emission Estimates		
							Natural Gas		
			HAP	TAC	RBC		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
Total Organic Compounds	--	--	--	--	--	--	0.18 (1)	1.08 (1)	0.20 (1)
TOXIC AIR CONTAMINANT									
Normal Hexane	110-54-3	289	Yes	Yes	Yes	[redacted]	1.8E-04 [redacted]	1.1E-03 [redacted]	1.9E-04 [redacted]
Total TAC Emission Estimates							**1.8E-04**	**1.1E-03**	**1.9E-04**
Total HAP Emission Estimates							**1.8E-04**	**1.1E-03**	**1.9E-04**
Total RBC Emission Estimates							**1.8E-04**	**1.1E-03**	**1.9E-04**
Total Non-RBC Emission Estimates							**0**	**0**	**0**

NOTES:

HAP = hazardous air pollutant.

RBC = risk-based concentration.

TAC = toxic air contaminant.

[redacted]

REFERENCES:

(1) See Table 20, Equipment Leak Fugitive VOC Emission Estimates.

[redacted]

Table 25
Equipment Leak (Offgas Only) TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Pollutant	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			[redacted]	Emission Estimates Offgas Service		
			HAP	TAC	RBC		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
Total Organic Compounds	--	--	--	--	--	--	0.17 (1)	0.77 (1)	0.14 (1)
TOXIC AIR CONTAMINANT									
Hexane	110-54-3	289	Yes	Yes	Yes	[redacted]	3.1E-03 [redacted]	0.014 [redacted]	2.6E-03 [redacted]
Hydrogen sulfide	7783-06-4	293	No	Yes	Yes	[redacted]	2.7E-06 [redacted]	1.2E-05 [redacted]	2.3E-06 [redacted]
Total TAC Emission Estimates							**3.1E-03**	**0.014**	**2.6E-03**
Total HAP Emission Estimates							**3.1E-03**	**0.014**	**2.6E-03**
Total RBC Emission Estimates							**3.1E-03**	**0.014**	**2.6E-03**
Total Non-RBC Emission Estimates							**0**	**0**	**0**

NOTES:

HAP = hazardous air pollutant.

RBC = risk-based concentration.

TAC = toxic air contaminant.

[redacted]

REFERENCES:

(1) See Table 20, Equipment Leak Fugitive VOC Emission Estimates.

[redacted]

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Table 26
Equipment Leak (Amine Service/Unit Only) TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Pollutant	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			[redacted]		Emission Estimates					
								Amine Service			Amine Unit		
			HAP	TAC	RBC	Amine Service	Amine Unit	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
Total Organic Compounds	--	--	--	--	--	--	--	0.20 (1)	0.96 (1)	0.18 (1)	1.13 (1)	9.62 (1)	1.76 (1)
TOXIC AIR CONTAMINANT													
Hydrogen sulfide	7783-06-4	293	No	Yes	Yes	[redacted]		3.1E-04 [redacted]	1.5E-03 [redacted]	2.7E-04 [redacted]	0.040 [redacted]	0.34 [redacted]	0.061 [redacted]
Total TAC Emission Estimates								**3.1E-04**	**1.5E-03**	**2.7E-04**	**0.040**	**0.34**	**0.061**
Total HAP Emission Estimates								**0**	**0**	**0**	**0**	**0**	**0**
Total RBC Emission Estimates								**3.1E-04**	**1.5E-03**	**2.7E-04**	**0.040**	**0.34**	**0.061**
Total Non-RBC Emission Estimates								**0**	**0**	**0**	**0**	**0**	**0**

NOTES:

HAP = hazardous air pollutant.

RBC = risk-based concentration.

TAC = toxic air contaminant.

[redacted]

REFERENCES:

(1) See Table 20 Equipment Leak Fugitive VOC Emission Estimates.

[redacted]

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Table 27
Equipment Leak (Acid Gas Service and SWS Unit Only) TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Pollutant	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			[redacted]		Emission Estimates					
								Acid Gas Service			Sour Water Stripper Offgas and Unit		
			HAP	TAC	RBC	Acid Gas Service	SWS Offgas & Unit	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
Total Organic Compounds	--	--	--	--	--	--	--	0.29 (1)	3.14 (1)	0.57 (1)	1.34 (2)	11.5 (2)	2.10 (2)
TOXIC AIR CONTAMINANT													
Ammonia	7664-41-7	26	No	Yes	Yes	[redacted]		9.0E-03 [redacted]	0.096 [redacted]	0.018 [redacted]	0.041 [redacted]	0.35 [redacted]	0.064 [redacted]
Hydrogen sulfide	7783-06-4	293	No	Yes	Yes	[redacted]		6.8E-04 [redacted]	7.3E-03 [redacted]	1.3E-03 [redacted]	3.1E-03 [redacted]	0.027 [redacted]	4.9E-03 [redacted]
Total TAC Emission Estimates								**9.7E-03**	**0.10**	**0.019**	**0.044**	**0.38**	**0.069**
Total HAP Emission Estimates								**0**	**0**	**0**	**0**	**0**	**0**
Total RBC Emission Estimates								**9.7E-03**	**0.10**	**0.019**	**0.044**	**0.38**	**0.069**
Total Non-RBC Emission Estimates								**0**	**0**	**0**	**0**	**0**	**0**

NOTES:

HAP = hazardous air pollutant.

RBC = risk-based concentration.

SWS = sour water stripper.

TAC = toxic air contaminant.

[redacted]

REFERENCES:

(1) See Table 20 Equipment Leak Fugitive VOC Emission Estimates.

[redacted]

Table 28
Equipment Leak (Waste Gas Only) TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Pollutant	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			[redacted]	Emission Estimates		
							Waste Gas Service		
			HAP	TAC	RBC		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
Total Organic Compounds	--	--	--	--	--	--	0.17 [1]	0.77 [1]	0.14 [1]
TOXIC AIR CONTAMINANT									
Hydrogen sulfide	7783-06-4	293	No	Yes	Yes	[redacted]	4.9E-04 [redacted]	2.2E-03 [redacted]	4.1E-04 [redacted]
Total TAC Emission Estimates							**4.9E-04**	**2.2E-03**	**4.1E-04**
Total HAP Emission Estimates							**0**	**0**	**0**
Total RBC Emission Estimates							**4.9E-04**	**2.2E-03**	**4.1E-04**
Total Non-RBC Emission Estimates							**0**	**0**	**0**

NOTES:

HAP = hazardous air pollutant.

RBC = risk-based concentration.

TAC = toxic air contaminant.

[redacted]

REFERENCES:

(1) See Table 20, Equipment Leak Fugitive VOC Emission Estimates.

[redacted]

Table 29
Product Storage Tank nos. 1-3—VOC/TAC Emission Estimates—Dedicated RD
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		(Units)	Renewable Diesel	AP-42 Variable
PRODUCTION VALUES				
Storage Tank ID	(1)	--	T_RNWDSL	--
Total Number of Storage Tanks	(1)	--	3.00	--
Total Annual Throughput	(1)	(gal/yr)	194 129 796	--
Total Annual Throughput	(a)	(bbl/yr)	4 622 138	Q
Maximum Daily Throughput	(1)	(gal/day)	542 262	--
Maximum Daily Throughput	(a)	(bbl/day)	12 911	--
Annual Days of Operation	(2)	(days/yr)	358	--
TANK PROPERTIES				
Tank Type (Fixed Roof or Internal Floating Roof Tank)	(1)	--	Fixed Roof	--
Insulated or Partially Insulated or Uninsulated?	(1)	--	--	--
Heated or Non-heated?	(1)	--	Non-Heated	--
Controlled or Fugitive?	(1)	--	Fugitive	--
Control Efficiency	(1)	(%)	0	--
Tank Roof Color	(1)	--	White	--
Tank Roof Condition	(1)	--	New	--
Tank Shell Color	(1)	--	White	--
Tank Shell Condition	(1)	--	New	--
Horizontal or Vertical	(1)	--	Vertical	--
Tank Diameter	(1)	(ft)	184	D
Tank Shell Height	(1)	(ft)	48.0	H_S
Roof Type	(3)	--	Cone	--
Maximum Liquid Height	(1)	(ft)	47.0	H_{LX}
Minimum Liquid Height	(4)	(ft)	1.00	H_{LN}
TANK CONTENT PROPERTIES				
Liquid Temperature	(1)	(°F)	77.0	T
Liquid Molecular Weight	(5)	(lb/lb-mole)	188	M_L
Vapor Molecular Weight	(5)	(lb/lb-mole)	130	M_V
Vapor Pressure Equation Constant A	(5)	--	12.1	A
Vapor Pressure Equation Constant B	(5)	--	8 907	B
True Vapor Pressure	(b)	(psia)	0.011	P_{VA}
ENVIRONMENTAL FACTORS				
Average Daily Maximum Ambient Temperature	(7)	(°R)	520	T_{AX}
Average Daily Minimum Ambient Temperature	(7)	(°R)	504	T_{AN}
Average Daily Total Insolation on a Horizontal Surface	(7)	(Btu/ft^2-day)	1 122	I
CALCUALTED VARIABLES				
Standing Loss Calculations				
Average Daily Ambient Temperature Range	(c)	(°R)	15.9	ΔT_A
Tank Roof Surface Solar Absorptance	(9)	--	0.17	a_R
Tank Shell Surface Solar Absorptance	(9)	--	0.17	a_S
Average Tank Surface Solar Absorptance	(d)	--	0.17	a
Average Daily Vapor Temperature Range	(e)	(°R)	14.9	ΔT_V
Vapor Space Expansion Factor	(f)	--	0.027	K_E
Effective Tank Diameter (if horizontal orientation)	(1)	(ft)	Not Applicable	D_E
Liquid Height	(12)	(ft)	24.0	H_L
Tank Shell Radius	(1)	(ft)	92.0	R_S
Tank Roof Height	(13)	(ft)	5.75	H_R
Roof Outage	(14)	(ft)	1.92	H_{RO}
Vapor Space Outage	(g)	(ft)	25.9	H_{VO}
Vented Vapor Saturation Factor	(h)	--	0.98	K_S
Average Daily Ambient Temperature	(i)	(°R)	512	T_{AA}
Liquid Bulk Temperature	(j)	(°R)	512	T_B
Average Vapor Temperature	(k)	(°R)	514	T_V
Stock Vapor Density	(l)	(lb/ft^3)	2 6E-04	W_V
Annual Standing Loss	(m)	(lb/yr)	1 753	L_S
Daily Standing Loss	(n)	(lb/day)	4.80	--
Working Loss Calculations				
Annual Net Working Loss Throughput	(o)	(ft^3/yr)	25 948 683	V_Q
Annual Sum of the Increase is Liquid Level	(p)	(ft/yr)	976	ΣH_{QI}
Number of Turnovers per Year	(q)	--	21.2	N
Working Loss Turnover (Saturation) Factor per Year	(r)	--	1.00	K_N
Daily Net Working Loss Throughput	(o)	(ft^3/day)	72 482	V_Q
Daily Sum of the Increase is Liquid Level	(p)	(ft/day)	2.73	ΣH_{QI}
Number of Turnovers per Day	(q)	--	0.059	N
Working Loss Turnover (Saturation) Factor per Day	(r)	--	1.00	K_N
Working Loss Product Factor	(26)	--	1.00	K_P
Vent Setting Correction Factor	(25)	--	1.00	K_B
Annual Working Loss	(s)	(lb/yr)	6 827	L_W
Daily Working Loss	(t)	(lb/day)	19.1	--
Annual Total Tank Routine Losses	(u)	**(lb/yr)**	**8,580**	L_T
Daily Total Tank Routine Losses	(u)	**(lb/day)**	**23.9**	**--**
Total Annual Emissions Estimate (All Renewable Diesel Storage Tanks)	(v)	**(lb/yr)**	**25,739**	**--**
Total Daily Emissions Estimate (All Renewable Diesel Storage Tanks)	(v)	**(lb/day)**	**71.6**	**--**

All notes and references are provided on the following page See Table 29 (Continued) Product Storage Tank nos 1-3—VOC/TAC Emission Estimates—Dedicated RD

Table 29 (Continued)
Product Storage Tank nos. 1-3—VOC/TAC Emission Estimates—Dedicated RD
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Chemical	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			EPA Tanks Methodology			Emissions Estimate		
							M_i		L_{fi}		
			HAP	TAC	RBC	[redacted]	Molecular Weight (lb/lb-mol)	[redacted]	Maximum Daily (lb/day)	Annual (lb/yr)	[redacted]
Benzene	71-43-2	46	Yes	Yes	Yes	[redacted]	78.1 (30)	[redacted]	5 2E-03	1.86	[redacted]
Chlorobenzene	108-90-7	108	Yes	Yes	Yes	[redacted]	113 (30)	[redacted]	4.1E-03	1.47	[redacted]
Ethylbenzene	100-41-4	229	Yes	Yes	Yes	[redacted]	106 (30)	[redacted]	0.019	6.78	[redacted]
Acenaphthene	83-32-9	402	Yes	Yes	No	[redacted]	154 (30)	[redacted]	7.1E-06	2.6E-03	[redacted]
Fluorene	86-73-7	425	Yes	Yes	No	[redacted]	166 (30)	[redacted]	3 3E-06	1.2E-03	[redacted]
2-Methylnaphthalene	91-57-6	427	Yes	Yes	No	[redacted]	142 (30)	[redacted]	2 0E-05	7.1E-03	[redacted]
Pyrene	129-00-0	431	Yes	Yes	No	[redacted]	202 (30)	[redacted]	4 2E-10	1.5E-07	[redacted]
Toluene	108-88-3	600	Yes	Yes	Yes	[redacted]	92.1 (30)	[redacted]	0.015	5.47	[redacted]
1 2 4-Trimethylbenzene	95-63-6	614	No	Yes	Yes	[redacted]	120 (30)	[redacted]	3.4E-03	1.23	[redacted]
1 3 5-Trimethylbenzene	108-67-8	615	No	Yes	Yes	[redacted]	120 (30)	[redacted]	1 3E-03	0.47	[redacted]
m-Xylene & p-Xylene	108-38-3	629	Yes	Yes	Yes	[redacted]	106 (30)	[redacted]	9.9E-03	3.57	[redacted]
o-Xylene	95-47-6	630	Yes	Yes	Yes	[redacted]	106 (30)	[redacted]	3 5E-03	1.27	[redacted]
o-Terphenyl	84-15-1	--	No	No	No	[redacted]	230 (30)	[redacted]	1 8E-08	6.5E-06	[redacted]
1-Pentanol	71-41-0	--	No	No	No	[redacted]	88.1 (30)	[redacted]	7 6E-06	2.7E-03	[redacted]
n-Butylbenzene	104-51-8	--	No	No	No	[redacted]	134 (30)	[redacted]	1 7E-04	0 062	[redacted]
n-Propylbenzene	103-65-1	--	No	No	No	[redacted]	120 (30)	[redacted]	1 6E-03	0.58	[redacted]
4-Isopropyltoluene	99-87-6	--	No	No	No	[redacted]	134 (30)	[redacted]	2 3E-04	0 081	[redacted]
1-Methylnaphthalene	90-12-0	--	No	No	No	[redacted]	142 (30)	[redacted]	1 0E-05	3.6E-03	[redacted]
p-Terphenyl-d14	1718-51-0	--	No	No	No	[redacted]	244 (30)	[redacted]	2.9E-09	1.0E-06	[redacted]
2-Fluorobiphenyl	321-60-8	--	No	No	No	[redacted]	172 (30)	[redacted]	2 2E-04	0 081	[redacted]
Total TAC Emission Estimates (for a single storage tank)									**0.062**	**22.1**	
Total HAP Emission Estimates (for a single storage tank)									**0.057**	**20.4**	
Total RBC-Only Emission Estimates (for a single storage tank)									**0.062**	**22.1**	
Total Non-RBC Emission Estimates (for a single storage tank)									**2.3E-03**	**0.83**	
Total TAC Emission Estimates (All Renewable Diesel Storage Tanks)									**0.18**	**66.4**	
Total HAP Emission Estimates (All Renewable Diesel Storage Tanks)									**0.17**	**61.3**	
Total RBC-Only Emission Estimates (All Renewable Diesel Storage Tanks)									**0.18**	**66.3**	
Total Non-RBC Emission Estimates (All Renewable Diesel Storage Tanks)									**6.9E-03**	**2.48**	

NOTES:

(a) Total annual or daily throughput (bbl/ unit) = (total annual or daily throughput [gal/ unit]) x bbl/42 gal)

(b) True vapor pressure (psia) = exp([vapor pressure equation constant A] - [vapor pressure constant equation B] / [liquid temperature (°F) + 459 67]); see Reference (6)

(c) Average daily ambient temperature range (°R) = ([daily maximum ambient temperature (°R)] - [daily minimum ambient temperature (°R)]); See Reference (8)

(d) Average tank surface solar absorbance = ([tank roof surface solar absorptance] + [tank shell surface solar absorptance]) / 2; See Reference (9)

(e) Average daily vapor temperature range (°R) = ([0 7] x [average daily temperature range (°R)]) + ([0 02] x [average tank surface solar absorptance] x [average daily total insolation factor (Btu/ft²-d)]); See Reference (10)

(f) Vapor space expansion factor = (0 0018) x (average daily vapor temperature range (°R]); See Reference (11)

(g) Vapor space outage (ft) = (tank shell height [ft]) - (liquid height [ft]) + (roof outage [ft]); See Reference (15)

(h) Vented vapor saturation factor = (1) / ([1] + [0 053] x [vapor pressure at average daily liquid surface temperature (psia)] x [vapor space outage (ft)]); See Reference (16)

(i) Average daily ambient temperature (°R) = ([average daily maximum ambient temperature (°R)] + [average daily minimum ambient temperature (°R)]) / (2); See Reference (17)

(j) If non-heated tank: Liquid bulk temperature (°R) = (average daily ambient temperature [°R]) + ([0 003] x [tank shell surface solar absorptance (°R)] x [average daily total insolation factor (Btu/ft²-day)]); See Reference (18)
For heated tanks the setpoint temperature for the storage tank is assumed to be representative of the liquid bulk temperature

(k) Average vapor temperature (°R) = ([2 2 x (tank shell height | ft |) / (tank diameter | ft |) + 1 1] x [average daily ambient temperature (°R)] + [0 8 x (liquid bulk temperature | °R |)] + [0 021 x (tank roof surface solar absorptance)
x (average daily total insolation factor | Btu/ft2-day |)] + [0 013 x (tank shell height | ft |) / (tank diameter | ft |) x (tank shell surface solar absorptance) x (average daily total insolation factor (| Btu/ft²-day |)]) / (2 2 x [tank shell height (ft)]
/ [tank diameter (ft)] + 1 9); See Reference (19)

(l) Vapor density (lb/ft³) = ([vapor molecular weight (lb/lb-mole)] x [true vapor pressure (psia)]) / ([10 731 psia-ft³/lb-mole-°R] x [average vapor temperature (°R)]); See Reference (20)

(m) Annual standing loss (lb/yr) = (365) x (vapor space exp factor per day) x ([π/4] x [diameter (ft)]²) x (vapor space outate [ft]) x (vented vapor saturation factor) x (stock vapor density [lb/ft³]) x (1 - [control efficiency (%) / 100]); See Reference (21)

(n) Daily standing loss lb/day) = (annual standing loss [lb/yr]) / (365 days/yr)

(o) Net working loss throughput (ft³/yr) = (5 614 ft³//bbl) x (total annual throughput [bbl/yr]); See Reference (22)

(p) Annual sum of the increases in liquid level (ft/yr) = ([5 614] x [total annual throughput (bbl/yr)]) / ([π/4] x [tank diameter (ft)]²); See Reference (23)

(q) Number of turnovers per year = (annual sum of the increases in liquid level [ft/yr]) / ([maximum liquid height (ft)] - [minimum liquid height (ft)]); See Reference (24)

(r) If N <= 36 working loss turnover factor equal to 1 or working loss turnover factor = ([180] + [number of turnovers per year]) / ([6] x [number of turnovers per year]); See Reference (25)

(s) Annual working loss (lb/yr) = (net working loss throughput [ft³/yr]) x (working loss turnover factor) x (working loss product factor) x (vapor density [lb/ft³]) x (vent setting correction factor) x (1- [control efficiency (%) / 100]); See Reference (27)

(t) Daily working loss lb/day) = (net working loss throughput [ft³/day]) x (working loss turnover factor) x (working loss product factor) x (vapor density [lb/ft³]) x (vent setting correction factor) x (1 - [control efficiency (%) / 100]); See Reference (27)

(u) Annual or daily total tank routine losses (lb/yr or lb/day) = (annual or daily standing losses [lb/yr or lb/day]) + (annual or daily working losses [lb/yr or lb/day]); See Reference (28)

(v) Total annual or daily emissions estimate (lb/ unit) = (total annual or daily tank routine losses [lb/ unit]) x (total number of storage tanks)

[redacted]

REFERENCES:

(1) See Table 2 Storage Tank—Input Assumptions and Parameters

(2) See Table 1 Input Assumptions and Parameters

(3) Engineering judgement based on typical bulk storage tank design for representative industries

(4) AP-42 Chapter 7 (June 2020); see equation 1-36 For vertical tanks value set to 1 For horizontal tanks value set to 0

(5) AP-42 Chapter 7 (June 2020); Table 7 1-2 Assumes chemical properties for no 2 fuel oil as most-representative of renewable diesel composition

(6) AP-42 Chapter 7 (June 2020); see equation 1-25 Assumes the vapor pressure equation constants for conventional petroleum refining no 2 fuel oil as most-representative This is considered to be conservative as the renewable diesel composition will be comprised primarily of straight-chain hydrocarbons that are less volatile in relation to the typical no 2 fuel oil components from petroleum refining

(7) Site-specific meteorological data obtained from the Portland General Electric Beaver Plant meteorological tower

(8) AP-42 Chapter 7 (June 2020); see equation 1-11

(9) AP-42 Chapter 7 (June 2020); Table 7 1-6

(10) AP-42 Chapter 7 (June 2020); see equation 1-7

(11) AP-42 Chapter 7 (June 2020); see equation 1-12

(12) AP-42 Chapter 7 (June 2020); see equation 1-16 Per equation 1-16 liquid height typically assumed to be at the half-full level in the absence of site-specific data

(13) AP-42 Chapter 7 (June 2020); see equation 1-18 for cone roofs (assumes standard cone roof slope of 0 0625 ft/ft) or see equation 1-20 for dome roofs (assumes modified dome roof radius equation)

(14) AP-42 Chapter 7 (June 2020); see equation 1-17 for cone roofs or see equation 1-19 for dome roofs

(15) AP-42 Chapter 7 (June 2020); see equation 1-16

(16) AP-42 Chapter 7 (June 2020); see equation 1-21 Assumes true vapor pressure as the vapor pressure at average daily liquid surface temperature

(17) AP-42 Chapter 7 (June 2020); see equation 1-30

(18) AP-42 Chapter 7 (June 2020); see equation 1-31

(19) AP-42 Chapter 7 (June 2020); see equation 1-32 Note the simplified version of this equation (e g equation 1-33) was not used since HS/D is not equal to 0 5 and allows for variances in α_R and α_S

(20) AP-42 Chapter 7 (June 2020); see equation 1-22

(21) AP-42 Chapter 7 (June 2020); see equation 1-4

(22) AP-42 Chapter 7 (June 2020); see equation 1-39

(23) AP-42 Chapter 7 (June 2020); see equation 1-37

(24) AP-42 Chapter 7 (June 2020); see equation 1-36

(25) AP-42 Chapter 7 (June 2020); see notes for equation 1-35

(26) AP-42 Chapter 7 (June 2020); see notes for equation 1-35 Assumes KP = 0 75 for crude oils or 1 for all other organic liquids

(27) AP-42 Chapter 7 (June 2020); see equation 1-35

(28) AP-42 Chapter 7 (June 2020); see equation 1-1

[redacted]

(30) Molecular weights obtained from National Institute of Standards and Technology Chemistry WebBook

[redacted]

Table 30
Product Storage Tank no. 4—VOC/TAC Emission Estimates—Swing RD vs. RJET
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		(Units)	Renewable Jet Fuel	AP-42 Variable
PRODUCTION VALUES				
Storage Tank ID	(1)	--	T_RDRJ	--
Total Number of Storage Tanks	(1)	--	1.00	--
Total Annual Throughput	(1)	(gal/yr)	63 474 474	--
Total Annual Throughput	(a)	(bbl/yr)	1 511 297	Q
Maximum Daily Throughput	(1)	(gal/day)	177 303	--
Maximum Daily Throughput	(a)	(bbl/day)	4 222	--
TANK PROPERTIES				
Tank Type (Fixed Roof or Floating Roof Tank)	(1)	--	Floating Roof Tank	--
Floating Roof Type (Internal or External)	(1)	--	Internal	--
Deck Construction Type (welded or bolted)	(2)	--	Welded	--
Insulated or Partially Insulated or Uninsulated?	(1)	--	--	--
Heated or Non-heated?	(1)	--	Non-Heated	--
Tank Roof Color	(1)	--	White	--
Tank Roof Condition	(1)	--	New	--
Tank Shell Color	(1)	--	White	--
Tank Shell Condition	(1)	--	New	--
Tank Diameter	(1)	(ft)	184	D
Tank Shell Height	(1)	(ft)	48.0	H_S
TANK FACTORS				
Zero Wind Speed Rim Seal Loss Factor	(3)	(lb-mole/ft-yr)	0.30	K_{Ra}
Wind Speed Dependent Rim Seal Loss Factor	(3)	(lb-mol/[mph]^n-ft-yr)	0.60	K_{Rb}
Seal-related Wind Speed Exponent	(3)	--	0.30	n
Product Factor	(4)	--	1.00	K_C
Deck Seam Loss Per Unit Seam Length Factor	(5)	(lb-mol/ft-yr)	0	K_D
Deck Seam Length Factor	(6)	(ft/ft²)	0.20	S_D
Shell Clingage Factor	(7)	(bbl/1 000 ft²)	7.5E-03	C_S
Number of Fixed Roof Support Columns	(8)	--	0	N_C
Effective Column Diameter	(8)	(ft)	0	F_C
TANK CONTENT PROPERTIES				
Liquid Temperature	(1)	(°F)	77.0	T
Liquid Molecular Weight	(9)	(lb/lb-mol)	162	M_L
Vapor Molecular Weight	(9)	(lb/lb-mol)	130	M_V
Average Organic Liquid Density	(9)	(lb/gal)	7.00	W_L
Vapor Pressure Equation Constant A	(9)	--	12.4	A
Vapor Pressure Equation Constant B	(9)	--	8 933	B
True Vapor Pressure	(11)	(psia)	0.16	P_{VA}
ENVIRONMENTAL FACTORS				
Average Daily Maximum Ambient Temperature	(12)	(°R)	520	T_{AX}
Average Daily Minimum Ambient Temperature	(12)	(°R)	504	T_{AN}
Average Daily Total Insolation on a Horizontal Surface	(12)	(Btu/ft^2-day)	1 122	I
Average Ambient Wind Speed	(13)	(mph)	0	V
Average Atmospheric Pressure	(12)	(psia)	14.7	P_A
CALCUALTED VARIABLES				
Standing Loss Calculations				
Average Daily Ambient Temperature	(c)	(°R)	512	T_{AA}
Tank Roof Surface Solar Absorptance	(15)	--	0.17	α_R
Tank Shell Surface Solar Absorptance	(15)	--	0.17	α_S
Liquid Bulk Temperature	(d)	(°R)	512	T_B
Vapor Pressure Function	(e)	--	2.7E-03	P*
Total Deck Fitting Loss Factor	(f)	(lb-mol/yr)	1 117	F_F
Rim Seal Loss	(i)	(lb/yr)	19.6	L_R
Deck Fitting Loss	(j)	(lb/yr)	398	L_F
Deck Seam Loss	(k)	(lb/yr)	0	L_D
Annual Standing Loss	(l)	(lb/yr)	417	L_S
Daily Standing Loss	(m)	(lb/day)	1.14	--
Working Loss Calculations				
Annual Working Loss	(n)	(lb/yr)	407	L_W
Daily Working Loss	(o)	(lb/day)	1.14	--
Annual Total Tank Routine Losses	**(p)**	**(lb/yr)**	**824**	**L_T**
Daily Total Tank Routine Losses	**(p)**	**(lb/day)**	**2.28**	**--**

All notes and references are provided on the following page See Table 30 (Continued) Product Storage Tank no 4—VOC/TAC Emission Estimates—Swing RD vs RJET

Table 30 (Continued)
Product Storage Tank no. 4—VOC/TAC Emission Estimates—Swing RD vs. RJET
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Chemical	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			EPA Tanks Methodology			Emissions Estimate		
						[redacted]	M_i	[redacted]	L_{ti}		
			HAP	TAC	RBC		Molecular Weight (lb/lb-mol)		Maximum Daily (lb/day)	Annual (lb/yr)	[redacted]
Benzene	71-43-2	46	Yes	Yes	Yes		78.1 (28)		3 0E-05	0.011	
Chlorobenzene	108-90-7	108	Yes	Yes	Yes		113 (28)		2 3E-05	8.5E-03	
Ethylbenzene	100-41-4	229	Yes	Yes	Yes		106 (28)		1.1E-04	0.039	
Acenaphthene	83-32-9	402	Yes	Yes	No		154 (28)		4.1E-08	1.5E-05	
Fluorene	86-73-7	425	Yes	Yes	No		166 (28)		1.9E-08	6.8E-06	
2-Methylnaphthalene	91-57-6	427	Yes	Yes	No		142 (28)		1.1E-07	4.1E-05	
Pyrene	129-00-0	431	Yes	Yes	No		202 (28)		2.4E-12	8.7E-10	
Toluene	108-88-3	600	Yes	Yes	Yes		92.1 (28)		8 7E-05	0.032	
1 2 4-Trimethylbenzene	95-63-6	614	No	Yes	Yes		120 (28)		2 0E-05	7.1E-03	
1 3 5-Trimethylbenzene	108-67-8	615	No	Yes	Yes		120 (28)		7.4E-06	2.7E-03	
m-Xylene & p-Xylene	108-38-3	629	Yes	Yes	Yes		106 (28)		5 7E-05	0.021	
o-Xylene	95-47-6	630	Yes	Yes	Yes		106 (28)		2 0E-05	7.3E-03	
o-Terphenyl	84-15-1	--	No	No	No		230 (28)		1 0E-10	3.8E-08	
1-Pentanol	71-41-0	--	No	No	No		88.1 (28)		4.4E-08	1.6E-05	
n-Butylbenzene	104-51-8	--	No	No	No		134 (28)		9.9E-07	3.6E-04	
n-Propylbenzene	103-65-1	--	No	No	No		120 (28)		9 3E-06	3.4E-03	
4-Isopropyltoluene	99-87-6	--	No	No	No		134 (28)		1 3E-06	4.7E-04	
1-Methylnaphthalene	90-12-0	--	No	No	No		142 (28)		5 7E-08	2.1E-05	
p-Terphenyl-d14	1718-51-0	--	No	No	No		244 (28)		1 6E-11	6.0E-09	
2-Fluorobiphenyl	321-60-8	--	No	No	No		172 (28)		1 3E-06	4.7E-04	
Total TAC Emission Estimates (for a single storage tank)									**3.5E-04**	**0.13**	
Total HAP Emission Estimates (for a single storage tank)									**3.3E-04**	**0.12**	
Total RBC-Only Emission Estimates (for a single storage tank)									**3.5E-04**	**0.13**	
Total Non-RBC Emission Estimates (for a single storage tank)									**1.3E-05**	**4.8E-03**	

NOTES:

(a) Total annual or daily throughput (bbl/ unit) = (total annual or daily throughput [gal/ unit]) x (bbl/42 gal)

(b) True vapor pressure (psia) = exp([vapor pressure equation constant A] - [vapor pressure constant equation B] / [liquid temperature {°F} + 459 67]); see Reference (10)

(c) Average daily ambient temperature (°R) = ([average daily maximum ambient temperature {°R}] + [average daily minimum ambient temperature {°R}]) / (2); See Reference (14)

(d) If non-heated tank: Liquid bulk temperature (°R) = (average daily ambient temperature [°R]) + ([0 003] x [tank shell surface solar absorptance {°R}] x [average daily total insolation factor {Btu/ft²-day}]); See Reference (16)
For heated tanks the setpoint temperature for the storage tank is assumed to be representative of the liquid bulk temperature

(e) Vapor pressure function = (true vapor pressure [psia]) / (atmospheric pressure [psia]) / (1 + [1 - {|vapor pressure of liquid (psia)| / |atmospheric pressure (psia)|}]^0 5)²; See Reference (17)

(f) Total deck fitting loss factor (lb-mole/yr) = Σ([number of deck fittings of a particular type] x [deck fitting loss factor for a particular type {lb-mole/yr}]); see Reference (18)

Fitting Type	Number of Deck Fittings of a Particular Type	Deck Fitting Loss Factor for a Particular Type
AP-42 Variable	N_{Fi}	K_{Fi}
Access Hatch	1 (19)	36 (19)
Gauge-Float Well	1 (19)	14 (19)
Gauge-Hatch/Sample Port	1 (19)	12 (19)
Vacuum Breaker	ERROR (19)	6 2 (19)
Deck Drain (Stub Drain)	271 (g)	1 2 (19)
Deck Leg	80 (h)	7 9 (19)
Ladder Well	1 (19)	98 (19)
Total deck fitting loss factor		*1117* (f)

(g) Typical number of deck drain fittings = (tank diameter [ft])² / (125); see Reference (21)

(h) Number of deck leg fittings = (5 + [tank diameter {ft} / 10] + [{tank diameter |ft|}² / 600]); See Reference (21)

(i) Rim seal loss lb/yr) = ([zero wind speed rim seal loss factor {lb-mole/ft-yr}] + [wind speed dependent rim seal loss factor {lb-mole/(mph)^n-ft-yr}] x [average ambient wind speed {mph}]^[seal-related wind speed exponent]) x (tank diameter [ft]) x (vapor pressure function) x (vapor molecular weight [lb/lb-mole]) x (product factor); See Reference (20)

(j) Deck fitting loss (lb/yr) = (total deck fitting loss factor [lb-mole/yr]) x (vapor pressure function) x (vapor molecular weight [lb/lb-mole]) x (product factor); See Reference (22)

(k) Deck seam loss (lb/yr) = (deck seam loss per unit seam length factor [lb-mole/ft-yr]) x (deck seam length factor [ft/ft²]) x (tank diameter [ft])² x (vapor pressure function) x (vapor molecular weight [lb/lb-mole]) x (product factor); See Reference (23)

(l) Standing loss (lb/yr) = (rim seal loss [lb/yr]) + (deck fitting loss [lb/yr]) + (deck seam loss [lb/yr]); See Reference (24)

(m) Daily standing loss (lb/day) = (annual standing loss [lb/yr]) / (365 days/yr)

(n) Annual working loss lb/yr) = (0 943) x (annual net throughput [bbl/yr]) x (shell clingage factor [bbl/1 000 ft²]) x (average organic liquid density [lb/gal]) / (tank diameter [ft]) x (1 + [number of fixed roof support columns] x [effective column diameter {ft}] / [tank diameter {ft}]); See Reference (25)

(o) Daily working loss (lb/day) = (0 943) x (daily net throughput [bbl/day]) x (shell clingage factor [bbl/1 000 ft²]) x (average organic liquid density [lb/gal]) / (tank diameter [ft]) x (1 + [number of fixed roof support columns] x [effective column diameter {ft}] / [tank diameter {ft}]); See Reference (25)

(p) Annual or daily total tank routine losses (lb/yr or lb/day) = (annual or daily standing losses [lb/yr or lb/day]) + (annual or daily working losses [lb/yr or lb/day]); See Reference (26)

(q) Total annual or daily emissions estimate (lb/ unit) = (total annual or daily tank routine losses [lb/ unit]) x (total number of storage tanks)

[redacted]

REFERENCES:

(1) See Table 2 Storage Tank—Input Assumptions and Parameters
(2) AP-42 Chapter 7 (June 2020); see equation 2-18
(3) AP-42 Chapter 7 (June 2020); Table 7 1-8 Values representative of welded tanks with liquid-mounted seal rim-mounted secondary system consistent with Bay Area Air Quality Management District BACT guidelines
(4) AP-42 Chapter 7 (June 2020); see equation 2-3 Assumes K_C equals 0 75 for crude oils or 1 for all other organic liquids
(5) AP-42 Chapter 7 (June 2020); see equation 2-18 Assumes K_D equals 0 14 for bolted decks or 0 0 for welded decks
(6) AP-42 Chapter 7 (June 2020); Table 7 1-16 Assumes typical deck seam length factor per footnote c
(7) AP-42 Chapter 7 (June 2020); Table 7 1-10 Conservatively assumes gasoline product storage and dense rust covering the inside surface of the tank shell
(8) AP-42 Chapter 7 (June 2020); see equation 2-19 note 3 Assumes the tank will be self-supporting
(9) AP-42 Chapter 7 (June 2020); Table 7 1-2 Coservatively assumes chemical properties of conventional petroleum refining no 2 fuel oil as most-representative for renewable diesel or jet kerosene (Jet A) for renewable jet fuel
(10) AP-42 Chapter 7 (June 2020); see equation 1-25 Assumes the vapor pressure equation constants from conventional petroleum refining of no 2 fuel oil or jet kerosene (Jet A) as most-representative This is considered to be conservative as the renewable compositions will be comprised primarily of straight-chain hydrocarbons that are less volatile in relation to the conventional petroleum refining components
(11) Information provided by NEXT Renewable Fuels Oregon LLC
(12) Site-specific meteorological data obtained from the Portland General Electric Beaver Plant meteorological tower
(13) AP-42 Chapter 7 (June 2020); see example 4 under solution item 4 For internal floating roof tanks wind speed is assumed to be zero
(14) AP-42 Chapter 7 (June 2020); see equation 1-30
(15) AP-42 Chapter 7 (June 2020); Table 7 1-6
(16) AP-42 Chapter 7 (June 2020); see equation 1-31
(17) AP-42 Chapter 7 (June 2020); equation 2-4
(18) AP-42 Chapter 7 (June 2020); equation 2-14
(19) AP-42 Chapter 7 (June 2020); Table 7 1-12 For internal floating roof tanks N_{vb} is equal to 1 per note j For internal floating roof tanks and domed external floating roof tanks the ambient wind speed is zero Therefore K_{Fi} equals K_{Fai}
(20) AP-42 Chapter 7 (June 2020); equation 2-3
(21) AP-42 Chapter 7 (June 2020); Table 7 1-15
(22) AP-42 Chapter 7 (June 2020); equation 2-13
(23) AP-42 Chapter 7 (June 2020); equation 2-18
(24) AP-42 Chapter 7 (June 2020); equation 2-2
(25) AP-42 Chapter 7 (June 2020); equation 2-19
(26) AP-42 Chapter 7 (June 2020); equation 2-1
[redacted]
(28) Molecular weights obtained from National Institute of Standards and Technology Chemistry WebBook
[redacted]
(30) Vapor pressure derived from publicly-available chemical data using the Clausius-Clapeyron relation at the specified liquid surface temperature
[redacted]

Table 31
Product Storage Tank no. 1—VOC/TAC Emission Estimates—Swing RN vs. RJET
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		(Units)	Renewable Jet Fuel	AP-42 Variable
PRODUCTION VALUES				
Storage Tank ID	(1)	--	T_RNRJ1	--
Total Number of Storage Tanks	(1)	--	1.00	--
Total Annual Throughput	(1)	(gal/yr)	63 474 474	--
Total Annual Throughput	(a)	(bbl/yr)	1 511 297	Q
Maximum Daily Throughput	(1)	(gal/day)	177 303	--
Maximum Daily Throughput	(a)	(bbl/day)	4 222	--
TANK PROPERTIES				
Tank Type (Fixed Roof or Floating Roof Tank)	(1)	--	Floating Roof Tank	--
Floating Roof Type (Internal or External)	(1)	--	Internal	--
Deck Construction Type (welded or bolted)	(2)	--	Welded	--
Insulated or Partially Insulated or Uninsulated?	(1)	--	--	--
Heated or Non-heated?	(1)	--	Non-Heated	--
Tank Roof Color	(1)	--	White	--
Tank Roof Condition	(1)	--	New	--
Tank Shell Color	(1)	--	White	--
Tank Shell Condition	(1)	--	New	--
Tank Diameter	(1)	(ft)	88.0	D
Tank Shell Height	(1)	(ft)	48.0	H_S
TANK FACTORS				
Zero Wind Speed Rim Seal Loss Factor	(3)	(lb-mole/ft-yr)	0.30	K_{Ra}
Wind Speed Dependent Rim Seal Loss Factor	(3)	(lb-mol/[mph]^n-ft-yr)	0.60	K_{Rb}
Seal-related Wind Speed Exponent	(3)	--	0.30	n
Product Factor	(4)	--	1.00	K_C
Deck Seam Loss Per Unit Seam Length Factor	(5)	(lb-mol/ft-yr)	0	K_D
Deck Seam Length Factor	(6)	(ft/ft²)	0.20	S_D
Shell Clingage Factor	(7)	(bbl/1 000 ft²)	7.5E-03	C_S
Number of Fixed Roof Support Columns	(8)	--	0	N_C
Effective Column Diameter	(8)	(ft)	0	F_C
TANK CONTENT PROPERTIES				
Liquid Temperature	(1)	(°F)	77.0	T
Liquid Molecular Weight	(9)	(lb/lb-mol)	162	M_L
Vapor Molecular Weight	(9)	(lb/lb-mol)	130	M_V
Average Organic Liquid Density	(9)	(lb/gal)	7.00	W_L
True Vapor Pressure	(10)	(psia)	0.16	P_{VA}
ENVIRONMENTAL FACTORS				
Average Daily Maximum Ambient Temperature	(11)	(°R)	520	T_{AX}
Average Daily Minimum Ambient Temperature	(11)	(°R)	504	T_{AN}
Average Daily Total Insolation on a Horizontal Surface	(11)	(Btu/ft^2-day)	1 122	I
Average Ambient Wind Speed	(12)	(mph)	0	V
Average Atmospheric Pressure	(11)	(psia)	14.7	P_A
CALCUALTED VARIABLES				
Standing Loss Calculations				
Average Daily Ambient Temperature	(b)	(°R)	512	T_{AA}
Tank Roof Surface Solar Absorptance	(14)	--	0.17	α_R
Tank Shell Surface Solar Absorptance	(14)	--	0.17	α_S
Liquid Bulk Temperature	(c)	(°R)	512	T_B
Vapor Pressure Function	(d)	--	2.7E-03	P*
Total Deck Fitting Loss Factor	(e)	(lb-mol/yr)	454	F_F
Rim Seal Loss	(h)	(lb/yr)	9.40	L_R
Deck Fitting Loss	(i)	(lb/yr)	162	L_F
Deck Seam Loss	(j)	(lb/yr)	0	L_D
Annual Standing Loss	(k)	(lb/yr)	171	L_S
Daily Standing Loss	(l)	(lb/day)	0.47	--
Working Loss Calculations				
Annual Working Loss	(m)	(lb/yr)	850	L_W
Daily Working Loss	(n)	(lb/day)	2.37	--
Annual Total Tank Routine Losses	**(o)**	**(lb/yr)**	**1,021**	L_T
Daily Total Tank Routine Losses	**(o)**	**(lb/day)**	**2.84**	**--**

All notes and references are provided on the following page See Table 31 (Continued) Product Storage Tank no 1—VOC/TAC Emission Estimates—Swing RN vs RJET

Table 31 (Continued)
Product Storage Tank no. 1—VOC/TAC Emission Estimates—Swing RN vs. RJET
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Chemical	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			EPA Tanks Methodology			Emissions Estimate	
			HAP	TAC	RBC	[redacted]	M_i Molecular Weight (lb/lb-mol)	[redacted]	L_{ti} Maximum Daily (lb/day)	Annual (lb/yr)
Benzene	71-43-2	46	Yes	Yes	Yes	[redacted]	78.1 (27)	[redacted]	3 7E-05	0.013
Chlorobenzene	108-90-7	108	Yes	Yes	Yes	[redacted]	113 (27)	[redacted]	2.9E-05	0.011
Ethylbenzene	100-41-4	229	Yes	Yes	Yes	[redacted]	106 (27)	[redacted]	1 3E-04	0.048
Acenaphthene	83-32-9	402	Yes	Yes	No	[redacted]	154 (27)	[redacted]	5.1E-08	1.8E-05
Fluorene	86-73-7	425	Yes	Yes	No	[redacted]	166 (27)	[redacted]	2 3E-08	8.4E-06
2-Methylnaphthalene	91-57-6	427	Yes	Yes	No	[redacted]	142 (27)	[redacted]	1.4E-07	5.1E-05
Pyrene	129-00-0	431	Yes	Yes	No	[redacted]	202 (27)	[redacted]	3 0E-12	1.1E-09
Toluene	108-88-3	600	Yes	Yes	Yes	[redacted]	92.1 (27)	[redacted]	1.1E-04	0.039
1 2 4-Trimethylbenzene	95-63-6	614	No	Yes	Yes	[redacted]	120 (27)	[redacted]	2 5E-05	8.8E-03
1 3 5-Trimethylbenzene	108-67-8	615	No	Yes	Yes	[redacted]	120 (27)	[redacted]	9 3E-06	3.3E-03
m-Xylene & p-Xylene	108-38-3	629	Yes	Yes	Yes	[redacted]	106 (27)	[redacted]	7.1E-05	0.026
o-Xylene	95-47-6	630	Yes	Yes	Yes	[redacted]	106 (27)	[redacted]	2 5E-05	9.1E-03
o-Terphenyl	84-15-1	--	No	No	No	[redacted]	230 (27)	[redacted]	1 3E-10	4.7E-08
1-Pentanol	71-41-0	--	No	No	No	[redacted]	88.1 (27)	[redacted]	5.4E-08	2.0E-05
n-Butylbenzene	104-51-8	--	No	No	No	[redacted]	134 (27)	[redacted]	1 2E-06	4.4E-04
n-Propylbenzene	103-65-1	--	No	No	No	[redacted]	120 (27)	[redacted]	1 2E-05	4.2E-03
4-Isopropyltoluene	99-87-6	--	No	No	No	[redacted]	134 (27)	[redacted]	1 6E-06	5.8E-04
1-Methylnaphthalene	90-12-0	--	No	No	No	[redacted]	142 (27)	[redacted]	7 2E-08	2.6E-05
p-Terphenyl-d14	1718-51-0	--	No	No	No	[redacted]	244 (27)	[redacted]	2.1E-11	7.4E-09
2-Fluorobiphenyl	321-60-8	--	No	No	No	[redacted]	172 (27)	[redacted]	1 6E-06	5.8E-04
Total TAC Emission Estimates (for a single storage tank)									**4.4E-04**	**0.16**
Total HAP Emission Estimates (for a single storage tank)									**4.1E-04**	**0.15**
Total RBC-Only Emission Estimates (for a single storage tank)									**4.4E-04**	**0.16**
Total Non-RBC Emission Estimates (for a single storage tank)									**1.6E-05**	**5.9E-03**

NOTES:

(a) Total annual or daily throughput (bbl/ unit) = (total annual or daily throughput [gal/ unit]) x (bbl/42 gal)

(b) Average daily ambient temperature (°R) = ([average daily maximum ambient temperature {°R}] + [average daily minimum ambient temperature {°R}]) / (2); See Reference (13)

(c) If non-heated tank: Liquid bulk temperature (°R) = (average daily ambient temperature [°R]) + ([0 003] x [tank shell surface solar absorptance {°R}] x [average daily total insolation factor {Btu/ft²-day}]); See Reference (15)
For heated tanks the setpoint temperature for the storage tank is assumed to be representative of the liquid bulk temperature

(d) Vapor pressure function = (true vapor pressure [psia]) / (atmospheric pressure [psia]) / (1 + [1 - {|vapor pressure of liquid (psia)| / |atmospheric pressure (psia)|}]^0 5)²; See Reference (16)

(e) Total deck fitting loss factor (lb-mole/yr) = Σ([number of deck fittings of a particular type] x [deck fitting loss factor for a particular type {lb-mole/yr}]); see Reference (17)

Fitting Type	Number of Deck Fittings of a Particular Type	Deck Fitting Loss Factor for a Particular Type
AP-42 Variable	**N_{Fi}**	**K_{Fi}**
Access Hatch	1 (18)	36 (18)
Gauge-Float Well	1 (18)	14 (18)
Gauge-Hatch/Sample Port	1 (18)	12 (18)
Vacuum Breaker	1 (18)	6 2 (18)
Deck Drain (Stub Drain)	62 (f)	1 2 (18)
Deck Leg	27 (g)	7 9 (18)
Ladder Well	1 (18)	98 (18)
Total deck fitting loss factor		*454* (e)

(f) Typical number of deck drain fittings = (tank diameter [ft])² / (125); see Reference (20)

(g) Number of deck leg fittings = (5 + [tank diameter {ft} / 10] + [{tank diameter |ft|}² / 600]); See Reference (20)

(h) Rim seal loss lb/yr) = ([zero wind speed rim seal loss factor {lb-mole/ft-yr}] + [wind speed dependent rim seal loss factor {lb-mole/(mph)^n-ft-yr}] x [average ambient wind speed {mph}]^[seal-related wind speed exponent]) x (tank diameter [ft]) x (vapor pressure function) x (vapor molecular weight [lb/lb-mole]) x (product factor); See Reference (19)

(i) Deck fitting loss (lb/yr) = (total deck fitting loss factor [lb-mole/yr]) x (vapor pressure function) x (vapor molecular weight [lb/lb-mole]) x (product factor); See Reference (21)

(j) Deck seam loss (lb/yr) = (deck seam loss per unit seam length factor [lb-mole/ft-yr]) x (deck seam length factor [ft/ft²]) x (tank diameter [ft])² x (vapor pressure function) x (vapor molecular weight [lb/lb-mole]) x (product factor); See Reference (22)

(k) Standing loss (lb/yr) = (rim seal loss [lb/yr]) + (deck fitting loss [lb/yr]) + (deck seam loss [lb/yr]); See Reference (23)

(l) Daily standing loss (lb/day) = (annual standing loss [lb/yr]) / (365 days/yr)

(m) Annual working loss lb/yr) = (0 943) x (annual net throughput [bbl/yr]) x (shell clingage factor [bbl/1 000 ft²]) x (average organic liquid density [lb/gal]) / (tank diameter [ft]) x (1 + [number of fixed roof support columns] x [effective column diameter {ft}] / [tank diameter {ft}]); See Reference (24)

(n) Daily working loss (lb/day) = (0 943) x (daily net throughput [bbl/day]) x (shell clingage factor [bbl/1 000 ft²]) x (average organic liquid density [lb/gal]) / (tank diameter [ft]) x (1 + [number of fixed roof support columns] x [effective column diameter {ft}] / [tank diameter {ft}]); See Reference (24)

(o) Annual or daily total tank routine losses (lb/yr or lb/day) = (annual or daily standing losses [lb/yr or lb/day]) + (annual or daily working losses [lb/yr or lb/day]); See Reference (25)

[redacted]

REFERENCES:

(1) See Table 2 Storage Tank—Input Assumptions and Parameters
(2) AP-42 Chapter 7 (June 2020); see equation 2-18
(3) AP-42 Chapter 7 (June 2020); Table 7 1-8 Values representative of welded tanks with liquid-mounted seal rim-mounted secondary system consistent with Bay Area Air Quality Management District BACT guidelines
(4) AP-42 Chapter 7 (June 2020); see equation 2-3 Assumes K_C equals 0 75 for crude oils or 1 for all other organic liquids
(5) AP-42 Chapter 7 (June 2020); see equation 2-18 Assumes K_D equals 0 14 for bolted decks or 0 0 for welded decks
(6) AP-42 Chapter 7 (June 2020); Table 7 1-16 Assumes typical deck seam length factor per footnote c
(7) AP-42 Chapter 7 (June 2020); Table 7 1-10 Conservatively assumes gasoline product storage and dense rust covering the inside surface of the tank shell
(8) AP-42 Chapter 7 (June 2020); see equation 2-19 note 3 Assumes the tank will be self-supporting
(9) AP-42 Chapter 7 (June 2020); Table 7 1-2 Assumes chemical properties representative of conventional petroleum refining jet kerosene (Jet A) for renewable jet fuel or jet naphtha as most-representative of renewable naphtha
(10) Information provided by NEXT Renewable Fuels Oregon LLC
(11) Site-specific meteorological data obtained from the Portland General Electric Beaver Plant meteorological tower
(12) AP-42 Chapter 7 (June 2020); see example 4 under solution item 4 For internal floating roof tanks wind speed is assumed to be zero
(13) AP-42 Chapter 7 (June 2020); see equation 1-30
(14) AP-42 Chapter 7 (June 2020); Table 7 1-6
(15) AP-42 Chapter 7 (June 2020); see equation 1-31
(16) AP-42 Chapter 7 (June 2020); equation 2-4
(17) AP-42 Chapter 7 (June 2020); equation 2-14
(18) AP-42 Chapter 7 (June 2020); Table 7 1-12 For internal floating roof tanks N_{vb} is equal to 1 per note j For internal floating roof tanks and domed external floating roof tanks the ambient wind speed is zero Therefore K_{Fi} equals K_{Fai}
(19) AP-42 Chapter 7 (June 2020); equation 2-3
(20) AP-42 Chapter 7 (June 2020); Table 7 1-15
(21) AP-42 Chapter 7 (June 2020); equation 2-13
(22) AP-42 Chapter 7 (June 2020); equation 2-18
(23) AP-42 Chapter 7 (June 2020); equation 2-2
(24) AP-42 Chapter 7 (June 2020); equation 2-19
(25) AP-42 Chapter 7 (June 2020); equation 2-1
[redacted]
(27) Molecular weights obtained from National Institute of Standards and Technology Chemistry WebBook
[redacted]
(29) Vapor pressure derived from publicly-available chemical data using the Clausius-Clapeyron relation at the specified liquid surface temperature
[redacted]

Table 32
Product Storage Tank no. 2—VOC/TAC Emission Estimates—Swing RN vs. RJET
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		(Units)	Renewable Naphtha	AP-42 Variable
PRODUCTION VALUES				
Storage Tank ID	(1)	--	T_RNRJ2	--
Total Number of Storage Tanks	(1)	--	1.00	--
Total Annual Throughput	(1)	(gal/yr)	17 817 660	--
Total Annual Throughput	(a)	(bbl/yr)	424 230	Q
Maximum Daily Throughput	(1)	(gal/day)	49 770	--
Maximum Daily Throughput	(a)	(bbl/day)	1 185	--
TANK PROPERTIES				
Tank Type (Fixed Roof or Floating Roof Tank)	(1)	--	Floating Roof Tank	--
Floating Roof Type (Internal or External)	(1)	--	Internal	--
Deck Construction Type (welded or bolted)	(2)	--	Welded	--
Insulated or Partially Insulated or Uninsulated?	(1)	--	--	--
Heated or Non-heated?	(1)	--	Non-Heated	--
Tank Roof Color	(1)	--	White	--
Tank Roof Condition	(1)	--	New	--
Tank Shell Color	(1)	--	White	--
Tank Shell Condition	(1)	--	New	--
Tank Diameter	(1)	(ft)	88.0	D
Tank Shell Height	(1)	(ft)	48.0	H_S
TANK FACTORS				
Zero Wind Speed Rim Seal Loss Factor	(3)	(lb-mole/ft-yr)	0.30	K_{Ra}
Wind Speed Dependent Rim Seal Loss Factor	(3)	(lb-mol/[mph]^n-ft-yr)	0.60	K_{Rb}
Seal-related Wind Speed Exponent	(3)	--	0.30	n
Product Factor	(4)	--	1.00	K_C
Deck Seam Loss Per Unit Seam Length Factor	(5)	(lb-mol/ft-yr)	0	K_D
Deck Seam Length Factor	(6)	(ft/ft²)	0.20	S_D
Shell Clingage Factor	(7)	(bbl/1 000 ft²)	7.5E-03	C_S
Number of Fixed Roof Support Columns	(8)	--	0	N_C
Effective Column Diameter	(8)	(ft)	0	F_C
TANK CONTENT PROPERTIES				
Liquid Temperature	(1)	(°F)	77.0	T
Liquid Molecular Weight	(9)	(lb/lb-mol)	120	M_L
Vapor Molecular Weight	(9)	(lb/lb-mol)	80.0	M_V
Average Organic Liquid Density	(9)	(lb/gal)	6.40	W_L
True Vapor Pressure	#REF!	(psia)	5.18	P_{VA}
ENVIRONMENTAL FACTORS				
Average Daily Maximum Ambient Temperature	(11)	(°R)	520	T_{AX}
Average Daily Minimum Ambient Temperature	(11)	(°R)	504	T_{AN}
Average Daily Total Insolation on a Horizontal Surface	(11)	(Btu/ft^2-day)	1 122	I
Average Ambient Wind Speed	(12)	(mph)	0	V
Average Atmospheric Pressure	(11)	(psia)	14.7	P_A
CALCUALTED VARIABLES				
Standing Loss Calculations				
Average Daily Ambient Temperature	(b)	(°R)	512	T_{AA}
Tank Roof Surface Solar Absorptance	(14)	--	0.17	α_R
Tank Shell Surface Solar Absorptance	(14)	--	0.17	α_S
Liquid Bulk Temperature	(c)	(°R)	512	T_B
Vapor Pressure Function	(d)	--	0.11	P*
Total Deck Fitting Loss Factor	(e)	(lb-mol/yr)	454	F_F
Rim Seal Loss	(h)	(lb/yr)	229	L_R
Deck Fitting Loss	(i)	(lb/yr)	3 932	L_F
Deck Seam Loss	(j)	(lb/yr)	0	L_D
Annual Standing Loss	(k)	(lb/yr)	4 161	L_S
Daily Standing Loss	(l)	(lb/day)	11.4	--
Working Loss Calculations				
Annual Working Loss	(m)	(lb/yr)	218	L_W
Daily Working Loss	(n)	(lb/day)	0.61	--
Annual Total Tank Routine Losses	**(o)**	**(lb/yr)**	**4,379**	**L_T**
Daily Total Tank Routine Losses	**(o)**	**(lb/day)**	**12.0**	**--**

All notes and references are provided on the following page See Table 32 (Continued) Product Storage Tank no 2—VOC/TAC Emission Estimates—Swing RN vs RJET

Table 32 (Continued)
Product Storage Tank no. 2—VOC/TAC Emission Estimates—Swing RN vs. RJET
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Chemical	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			EPA Tanks Methodology			Emissions Estimate			
			HAP	TAC	RBC	[redacted]	M_i Molecular Weight (lb/lb-mol)	[redacted]	L_{ti} Maximum Daily (lb/day)	[redacted]	Annual (lb/yr)	[redacted]
Benzene	71-43-2	46	Yes	Yes	Yes		78.1 [27]		--		--	
Chlorobenzene	108-90-7	108	Yes	Yes	Yes		113 [27]		--		--	
Ethylbenzene	100-41-4	229	Yes	Yes	Yes		106 [27]		--		--	
Acenaphthene	83-32-9	402	Yes	Yes	No		154 [27]		--		--	
Fluorene	86-73-7	425	Yes	Yes	No		166 [27]		--		--	
2-Methylnaphthalene	91-57-6	427	Yes	Yes	No		142 [27]		--		--	
Pyrene	129-00-0	431	Yes	Yes	No		202 [27]		--		--	
Toluene	108-88-3	600	Yes	Yes	Yes		92.1 [27]		1 0E-05		3.7E-03	
1 2 4-Trimethylbenzene	95-63-6	614	No	Yes	Yes		120 [27]		--		--	
1 3 5-Trimethylbenzene	108-67-8	615	No	Yes	Yes		120 [27]		--		--	
m-Xylene & p-Xylene	108-38-3	629	Yes	Yes	Yes		106 [27]		--		--	
o-Xylene	95-47-6	630	Yes	Yes	Yes		106 [27]		--		--	
o-Terphenyl	84-15-1	--	No	No	No		230 [27]		2 0E-11		7.1E-09	
1-Pentanol	71-41-0	--	No	No	No		88.1 [27]		1 3E-09		4.7E-07	
n-Butylbenzene	104-51-8	--	No	No	No		134 [27]		--		--	
n-Propylbenzene	103-65-1	--	No	No	No		120 [27]		--		--	
4-Isopropyltoluene	99-87-6	--	No	No	No		134 [27]		--		--	
1-Methylnaphthalene	90-12-0	--	No	No	No		142 [27]		--		--	
p-Terphenyl-d14	1718-51-0	--	No	No	No		244 [27]		4 8E-12		1.7E-09	
2-Fluorobiphenyl	321-60-8	--	No	No	No		172 [27]		4 3E-07		1.6E-04	
Total TAC Emission Estimates (for a single storage tank)									**1.0E-05**		**3.7E-03**	
Total HAP Emission Estimates (for a single storage tank)									**1.0E-05**		**3.7E-03**	
Total RBC-Only Emission Estimates (for a single storage tank)									**1.0E-05**		**3.7E-03**	
Total Non-RBC Emission Estimates (for a single storage tank)									**4.3E-07**		**1.6E-04**	

NOTES:

(a) Total annual or daily throughput (bbl/ unit) = (total annual or daily throughput [gal/ unit]) x (bbl/42 gal)

(b) Average daily ambient temperature (°R) = ([average daily maximum ambient temperature {°R}] + [average daily minimum ambient temperature {°R}]) / (2); See Reference (13)

(c) If non-heated tank: Liquid bulk temperature (°R) = (average daily ambient temperature [°R]) + ([0 003] x [tank shell surface solar absorptance {°R}] x [average daily total insolation factor {Btu/ft²-day}]); See Reference (15)
For heated tanks the setpoint temperature for the storage tank is assumed to be representative of the liquid bulk temperature

(d) Vapor pressure function = (true vapor pressure [psia]) / (atmospheric pressure [psia]) / (1 + [1 - {|vapor pressure of liquid (psia)| / |atmospheric pressure (psia)|}]^0 5)²; See Reference (16)

(e) Total deck fitting loss factor (lb-mole/yr) = Σ([number of deck fittings of a particular type] x [deck fitting loss factor for a particular type {lb-mole/yr}]); see Reference (17)

Fitting Type	Number of Deck Fittings of a Particular Type	Deck Fitting Loss Factor for a Particular Type
AP-42 Variable	N_{Fi}	K_{Fi}
Access Hatch	1 [18]	36 [18]
Gauge-Float Well	1 [18]	14 [18]
Gauge-Hatch/Sample Port	1 [18]	12 [18]
Vacuum Breaker	1 [18]	6 2 [18]
Deck Drain (Stub Drain)	62 [f]	1 2 [18]
Deck Leg	27 [g]	7 9 [18]
Ladder Well	1 [18]	98 [18]
Total deck fitting loss factor		*454* [e]

(f) Typical number of deck drain fittings = (tank diameter [ft])² / (125); see Reference (20)

(g) Number of deck leg fittings = (5 + [tank diameter {ft} / 10] + [{tank diameter |ft|}² / 600]); See Reference (20)

(h) Rim seal loss lb/yr) = ([zero wind speed rim seal loss factor {lb-mole/ft-yr}] + [wind speed dependent rim seal loss factor {lb-mole/(mph)ⁿ-ft-yr}] x [average ambient wind speed {mph}]^[seal-related wind speed exponent]) x (tank diameter [ft]) x (vapor pressure function) x (vapor molecular weight [lb/lb-mole]) x (product factor); See Reference (19)

(i) Deck fitting loss (lb/yr) = (total deck fitting loss factor [lb-mole/yr]) x (vapor pressure function) x (vapor molecular weight [lb/lb-mole]) x (product factor); See Reference (21)

(j) Deck seam loss (lb/yr) = (deck seam loss per unit seam length factor [lb-mole/ft-yr]) x (deck seam length factor [ft/ft²]) x (tank diameter [ft])² x (vapor pressure function) x (vapor molecular weight [lb/lb-mole]) x (product factor); See Reference (22)

(k) Standing loss (lb/yr) = (rim seal loss [lb/yr]) + (deck fitting loss [lb/yr]) + (deck seam loss [lb/yr]); See Reference (23)

(l) Daily standing loss (lb/day) = (annual standing loss [lb/yr]) / (365 days/yr)

(m) Annual working loss lb/yr) = (0 943) x (annual net throughput [bbl/yr]) x (shell clingage factor [bbl/1 000 ft²]) x (average organic liquid density [lb/gal]) / (tank diameter [ft]) x (1 + [number of fixed roof support columns] x [effective column diameter {ft}] / [tank diameter {ft}]); See Reference (24)

(n) Daily working loss (lb/day) = (0 943) x (daily net throughput [bbl/day]) x (shell clingage factor [bbl/1 000 ft²]) x (average organic liquid density [lb/gal]) / (tank diameter [ft]) x (1 + [number of fixed roof support columns] x [effective column diameter {ft}] / [tank diameter {ft}]); See Reference (24)

(o) Annual or daily total tank routine losses (lb/yr or lb/day) = (annual or daily standing losses [lb/yr or lb/day]) + (annual or daily working losses [lb/yr or lb/day]); See Reference (25)

[redacted]

REFERENCES:

(1) See Table 2 Storage Tank—Input Assumptions and Parameters

(2) AP-42 Chapter 7 (June 2020); see equation 2-18

(3) AP-42 Chapter 7 (June 2020); Table 7 1-8 Values representative of welded tanks with liquid-mounted seal rim-mounted secondary system consistent with Bay Area Air Quality Management District BACT guidelines

(4) AP-42 Chapter 7 (June 2020); see equation 2-3 Assumes K_C equals 0 75 for crude oils or 1 for all other organic liquids

(5) AP-42 Chapter 7 (June 2020); see equation 2-18 Assumes K_D equals 0 14 for bolted decks or 0 0 for welded decks

(6) AP-42 Chapter 7 (June 2020); Table 7 1-16 Assumes typical deck seam length factor per footnote c

(7) AP-42 Chapter 7 (June 2020); Table 7 1-10 Conservatively assumes gasoline product storage and dense rust covering the inside surface of the tank shell

(8) AP-42 Chapter 7 (June 2020); see equation 2-19 note 3 Assumes the tank will be self-supporting

(9) AP-42 Chapter 7 (June 2020); Table 7 1-2 Assumes chemical properties representative of conventional petroleum refining jet kerosene (Jet A) for renewable jet fuel or jet naphtha as most-representative of renewable naphtha

(10) Information provided by NEXT Renewable Fuels Oregon LLC

(11) Site-specific meteorological data obtained from the Portland General Electric Beaver Plant meteorological tower

(12) AP-42 Chapter 7 (June 2020); see example 4 under solution item 4 For internal floating roof tanks wind speed is assumed to be zero

(13) AP-42 Chapter 7 (June 2020); see equation 1-30

(14) AP-42 Chapter 7 (June 2020); Table 7 1-6

(15) AP-42 Chapter 7 (June 2020); see equation 1-31

(16) AP-42 Chapter 7 (June 2020); equation 2-4

(17) AP-42 Chapter 7 (June 2020); equation 2-14

(18) AP-42 Chapter 7 (June 2020); Table 7 1-12 For internal floating roof tanks N_{vb} is equal to 1 per note j For internal floating roof tanks and domed external floating roof tanks the ambient wind speed is zero Therefore K_{Fi} equals K_{Fai}

(19) AP-42 Chapter 7 (June 2020); equation 2-3

(20) AP-42 Chapter 7 (June 2020); Table 7 1-15

(21) AP-42 Chapter 7 (June 2020); equation 2-13

(22) AP-42 Chapter 7 (June 2020); equation 2-18

(23) AP-42 Chapter 7 (June 2020); equation 2-2

(24) AP-42 Chapter 7 (June 2020); equation 2-19

(25) AP-42 Chapter 7 (June 2020); equation 2-1

[redacted]

(27) Molecular weights obtained from National Institute of Standards and Technology Chemistry WebBook

[redacted]

(29) Vapor pressure derived from publicly-available chemical data using the Clausius-Clapeyron relation at the specified liquid surface temperature

[redacted]

Table 33
Product Storage Tank no. 3—VOC/TAC Emission Estimates—Swing RN vs. RJET
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		(Units)	Renewable Naphtha	AP-42 Variable
PRODUCTION VALUES				
Storage Tank ID	(1)	--	T_RNRJ3	--
Total Number of Storage Tanks	(1)	--	1.00	--
Total Annual Throughput	(1)	(gal/yr)	17 817 660	--
Total Annual Throughput	(a)	(bbl/yr)	424 230	Q
Maximum Daily Throughput	(1)	(gal/day)	49 770	--
Maximum Daily Throughput	(a)	(bbl/day)	1 185	--
TANK PROPERTIES				
Tank Type (Fixed Roof or Floating Roof Tank)	(1)	--	Floating Roof Tank	--
Floating Roof Type (Internal or External)	(1)	--	Internal	--
Deck Construction Type (welded or bolted)	(2)	--	Welded	--
Insulated or Partially Insulated or Uninsulated?	(1)	--	--	--
Heated or Non-heated?	(1)	--	Non-Heated	--
Tank Roof Color	(1)	--	White	--
Tank Roof Condition	(1)	--	New	--
Tank Shell Color	(1)	--	White	--
Tank Shell Condition	(1)	--	New	--
Tank Diameter	(1)	(ft)	88.0	D
Tank Shell Height	(1)	(ft)	48.0	H_S
TANK FACTORS				
Zero Wind Speed Rim Seal Loss Factor	(3)	(lb-mole/ft-yr)	0.30	K_{Ra}
Wind Speed Dependent Rim Seal Loss Factor	(3)	(lb-mol/[mph]^n-ft-yr)	0.60	K_{Rb}
Seal-related Wind Speed Exponent	(3)	--	0.30	n
Product Factor	(4)	--	1.00	K_C
Deck Seam Loss Per Unit Seam Length Factor	(5)	(lb-mol/ft-yr)	0	K_D
Deck Seam Length Factor	(6)	(ft/ft²)	0.20	S_D
Shell Clingage Factor	(7)	(bbl/1 000 ft²)	7.5E-03	C_S
Number of Fixed Roof Support Columns	(8)	--	0	N_C
Effective Column Diameter	(8)	(ft)	0	F_C
TANK CONTENT PROPERTIES				
Liquid Temperature	(1)	(°F)	77.0	T
Liquid Molecular Weight	(9)	(lb/lb-mol)	120	M_L
Vapor Molecular Weight	(9)	(lb/lb-mol)	80.0	M_V
Average Organic Liquid Density	(9)	(lb/gal)	6.40	W_L
True Vapor Pressure	(10)	(psia)	5.18	P_{VA}
ENVIRONMENTAL FACTORS				
Average Daily Maximum Ambient Temperature	(11)	(°R)	520	T_{AX}
Average Daily Minimum Ambient Temperature	(11)	(°R)	504	T_{AN}
Average Daily Total Insolation on a Horizontal Surface	(11)	(Btu/ft^2-day)	1 122	I
Average Ambient Wind Speed	(12)	(mph)	0	V
Average Atmospheric Pressure	(11)	(psia)	14.7	P_A
CALCUALTED VARIABLES				
Standing Loss Calculations				
Average Daily Ambient Temperature	(b)	(°R)	512	T_{AA}
Tank Roof Surface Solar Absorptance	(14)	--	0.17	α_R
Tank Shell Surface Solar Absorptance	(14)	--	0.17	α_S
Liquid Bulk Temperature	(c)	(°R)	512	T_B
Vapor Pressure Function	(d)	--	0.11	P*
Total Deck Fitting Loss Factor	(e)	(lb-mol/yr)	454	F_F
Rim Seal Loss	(h)	(lb/yr)	229	L_R
Deck Fitting Loss	(i)	(lb/yr)	3 932	L_F
Deck Seam Loss	(j)	(lb/yr)	0	L_D
Annual Standing Loss	(k)	(lb/yr)	4 161	L_S
Daily Standing Loss	(l)	(lb/day)	11.4	--
Working Loss Calculations				
Annual Working Loss	(m)	(lb/yr)	218	L_W
Daily Working Loss	(n)	(lb/day)	0.61	--
Annual Total Tank Routine Losses	**(o)**	**(lb/yr)**	**4,379**	L_T
Daily Total Tank Routine Losses	**(o)**	**(lb/day)**	**12.0**	**--**

All notes and references are provided on the following page See Table 33 (Continued) Product Storage Tank no 3—VOC/TAC Emission Estimates—Swing RN vs RJET

Table 33 (Continued)
Product Storage Tank no. 3—VOC/TAC Emission Estimates—Swing RN vs. RJET
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Chemical	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			EPA Tanks Methodology			Emissions Estimate			
						[redacted]	M_i	[redacted]	L_{ti}			
			HAP	TAC	RBC		Molecular Weight (lb/lb-mol)		Maximum Daily (lb/day)		Annual (lb/yr)	
Benzene	71-43-2	46	Yes	Yes	Yes		78.1 (27)		--	[redacted]	--	[redacted]
Chlorobenzene	108-90-7	108	Yes	Yes	Yes		113 (27)		--		--	
Ethylbenzene	100-41-4	229	Yes	Yes	Yes		106 (27)		--		--	
Acenaphthene	83-32-9	402	Yes	Yes	No		154 (27)		--		--	
Fluorene	86-73-7	425	Yes	Yes	No		166 (27)		--		--	
2-Methylnaphthalene	91-57-6	427	Yes	Yes	No		142 (27)		--		--	
Pyrene	129-00-0	431	Yes	Yes	No		202 (27)		--		--	
Toluene	108-88-3	600	Yes	Yes	Yes		92.1 (27)		1 0E-05		3.7E-03	
1 2 4-Trimethylbenzene	95-63-6	614	No	Yes	Yes		120 (27)		--		--	
1 3 5-Trimethylbenzene	108-67-8	615	No	Yes	Yes		120 (27)		--		--	
m-Xylene & p-Xylene	108-38-3	629	Yes	Yes	Yes		106 (27)		--		--	
o-Xylene	95-47-6	630	Yes	Yes	Yes		106 (27)		--		--	
o-Terphenyl	84-15-1	--	No	No	No		230 (27)		2 0E-11		7.1E-09	
1-Pentanol	71-41-0	--	No	No	No		88.1 (27)		1 3E-09		4.7E-07	
n-Butylbenzene	104-51-8	--	No	No	No		134 (27)		--		--	
n-Propylbenzene	103-65-1	--	No	No	No		120 (27)		--		--	
4-Isopropyltoluene	99-87-6	--	No	No	No		134 (27)		--		--	
1-Methylnaphthalene	90-12-0	--	No	No	No		142 (27)		--		--	
p-Terphenyl-d14	1718-51-0	--	No	No	No		244 (27)		4 8E-12		1.7E-09	
2-Fluorobiphenyl	321-60-8	--	No	No	No		172 (27)		4 3E-07		1.6E-04	
Total TAC Emission Estimates (for a single storage tank)									**1.0E-05**		**3.7E-03**	
Total HAP Emission Estimates (for a single storage tank)									**1.0E-05**		**3.7E-03**	
Total RBC-Only Emission Estimates (for a single storage tank)									**1.0E-05**		**3.7E-03**	
Total Non-RBC Emission Estimates (for a single storage tank)									**4.3E-07**		**1.6E-04**	

NOTES:

(a) Total annual or daily throughput (bbl/ unit) = (total annual or daily throughput [gal/ unit]) x (bbl/42 gal)

(b) Average daily ambient temperature (°R) = ([average daily maximum ambient temperature {°R}] + [average daily minimum ambient temperature {°R}]) / (2); See Reference (13)

(c) If non-heated tank: Liquid bulk temperature (°R) = (average daily ambient temperature [°R]) + ([0 003] x [tank shell surface solar absorptance {°R}] x [average daily total insolation factor {Btu/ft²-day}]); See Reference (15)
For heated tanks the setpoint temperature for the storage tank is assumed to be representative of the liquid bulk temperature

(d) Vapor pressure function = (true vapor pressure [psia]) / (atmospheric pressure [psia]) / (1 + [1 - {|vapor pressure of liquid (psia)| / |atmospheric pressure (psia)|}]^0 5)²; See Reference (16)

(e) Total deck fitting loss factor (lb-mole/yr) = Σ([number of deck fittings of a particular type] x [deck fitting loss factor for a particular type {lb-mole/yr}]); see Reference (17)

Fitting Type	Number of Deck Fittings of a Particular Type	Deck Fitting Loss Factor for a Particular Type
AP-42 Variable	N_{Fi}	K_{Fi}
Access Hatch	1 (18)	36 (18)
Gauge-Float Well	1 (18)	14 (18)
Gauge-Hatch/Sample Port	1 (18)	12 (18)
Vacuum Breaker	1 (18)	6 2 (18)
Deck Drain (Stub Drain)	62 (f)	1 2 (18)
Deck Leg	27 (g)	7 9 (18)
Ladder Well	1 (18)	98 (18)
Total deck fitting loss factor		*454* (e)

(f) Typical number of deck drain fittings = (tank diameter [ft])² / (125); see Reference (20)

(g) Number of deck leg fittings = (5 + [tank diameter {ft} / 10] + [{tank diameter |ft|}² / 600]); See Reference (20)

(h) Rim seal loss lb/yr) = ([zero wind speed rim seal loss factor {lb-mole/ft-yr}] + [wind speed dependent rim seal loss factor {lb-mole/(mph)ⁿ-ft-yr}] x [average ambient wind speed {mph}]^[seal-related wind speed exponent]) x (tank diameter [ft])
x (vapor pressure function) x (vapor molecular weight [lb/lb-mole]) x (product factor); See Reference (19)

(i) Deck fitting loss (lb/yr) = (total deck fitting loss factor [lb-mole/yr]) x (vapor pressure function) x (vapor molecular weight [lb/lb-mole]) x (product factor); See Reference (21)

(j) Deck seam loss (lb/yr) = (deck seam loss per unit seam length factor [lb-mole/ft-yr]) x (deck seam length factor [ft/ft²]) x (tank diameter [ft])² x (vapor pressure function) x (vapor molecular weight [lb/lb-mole])
x (product factor); See Reference (22)

(k) Standing loss (lb/yr) = (rim seal loss [lb/yr]) + (deck fitting loss [lb/yr]) + (deck seam loss [lb/yr]); See Reference (23)

(l) Daily standing loss (lb/day) = (annual standing loss [lb/yr]) / (365 days/yr)

(m) Annual working loss lb/yr) = (0 943) x (annual net throughput [bbl/yr]) x (shell clingage factor [bbl/1 000 ft²]) x (average organic liquid density [lb/gal]) / (tank diameter [ft]) x (1 + [number of fixed roof support columns]
x [effective column diameter {ft}] / [tank diameter {ft}]); See Reference (24)

(n) Daily working loss (lb/day) = (0 943) x (daily net throughput [bbl/day]) x (shell clingage factor [bbl/1 000 ft²]) x (average organic liquid density [lb/gal]) / (tank diameter [ft]) x (1 + [number of fixed roof support columns]
x [effective column diameter {ft}] / [tank diameter {ft}]); See Reference (24)

(o) Annual or daily total tank routine losses (lb/yr or lb/day) = (annual or daily standing losses [lb/yr or lb/day]) + (annual or daily working losses [lb/yr or lb/day]); See Reference (25)

[redacted]

REFERENCES:

(1) See Table 2 Storage Tank—Input Assumptions and Parameters
(2) AP-42 Chapter 7 (June 2020); see equation 2-18
(3) AP-42 Chapter 7 (June 2020); Table 7 1-8 Values representative of welded tanks with liquid-mounted seal rim-mounted secondary system consistent with Bay Area Air Quality Management District BACT guidelines
(4) AP-42 Chapter 7 (June 2020); see equation 2-3 Assumes K_C equals 0 75 for crude oils or 1 for all other organic liquids
(5) AP-42 Chapter 7 (June 2020); see equation 2-18 Assumes K_D equals 0 14 for bolted decks or 0 0 for welded decks
(6) AP-42 Chapter 7 (June 2020); Table 7 1-16 Assumes typical deck seam length factor per footnote c
(7) AP-42 Chapter 7 (June 2020); Table 7 1-10 Conservatively assumes gasoline product storage and dense rust covering the inside surface of the tank shell
(8) AP-42 Chapter 7 (June 2020); see equation 2-19 note 3 Assumes the tank will be self-supporting
(9) AP-42 Chapter 7 (June 2020); Table 7 1-2 Assumes chemical properties representative of conventional petroleum refining jet kerosene (Jet A) for renewable jet fuel or jet naphtha as most-representative of renewable naphtha
(10) Information provided by NEXT Renewable Fuels Oregon LLC
(11) Site-specific meteorological data obtained from the Portland General Electric Beaver Plant meteorological tower
(12) AP-42 Chapter 7 (June 2020); see example 4 under solution item 4 For internal floating roof tanks wind speed is assumed to be zero
(13) AP-42 Chapter 7 (June 2020); see equation 1-30
(14) AP-42 Chapter 7 (June 2020); Table 7 1-6
(15) AP-42 Chapter 7 (June 2020); see equation 1-31
(16) AP-42 Chapter 7 (June 2020); equation 2-4
(17) AP-42 Chapter 7 (June 2020); equation 2-14
(18) AP-42 Chapter 7 (June 2020); Table 7 1-12 For internal floating roof tanks N_{vb} is equal to 1 per note j For internal floating roof tanks and domed external floating roof tanks the ambient wind speed is zero Therefore K_{Fi} equals K_{Fai}
(19) AP-42 Chapter 7 (June 2020); equation 2-3
(20) AP-42 Chapter 7 (June 2020); Table 7 1-15
(21) AP-42 Chapter 7 (June 2020); equation 2-13
(22) AP-42 Chapter 7 (June 2020); equation 2-18
(23) AP-42 Chapter 7 (June 2020); equation 2-2
(24) AP-42 Chapter 7 (June 2020); equation 2-19
(25) AP-42 Chapter 7 (June 2020); equation 2-1
[redacted]
(27) Molecular weights obtained from National Institute of Standards and Technology Chemistry WebBook
[redacted]
(29) Vapor pressure derived from publicly-available chemical data using the Clausius-Clapeyron relation at the specified liquid surface temperature
[redacted]

Table 34
Hydrocarbon Slop Storage Tank VOC/TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		(Units)	Hydrocarbon Slop	AP-42 Variable
PRODUCTION VALUES				
Storage Tank ID	(1)	--	T_HCSLOP	--
Total Number of Storage Tanks	(1)	--	1 00	--
Total Annual Throughput	(1)	(gal/yr)	15 487 080	--
Total Annual Throughput	(a)	(bbl/yr)	368 740	Q
Maximum Daily Throughput	(1)	(gal/day)	43 260	--
Maximum Daily Throughput	(a)	(bbl/day)	1 030	--
TANK PROPERTIES				
Tank Type (Fixed Roof or Floating Roof Tank)	(1)	--	Floating Roof Tank	--
Floating Roof Type (Internal or External)	(1)	--	Internal	--
Deck Construction Type (welded or bolted)	(2)	--	Welded	--
Insulated or Partially Insulated or Uninsulated?	(1)	--	--	--
Heated or Non-heated?	(1)	--	Heated	--
Tank Roof Color	(1)	--	White	--
Tank Roof Condition	(1)	--	New	--
Tank Shell Color	(1)	--	White	--
Tank Shell Condition	(1)	--	New	--
Tank Diameter	(1)	(ft)	52 0	D
Tank Shell Height	(1)	(ft)	40 0	H_S
TANK FACTORS				
Zero Wind Speed Rim Seal Loss Factor	(3)	(lb-mole/ft-yr)	0 30	K_{Ra}
Wind Speed Dependent Rim Seal Loss Factor	(3)	(lb-mol/[mph]^n-ft-yr)	0 60	K_{Rb}
Seal-related Wind Speed Exponent	(3)	--	0 30	n
Product Factor	(4)	--	1 00	K_C
Deck Seam Loss Per Unit Seam Length Factor	(5)	(lb-mol/ft-yr)	0	K_D
Deck Seam Length Factor	(6)	(ft/ft²)	0 20	S_D
Shell Clingage Factor	(7)	(bbl/1 000 ft²)	7 5E-03	C_S
Number of Fixed Roof Support Columns	(8)	--	0	N_C
Effective Column Diameter	(8)	(ft)	0	F_C
TANK CONTENT PROPERTIES				
Liquid Temperature	(1)	(°F)	120	T
Liquid Molecular Weight	(9)	(lb/lb-mol)	188	M_L
Vapor Molecular Weight	(9)	(lb/lb-mol)	130	M_V
Average Organic Liquid Density	(9)	(lb/gal)	7.10	W_L
Vapor Pressure Equation Constant A	(9)	--	12.1	A
Vapor Pressure Equation Constant B	(9)	--	8 907	B
True Vapor Pressure	(b)	(psia)	0.038	P_{VA}
ENVIRONMENTAL FACTORS				
Average Daily Maximum Ambient Temperature	(11)	(°R)	520	T_{AX}
Average Daily Minimum Ambient Temperature	(11)	(°R)	504	T_{AN}
Average Daily Total Insolation on a Horizontal Surface	(11)	(Btu/ft^2-day)	1 122	I
Average Ambient Wind Speed	(12)	(mph)	0	V
Average Atmospheric Pressure	(11)	(psia)	14 7	P_A
CALCUALTED VARIABLES				
Standing Loss Calculations				
Average Daily Ambient Temperature	(c)	(°R)	512	T_{AA}
Tank Roof Surface Solar Absorptance	(14)	--	0.17	α_R
Tank Shell Surface Solar Absorptance	(14)	--	0.17	α_S
Liquid Bulk Temperature	(d)	(°R)	580	T_B
Vapor Pressure Function	(e)	--	6 5E-04	P*
Total Deck Fitting Loss Factor	(f)	(lb-mol/yr)	311	F_F
Rim Seal Loss	(i)	(lb/yr)	1 32	L_R
Deck Fitting Loss	(j)	(lb/yr)	26 3	L_F
Deck Seam Loss	(k)	(lb/yr)	0	L_D
Annual Standing Loss	(l)	(lb/yr)	27 7	L_S
Daily Standing Loss	(m)	(lb/day)	0.076	--
Working Loss Calculations				
Annual Working Loss	(n)	(lb/yr)	356	L_W
Daily Working Loss	(o)	(lb/day)	0.99	--
Annual Total Tank Routine Losses	**(p)**	**(lb/yr)**	**384**	**L_T**
Daily Total Tank Routine Losses	**(p)**	**(lb/day)**	**1.07**	**--**

All notes and references are provided on the following page See Table 34 (Continued) Hydrocarbon Slop Storage Tank VOC/TAC Emission Estimates

Table 34 (Continued)
Hydrocarbon Slop Storage Tank VOC/TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Chemical	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			EPA Tanks Methodology			Emissions Estimate	
						[redacted]	M_i	[redacted]	L_{ti}	
			HAP	TAC	RBC		Molecular Weight (lb/lb-mol)		Maximum Daily (lb/day)	Annual (lb/yr)
Benzene	71-43-2	46	Yes	Yes	Yes		78.1 (27)		1 8E-04	0.066
Chlorobenzene	108-90-7	108	Yes	Yes	Yes		113 (27)		1 8E-04	0.065
Ethylbenzene	100-41-4	229	Yes	Yes	Yes		106 (27)		8 7E-04	0 31
Acenaphthene	83-32-9	402	Yes	Yes	No		154 (27)		7 0E-07	2 5E-04
Fluorene	86-73-7	425	Yes	Yes	No		166 (27)		2 3E-07	8 2E-05
2-Methylnaphthalene	91-57-6	427	Yes	Yes	No		142 (27)		1 6E-06	5 8E-04
Pyrene	129-00-0	431	Yes	Yes	No		202 (27)		7.1E-11	2 6E-08
Toluene	108-88-3	600	Yes	Yes	Yes		92.1 (27)		6.1E-04	0 22
1 2 4-Trimethylbenzene	95-63-6	614	No	Yes	Yes		120 (27)		1.9E-04	0.068
1 3 5-Trimethylbenzene	108-67-8	615	No	Yes	Yes		120 (27)		7 0E-05	0.025
m-Xylene & p-Xylene	108-38-3	629	Yes	Yes	Yes		106 (27)		4 6E-04	0.17
o-Xylene	95-47-6	630	Yes	Yes	Yes		106 (27)		1 7E-04	0.061
o-Terphenyl	84-15-1	--	No	No	No		230 (27)		3 0E-09	1.1E-06
1-Pentanol	71-41-0	--	No	No	No		88.1 (27)		5 6E-07	2 0E-04
n-Butylbenzene	104-51-8	--	No	No	No		134 (27)		1 0E-05	3 7E-03
n-Propylbenzene	103-65-1	--	No	No	No		120 (27)		8 5E-05	0.030
4-Isopropyltoluene	99-87-6	--	No	No	No		134 (27)		1 3E-05	4 6E-03
1-Methylnaphthalene	90-12-0	--	No	No	No		142 (27)		8 5E-07	3.1E-04
p-Terphenyl-d14	1718-51-0	--	No	No	No		244 (27)		7.4E-10	2 6E-07
2-Fluorobiphenyl	321-60-8	--	No	No	No		172 (27)		1 2E-05	4 2E-03
Total TAC Emission Estimates (for a single storage tank)									**2.7E-03**	**0.98**
Total HAP Emission Estimates (for a single storage tank)									**2.5E-03**	**0.89**
Total RBC-Only Emission Estimates (for a single storage tank)									**2.7E-03**	**0.98**
Total Non-RBC Emission Estimates (for a single storage tank)									**1.2E-04**	**0.044**

NOTES:

(a) Total annual or daily throughput bbl/ unit) = (total annual or daily throughput [gal/ unit]) x (bbl/42 gal)

b) True vapor pressure (psia) = exp([vapor pressure equation constant A] - [vapor pressure constant equation B] / [liquid temperature {°F} + 459 67]); see Reference (10)

(c) Average daily ambient temperature (°R) = ([average daily maximum ambient temperature {°R}] + [average daily minimum ambient temperature {°R}]) / (2); See Reference (13)

(d) If non-heated tank: Liquid bulk temperature (°R) = (average daily ambient temperature [°R]) + ([0 003] x [tank shell surface solar absorptance {°R}] x [average daily total insolation factor {Btu/ft²-day}]); See Reference (15)
For heated tanks the setpoint temperature for the storage tank is assumed to be representative of the liquid bulk temperature

(e) Vapor pressure function = (true vapor pressure [psia]) / (atmospheric pressure [psia]) / (1 + [1 - {|vapor pressure of liquid (psia)| / |atmospheric pressure (psia)|}]^0 5)²; See Reference (16)

(f) Total deck fitting loss factor (lb-mole/yr) = Σ([number of deck fittings of a particular type] x [deck fitting loss factor for a particular type {lb-mole/yr}]); see Reference (17)

Fitting Type	Number of Deck Fittings of a Particular Type	Deck Fitting Loss Factor for a Particular Type
AP-42 Variable	N_{Fi}	K_{Fi}
Access Hatch	1 (18)	36 (18)
Gauge-Float Well	1 (18)	14 (18)
Gauge-Hatch/Sample Port	1 (18)	12 (18)
Vacuum Breaker	1 (18)	6 2 (18)
Deck Drain (Stub Drain)	22 (g)	1 2 (18)
Deck Leg	15 (h)	7 9 (18)
Ladder Well	1 (18)	98 (18)
Total deck fitting loss factor		*311* (f)

(g) Typical number of deck drain fittings = (tank diameter [ft])² / (125); see Reference (20)

(h) Number of deck leg fittings = (5 + [tank diameter {ft} / 10] + [{tank diameter |ft|}² / 600]); See Reference (20)

(i) Rim seal loss (lb/yr) = ([zero wind speed rim seal loss factor {lb-mole/ft-yr}] + [wind speed dependent rim seal loss factor {lb-mole/(mph)^n-ft-yr}] x [average ambient wind speed {mph}]^{seal-related wind speed exponent}) x (tank diameter [ft]) x (vapor pressure function) x (vapor molecular weight [lb/lb-mole]) x (product factor); See Reference (19)

(j) Deck fitting loss (lb/yr) = (total deck fitting loss factor [lb-mole/yr]) x (vapor pressure function) x (vapor molecular weight [lb/lb-mole]) x (product factor); See Reference (21)

k) Deck seam loss lb/yr) = (deck seam loss per unit seam length factor [lb-mole/ft-yr]) x (deck seam length factor [ft/ft²]) x (tank diameter [ft])² x (vapor pressure function) x (vapor molecular weight [lb/lb-mole]) x (product factor); See Reference (22)

(l) Standing loss (lb/yr) = (rim seal loss [lb/yr]) + (deck fitting loss [lb/yr]) + (deck seam loss [lb/yr]); See Reference (23)

(m) Daily standing loss (lb/day) = (annual standing loss [lb/yr]) / (365 days/yr)

(n) Annual working loss (lb/yr) = (0 943) x (annual net throughput [bbl/yr]) x (shell clingage factor [bbl/1 000 ft²]) x (average organic liquid density [lb/gal]) / (tank diameter [ft]) x (1 + [number of fixed roof support columns] x [effective column diameter {ft}] / [tank diameter {ft}]); See Reference (24)

(o) Daily working loss (lb/day) = (0 943) x (daily net throughput [bbl/day]) x (shell clingage factor [bbl/1 000 ft²]) x (average organic liquid density [lb/gal]) / (tank diameter [ft]) x (1 + [number of fixed roof support columns] x [effective column diameter {ft}] / [tank diameter {ft}]); See Reference (24)

(p) Annual or daily total tank routine losses (lb/yr or lb/day) = (annual or daily standing losses [lb/yr or lb/day]) + (annual or daily working losses [lb/yr or lb/day]); See Reference (25)

[redacted]

REFERENCES:

(1) See Table 2 Storage Tank—Input Assumptions and Parameters

(2) AP-42 Chapter 7 (June 2020); see equation 2-18

(3) AP-42 Chapter 7 (June 2020); Table 7 1-8 Values representative of welded tanks with liquid-mounted seal rim-mounted secondary system consistent with Bay Area Air Quality Management District BACT guidelines

(4) AP-42 Chapter 7 (June 2020); see equation 2-3 Assumes K_C equals 0 75 for crude oils or 1 for all other organic liquids

(5) AP-42 Chapter 7 (June 2020); see equation 2-18 Assumes K_D equals 0 14 for bolted decks or 0 0 for welded decks

(6) AP-42 Chapter 7 (June 2020); Table 7 1-16 Assumes typical deck seam length factor per footnote c

(7) AP-42 Chapter 7 (June 2020); Table 7 1-10 Conservatively assumes gasoline product storage and dense rust covering the inside surface of the tank shell

(8) AP-42 Chapter 7 (June 2020); see equation 2-19 note 3 Assumes the tank will be self-supporting

(9) AP-42 Chapter 7 (June 2020); Table 7 1-2 Assumes the liquid and vapor molecular weight true vapor pressure and liquid density for no 2 fuel oil from petroleum refining as most-representative This is considered to be conservative as the hydrocarbon slop composition will be primarily of straight-chain hydrocarbons that are less volatile in relation to the typical no 2 fuel oil components from petroleum refining

(10) AP-42 Chapter 7 (June 2020); see equation 1-25 Assumes the vapor pressure equation constants for no 2 fuel oil from petroleum refining as most-representative This is considered to be conservative as the hydrocarbon slop composition will be comprised primarily of straight-chain hydrocarbons that are less volatile in relation to the typical no 2 fuel oil components from petroleum refining

(11) Site-specific meteorological data obtained from the Portland General Electric Beaver Plant meteorological tower

(12) AP-42 Chapter 7 (June 2020); see example 4 under solution item 4 For internal floating roof tanks wind speed is assumed to be zero

(13) AP-42 Chapter 7 (June 2020); see equation 1-30

(14) AP-42 Chapter 7 (June 2020); Table 7 1-6

(15) AP-42 Chapter 7 (June 2020); see equation 1-31

(16) AP-42 Chapter 7 (June 2020); equation 2-4

(17) AP-42 Chapter 7 (June 2020); equation 2-14

(18) AP-42 Chapter 7 (June 2020); Table 7 1-12 For internal floating roof tanks N_{vb} is equal to 1 per note j For internal floating roof tanks and domed external floating roof tanks the ambient wind speed is zero Therefore K_{Fi} equals K_{Fai}

(19) AP-42 Chapter 7 (June 2020); equation 2-3

(20) AP-42 Chapter 7 (June 2020); Table 7 1-15

(21) AP-42 Chapter 7 (June 2020); equation 2-13

(22) AP-42 Chapter 7 (June 2020); equation 2-18

(23) AP-42 Chapter 7 (June 2020); equation 2-2

(24) AP-42 Chapter 7 (June 2020); equation 2-19

(25) AP-42 Chapter 7 (June 2020); equation 2-1

[redacted]

(27) Molecular weights obtained from National Institute of Standards and Technology Chemistry WebBook

[redacted]

Table 35
Oil Water Separator Slop Storage Tank VOC/TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		(Units)	Oil Water Separator Slop	AP-42 Variable
PRODUCTION VALUES				
Storage Tank ID	(1)	--	T_OWSSLP	--
Total Number of Storage Tanks	(1)	--	1 00	--
Total Annual Throughput	(1)	(gal/yr)	15 487 080	--
Total Annual Throughput	(a)	(bbl/yr)	368 740	Q
Maximum Daily Throughput	(1)	(gal/day)	43 260	--
Maximum Daily Throughput	(a)	(bbl/day)	1 030	--
TANK PROPERTIES				
Tank Type (Fixed Roof or Floating Roof Tank)	(1)	--	Floating Roof Tank	--
Floating Roof Type (Internal or External)	(1)	--	Internal	--
Deck Construction Type (welded or bolted)	(2)	--	Welded	--
Insulated or Partially Insulated or Uninsulated?	(1)	--	--	--
Heated or Non-heated?	(1)	--	Non-Heated	--
Control Efficiency	(1)	(%)	0	--
Tank Roof Color	(1)	--	White	--
Tank Roof Condition	(1)	--	New	--
Tank Shell Color	(1)	--	White	--
Tank Shell Condition	(1)	--	New	--
Tank Diameter	(1)	(ft)	43 0	D
Tank Shell Height	(1)	(ft)	40 0	H_S
TANK FACTORS				
Zero Wind Speed Rim Seal Loss Factor	(3)	(lb-mole/ft-yr)	0 30	K_{Ra}
Wind Speed Dependent Rim Seal Loss Factor	(3)	(lb-mol/[mph]^n-ft-yr)	0 60	K_{Rb}
Seal-related Wind Speed Exponent	(3)	--	0 30	n
Product Factor	(4)	--	1 00	K_C
Deck Seam Loss Per Unit Seam Length Factor	(5)	(lb-mol/ft-yr)	0	K_D
Deck Seam Length Factor	(6)	(ft/ft²)	0 20	S_D
Shell Clingage Factor	(7)	(bbl/1 000 ft²)	7 5E-03	C_S
Number of Fixed Roof Support Columns	(8)	--	0	N_C
Effective Column Diameter	(8)	(ft)	0	F_C
TANK CONTENT PROPERTIES				
Liquid Temperature	(1)	(°F)	77 0	T
Liquid Molecular Weight	(9)	(lb/lb-mol)	188	M_L
Vapor Molecular Weight	(9)	(lb/lb-mol)	130	M_V
Average Organic Liquid Density	(9)	(lb/gal)	7.10	W_L
Vapor Pressure Equation Constant A	(9)	--	12.1	A
Vapor Pressure Equation Constant B	(9)	--	8 907	B
True Vapor Pressure	(b)	(psia)	0.011	P_{VA}
ENVIRONMENTAL FACTORS				
Average Daily Maximum Ambient Temperature	(11)	(°R)	520	T_{AX}
Average Daily Minimum Ambient Temperature	(11)	(°R)	504	T_{AN}
Average Daily Total Insolation on a Horizontal Surface	(11)	(Btu/ft^2-day)	1 122	I
Average Ambient Wind Speed	(12)	(mph)	0	V
Average Atmospheric Pressure	(11)	(psia)	14 7	P_A
CALCUALTED VARIABLES				
Standing Loss Calculations				
Average Daily Ambient Temperature	(c)	(°R)	512	T_{AA}
Tank Roof Surface Solar Absorptance	(14)	--	0.17	α_R
Tank Shell Surface Solar Absorptance	(14)	--	0.17	α_S
Liquid Bulk Temperature	(d)	(°R)	512	T_B
Vapor Pressure Function	(e)	--	1.9E-04	P*
Total Deck Fitting Loss Factor	(f)	(lb-mol/yr)	287	F_F
Rim Seal Loss	(i)	(lb/yr)	0 32	L_R
Deck Fitting Loss	(j)	(lb/yr)	7 08	L_F
Deck Seam Loss	(k)	(lb/yr)	0	L_D
Annual Standing Loss	(l)	(lb/yr)	7.40	L_S
Daily Standing Loss	(m)	(lb/day)	0.020	--
Working Loss Calculations				
Annual Working Loss	(n)	(lb/yr)	431	L_W
Daily Working Loss	(o)	(lb/day)	1 20	--
Annual Total Tank Routine Losses	**(p)**	**(lb/yr)**	**438**	**L_T**
Daily Total Tank Routine Losses	**(p)**	**(lb/day)**	**1.22**	**--**

All notes and references are provided on the following page See Table 35 (Continued) Oil Water Separator Slop Storage Tank VOC/TAC Emission Estimates

Table 35 (Continued)
Oil Water Separator Slop Storage Tank VOC/TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Chemical	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			EPA Tanks Methodology			Emissions Estimate	
						[redacted]	M_i	[redacted]	L_{ti}	
			HAP	TAC	RBC		Molecular Weight (lb/lb-mol)		Maximum Daily (lb/day)	Annual (lb/yr)
Benzene	71-43-2	46	Yes	Yes	Yes	[redacted]	78.1 [27]	[redacted]	2 6E-04	0.095
Chlorobenzene	108-90-7	108	Yes	Yes	Yes	[redacted]	113 [27]	[redacted]	2.1E-04	0.075
Ethylbenzene	100-41-4	229	Yes	Yes	Yes	[redacted]	106 [27]	[redacted]	9 7E-04	0 35
Acenaphthene	83-32-9	402	Yes	Yes	No	[redacted]	154 [27]	[redacted]	3 6E-07	1 3E-04
Fluorene	86-73-7	425	Yes	Yes	No	[redacted]	166 [27]	[redacted]	1 7E-07	6 0E-05
2-Methylnaphthalene	91-57-6	427	Yes	Yes	No	[redacted]	142 [27]	[redacted]	1 0E-06	3 6E-04
Pyrene	129-00-0	431	Yes	Yes	No	[redacted]	202 [27]	[redacted]	2.1E-11	7 7E-09
Toluene	108-88-3	600	Yes	Yes	Yes	[redacted]	92.1 [27]	[redacted]	7 8E-04	0 28
1 2 4-Trimethylbenzene	95-63-6	614	No	Yes	Yes	[redacted]	120 [27]	[redacted]	1 8E-04	0.063
1 3 5-Trimethylbenzene	108-67-8	615	No	Yes	Yes	[redacted]	120 [27]	[redacted]	6 6E-05	0.024
m-Xylene & p-Xylene	108-38-3	629	Yes	Yes	Yes	[redacted]	106 [27]	[redacted]	5.1E-04	0.18
o-Xylene	95-47-6	630	Yes	Yes	Yes	[redacted]	106 [27]	[redacted]	1 8E-04	0.065
o-Terphenyl	84-15-1	--	No	No	No	[redacted]	230 [27]	[redacted]	9 3E-10	3 3E-07
1-Pentanol	71-41-0	--	No	No	No	[redacted]	88.1 [27]	[redacted]	3.9E-07	1.4E-04
n-Butylbenzene	104-51-8	--	No	No	No	[redacted]	134 [27]	[redacted]	8 8E-06	3 2E-03
n-Propylbenzene	103-65-1	--	No	No	No	[redacted]	120 [27]	[redacted]	8 3E-05	0.030
4-Isopropyltoluene	99-87-6	--	No	No	No	[redacted]	134 [27]	[redacted]	1 2E-05	4 2E-03
1-Methylnaphthalene	90-12-0	--	No	No	No	[redacted]	142 [27]	[redacted]	5.1E-07	1 8E-04
p-Terphenyl-d14	1718-51-0	--	No	No	No	[redacted]	244 [27]	[redacted]	1 5E-10	5 3E-08
2-Fluorobiphenyl	321-60-8	--	No	No	No	[redacted]	172 [27]	[redacted]	1.1E-05	4.1E-03
Total TAC Emission Estimates (for a single storage tank)									**3.2E-03**	**1.13**
Total HAP Emission Estimates (for a single storage tank)									**2.9E-03**	**1.04**
Total RBC-Only Emission Estimates (for a single storage tank)									**3.2E-03**	**1.13**
Total Non-RBC Emission Estimates (for a single storage tank)									**1.2E-04**	**0.042**

NOTES:

(a) Total annual or daily throughput bbl/ unit) = (total annual or daily throughput [gal/ unit]) x (bbl/42 gal)

b) True vapor pressure (psia) = exp([vapor pressure equation constant A] - [vapor pressure constant equation B] / [liquid temperature {°F} + 459 67]); see Reference (10)

(c) Average daily ambient temperature (°R) = ([average daily maximum ambient temperature {°R}] + [average daily minimum ambient temperature {°R}]) / (2); See Reference (13)

(d) If non-heated tank: Liquid bulk temperature (°R) = (average daily ambient temperature [°R]) + ([0 003] x [tank shell surface solar absorptance {°R}] x [average daily total insolation factor {Btu/ft²-day}]); See Reference (15)
For heated tanks the setpoint temperature for the storage tank is assumed to be representative of the liquid bulk temperature

(e) Vapor pressure function = (true vapor pressure [psia]) / (atmospheric pressure [psia]) / (1 + [1 - {|vapor pressure of liquid (psia)| / |atmospheric pressure (psia)|}]^0 5)²; See Reference (16)

(f) Total deck fitting loss factor (lb-mole/yr) = Σ([number of deck fittings of a particular type] x [deck fitting loss factor for a particular type {lb-mole/yr}]); see Reference (17)

Fitting Type	Number of Deck Fittings of a Particular Type	Deck Fitting Loss Factor for a Particular Type
AP-42 Variable	N_{Fi}	K_{Fi}
Access Hatch	1 [18]	36 [18]
Gauge-Float Well	1 [18]	14 [18]
Gauge-Hatch/Sample Port	1 [18]	12 [18]
Vacuum Breaker	1 [18]	6 2 [18]
Deck Drain (Stub Drain)	15 [g]	1 2 [18]
Deck Leg	13 [h]	7 9 [18]
Ladder Well	1 [18]	98 [18]
Total deck fitting loss factor		*287* [f]

(g) Typical number of deck drain fittings = (tank diameter [ft])² / (125); see Reference (20)

(h) Number of deck leg fittings = (5 + [tank diameter {ft} / 10] + [{tank diameter |ft|}² / 600]); See Reference (20)

(i) Rim seal loss (lb/yr) = ([zero wind speed rim seal loss factor {lb-mole/ft-yr}] + [wind speed dependent rim seal loss factor {lb-mole/(mph)^n-ft-yr}] x [average ambient wind speed {mph}]^[seal-related wind speed exponent]) x (tank diameter [ft]) x (vapor pressure function) x (vapor molecular weight [lb/lb-mole]) x (product factor); See Reference (19)

(j) Deck fitting loss (lb/yr) = (total deck fitting loss factor [lb-mole/yr]) x (vapor pressure function) x (vapor molecular weight [lb/lb-mole]) x (product factor); See Reference (21)

k) Deck seam loss lb/yr) = (deck seam loss per unit seam length factor [lb-mole/ft-yr]) x (deck seam length factor [ft/ft²]) x (tank diameter [ft])² x (vapor pressure function) x (vapor molecular weight [lb/lb-mole]) x (product factor); See Reference (22)

(l) Standing loss (lb/yr) = (rim seal loss [lb/yr]) + (deck fitting loss [lb/yr]) + (deck seam loss [lb/yr]); See Reference (23)

(m) Daily standing loss (lb/day) = (annual standing loss [lb/yr]) / (365 days/yr)

(n) Annual working loss (lb/yr) = (0 943) x (annual net throughput [bbl/yr]) x (shell clingage factor [bbl/1 000 ft²]) x (average organic liquid density [lb/gal]) / (tank diameter [ft]) x (1 + [number of fixed roof support columns] x [effective column diameter {ft}] / [tank diameter {ft}]); See Reference (24)

(o) Daily working loss (lb/day) = (0 943) x (daily net throughput [bbl/day]) x (shell clingage factor [bbl/1 000 ft²]) x (average organic liquid density [lb/gal]) / (tank diameter [ft]) x (1 + [number of fixed roof support columns] x [effective column diameter {ft}] / [tank diameter {ft}]); See Reference (24)

(p) Annual or daily total tank routine losses (lb/yr or lb/day) = (annual or daily standing losses [lb/yr or lb/day]) + (annual or daily working losses [lb/yr or lb/day]); See Reference (25)

[redacted]

REFERENCES:

(1) See Table 2 Storage Tank—Input Assumptions and Parameters
(2) AP-42 Chapter 7 (June 2020); see equation 2-18
(3) AP-42 Chapter 7 (June 2020); Table 7 1-8 Values representative of welded tanks with liquid-mounted seal rim-mounted secondary system consistent with Bay Area Air Quality Management District BACT guidelines
(4) AP-42 Chapter 7 (June 2020); see equation 2-3 Assumes K_C equals 0 75 for crude oils or 1 for all other organic liquids
(5) AP-42 Chapter 7 (June 2020); see equation 2-18 Assumes K_D equals 0 14 for bolted decks or 0 0 for welded decks
(6) AP-42 Chapter 7 (June 2020); Table 7 1-16 Assumes typical deck seam length factor per footnote c
(7) AP-42 Chapter 7 (June 2020); Table 7 1-10 Conservatively assumes gasoline product storage and dense rust covering the inside surface of the tank shell
(8) AP-42 Chapter 7 (June 2020); see equation 2-19 note 3 Assumes the tank will be self-supporting
(9) AP-42 Chapter 7 (June 2020); Table 7 1-2 Assumes the liquid and vapor molecular weight true vapor pressure and liquid density for no 2 fuel oil from petroleum refining as most-representative This is considered to be conservative as the Oil Water Separator slop composition will be primarily of straight-chain hydrocarbons that are less volatile in relation to the typical no 2 fuel oil components from petroleum refining
(10) AP-42 Chapter 7 (June 2020); see equation 1-25 Assumes the vapor pressure equation constants for no 2 fuel oil from petroleum refining as most-representative This is considered to be conservative as the Oil Water Separator slop composition will be comprised primarily of straight-chain hydrocarbons that are less volatile in relation to the typical no 2 fuel oil components from petroleum refining
(11) Site-specific meteorological data obtained from the Portland General Electric Beaver Plant meteorological tower
(12) AP-42 Chapter 7 (June 2020); see example 4 under solution item 4 For internal floating roof tanks wind speed is assumed to be zero
(13) AP-42 Chapter 7 (June 2020); see equation 1-30
(14) AP-42 Chapter 7 (June 2020); Table 7 1-6
(15) AP-42 Chapter 7 (June 2020); see equation 1-31
(16) AP-42 Chapter 7 (June 2020); equation 2-4
(17) AP-42 Chapter 7 (June 2020); equation 2-14
(18) AP-42 Chapter 7 (June 2020); Table 7 1-12 For internal floating roof tanks N_{vb} is equal to 1 per note j For internal floating roof tanks and domed external floating roof tanks the ambient wind speed is zero Therefore K_{Fi} equals K_{Fai}
(19) AP-42 Chapter 7 (June 2020); equation 2-3
(20) AP-42 Chapter 7 (June 2020); Table 7 1-15
(21) AP-42 Chapter 7 (June 2020); equation 2-13
(22) AP-42 Chapter 7 (June 2020); equation 2-18
(23) AP-42 Chapter 7 (June 2020); equation 2-2
(24) AP-42 Chapter 7 (June 2020); equation 2-19
(25) AP-42 Chapter 7 (June 2020); equation 2-1
[redacted]
(27) Molecular weights obtained from National Institute of Standards and Technology Chemistry WebBook
[redacted]

Table 36
Wastewater Treatment System VOC/TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Pollutant	Molecular Formula	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			Emissions Estimate											
							Sequencing Batch Reactors			SBR Post-Equalization Tank			Disk Filters			Total		
				HAP	TAC	RBC	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
Total VOC	--	--	--	--	--	--	0.032 [1]	0.77 [1]	0.14 [1]	2.3E-09 [1]	5 5E-08 [1]	1 0E-08 [1]	7.6E-10 [1]	1.8E-08 [1]	3.3E-09 [1]	0.032	0 77	0.14
TOXIC AIR CONTAMINANT																		
Ammonia	NH_3	7664-41-7	26	No	Yes	Yes	2 8E-05 [a]	6 7E-04 [2]	1.2E-04 [b]	--	--	--	--	--	--	2 8E-05	6 7E-04	1 2E-04
Benzene	C_6H_6	71-43-2	46	Yes	Yes	Yes	6 0E-04 [a]	0.014 [2]	2.6E-03 [b]	--	--	--	--	--	--	6 0E-04	0.014	2 6E-03
Chlorobenzene	C_6H_5Cl	108-90-7	108	Yes	Yes	Yes	1 6E-03 [a]	0.039 [2]	7.1E-03 [b]	--	--	--	--	--	--	1 6E-03	0.039	7.1E-03
Ethylbenzene	C_8H_{10}	100-41-4	229	Yes	Yes	Yes	0.012 [a]	0.29 [2]	0 053 [b]	--	--	--	--	--	--	0.012	0 29	0.053
Hydrogen Sulfide	H_2S	7783-06-4	293	No	Yes	Yes	0.046 [a]	1.11 [2]	0.20 [b]	2.1E-08 [a]	5.1E-07 [2]	9 3E-08 [b]	4.7E-08 [a]	1.1E-06 [2]	2.0E-07 [b]	0.046	1.11	0 20
Acenaphthene	$C_{12}H_{10}$	83-32-9	402	Yes	Yes	No	6.4E-05 [a]	1 5E-03 [2]	2.8E-04 [b]	1.4E-09 [a]	3.4E-08 [2]	6 3E-09 [b]	6.0E-10 [a]	1.5E-08 [2]	2.6E-09 [b]	6.4E-05	1 5E-03	2 8E-04
Fluorene	$C_{13}H_{10}$	86-73-7	425	Yes	Yes	No	7 2E-06 [a]	1 7E-04 [2]	3.1E-05 [b]	3.5E-10 [a]	8 3E-09 [2]	1 5E-09 [b]	9.1E-11 [a]	2.2E-09 [2]	4.0E-10 [b]	7 2E-06	1 7E-04	3.1E-05
2-Methylnaphthalene	$C_{11}H_{10}$	91-57-6	427	Yes	Yes	No	4.9E-06 [a]	1 2E-04 [2]	2.2E-05 [b]	1.8E-11 [a]	4 3E-10 [2]	7 8E-11 [b]	--	--	--	4.9E-06	1 2E-04	2 2E-05
Pyrene	$C_{16}H_{10}$	129-00-0	431	Yes	Yes	No	8.1E-08 [a]	1.9E-06 [2]	3.6E-07 [b]	4.9E-10 [a]	1 2E-08 [2]	2 2E-09 [b]	3.7E-11 [a]	9.0E-10 [2]	1.6E-10 [b]	8 2E-08	2 0E-06	3 6E-07
Phenol	C_6H_6O	108-95-2	497	Yes	Yes	Yes	1 2E-04 [a]	2 8E-03 [2]	5.1E-04 [b]	--	--	--	--	--	--	1 2E-04	2 8E-03	5.1E-04
Toluene	C_7H_8	108-88-3	600	Yes	Yes	Yes	4 2E-03 [a]	0.100 [2]	0 018 [b]	--	--	--	--	--	--	4 2E-03	0.100	0.018
1 2 4-Trimethylbenzene	C_9H_{12}	95-63-6	614	No	Yes	Yes	2 2E-03 [a]	0.054 [2]	9.8E-03 [b]	--	--	--	--	--	--	2 2E-03	0.054	9 8E-03
1 3 5-Trimethylbenzene	C_9H_{12}	108-67-8	615	No	Yes	Yes	2 0E-03 [a]	0.049 [2]	8.9E-03 [b]	--	--	--	--	--	--	2 0E-03	0.049	8.9E-03
m-Xylene & p-Xylene	C_8H_{10}	108-38-3	629	Yes	Yes	Yes	6.1E-03 [a]	0.15 [2]	0 027 [b]	1.9E-11 [a]	4 5E-10 [2]	8 2E-11 [b]	2.5E-11 [a]	5.9E-10 [2]	1.1E-10 [b]	6.1E-03	0.15	0.027
o-Xylene	C_8H_{10}	95-47-6	630	Yes	Yes	Yes	3.1E-03 [a]	0.074 [2]	0 013 [b]	--	--	--	--	--	--	3.1E-03	0.074	0.013
Total TAC Emission Estimates							**0.078**	**1.88**	**0.34**	**2.3E-08**	**5.6E-07**	**1.0E-07**	**4.7E-08**	**1.1E-06**	**2.1E-07**	**0.078**	**1.88**	**0.34**
Total HAP Emission Estimates							**0.028**	**0.67**	**0.12**	**2.3E-09**	**5.5E-08**	**1.0E-08**	**7.6E-10**	**1.8E-08**	**3.3E-09**	**0.028**	**0.67**	**0.12**
Total RBC Emission Estimates							**0.078**	**1.88**	**0.34**	**2.1E-08**	**5.1E-07**	**9.3E-08**	**4.7E-08**	**1.1E-06**	**2.0E-07**	**0.078**	**1.88**	**0.34**
Total Non-RBC Emission Estimates							**7.6E-05**	**1.8E-03**	**3.3E-04**	**2.3E-09**	**5.5E-08**	**1.0E-08**	**7.3E-10**	**1.8E-08**	**3.2E-09**	**7.6E-05**	**1.8E-03**	**3.3E-04**

NOTES:

HAP = hazardous air pollutant

RBC = risk-based concentration

TAC = toxic air contaminant

VOC = volatile organic compound

(a) Hourly emissions estimate (lb/hr) = (daily emissions estimate [lb/day]) / (daily hours of operation [hrs/day])

Daily hours of operation (hrs/day) = 24 0 (3)

(b) Annual emissions estimate (tons/yr) = (daily emissions estimate [lb/day]) x (annual days of operation [days/yr]) x (ton/2 000 lb)

Annual days of operation (day/yr) = 365 (3)

REFERENCES:

(1) Only Phenol contains carbon molecules As a result the total VOC emission estimates are assumed to be equal to the Phenol emission estimates

(2) Wastewater treatment system design specifications provided by NEXT Renewable Fuels Oregon LLC Emissions estimates derived using TOXCHEM version 4 4 Assumes default TOXCHEM model inputs unless site-specific data was readily-available Conservatively assumes controlled emissions from the Mist Filter control device which are routed into the SBR units for microbial feed (i e likely to be consumed) are emitted directly to atmosphere

(3) Assumes continuous daily and annual operation

Table 37
Emergency Fire Water Pump TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Emergency Fire Water Pump (Diesel Fueled)
Hourly Fuel Usage (gal/hr)	(1)	23 5
Maximum Daily Fuel Usage (gal/day)	(1)	141
Annual Fuel Usage (gal/yr)	(1)	2 350
Daily Hours of Operation (hrs/day)	(1)	6 00
Annual Hours of Operation (hrs/yr)	(1)	100
Engine Size (kW)	(2)	306

Toxic Air Contaminant	CAS No.	DEQ Sequence Number	HAP? (Yes/No)	TAC? (Yes/No)	RBC? (Yes/No)	Emission Factor	Emission Estimates: Hourly (lb/hr)	Emission Estimates: Daily (lb/day)	Emission Estimates: Annual (tons/yr)
SPECIATED ORGANIC/INORGANIC COMPOUNDS									
Acetaldehyde	75-07-0	1	Yes	Yes	Yes	0 78 (lb/Mgal) [3]	0 018 [a]	0 11 [a]	9 2E-04 [b]
Acrolein	107-02-8	5	Yes	Yes	Yes	0 034 (lb/Mgal) [3]	8 0E-04 [a]	4 8E-03 [a]	4 0E-05 [b]
Ammonia	7664-41-7	26	No	Yes	Yes	1 40 (lb/Mgal) [3]	0 033 [a]	0 20 [a]	1 6E-03 [b]
Benzene	71-43-2	46	Yes	Yes	Yes	0 19 (lb/Mgal) [3]	4 4E-03 [a]	0 026 [a]	2 2E-04 [b]
1 3-Butadiene	106-99-0	75	Yes	Yes	Yes	0 22 (lb/Mgal) [3]	5 1E-03 [a]	0 031 [a]	2 6E-04 [b]
Ethylbenzene	100-41-4	229	Yes	Yes	Yes	0 011 (lb/Mgal) [3]	2 6E-04 [a]	1 5E-03 [a]	1 3E-05 [b]
Formaldehyde	50-00-0	250	Yes	Yes	Yes	1 73 (lb/Mgal) [3]	0 041 [a]	0 24 [a]	2 0E-03 [b]
Hexane	110-54-3	289	Yes	Yes	Yes	0 027 (lb/Mgal) [3]	6 3E-04 [a]	3 8E-03 [a]	3 2E-05 [b]
Hydrochloric acid	7647-01-0	292	Yes	Yes	Yes	0 19 (lb/Mgal) [3]	4 4E-03 [a]	0 026 [a]	2 2E-04 [b]
Toluene	108-88-3	600	Yes	Yes	Yes	0 11 (lb/Mgal) [3]	2 5E-03 [a]	0 015 [a]	1 2E-04 [b]
Xylene (mixture)	1330-20-7	628	Yes	Yes	Yes	0 042 (lb/Mgal) [3]	1 0E-03 [a]	6 0E-03 [a]	5 0E-05 [b]
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)									
PAHs (excluding Naphthalene)	PAHs	401	Yes	Yes	Yes	0 036 (lb/Mgal) [3]	8 5E-04 [a]	5 1E-03 [a]	4 3E-05 [b]
Benzo(a)pyrene	50-32-8	406	Yes	Yes	Yes	3 5E-08 (lb/Mgal) [4]	8 3E-10 [a]	5 0E-09 [a]	4 2E-11 [b]
Naphthalene	91-20-3	428	Yes	Yes	Yes	0 020 (lb/Mgal) [3]	4 6E-04 [a]	2 8E-03 [a]	2 3E-05 [b]
TRACE METALS									
Arsenic	7440-38-2	37	Yes	Yes	Yes	1 6E-03 (lb/Mgal) [3]	3 8E-05 [a]	2 3E-04 [a]	1 9E-06 [b]
Cadmium	7440-43-9	83	Yes	Yes	Yes	1 5E-03 (lb/Mgal) [3]	3 5E-05 [a]	2 1E-04 [a]	1 8E-06 [b]
Chromium VI	18540-29-9	136	Yes	Yes	Yes	1 0E-04 (lb/Mgal) [3]	2 4E-06 [a]	1 4E-05 [a]	1 2E-07 [b]
Copper	7440-50-8	149	No	Yes	Yes	4 1E-03 (lb/Mgal) [3]	9 6E-05 [a]	5 8E-04 [a]	4 8E-06 [b]
Lead	7439-92-1	305	Yes	Yes	Yes	8 3E-03 (lb/Mgal) [3]	2 0E-04 [a]	1 2E-03 [a]	9 8E-06 [b]
Manganese	7439-96-5	312	Yes	Yes	Yes	3 1E-03 (lb/Mgal) [3]	7 3E-05 [a]	4 4E-04 [a]	3 6E-06 [b]
Mercury	7439-97-6	316	Yes	Yes	Yes	2 0E-03 (lb/Mgal) [3]	4 7E-05 [a]	2 8E-04 [a]	2 4E-06 [b]
Nickel	7440-02-0	364	Yes	Yes	Yes	3 9E-03 (lb/Mgal) [3]	9 2E-05 [a]	5 5E-04 [a]	4 6E-06 [b]
Selenium	7782-49-2	575	Yes	Yes	Yes	2 2E-03 (lb/Mgal) [3]	5 2E-05 [a]	3 1E-04 [a]	2 6E-06 [b]
DIESEL PARTICULATE MATTER (DPM)									
Total DPM	DPM	200	No	Yes	Yes	--	0 16	0 87	7 3E-03
DPM From Normal Operation	--	--	--	--	--	*0.21 (g/kW-hr)* [5]	*0.14* [c]	*0.85* [d]	*7.1E-03* [e]
DPM From Cold Start	--	--	--	--	--	*1.50 (g/kW-hr)* [6]	*0.017* [f]	*0.017* [g]	*1.7E-04* [h]
Total TAC Emission Estimates							**0.27**	**1.54**	**0.013**
Total HAP Emission Estimates							**0.080**	**0.48**	**4.0E-03**
Total RBC Emission Estimates							**0.27**	**1.54**	**0.013**
Total Non-RBC Emission Estimates							**--**	**--**	**--**

Color Key
MFA-Specific CAS number.

NOTES

g/kW-hr gram per kilowatt-hour.
HAP hazardous air pollutant.
Mgal thousand gallons.
MMBtu/gal m llion British thermal units per gal.
RBC risk-based concentration.
TAC toxic air contaminant.

(a) Hourly or daily emissions estimate (lb/hr or lb/day) (emission factor [lb/Mgal]) x (hourly or daily fuel usage [gal/hr or gal/day]) x (Mgal/1 000 ga)
(b) Annual emiss ons estimate (tons/yr) (emission factor [lb/Mgal]) x (annual fuel usage [gal/yr]) x (Mgal/1 000 gal) x (ton/2 000 lb)
(c) Hourly emiss ons estimate (lb/hr) (emission factor [g/kW-hr]) x (engine size [kW]) x (lb/453.592 g)
(d) Daily emissions estimate (lb/day) (emission factor [g/kW-hr]) x (engine size [kW]) x (daily hours of operation [hrs/day]) x (lb/453.592 g)
(e) Annual emiss ons estimate (tons/yr) (emission factor [g/kW-hr]) x (engine size [kW]) x (annual hours of operation [hrs/yr]) x (lb/453.592 g) x (ton/2 000 lb)
(f) Hourly emiss ons estimate (lb/hr) (emission factor [g/kW-hr]) x (engine size [kW]) x (cold start duration [min/cold start]) x (hr/60 min) x (b/453.592 g)

Cold start duration (min/cold start) 1.00 (7)

(g) Daily emissions estimate (lb/day) (emission factor [g/kW-hr]) x (engine size [kW]) x (cold start durat on [min/cold start]) x (hr/60 min) x (daily number of cold starts [cold starts/day])

Cold start duration (min/cold start) 1.00 (7)
Daily number of cold starts (cold starts/day) 1.00 (7)

(h) Annual emiss ons estimate (tons/yr) (emission factor [g/kW-hr]) x (engine size [kW]) x (cold start duration [min/cold start]) x (hr/60 min) x (annual number of cold starts [cold starts/yr]) x (ton/2 000 lb)

Cold start duration (min/cold start) 1.00 (7)
Annual number of cold starts (cold starts/yr) 20.0 (7)

REFERENCES

(1) See Table 1 Input Assumptions and Parameters.
(2) See Table 3 Miscellaneous—Input Assumptions and Parameters.
(3) Reporting Procedures for AB2588 Facilities for Reporting their Quadrennial Air Toxics Emissions Inventory publ shed by the South Coast Air Quality Management District (SCAQMD) in December 2016. See Append x B Table B-2 Default EF for Diesel/Distillate Oil Fuel Combustion (lb/1000 gal) for stationary and portable internal combustion engines (ICE). Assumes SCR control.
(4) AP-42 Chapter 3.4 (October 1996) Table 3.4-4 PAH Emission Factors for Large Uncontrolled Stationary Diesel Engines. Converted assuming 0.138 MMBtu/gal per 40 CFR Part 98 Table C-1.
(5) USEPA Nonroad Compress on-Ignition Engines Exhaust Emission Standards (EPA-420-B-16-022) dated March 2016. Assumes Tier 4 emiss on factor PM+NMHC is representative of DPM.
(6) USEPA Nonroad Compress on-Ignition Engines Exhaust Emission Standards (EPA-420-B-16-022) dated March 2016. Assumes Tier 2 PM emission factor plus T er 1 emission factor for NMHC is representative of DPM during uncontrolled cold start period.
(7) Air Quality Implications of Backup Generators in Californ a PIER Final Project Report prepared by the California Energy Commission dated July 2005. See section 3.4. Conservatively assumes each cold start lasts for up to one minute. Assumes only one cold start per day and up to 20 cold starts per year.

Table 38
Emergency Generator nos. 1-2 TAC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Emergency Generator 1 (Diesel Fuel)	Emergency Generator 2 (Diesel Fuel)	Emergency Generator Total
Hourly Fuel Usage (gal/hr)	[1]	90 1	90 1	
Maximum Daily Fuel Usage (gal/day)	[1]	541	541	
Annual Fuel Usage (gal/yr)	[1]	9 009	9 009	
Daily Hours of Operation (hrs/day)	[1]	6 00	6 00	
Annual Hours of Operation hrs/yr)	[1]	100	100	
Engine Size (kW)	[2]	1 491	1 491	

Toxic Air Contaminant	CAS No.	DEQ Sequence Number	HAP? (Yes/No)	TAC? (Yes/No)	RBC? (Yes/No)	Emission Factor	Emissions Estimate: Emergency Generator 1 (Diesel Fuel) Hourly (lb/hr)	Emergency Generator 1 Daily (lb/day)	Emergency Generator 1 Annual (tons/yr)	Emergency Generator 2 (Diesel Fuel) Hourly (lb/hr)	Emergency Generator 2 Daily (lb/day)	Emergency Generator 2 Annual (tons/yr)	Total Hourly (lb/hr)	Total Daily (lb/day)	Total Annual (tons/yr)
SPECIATED ORGANIC/INORGANIC COMPOUNDS															
Acetaldehyde	75-07-0	1	Yes	Yes	Yes	0 78 (lb/Mgal) [3]	0 071 [a]	0 42 [a]	3 5E-03 [b]	0 071 [a]	0 42 [a]	3 5E-03 [b]	0 14	0 85	7 1E-03
Acrolein	107-02-8	5	Yes	Yes	Yes	0 034 (lb/Mgal) [3]	3 1E-03 [a]	0 018 [a]	1 5E-04 [b]	3 1E-03 [a]	0 018 [a]	1 5E-04 [b]	6 1E-03	0 037	3 1E-04
Ammonia	7664-41-7	26	No	Yes	Yes	1 40 (lb/Mgal) [3]	0 13 [a]	0 76 [a]	6 3E-03 [b]	0 13 [a]	0 76 [a]	6 3E-03 [b]	0 25	1 51	0 013
Benzene	71-43-2	46	Yes	Yes	Yes	0 19 (lb/Mgal) [3]	0 017 [a]	0 10 [a]	8 4E-04 [b]	0 017 [a]	0 10 [a]	8 4E-04 [b]	0 034	0 20	1 7E-03
1 3-Butadiene	106-99-0	75	Yes	Yes	Yes	0 22 (lb/Mgal) [3]	0 020 [a]	0 12 [a]	9 8E-04 [b]	0 020 [a]	0 12 [a]	9 8E-04 [b]	0 039	0 24	2 0E-03
Ethylbenzene	100-41-4	229	Yes	Yes	Yes	0 011 (lb/Mgal) [3]	9 8E-04 [a]	5 9E-03 [a]	4 9E-05 [b]	9 8E-04 [a]	5 9E-03 [a]	4 9E-05 [b]	2 0E-03	0 012	9 8E-05
Formaldehyde	50-00-0	250	Yes	Yes	Yes	1 73 (lb/Mgal) [3]	0 16 [a]	0 93 [a]	7 8E-03 [b]	0 16 [a]	0 93 [a]	7 8E-03 [b]	0 31	1 87	0 016
Hexane	110-54-3	289	Yes	Yes	Yes	0 027 (lb/Mgal) [3]	2 4E-03 [a]	0 015 [a]	1 2E-04 [b]	2 4E-03 [a]	0 015 [a]	1 2E-04 [b]	4 8E-03	0 029	2 4E-04
Hydrochloric acid	7647-01-0	292	Yes	Yes	Yes	0 19 (lb/Mgal) [3]	0 017 [a]	0 10 [a]	8 4E-04 [b]	0 017 [a]	0 10 [a]	8 4E-04 [b]	0 034	0 20	1 7E-03
Toluene	108-88-3	600	Yes	Yes	Yes	0 11 (lb/Mgal) [3]	9 5E-03 [a]	0 057 [a]	4 7E-04 [b]	9 5E-03 [a]	0 057 [a]	4 7E-04 [b]	0 019	0 11	9 5E-04
Xylene (mixture)	1330-20-7	628	Yes	Yes	Yes	0 042 (lb/Mgal) [3]	3 8E-03 [a]	0 023 [a]	1 9E-04 [b]	3 8E-03 [a]	0 023 [a]	1 9E-04 [b]	7 6E-03	0 046	3 8E-04
POLYCYCLIC AROMATIC HYDROCARBONS (PAH)															
PAHs (excluding Naphthalene)	PAHs	401	Yes	Yes	Yes	0 036 (lb/Mgal) [3]	3 3E-03 [a]	0 020 [a]	1 6E-04 [b]	3 3E-03 [a]	0 020 [a]	1 6E-04 [b]	6 5E-03	0 039	3 3E-04
Benzo(a)pyrene	50-32-8	406	Yes	Yes	Yes	3 5E-08 (lb/Mgal) [4]	3 2E-09 [a]	1 9E-08 [a]	1 6E-10 [b]	3 2E-09 [a]	1 9E-08 [a]	1 6E-10 [b]	6 4E-09	3 8E-08	3 2E-10
Naphthalene	91-20-3	428	Yes	Yes	Yes	0 020 (lb/Mgal) [3]	1 8E-03 [a]	0 011 [a]	8 9E-05 [b]	1 8E-03 [a]	0 011 [a]	8 9E-05 [b]	3 5E-03	0 021	1 8E-04
METALS															
Arsenic	7440-38-2	37	Yes	Yes	Yes	1 6E-03 (lb/Mgal) [3]	1 4E-04 [a]	8 6E-04 [a]	7 2E-06 [b]	1 4E-04 [a]	8 6E-04 [a]	7 2E-06 [b]	2 9E-04	1 7E-03	1 4E-05
Cadmium	7440-43-9	83	Yes	Yes	Yes	1 5E-03 (lb/Mgal) [3]	1 4E-04 [a]	8 1E-04 [a]	6 8E-06 [b]	1 4E-04 [a]	8 1E-04 [a]	6 8E-06 [b]	2 7E-04	1 6E-03	1 4E-05
Chromium VI	18540-29-9	136	Yes	Yes	Yes	1 0E-04 (lb/Mgal) [3]	9 0E-06 [a]	5 4E-05 [a]	4 5E-07 [b]	9 0E-06 [a]	5 4E-05 [a]	4 5E-07 [b]	1 8E-05	1 1E-04	9 0E-07
Copper	7440-50-8	149	No	Yes	Yes	4 1E-03 (lb/Mgal) [3]	3 7E-04 [a]	2 2E-03 [a]	1 8E-05 [b]	3 7E-04 [a]	2 2E-03 [a]	1 8E-05 [b]	7 4E-04	4 4E-03	3 7E-05
Lead	7439-92-1	305	Yes	Yes	Yes	8 3E-03 (lb/Mgal) [3]	7 5E-04 [a]	4 5E-03 [a]	3 7E-05 [b]	7 5E-04 [a]	4 5E-03 [a]	3 7E-05 [b]	1 5E-03	9 0E-03	7 5E-05
Manganese	7439-96-5	312	Yes	Yes	Yes	3 1E-03 (lb/Mgal) [3]	2 8E-04 [a]	1 7E-03 [a]	1 4E-05 [b]	2 8E-04 [a]	1 7E-03 [a]	1 4E-05 [b]	5 6E-04	3 4E-03	2 8E-05
Mercury	7439-97-6	316	Yes	Yes	Yes	2 0E-03 (lb/Mgal) [3]	1 8E-04 [a]	1 1E-03 [a]	9 0E-06 [b]	1 8E-04 [a]	1 1E-03 [a]	9 0E-06 [b]	3 6E-04	2 2E-03	1 8E-05
Nickel	7440-02-0	364	Yes	Yes	Yes	3 9E-03 (lb/Mgal) [3]	3 5E-04 [a]	2 1E-03 [a]	1 8E-05 [b]	3 5E-04 [a]	2 1E-03 [a]	1 8E-05 [b]	7 0E-04	4 2E-03	3 5E-05
Selenium	7782-49-2	575	Yes	Yes	Yes	2 2E-03 (lb/Mgal) [3]	2 0E-04 [a]	1 2E-03 [a]	9 9E-06 [b]	2 0E-04 [a]	1 2E-03 [a]	9 9E-06 [b]	4 0E-04	2 4E-03	2 0E-05
DIESEL PARTICULATE MATTER (DPM)															
Total DPM	DPM	200	No	Yes	Yes	--	0 81	4 42	0 037	0 81	4 42	0 037	1 61	8 84	0 074
DPM From Normal Operation	--	--	--	--	--	*0.22 (g/kW-hr)* [5]	*0.72* [c]	*4.34* [d]	*0.036* [e]	*0.72* [c]	*4.34* [d]	*0.036* [e]	*1.45*	*8.68*	*0.072*
DPM From Cold Start	--	--	--	--	--	*1.50 (g/kW-hr)* [6]	*0.082* [f]	*0.082* [g]	*8.2E-04* [h]	*0.082* [f]	*0.082* [g]	*8.2E-04* [h]	*0.16*	*0.16*	*1.6E-03*
Total TAC Emission Estimates							**1.24**	**7.02**	**0.059**	**1.24**	**7.02**	**0.059**	**2.48**	**14.0**	**0.12**
Total HAP Emission Estimates							**0.31**	**1.84**	**0.015**	**0.31**	**1.84**	**0.015**	**0.61**	**3.67**	**0.031**
Total RBC Emission Estimates							**1.24**	**7.02**	**0.059**	**1.24**	**7.02**	**0.059**	**2.48**	**14.0**	**0.12**
Total Non-RBC Emission Estimates							--	--	--	--	--	--	--	--	--

Color Key
MFA-Specific CAS number

NOTES:

g/kW-hr = gram per kilowatt-hour

HAP = hazardous air pollutant

Mgal = thousand gallons

MMBtu/gal = million British thermal units per gal

RBC = risk-based concentration

TAC = toxic air contaminant

(a) Hourly or daily emissions estimate (lb/hr or lb/day) = (emission factor [lb/Mgal]) x (hourly or daily fuel usage [gal/hr or gal/day]) x (Mgal/1 000 gal)

(b) Annual emissions estimate (tons/yr) = (emission factor [lb/Mgal]) x (annual fuel usage [gal/yr]) x (Mgal/1 000 gal) x (ton/2 000 lb)

(c) Hourly emissions estimate (lb/hr) = (emission factor [g/kW-hr]) x (engine size [kW]) x (lb/453 592 g)

(d) Daily emissions estimate (lb/day) = (emission factor [g/kW-hr]) x (engine size [kW]) x (daily hours of operation [hrs/day]) x (lb/453 592 g)

(e) Annual emissions estimate (tons/yr) = (emission factor [g/kW-hr]) x (engine size [kW]) x (annual hours of operation [hrs/yr]) x (lb/453 592 g) x (ton/2 000 lb)

(f) Hourly emissions estimate (lb/hr) = (emission factor [g/kW-hr]) x (engine size [kW]) x (cold start duration [min/cold start]) x (hr/60 min) x (lb/453 592 g)

Cold start duration (min/cold start) = 1 00 (7)

(g) Daily emissions estimate (lb/day) = (emission factor [g/kW-hr]) x (engine size [kW]) x (cold start duration [min/cold start]) x (hr/60 min) x (daily number of cold starts [cold starts/day]) x (lb/453 592 g)

Cold start duration (min/cold start) = 1 00 (7)

Daily number of cold starts (cold starts/day) = 1 00 (7)

(h) Annual emissions estimate (tons/yr) = (emission factor [g/kW-hr]) x (engine size [kW]) x (cold start duration [min/cold start]) x (hr/60 min) x (annual number of cold starts [cold starts/yr]) x (lb/453 592 g) x (ton/2 000 lb)

Cold start duration (min/cold start) = 1 00 (7)

Annual number of cold starts (cold starts/yr) = 20 0 (7)

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters

(2) See Table 3 Miscellaneous—Input Assumptions and Parameters

(3) Reporting Procedures for AB2588 Facilities for Reporting their Quadrennial Air Toxics Emissions Inventory published by the South Coast Air Quality Management District (SCAQMD) in December 2016
See Appendix B Table B-2 Default EF for Diesel/Distillate Oil Fuel Combustion (lb/1000 gal) for stationary and portable internal combustion engines (ICE) Assumes SCR control

(4) AP-42 Chapter 3 4 (October 1996) Table 3 4-4 PAH Emission Factors for Large Uncontrolled Stationary Diesel Engines Converted assuming 0 138 MMBtu/gal per 40 CFR Part 98 Table C-1

(5) USEPA Nonroad Compression-Ignition Engines: Exhaust Emission Standards EPA-420-B-16-022) dated March 2016 Assumes Tier 4 emission factor PM+NMHC is representative of DPM

(6) USEPA Nonroad Compression-Ignition Engines: Exhaust Emission Standards EPA-420-B-16-022) dated March 2016 Assumes Tier 2 PM emission factor plus Tier 1 emission factor for NMHC is representative of DPM during uncontrolled cold start period

(7) Air Quality Implications of Backup Generators in California PIER Final Project Report prepared by the California Energy Commission dated July 2005 See section 3 4 Conservatively assumes each cold start lasts for up to one minute Assumes only one cold start per day and up to 20 cold starts per year

Table 39
Filter Aid Dry Material Handling (Silo) Particulate Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Filter Aid (FA) Dry Material Handling	
		Train nos. 1-2	Train no. 3
		Railcar Unloading to FA Silos	Railcar Unloading to FA Silos
Pretreatment Train Vent ID		*1FASV1, 2FASV1*	*3FASV1, 3FASV2, 3FASV3*
Hourly Throughput (lb/hr)	(1)	23,529	23,529
Daily Throughput (lb/day)	(1)	200,000	200,000
Annual Throughput (tons/yr)	(1)	3,061	6,122
PM Control Efficiency (%)	(2)	99.9	99.9

Pollutant	Emission Factor (lb/ton)		Emission Estimates								
			Train nos. 1-2			Train no. 3			Total		
			Railcar Unloading to FA Silos			Railcar Unloading to FA Silos					
			Hourly [(a)] (lb/hr)	Daily [(a)] (lb/day)	Annual [(b)] (tons/yr)	Hourly [(a)] (lb/hr)	Daily [(a)] (lb/day)	Annual [(b)] (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
PM	0.73	(3)	8.6E-03	0.073	1.1E-03	8.6E-03	0.073	2.2E-03	**0.017**	**0.15**	**3.4E-03**
PM_{10}	0.47	(3)	5.5E-03	0.047	7.2E-04	5.5E-03	0.047	1.4E-03	**0.011**	**0.094**	**2.2E-03**
$PM_{2.5}$	0.47	(4)	5.5E-03	0.047	7.2E-04	5.5E-03	0.047	1.4E-03	**0.011**	**0.094**	**2.2E-03**

NOTES:

(a) Hourly or daily emissions estimate (lb/"unit") = (emission factor [lb/ton]) x (hourly or daily throughput [lb/"unit"]) x (ton/2,000 lb) x (1 - [control efficiency {%} / 100])

(b) Annual emissions estimate (tons/yr) = (emission factor [lb/ton]) x (annual throughput [tons/yr]) x (ton/2,000 lb) x (1 - [control efficiency {%} / 100])

REFERENCES:

(1) See Table 1, Input Assumptions and Parameters.

(2) See Table 3, Miscellaneous—Input Assumptions and Parameters.

(3) AP-42 Chapter 11.12 (June 2006) Table 11.12-2 "Emission Factors for Concrete Batching." Assumes the uncontrolled emission factors for cement unloading to elevated storage silos as representative of the proposed material transfer activities.

(4) Assumes 100% of PM_{10} is equal to $PM_{2.5}$.

Table 40
Filter Aid Dry Material Handling (Day Tank) Particulate Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Filter Aid (FA) Dry Material Handling		
		Train nos. 1-2	Train no. 3	Train no. 3
		FA Silo to Absorption FA Day Tank	FA Silo to Absorption FA Day Tank	FA Silo to PE Removal FA Day Tanks
Pretreatment Train Vent ID		*1FADT, 2FADT*	*3FADT1*	*3FADT2, 3FADT3*
Hourly Throughput (lb/hr)	(1)	713	602	823
Daily Throughput (lb/day)	(1)	17,100	14,450	19,751
Annual Throughput (tons/yr)	(1)	3,061	2,586	3,535
PM Control Efficiency (%)	(2)	99.9	99.9	99.9

Pollutant	Emission Factor (lb/ton)		Emission Estimates											
			Train nos. 1-2			Train no. 3			Train no. 3			Total		
			FA Silo to Absorption FA Day Tank			FA Silo to Absorption FA Day Tank			FA Silo to PE Removal FA Day Tanks					
			Hourly (a) (lb/hr)	Daily (a) (lb/day)	Annual (b) (tons/yr)	Hourly (a) (lb/hr)	Daily (a) (lb/day)	Annual (b) (tons/yr)	Hourly (a) (lb/hr)	Daily (a) (lb/day)	Annual (b) (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
PM	0.73	(3)	2.6E-04	6.2E-03	1.1E-03	2.2E-04	5.3E-03	9.4E-04	3.0E-04	7.2E-03	1.3E-03	**7.8E-04**	**0.019**	**3.4E-03**
PM_{10}	0.47	(3)	1.7E-04	4.0E-03	7.2E-04	1.4E-04	3.4E-03	6.1E-04	1.9E-04	4.6E-03	8.3E-04	**5.0E-04**	**0.012**	**2.2E-03**
$PM_{2.5}$	0.47	(4)	1.7E-04	4.0E-03	7.2E-04	1.4E-04	3.4E-03	6.1E-04	1.9E-04	4.6E-03	8.3E-04	**5.0E-04**	**0.012**	**2.2E-03**

NOTES:

(a) Hourly or daily emissions estimate (lb/"unit") = (emission factor [lb/ton]) x (hourly or daily throughput [lb/"unit"]) x (ton/2 000 lb) x (1 - [control efficiency {%} / 100])

(b) Annual emissions estimate (tons/yr) = (emission factor [lb/ton]) x (annual throughput [tons/yr]) x (ton/2 000 lb) x (1 - [control efficiency {%} / 100])

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters.

(2) See Table 3 Miscellaneous—Input Assumptions and Parameters.

(3) AP-42 Chapter 11.12 (June 2006) Table 11.12-2 "Emission Factors for Concrete Batching." Assumes the uncontrolled emission factors for cement unloading to elevated storage silos as representative of the proposed material transfer activities.

(4) Assumes 100% of PM_{10} is equal to $PM_{2.5}$.

Table 41
Filter Aid Dry Material Handling (Hopper) Particulate Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Filter Aid (FA) Dry Material Handling		
		Train nos. 1-2	Train no. 3	Train no. 3
		FA Absorption Day Tank to Absorption Hopper	FA Absorption Day Tank to Absorption Hopper	PE Removal Day Tank to PE Removal Hopper
Pretreatment Train Vent ID		*1FADT, 2FADT*	*3FADT1*	*3FADT3*
Hourly Throughput (lb/hr)	(1)	713	356	246
Daily Throughput (lb/day)	(1)	17,100	8,550	5,900
Annual Throughput (tons/yr)	(1)	3,061	1,530	1,056
PM Control Efficiency (%)	(2)	99.9	99.9	99.9

Pollutant	Emission Factor (lb/ton)		Emission Estimates											
			Train nos. 1-2			Train no. 3			Train no. 3			Total		
			FA Absorption Day Tank to Absorption Hopper			FA Absorption Day Tank to Absorption Hopper			PE Removal Day Tank to PE Removal Hopper					
			Hourly (a) (lb/hr)	Daily (a) (lb/day)	Annual (b) (tons/yr)	Hourly (a) (lb/hr)	Daily (a) (lb/day)	Annual (b) (tons/yr)	Hourly (a) (lb/hr)	Daily (a) (lb/day)	Annual (b) (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
PM	0.73	(3)	2.6E-04	6.2E-03	1.1E-03	1.3E-04	3.1E-03	5.6E-04	9.0E-05	2.2E-03	3.9E-04	**4.8E-04**	**0.012**	**2.1E-03**
PM_{10}	0.47	(3)	1.7E-04	4.0E-03	7.2E-04	8.4E-05	2.0E-03	3.6E-04	5.8E-05	1.4E-03	2.5E-04	**3.1E-04**	**7.4E-03**	**1.3E-03**
$PM_{2.5}$	0.47	(4)	1.7E-04	4.0E-03	7.2E-04	8.4E-05	2.0E-03	3.6E-04	5.8E-05	1.4E-03	2.5E-04	**3.1E-04**	**7.4E-03**	**1.3E-03**

NOTES:

(a) Hourly or daily emissions estimate (lb/"unit") = (emission factor [lb/ton]) x (hourly or daily throughput [lb/"unit"]) x (ton/2 000 lb) x (1 - [control efficiency {%} / 100])

(b) Annual emissions estimate (tons/yr) = (emission factor [lb/ton]) x (annual throughput [tons/yr]) x (ton/2 000 lb) x (1 - [control efficiency {%} / 100])

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters.

(2) See Table 3 Miscellaneous—Input Assumptions and Parameters.

(3) AP-42 Chapter 11.12 (June 2006) Table 11.12-2 "Emission Factors for Concrete Batching." Assumes the uncontrolled emission factors for cement unloading to elevated storage silos as representative of the proposed material transfer activities.

(4) Assumes 100% of PM_{10} is equal to $PM_{2.5}$.

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Table 42
Bleaching Earth Dry Material Handling Particulate Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Bleaching Earth (BE) Dry Material Handling		
		Train nos. 1-3	Train nos. 1-3	Train nos. 1-3
		Railcar Unloading to BE Silos	BE Silo to Bleaching Day Tank (wet)	BE Silo to Bleaching Day Tank (dry)
Pretreatment Train Vent ID		*1BESV1-3, 2BESV1-3, 3BESV1-3*	*1BEDAY1, 2BEDAY1, 3BEDAY1*	*1BEDAY2, 2BEDAY2, 3BEDAY2*
Hourly Throughput (lb/hr)	(1)	24 691	5 353	5 353
Daily Throughput (lb/day)	(1)	400 000	128 475	128 475
Annual Throughput (tons/yr)	(1)	45 994	22 997	22 997
PM Control Efficiency (%)	(2)	99.9	99.9	99.9

Pollutant	Emission Factor (lb/ton)		Emission Estimates											
			Train nos. 1-3			Train nos. 1-3			Train nos. 1-3			Total		
			Railcar Unloading to BE Silos			BE Silo to Bleaching Day Tank (wet)			BE Silo to Bleaching Day Tank (dry)					
			Hourly [(a)] (lb/hr)	Daily [(a)] (lb/day)	Annual [(b)] (tons/yr)	Hourly [(a)] (lb/hr)	Daily [(a)] (lb/day)	Annual [(b)] (tons/yr)	Hourly [(a)] (lb/hr)	Daily [(a)] (lb/day)	Annual [(b)] (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
PM	0.73	(3)	9.0E-03	0.15	0.017	2.0E-03	0.047	8.4E-03	2.0E-03	0.047	8.4E-03	**0.013**	**0.24**	**0.034**
PM_{10}	0.47	(3)	5.8E-03	0.094	0.011	1.3E-03	0.030	5.4E-03	1.3E-03	0.030	5.4E-03	**8.3E-03**	**0.15**	**0.022**
$PM_{2.5}$	0.47	(4)	5.8E-03	0.094	0.011	1.3E-03	0.030	5.4E-03	1.3E-03	0.030	5.4E-03	**8.3E-03**	**0.15**	**0.022**

NOTES:

(a) Hourly or daily emissions estimate (lb/"unit") = (emission factor [lb/ton]) x (hourly or daily throughput [lb/"unit"]) x (ton/2 000 lb) x (1 - [control efficiency {%} / 100])

(b) Annual emissions estimate (tons/yr) = (emission factor [lb/ton]) x (annual throughput [tons/yr]) x (ton/2 000 lb) x (1 - [control efficiency {%} / 100])

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters.

(2) See Table 3 Miscellaneous—Input Assumptions and Parameters.

(3) AP-42 Chapter 11.12 (June 2006) Table 11.12-2 "Emission Factors for Concrete Batching." Assumes the uncontrolled emission factors for cement unloading to elevated storage silos as representative of the proposed material transfer activities.

(4) Assumes 100% of PM_{10} is equal to $PM_{2.5}$.

Table 43
Boiler nos. 1-2 (Natural Gas-Fired) Criteria Pollutant and GHG Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Boiler nos. 1-2 (Natural Gas-Fired)
Hourly Natural Gas Usage (MMcf/hr)	[1]	0.14
Daily Natural Gas Usage (MMcf/day)	[1]	3.42
Annual Natural Gas Usage (MMcf/yr)	[1]	1 224
SCR Controlled? (Yes/No)	[2]	Yes
EXHAUST PARAMETERS		
Exhaust Flowrate (acfm)	[2]	40 208
Exhaust Temperature (°F)	[2]	284
Exhaust Pressure (psia)	[4]	14 7
Exhaust Moisture Content (%)	[2]	18.04
Exhaust Flowrate (dscfm)	[a]	23 476
GENERAL		
Density of Air (lb/ft^3 [at 70°F and 14 7 psi])		0 07487
Molecular Weight of Dry Air (lb/lb-mol)		28.9647
Molecular Weight of NO_X (lb/lb-mol)		46 0055
Molecular Weight of CO (lb/lb-mol)		28.01

Pollutant	Emission Factor		SCR Outlet Concentration (ppm_{vd})	Emission Estimates		
	(lb/MMBtu)	(lb/MMcf)		Hourly (lb/hr)	Daily [a] (lb/day)	Annual (tons/yr)
PM	5.5E-03 [3]	5.98 [b]	--	0.85 [c]	20 5 [c]	3 66 [d]
PM_{10}	5.5E-03 [5]	5.98 [b]	--	0.85 [c]	20 5 [c]	3 66 [d]
$PM_{2.5}$	5.5E-03 [5]	5.98 [b]	--	0.85 [c]	20 5 [c]	3 66 [d]
NO_X	--	--	5 [7]	0.84 [e]	20.1 [f]	3 60 [g]
CO	--	--	20 [7]	2.04 [e]	49 0 [f]	8 76 [g]
VOC	--	5.50 [6]	--	0.78 [c]	18 8 [c]	3 37 [d]
SO_2	--	0.60 [6]	--	0 085 [c]	2 05 [c]	0 37 [d]
CO_2	--	120 000 [6]	--	17 096 [c]	410 294 [c]	73 443 [d]
CH_4	2.2E-03 [9]	2.40 [b]	--	0.34 [c]	8 20 [c]	1.47 [d]
N_2O	2.2E-04 [9]	0.24 [b]	--	0 034 [c]	0 82 [c]	0.147 [d]
CO_2e	--	120 131 [h]	--	17 114 [c]	410 744 [c]	73 523 [d]

NOTES:

lb/lb-mol = pound per pound-mole

MMBtu = million British thermal units

MMcf = million cubic feet

ppm_{vd} = parts per million by volume dry-basis

SCR = selective catalytic reduction

(a) Exhaust flowrate (dscfm) = (exhaust flowrate [acfm]) x (460 + 70°F) / (460 + [exhaust temperature {°F}]) x (exhaust pressure [psia]) / (14 696 psi) x (1 - [exhaust moisture content {%} / 100])

(b) Emission factor (lb/MMcf) = (emission factor [lb/MMBtu]) x (natural gas high heat content [Btu/scf])

Natural gas high heat content (Btu/scf) = 1 088 (8)

(c) Hourly or daily emissions estimate (lb/hr or lb/day) = (emission factor [lb/MMcf]) x (hourly or daily natural gas usage [MMcf/hr or MMcf/day])

(d) Annual emissions estimate (tons/yr) = (emission factor [lb/MMcf]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

(e) Hourly emissions estimate (lb/hr) = (outlet concentration [ppm_{vd}] / 10^6) x (density of air [lb/ft^3]) x (exhaust flowrate [dscfm]) x (60 min/hr) / (molecular weight of dry air [lb/lb-mol]) x (molecular weight of NO_X or CO [lb/lb-mol])

(f) Daily emissions estimate lb/day) = (outlet concentration [ppm_{vd}] / 10^6) x (density of air [lb/ft^3]) x (exhaust flowrate [dscfm]) x (60 min/hr) x (daily natural gas usage [MMcf/day]) / (hourly natural gas usage [MMcf/hr]) / (molecular weight of dry air [lb/lb-mol]) x (molecular weight of NO_X of CO [lb/lb-mol])

(g) Annual emissions estimate (tons/yr) = (outlet concentration [ppm_{vd}] / 10^6) x (density of air [lb/ft^3]) x (exhaust flowrate [dscfm]) x (60 min/hr) x (ton/2 000 lb) x (annual natural gas usage [MMcf/yr]) / hourly natural gas usage [MMcf/hr]) / (molecular weight of dry air [lb/lb-mol]) x (molecular weight of NO_X or CO [lb/lb-mol])

(h) CO_2e emission factor (lb/MMcf) = (CO_2 emission factor [lb/MMcf]) + ([CH_4 emission factor {lb/MMcf}] x [CH_4 global warming potential]) + ([N_2O emission factor {lb/MMcf}] x [N_2O global warming potential])

CH_4 global warming potential = 25 0 (10)

N_2O global warming potential = 298 (10)

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters

(2) See Victory Energy 50 000 PPH Voyager Series Package Boiler proposal dated May 12 2021 Flowrate doubled to account for combined flow from boiler nos 1 and 2

(3) Assumes that 100% of PM is $PM_{2.5}$

(4) Assumes boiler exhaust will contain negligible water content and be at approximately ambient pressure

(5) PM_{10} and $PM_{2.5}$ emission factor represents vendor guarantee

(6) AP-42 Chapter 1 4 (July 1998) Table 1 4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion

(7) See Victory Energy 50 000 PPH Voyager Series Package Boiler proposal dated May 12 2021 See section 4 0 Outlet concentration limits corrected to 3% oxygen content

(8) See Table 3 Miscellaneous—Input Assumptions and Parameters

(9) 40 CFR Part 98 Subpart C Table C-2 CH_4 and N_2O Emission Factors for Various Types of Fuel Value converted from kg by multiplying by 2 205 lb

(10) 40 CFR Part 98 Subpart A Table A-1 Global Warming Potentials

Table 44
Feed Heaters Criteria Pollutant and GHG Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Ecofining Units—Feed Heaters		
		Train no. 1	Train no. 2	Train no. 3
Hourly Natural Gas Usage (MMcf/hr)	[1]	0.032	0.032	0 032
Daily Natural Gas Usage (MMcf/day)	[1]	0.78	0 78	0.78
Annual Natural Gas Usage (MMcf/yr)	[1]	278	278	278
SCR Control Technology? (Yes/No)	[2]	Yes	Yes	Yes
EXHAUST PARAMETERS				
Exhaust Flowrate (acfm)	[2]	8 841	8 841	8 841
Exhaust Temperature (°F)	[2]	350	350	350
Exhaust Pressure (psia)	[3]	14.7	14 7	14.7
Exhaust Moisture Content (%)	[3]	0	0	0
Exhaust Flowrate (dscfm)	[a]	5 785	5 785	5 785
GENERAL				
Density of Air (lb/ft^3 [at 70°F and 14 7 psi])		0 07487		
Molecular Weight of Dry Air (lb/lb-mol)		28.9647		
Molecular Weight of NO_X (lb/lb-mol)		46.0055		
Molecular Weight of CO (lb/lb-mol)		28.01		

Pollutant	Emission Factor		SCR Outlet Concentration (ppm)	Ecofining Units—Feed Heaters Emission Estimates											
				Train no. 1			Train no. 2			Train no. 3			Total		
	(lb/MMBtu)	(lb/MMcf)		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
PM	--	7.60 [4]	--	0 25 [b]	5.90 [b]	1 06 [c]	0.25 [b]	5.90 [b]	1.06 [c]	0.25 [b]	5.90 [b]	1.06 [c]	**0.74**	**17.7**	**3.17**
PM_{10}	--	7.60 [5]	--	0 25 [b]	5.90 [b]	1 06 [c]	0.25 [b]	5.90 [b]	1.06 [c]	0.25 [b]	5.90 [b]	1.06 [c]	**0.74**	**17.7**	**3.17**
$PM_{2.5}$	--	7.60 [5]	--	0 25 [b]	5.90 [b]	1 06 [c]	0.25 [b]	5.90 [b]	1.06 [c]	0.25 [b]	5.90 [b]	1.06 [c]	**0.74**	**17.7**	**3.17**
NO_X	--	--	5 [6]	0 21 [d]	4.95 [e]	0 89 [f]	0.21 [d]	4.95 [e]	0.89 [f]	0.21 [d]	4.95 [e]	0.89 [f]	**0.62**	**14.9**	**2.66**
CO	--	--	20 [6]	0 50 [d]	12.1 [e]	2.16 [f]	0.50 [d]	12.1 [e]	2.16 [f]	0.50 [d]	12.1 [e]	2.16 [f]	**1.51**	**36.2**	**6.48**
VOC	--	5.50 [4]	--	0.18 [b]	4.27 [b]	0 76 [c]	0.18 [b]	4 27 [b]	0.76 [c]	0.18 [b]	4.27 [b]	0.76 [c]	**0.53**	**12.8**	**2.29**
SO_2	--	0.60 [4]	--	0.019 [b]	0.47 [b]	0.083 [c]	0 019 [b]	0.47 [b]	0 083 [c]	0.019 [b]	0.47 [b]	0.083 [c]	**0.058**	**1.40**	**0.25**
CO_2	--	120 000 [4]	--	3 882 [b]	93 176 [b]	16 679 [c]	3 882 [b]	93 176 [b]	16 679 [c]	3 882 [b]	93 176 [b]	16 679 [c]	**11,647**	**279,529**	**50,036**
CH_4	2.2E-03 [8]	2.40 [g]	--	0.078 [b]	1.86 [b]	0 33 [c]	0 078 [b]	1 86 [b]	0.33 [c]	0.078 [b]	1.86 [b]	0.33 [c]	**0.23**	**5.59**	**1.00**
N_2O	2.2E-04 [8]	0.24 [g]	--	7 8E-03 [b]	0.19 [b]	0.033 [c]	7.8E-03 [b]	0.19 [b]	0 033 [c]	7 8E-03 [b]	0.19 [b]	0.033 [c]	**0.023**	**0.56**	**0.10**
CO_2e	--	120 131 [h]	--	3 887 [b]	93 279 [b]	16 697 [c]	3 887 [b]	93 279 [b]	16 697 [c]	3 887 [b]	93 279 [b]	16 697 [c]	**11,660**	**279,836**	**50,091**

NOTES:

acfm = actual cubic feet per minute

dscfm = dry standard cubic feet per minute

lb/lb-mol = pound per pound-mole

MMBtu = million British thermal units

MMcf = million cubic feet

ppm = parts per million

psia = pounds per square inch absolute

SCR = selective catalytic reduction

(a) Exhaust flowrate (dscfm) = (exhaust flowrate [acfm]) x (460 + 70°F) / (460 + [exhaust temperature {°F}]) x (exhaust pressure [psia]) / (14 696 psi) x (1 - [exhaust moisture content {%} / 100])

(b) Hourly or daily emissions estimate lb/hr or lb/day) = (emission factor [lb/MMcf]) x (hourly or daily natural gas fuel usage [MMcf/hr or MMcf/day])

(c) Annual emissions estimate (tons/yr) = (emission factor [lb/MMcf]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

(d) Hourly emissions estimate (lb/hr) = (outlet concentration [ppm_{vd}] / 10^6) x (density of air [lb/ft^3]) x (exhaust flowrate [dscfm]) x (60 min/hr) / (molecular weight of dry air [lb/lb-mol]) x (molecular weight of NO_X and CO [lb/lb-mol])

(e) Daily emissions estimate (lb/day) = (outlet concentration [ppm_{vd}] / 10^6) x (density of air [lb/ft^3]) x (exhaust flowrate [dscfm]) x (60 min/hr) x (daily natural gas usage [MMcf/day]) / (hourly natural gas usage [MMcf/hr]) / (molecular weight of dry air [lb/lb-mol]) x (molecular weight of NO_X and CO [lb/lb-mol])

(f) Annual emissions estimate (tons/yr) = (outlet concentration [ppm_{vd}] / 10^6) x (density of air [lb/ft^3]) x (exhaust flowrate [dscfm]) x (60 min/hr) x (annual natural gas usage [MMcf/yr]) / hourly natural gas usage [MMcf/hr]) / (molecular weight of dry air [lb/lb-mol]) x (molecular weight of NO_X and CO [lb/lb-mol]) x (ton/2 000 lb)

(g) Emission factor (lb/MMcf) = (emission factor [lb/MMBtu]) x (natural gas high heat content [Btu/scf])

Natural gas high heat content (Btu/scf) = 1 088 (7)

(h) CO_2e emission factor (lb/MMcf) = (CO_2 emission factor [lb/MMcf]) + ([CH_4 emission factor {lb/MMcf}] x [CH_4 global warming potential]) + ([N_2O emission factor {lb/MMcf}] x [N_2O global warming potential])

CH_4 global warming potential = 25 0 (9)

N_2O global warming potential = 298 (9)

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters

(2) Information provided by NEXT Renewable Fuels Oregon LLC

(3) Assumes boiler exhaust will contain negligible water content and be at approximately ambient pressure

(4) AP-42 Chapter 1 4 (July 1998) Table 1 4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion

(5) Assumes that 100% of PM is $PM_{2.5}$

(6) See Victory Energy 50 000 PPH Voyager Series Package Boiler proposal dated May 12 2021 See section 4 0 Outlet concentration limits corrected to 3% oxygen content

(7) See Table 3 Miscellaneous—Input Assumptions and Parameters

(8) 40 CFR Part 98 Subpart C Table C-2 CH_4 and N_2O Emission Factors for Various Types of Fuel Value converted from kg by multiplying by 2 205 lb

(9) 40 CFR Part 98 Subpart A Table A-1 Global Warming Potentials

Table 45
Isomerization Unit Heaters Criteria Pollutant and GHG Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Ecofining Units—Isomerization Heaters		
		Train no. 1	Train no. 2	Train no. 3
Hourly Natural Gas Usage (MMcf/hr)	(1)	4.9E-03	4.9E-03	4.9E-03
Daily Natural Gas Usage (MMcf/day)	(1)	0.12	0.12	0.12
Annual Natural Gas Usage (MMcf/yr)	(1)	42.1	42.1	42.1
SCR Control Technology? (Yes/No)	(2)	Yes	Yes	Yes
EXHAUST PARAMETERS				
Exhaust Flowrate (acfm)	(2)	1 348	1 348	1 348
Exhaust Temperature (°F)	(2)	350	350	350
Exhaust Pressure (psia)	(3)	14.7	14 7	14.7
Exhaust Moisture Content (%)	(3)	0	0	0
Exhaust Flowrate (dscfm)	(a)	882	882	882
GENERAL				
Density of Air (lb/ft^3 [at 70°F and 14 7 psi])		0 07487		
Molecular Weight of Dry Air (lb/lb-mol)		28.9647		
Molecular Weight of NO_X (lb/lb-mol)		46.0055		
Molecular Weight of CO (lb/lb-mol)		28.01		

Pollutant	Emission Factor		SCR Outlet Concentration (ppm)	Ecofining Units—Isomerization Heaters Emission Estimates											
				Train no. 1			Train no. 2			Train no. 3			Total		
	(lb/MMBtu)	(lb/MMcf)		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
PM	--	7.60 (4)	--	0.037 (b)	0.89 (b)	0.16 (c)	0 037 (b)	0 89 (b)	0.16 (c)	0.037 (b)	0.89 (b)	0.16 (c)	**0.11**	**2.68**	**0.48**
PM_{10}	--	7.60 (5)	--	0.037 (b)	0.89 (b)	0.16 (c)	0 037 (b)	0 89 (b)	0.16 (c)	0.037 (b)	0.89 (b)	0.16 (c)	**0.11**	**2.68**	**0.48**
$PM_{2.5}$	--	7.60 (5)	--	0.037 (b)	0.89 (b)	0.16 (c)	0 037 (b)	0 89 (b)	0.16 (c)	0.037 (b)	0.89 (b)	0.16 (c)	**0.11**	**2.68**	**0.48**
NO_X	--	--	5 (6)	0.031 (d)	0.76 (e)	0.14 (f)	0 031 (d)	0 76 (e)	0.14 (f)	0.031 (d)	0.76 (e)	0.14 (f)	**0.094**	**2.27**	**0.41**
CO	--	--	20 (6)	0.077 (d)	1.84 (e)	0 33 (f)	0 077 (d)	1 84 (e)	0.33 (f)	0.077 (d)	1.84 (e)	0.33 (f)	**0.23**	**5.52**	**0.99**
VOC	--	5.50 (4)	--	0.027 (b)	0.65 (b)	0.12 (c)	0 027 (b)	0 65 (b)	0.12 (c)	0.027 (b)	0.65 (b)	0.12 (c)	**0.081**	**1.94**	**0.35**
SO_2	--	0.60 (4)	--	2.9E-03 (b)	0 071 (b)	0.013 (c)	2.9E-03 (b)	0.071 (b)	0 013 (c)	2.9E-03 (b)	0 071 (b)	0.013 (c)	**8.8E-03**	**0.21**	**0.038**
CO_2	--	120 000 (4)	--	588 (b)	14 118 (b)	2 527 (c)	588 (b)	14 118 (b)	2 527 (c)	588 (b)	14 118 (b)	2 527 (c)	**1,765**	**42,353**	**7,581**
CH_4	2.2E-03 (8)	2.40 (g)	--	0.012 (b)	0.28 (b)	0.051 (c)	0 012 (b)	0 28 (b)	0 051 (c)	0.012 (b)	0.28 (b)	0.051 (c)	**0.035**	**0.85**	**0.15**
N_2O	2.2E-04 (8)	0.24 (g)	--	1 2E-03 (b)	0 028 (b)	5.1E-03 (c)	1.2E-03 (b)	0.028 (b)	5.1E-03 (c)	1 2E-03 (b)	0 028 (b)	5.1E-03 (c)	**3.5E-03**	**0.085**	**0.015**
CO_2e	--	120 131 (h)	--	589 (b)	14 133 (b)	2 530 (c)	589 (b)	14 133 (b)	2 530 (c)	589 (b)	14 133 (b)	2 530 (c)	**1,767**	**42,399**	**7,589**

NOTES:

lb/lb-mol = pound per pound-mole

MMBtu = million British thermal units

MMcf = million cubic feet

ppm = parts per million

SCR = selective catalytic reduction

(a) Exhaust flowrate (dscfm) = (exhaust flowrate [acfm]) x (460 + 70°F) / (460 + [exhaust temperature (°F)]) x (exhaust pressure [psia]) / (14 696 psi) x (1 - [exhaust moisture content (%) / 100])

(b) Hourly or daily emissions estimate lb/hr or lb/day) = (emission factor [lb/MMcf]) x (hourly or daily natural gas fuel usage [MMcf/hr or MMcf/day])

(c) Annual emissions estimate (tons/yr) = (emission factor [lb/MMcf]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

(d) Hourly emissions estimate (lb/hr) = (outlet concentration [ppm_{vd}] / 10^6) x (density of air [lb/ft^3]) x (exhaust flowrate [dscfm]) x (60 min/hr) / (molecular weight of dry air [lb/lb-mol]) x (molecular weight of NO_X or CO [lb/lb-mol])

(e) Daily emissions estimate (lb/day) = (outlet concentration [ppm_{vd}] / 10^6) x (density of air [lb/ft^3]) x (exhaust flowrate [dscfm]) x (60 min/hr) x (daily natural gas usage [MMcf/day]) / (hourly natural gas usage [MMcf/hr]) / (molecular weight of dry air [lb/lb-mol]) x (molecular weight of NO_X or CO [lb/lb-mol])

(f) Annual emissions estimate (tons/yr) = (outlet concentration [ppm] / 10^6) x (density of air [lb/ft^3]) x (exhaust flowrate [dscfm]) x (60 min/hr) x (annual natural gas usage [MMcf/yr]) '/ (hourly natural gas usage [MMcf/hr]) / (molecular weight of dry air [lb/lb-mol]) x (molecular weight of NO_X or CO [lb/lb-mol]) x (ton/2 000 lb)

(g) Emission factor (lb/MMcf) = (emission factor [lb/MMBtu]) x (natural gas high heat content [Btu/scf])

Natural gas high heat content (Btu/scf) = 1 088 (7)

(h) CO_2e emission factor (lb/MMcf) = (CO_2 emission factor [lb/MMcf]) + ([CH_4 emission factor {lb/MMcf}] x [CH_4 global warming potential]) + ([N_2O emission factor {lb/MMcf}] x [N_2O global warming potential])

CH_4 global warming potential = 25 0 (9)

N_2O global warming potential = 298 (9)

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters

(2) Information provided by NEXT Renewable Fuels Oregon LLC

(3) Assumes boiler exhaust will contain negligible water content and be at approximately ambient pressure

(4) AP-42 Chapter 1 4 (July 1998) Table 1 4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion

(5) Assumes that 100% of PM is $PM_{2.5}$

(6) See Victory Energy 50 000 PPH Voyager Series Package Boiler proposal dated May 12 2021 See section 4 0 Outlet concentration limits corrected to 3% oxygen content

(7) See Table 3 Miscellaneous—Input Assumptions and Parameters

(8) 40 CFR Part 98 Subpart C Table C-2 CH_4 and N_2O Emission Factors for Various Types of Fuel Value converted from kg by multiplying by 2 205 lb

(9) 40 CFR Part 98 Subpart A Table A-1 Global Warming Potentials

Table 46
Jet Fractionator Criteria Pollutant and GHG Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Jet Fractionator
Hourly Natural Gas Usage (MMcf/hr)	(1)	0.11
Daily Natural Gas Usage (MMcf/day)	(1)	2 76
Annual Natural Gas Usage (MMcf/yr)	(1)	987
SCR Controlled? (Yes/No)	(2)	Yes
EXHAUST PARAMETERS		
Exhaust Flowrate (acfm)	(2)	48 920
Exhaust Temperature (°F)	(2)	350
Exhaust Pressure (psia)	(3)	14 696
Exhaust Moisture Content (%)	(3)	0
Exhaust Flowrate (dscfm)	(a)	32 009
GENERAL		
Density of Air (lb/ft^3 [at 70°F and 14.7 psi])		0.07487
Molecular Weight of Dry Air (lb/lb-mol)		28.9647
Molecular Weight of NO_X (lb/lb-mol)		46.0055
Molecular Weight of CO (lb/lb-mol)		28.01

Pollutant	Emission Factor		SCR Outlet Concentration (ppm_{vd})	Emission Estimates		
	(lb/MMBtu)	(lb/MMcf)		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
PM	--	7.60 (4)	--	0 87 (b)	21 0 (b)	3.75 (c)
PM_{10}	--	7.60 (5)	--	0 87 (b)	21 0 (b)	3.75 (c)
$PM_{2.5}$	--	7.60 (5)	--	0 87 (b)	21 0 (b)	3.75 (c)
NO_X	--	--	5 (6)	1.14 (d)	27.4 (e)	4.91 (f)
CO	--	--	20 (7)	2 78 (d)	66 7 (e)	11.9 (f)
VOC	--	5.50 (4)	--	0 63 (b)	15 2 (b)	2.71 (c)
SO_2	--	0.60 (4)	--	0.069 (b)	1.65 (b)	0.30 (c)
CO_2	--	120 000 (4)	--	13 787 (b)	330 882 (b)	59 228 (c)
CH_4	2 2E-03 (9)	2.40 (g)	--	0 28 (b)	6.62 (b)	1.18 (c)
N_2O	2 2E-04 (9)	0.24 (g)	--	0.028 (b)	0.66 (b)	0.118 (c)
CO_2e	--	120 131 (h)	--	13 802 (b)	331 245 (b)	59 293 (c)

NOTES:

lb/lb-mol = pound per pound-mole

MMBtu = million British thermal units

MMcf = million cubic feet

ppm_{vd} = parts per million by volume dry-basis

(a) Exhaust flowrate (dscfm) = (exhaust flowrate [acfm]) x (460 + 70°F) / (460 + [exhaust temperature {°F}]) x (exhaust pressure [psia]) / (14 696 psi) x (1 - [exhaust moisture content {%} / 100])

(b) Hourly or daily emissions estimate (lb/hr or lb/day) = (emission factor [lb/MMcf]) x (hourly or daily natural gas usage [MMcf/hr or MMcf/day])

(c) Annual emissions estimate (tons/yr) = (emission factor [lb/MMcf]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

(d) Hourly emissions estimate (lb/hr) = (outlet concentration [ppm_{vd}] / 10^6) x (density of air [lb/ft^3]) x (exhaust flowrate [dscfm]) x (60 min/hr) / (molecular weight of dry air [lb/lb-mol]) x (molecular weight of NO_X or CO [lb/lb-mol])

(e) Daily emissions estimate (lb/day) = (outlet concentration [ppm_{vd}] / 10^6) x (density of air [lb/ft^3]) x (exhaust flowrate [dscfm]) x (60 min/hr) x (daily natural gas usage [MMcf/day]) / (hourly natural gas usage [MMcf/hr]) / (molecular weight of dry air [lb/lb-mol]) x (molecular weight of NO_X or CO [lb/lb-mol])

(f) Annual emissions estimate (tons/yr) = (outlet concentration [ppm] / 10^6) x (density of air [lb/ft^3]) x (exhaust flowrate [dscfm]) x (60 min/hr) x (ton/2 000 lb) x (annual natural gas usage [MMcf/yr]) / hourly natural gas usage [MMcf/hr]) / (molecular weight of dry air [lb/lb-mol]) x (molecular weight of NO_X or CO [lb/lb-mol])

(g) Emission factor (lb/MMcf) = (emission factor [lb/MMBtu]) x (natural gas high heat content [Btu/scf])

Natural gas high heat content Btu/scf) = 1 088 (8)

(h) CO_2e emission factor (lb/MMcf) = (CO_2 emission factor [lb/MMcf]) + ([CH_4 emission factor {lb/MMcf}] x [CH_4 global warming potential]) + ([N_2O emission factor {lb/MMcf}] x [N_2O global warming potential])

CH_4 global warming potential = 25 0 (10)

N_2O global warming potential = 298 (10)

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters

(2) Information provided by NEXT Renewable Fuels Oregon LLC

(3) Assumes boiler exhaust will contain negligible water content and be at approximately ambient pressure

(4) AP-42 Chapter 1 4 (July 1998) Table 1 4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion

(5) Assumes that 100% of PM is $PM_{2.5}$

(6) Application for Authority to Construct and Major Facility Review Permit prepared by Air Liquide in October 2005 See Engineering Evaluation Section 3 Best Available Control Technology dated March 13 2007 Assumes SCAQMD BACT emission factor representative of SCR control

(7) Assumes vendor guarantee outlet concentration per Cleaver Brooks Engineered Boiler Systems proposal no 2580015 dated February 21 2020 Outlet concentration has been corrected to 3 percent oxygen

(8) See Table 3 Miscellaneous—Input Assumptions and Parameters

(9) 40 CFR Part 98 Subpart C Table C-2 CH_4 and N_2O Emission Factors for Various Types of Fuel Value converted from kg by multiplying by 2 205 lb

(10) 40 CFR Part 98 Subpart A Table A-1 Global Warming Potentials

Table 47
Hydrogen Plant Heater Criteria Pollutant and GHG Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Hydrogen Plant Heater	
		Natural Gas-Fired Combustion	PSA Tail Gas Only
Hourly Fuel Usage (MMcf/hr)	(1)	0.11	2.60
Daily Fuel Usage (MMcf/day)	(1)	2.52	62.5
Annual Fuel Usage (MMcf/yr)	(1)	902	22 365
High Heat Content (Btu/scf)	(2)	1 088	225
SCR Controlled? (Yes/No)	(3)	Yes	Yes
Fuel Composition Correction Factor		[redacted]	
H_2 Molar Percent (%)			
CO Molar Percent (%)			
CO_2 Molar Percent (%)			
H_2O Molar Percent (%)			
N_2 Molar Percent (%)			
CH_4 Molar Percent (%)			
EXHAUST PARAMETERS			
Exhaust Flowrate (dscfm)	(3)	126 983	
GENERAL			
Density of Air (lb/ft³ [at 70°F and 14.7 psi])		0 07487	
Molecular Weight of Dry Air (lb/lb-mol)		28.9647	
Molecular Weight of NO_X (lb/lb-mol)		46 0055	
Molecular Weight of CO (lb/lb-mol)		28 01	
Molecular Weight of CO_2 (lb/lb-mol)		44 01	

Pollutant	Emission Factor		SCR Outlet Concentration (ppm)	Emission Estimates								
				Natural Gas-Fired Combustion			PSA Tail Gas Only			Total		
	(lb/MMBtu)	(lb/MMcf)		Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
PM	--	7.60 (5)	--	0.80 (c)	19 2 (c)	3.43 (d)	2.64 [redacted]	63 3 [redacted]	11.3 [redacted]	**3.43** (6)	**82.4** (6)	**14.8** (6)
PM_{10}	--	7.60 (7)	--	0.80 (c)	19 2 (c)	3.43 (d)	2.64 [redacted]	63 3 [redacted]	11.3 [redacted]	**3.43** (6)	**82.4** (6)	**14.8** (6)
$PM_{2.5}$	--	7.60 (7)	--	0.80 (c)	19 2 (c)	3.43 (d)	2.64 [redacted]	63 3 [redacted]	11.3 [redacted]	**3.43** (6)	**82.4** (6)	**14.8** (6)
NO_X	--	--	5.00 (8)	--	--	--	--	--	--	**4.53** (g)	**109** (h)	**19.5** (i)
CO	--	--	10.0 (8)	--	--	--	--	--	--	**5.52** (g)	**132** (h)	**23.7** (i)
VOC	--	5.50 (5)	--	0.58 (c)	13.9 (c)	2.48 (d)	1.91 [redacted]	45 8 [redacted]	8 20 [redacted]	**2.49** (6)	**59.7** (6)	**10.7** (6)
SO_2	--	0.60 (5)	--	0.06 (c)	1 51 (c)	0.27 (d)	0.21 [redacted]	5 00 [redacted]	0 89 [redacted]	**0.27** (6)	**6.51** (6)	**1.16** (6)
CO_2	--	120 000 (5)	--	12 600 (c)	302 400 (c)	54 130 (d)	197 161 [redacted]	4 731 856 [redacted]	847 002 [redacted]	**209,761** (6)	**5,034,256** (6)	**901,132** (6)
CH_4	2.2E-03 (9)	--	--	0.25 (k)	6 05 (k)	1.08 (l)	0.17 [redacted]	4.13 [redacted]	0 74 [redacted]	**0.42** (6)	**10.18** (6)	**1.82** (6)
N_2O	2.2E-04 (9)	--	--	0 025 (k)	0 60 (k)	0.11 (l)	0.13 (k)	3.10 (k)	0 55 (l)	**0.15** (6)	**3.70** (6)	**0.66** (6)
CO_2e	--	--	--	12 614 (o)	302 731 (o)	54 189 (p)	197 203 (o)	4 732 883 (o)	847 186 (p)	**209,817** (6)	**5,035,614** (6)	**901,375** (6)

NOTES:

dscfm = dry standard cubic feet per minute

lb/ft³ = pounds per cubic foot

lb/lb-mol = pound per pound-mole

MMBtu = million British thermal units

MMcf = million cubic feet

ppm = parts per million

psi = pounds per square inch

PSA = pressure-swing adsorption

SCR = selective catalytic reduction

[redacted]

(b) Exhaust flowrate (dscfm) = (exhaust flowrate [wscfm]) x (1 - [exhaust moisture content {%} / 100])

(c) Hourly or daily emissions estimate (lb/hr or lb/day) = (emission factor [lb/MMcf]) x (hourly or daily natural gas fuel usage [MMcf/hr or MMcf/day])

(d) Annual emissions estimate (tons/yr) = (emission factor [lb/MMcf]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

[redacted]

(g) Hourly emissions estimate lb/hr) = (outlet concentration [ppm_{vd}] / 10^6) x (density of air [lb/ft³]) x (exhaust flowrate [dscfm]) x (60 min/hr) / (molecular weight of dry air [lb/lb-mol]) x (molecular weight of NO_X or CO [lb/lb-mol])

h) Daily emissions estimate (lb/day) = (outlet concentration [ppm_{vd}] / 10^6) x (density of air [lb/ft³]) x (exhaust flowrate [dscfm]) x (60 min/hr) x (daily natural gas usage [MMcf/day]) / (hourly natural gas usage [MMcf/hr]) / (molecular weight of dry air [lb/lb-mol]) x (molecular weight of NO_X or CO [lb/lb-mol])

i) Annual emissions estimate (tons/yr) = (outlet concentration [ppm_{vd}] / 10^6) x (density of air [lb/ft³]) x (exhaust flowrate [dscfm]) x (60 min/hr) x (annual natural gas usage [MMcf/yr]) / hourly natural gas usage [MMcf/hr]) / (molecular weight of dry air [lb/lb-mol]) x (molecular weight of NO_X or CO [lb/lb-mol]) x (ton/2 000 lb)

[redacted]

(k) Hourly or daily emissions estimate (lb/ unit) = (emission factor [lb/MMBtu]) x (fuel high heat content [Btu/scf]) x (hourly or daily fuel usage [MMcf/ unit])

l) Annual emissions estimate (tons/yr) = (emission factor [lb/MMBtu]) x (fuel high heat content [Btu/scf]) x (annual fuel usage [MMcf/yr]) x (ton/2 000 lb)

(m) Hourly or daily emissions estimate (lb/ unit) = (emission factor [lb/MMBtu]) x (fuel high heat content [Btu/scf]) x (hourly or daily fuel usage [MMcf/ unit]) x (pollutant molar percent [%] / 100)

(n) Annual emissions estimate (tons/yr) = (emission factor [lb/MMBtu]) x (fuel high heat content [Btu/scf]) x (annual fuel usage [MMcf/yr]) x (pollutant molar percent [%] / 100) x (ton/2 000 lb)

(o) CO_2e emissions estimate (lb/ unit) = (CO_2 emissions estimate [lb/ unit]) + ([CH_4 emissions emission {lb/ unit }] x [CH_4 global warming potential]) + ([N_2O emissions estimate {lb/ unit }] x [N_2O global warming potential])

CH_4 global warming potential = 25 0 (11)

N_2O global warming potential = 298 (11)

(p) CO_2e emissions estimate (tons/yr) = (CO_2 emissions estimate [tons/yr]) + ([CH_4 emissions emission {tons/yr}] x [CH_4 global warming potential]) + ([N_2O emissions estimate {tons/yr}] x [N_2O global warming potential])

CH_4 global warming potential = 25 0 (11)

N_2O global warming potential = 298 (11)

[redacted]

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters

(2) See Table 3 Miscellaneous—Input Assumptions and Parameters

(3) Information provided by NEXT Renewable Fuels Oregon LLC

[redacted]

(5) AP-42 Chapter 1 4 (July 1998) Table 1 4-2 Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion

(6) Value represents the sum total of natural gas and PSA tail gas combustion emission estimates

(7) Assumes 100% of PM is $PM_{2.5}$

(8) Application for Authority to Construct and Major Facility Review Permit prepared by Air Liquide in October 2005 See Engineering Evaluation Section 3 Best Available Control Technology dated March 13 2007
Assumes SCAQMD BACT emission factor representative of SCR control

(9) 40 CFR Part 98 Subpart C Table C-2 Default CH_4 and N_2O Emission Factors for Various Types of Fuel Value converted from kg by multiplying by 2 205 lb

[redacted]

(11) 40 CFR Part 98 Subpart A Table A-1 Global Warming Potentials

[redacted]

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Table 48
Incinerator Criteria Pollutant and GHG Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Incinerator
Hourly Natural Gas or Waste Gas Usage (MMcf/hr)	[1]	0.017
Daily Natural Gas or Waste Gas Usage (MMcf/day)	[1]	0.40
Annual Natural Gas or Waste Gas Usage (MMcf/yr)	[1]	142
EXHAUST PARAMETERS		
Exhaust Outlet Flowrate (dscfm)	[2]	6,672
CO Outlet Concentration (ppm)	[3]	50
CO_2 Outlet Concentration (ppm)	[2]	300,065
NO_X Outlet Concentration (ppm)	[3]	9
SO_2 Outlet Concentration (ppm)	[3]	75
GENERAL		
Incinerator Control Efficiency (%)	[4]	99.5
Density of Air (lb/ft^3 [at 70°F and 14.7 psi])		0.07487
Molecular Weight of Dry Air (lb/lb-mol)		28.9647
Molecular Weight of CO (lb/lb-mol)		28.01
Molecular Weight of CO_2 (lb/lb-mol)		44.009
Molecular Weight of NO_X (lb/lb-mol)		46.0055
Molecular Weight of SO_2 (lb/lb-mol)		64.066

Pollutant	Emission Factor		Emission Estimates		
	(lb/MMBtu)	(lb/MMcf)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
PM	--	7.60 [5]	0.13 [a]	3.02 [a]	0.54 [b]
PM_{10}	--	7.60 [6]	0.13 [a]	3.02 [a]	0.54 [b]
$PM_{2.5}$	--	7.60 [6]	0.13 [a]	3.02 [a]	0.54 [b]
NO_X	--	--	0.43 [c]	10.3 [d]	1.84 [e]
CO	--	--	1.45 [c]	34.8 [d]	6.23 [e]
VOC	--	5.50 [5]	0.091 [a]	2.18 [a]	0.39 [b]
SO_2	--	--	4.97 [c]	119 [d]	21.4 [e]
CO_2	--	--	13,665 [c]	327,971 [d]	58,707 [e]
CH_4	2.2E-03 [7]	2.40 [f]	0.040 [a]	0.95 [a]	0.17 [b]
N_2O	2.2E-04 [7]	0.24 [f]	4.0E-03 [a]	0.095 [a]	0.017 [b]
CO_2e	--	--	13,668 [g]	328,023 [g]	58,716 [g]

NOTES:

dscfm = dry standard cubic feet per minute.

lb/ft^3 = pounds per cubic foot.

lb/lb-mol = pound per pound-mole.

MMBtu = million British thermal units.

MMcf = million cubic feet.

ppm = parts per million.

psi = pounds per square inch.

(a) Hourly or daily emissions estimate (lb/hr or lb/day) = (emission factor [lb/MMcf]) x (hourly or daily natural gas fuel usage [MMcf/hr or MMcf/day])

(b) Annual emissions estimate (tons/yr) = (emission factor [lb/MMcf]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

(c) Hourly emissions estimate (lb/hr) = (outlet concentration [ppm] / 10^6) x (density of air [lb/ft^3]) x (exhaust flowrate [dscfm]) x (60 min/hr) / (molecular weight of dry air [lb/lb-mol]) x (pollutant molecular weight [lb/lb-mol])

(d) Daily emissions estimate (lb/day) = (outlet concentration [ppm] / 10^6) x (density of air [lb/ft^3]) x (exhaust flowrate [dscfm]) x (60 min/hr) / (molecular weight of dry air [lb/lb-mol]) x (pollutant molecular weight [lb/lb-mol]) x (daily natural gas usage [MMcf/day]) / (hourly natural gas usage [MMcf/hr])

(e) Annual emissions estimate (tons/yr) = (outlet concentration [ppm] / 10^6) x (density of air [lb/ft^3]) x (exhaust flowrate [dscfm]) x (60 min/hr) / (molecular weight of dry air [lb/lb-mol]) x (pollutant molecular weight [lb/lb-mol]) x (annual natural gas usage [MMcf/yr]) / (hourly natural gas usage [MMcf/hr]) x (ton/2 000 lb)

(f) CH_4 or N_2O emission factor (lbs/MMcf) = (CH_4 or N_2O emission factor [lb/MMBtu]) x (natural gas heat content [Btu/scf])

Natural gas high heat content (Btu/scf) = 1 088 (4)

(g) CO_2e emissions estimate (lb/hr lb/day or tons/yr) = (CO_2 emissions estimate [lb/hr or lb/day]) + ([CH_4 emissions estimate {lb/hr lb/day or tons/yr}] x [CH_4 global warming potential]) + ([N_2O emissions estimate {lb/hr lb/day or tons/yr}] x [N_2O global warming potential])

CH_4 global warming potential = 25.0 (8)

N_2O global warming potential = 298 (8)

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters.

(2) Value derived from vendor design documents provided by NEXT Renewable Fuels Oregon LLC. Flowrate accounts for high moisture content exhaust (approx. 14%).

(3) Vendor guarantee outlet concentration provided by NEXT Renewable Fuels Oregon LLC.

(4) See Table 3 Miscellaneous—Input Assumptions and Parameters.

(5) AP-42 Chapter 1.4 (July 1998) Table 1.4-2 "Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion."

(6) Assumes that 100% of PM is $PM_{2.5}$.

(7) 40 CFR Part 98 Subpart C Table C-2 "Default CH_4 and N_2O Emission Factors for Various Types of Fuel." Value converted from kg by multiplying by 2.205 lb.

(8) 40 CFR Part 98 Subpart A Table A-1 "Global Warming Potentials."

Table 49
Flare—Pilot Light Criteria Pollutant and GHG Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Flare Pilot Light (Natural Gas-Fired Combustion)
Hourly Natural Gas Usage (MMcf/hr)	(1)	1.3E-03
Daily Natural Gas Usage (MMcf/day)	(1)	0.030
Annual Natural Gas Usage (MMcf/yr)	(1)	11.0

Pollutant	Emission Factor				Emission Estimates		
	(lb/MMBtu)		(lb/MMcf)		Hourly [(a)] (lb/hr)	Daily [(b)] (lb/day)	Annual [(c)] (tons/yr)
PM	--		7.60	(2)	9.5E-03	0.23	0 042
PM_{10}	--		7.60	(3)	9.5E-03	0.23	0 042
$PM_{2\ 5}$	--		7.60	(3)	9.5E-03	0.23	0 042
NO_X	--		100.0	(4)	0.13	3.00	0.55
CO	--		84.0	(4)	0.11	2.52	0.46
VOC	--		5.50	(3)	6.9E-03	0.17	0 030
SO_2	--		0.60	(3)	7.5E-04	0.018	3.3E-03
CO_2	--		120 000	(5)	150	3 600	657
CH_4	2.2E-03	(6)	2.40	(d)	3.0E-03	0.072	0 013
N_2O	2.2E-04	(6)	0.24	(d)	3.0E-04	7.2E-03	1.3E-03
CO_2e	--		120 131	(e)	150	3 604	658

NOTES:

GHG = greenhouse gas.

MMBtu = million British thermal units.

MMcf = million cubic feet.

(a) Hourly emissions estimate (lb/hr) = (emission factor [lb/MMcf]) x (hourly natural gas fuel usage [MMcf/yr])

(b) Daily emissions estimate (lb/day) = (emission factor [lb/MMcf]) x (daily natural gas fuel usage [MMcf/day])

(c) Annual emission estimates (tons/yr) = (emission factor [lb/MMcf]) x (annual fuel usage [MMcf/yr]) x (ton/2 000 lb)

(d) CH_4 or N_2O emission factor (lbs/MMcf) = (CH_4 or N_2O emission factor [lb/MMBtu]) x (natural gas heat content [Btu/scf])

Natural gas high heat content (Btu/scf) = 1 088 (7)

(e) CO_2e emission factor (lb/MMcf) = (CO_2 emission factor [lb/MMcf]) + ([CH_4 emission factor {lb/MMcf}] x [CH_4 global warming potential]) + ([N_2O emission factor {lb/MMcf}] x [N_2O global warming potential])

CH_4 global warming potential = 25 0 (8)

N_2O global warming potential = 298 (8)

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters.

(2) AP-42 Chapter 1.4 (July 1998) Table 1.4-2 "Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion."

(3) Assumes that PM equals $PM_{2.5}$.

(4) AP-42 Chapter 1.4 (July 1998) Table 1.4-1 "Emission Factors for Nitrogen Oxides (NO_x) and Carbon Monoxide (CO) from Natural Gas Combustion."

(5) AP-42 Chapter 1.4 (July 1998) Table 1.4-2 "Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion."

(6) 40 CFR Part 98 Subpart C Table C-2 " CH_4 and N_2O Emission Factors for Various Types of Fuel." Value converted from kg by multiplying by 2.205 lb.

(7) See Table 3 Miscellaneous—Input Assumptions and Parameters.

(8) 40 CFR Part 98 Subpart A Table A-1 "Global Warming Potentials"

Table 50
VCU Criteria Pollutant and GHG Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Rail/Truck VCU
Hourly Natural Gas Usage (MMcf/hr)	(1)	1.6E-03
Daily Natural Gas Usage (MMcf/day)	(1)	0 04
Annual Natural Gas Usage (MMcf/yr)	(1)	13.4
Vapor Combustion Unit VOC Control Efficiency	(2)	98.0

Pollutant	Emission Factor				Emission Estimates					
					Rail/Truck VCU					
	(lb/MMBtu)		(lb/MMcf)		Hourly (lb/hr)		Daily (lb/day)		Annual (ton/yr)	
PM	--		7.60	(3)	0.012	(a)	0.29	(a)	0.051	(b)
PM_{10}	--		7.60	(4)	0.012	(a)	0.29	(a)	0.051	(b)
$PM_{2.5}$	--		7.60	(4)	0.012	(a)	0.29	(a)	0.051	(b)
NO_X	--		50.0	(5)	0.078	(a)	1.88	(a)	0.34	(b)
CO	--		84.0	(5)	0.13	(a)	3.15	(a)	0.56	(b)
VOC	--		5.50	(3)	1.7E-04	(c)	4.1E-03	(c)	7.4E-04	(d)
SO_2	--		0.60	(3)	9.4E-04	(a)	0.023	(a)	4 0E-03	(b)
Pb	--		5.0E-04	(3)	7.8E-07	(a)	1.9E-05	(a)	3.4E-06	(b)
CO_2	--		120 000	(3)	188	(a)	4 500	(a)	806	(b)
CH_4	2.2E-03	(6)	2.40	(e)	3.7E-03	(a)	0.090	(a)	0.016	(b)
N_2O	2.2E-04	(6)	0.24	(e)	3.7E-04	(a)	9.0E-03	(a)	1 6E-03	(b)
CO_2e	--		120 131	(f)	188	(a)	4 505	(a)	806	(b)

NOTES:

GHG = greenhouse gas.

MMBtu = million British thermal units.

MMcf = million cubic feet.

VCU = vapor combustion unit.

(a) Hourly or daily emissions estimate (lb/"unit") = (emission factor [lb/MMcf]) x (hourly or daily natural gas fuel usage [MMcf/"unit"])

(b) Annual emissions estimate (tons/yr) = (emission factor [lb/MMcf]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb)

(c) Hourly or daily emissions estimate (lb/"unit") = (emission factor [lb/MMcf]) x (hourly or daily natural gas fuel usage [MMcf/"unit"]) x (1 - [control efficiency {%} / 100])

(d) Annual emissions estimate (tons/yr) = (emission factor [lb/MMcf]) x (annual natural gas usage [MMcf/yr]) x (ton/2 000 lb) x (1 - [control efficiency {%} / 100])

(e) CH_4 or N_2O emission factor (lbs/MMcf) = (CH_4 or N_2O emission factor [lb/MMBtu]) x (natural gas heat content [Btu/scf])

Natural gas default high heat content (Btu/scf) = 1 088 (2)

(f) CO_2e emission factor (lb/MMcf) = (CO_2 emission factor [lb/MMcf]) + ([CH_4 emission factor {lb/MMcf}] x [CH_4 global warming potential]) + ([N_2O emission factor {lb/MMcf}] x [N_2O global warming potential])

CH_4 global warming potential = 25.0 (7)

N_2O global warming potential = 298 (7)

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters.

(2) See Table 3 Miscellaneous—Input Assumptions and Parameters.

(3) AP-42 Chapter 1.4 (July 1998) Table 1.4-2 "Emission Factors for Criteria Pollutants and Greenhouse Gases from Natural Gas Combustion."

(4) Assumes that PM equals $PM_{2.5}$.

(5) AP-42 Chapter 1.4 (July 1998) Table 1.4-1 "Emission Factors for Nitrogen Oxides (NO_x) and Carbon Monoxide (CO) from Natural Gas Combustion." Assumes small boilers (less than 100 MMBtu/hr) controlled by low NO_X burners.

(6) 40 CFR Part 98 Subpart C Table C-2 "Default CH_4 and N_2O Emission Factors for Various Types of Fuel." Value converted from kg by multiplying by 2.205 lb.

(7) 40 CFR Part 98 Subpart A Table A-1 "Global Warming Potentials"

Table 51
Raw Oil Feedstock (Vegetable Oil) Storage Tank VOC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		(Units)	Vegetable Oils	AP-42 Variable
PRODUCTION VALUES				
Storage Tank ID	(1)	--	T_VEGOIL	--
Total Number of Storage Tanks	(1)	--	3	--
Total Annual Throughput	(1)	(gal/yr)	154 870 800	--
Total Annual Throughput	(a)	(bbl/yr)	3 687 400	Q
Maximum Daily Throughput	(1)	(gal/day)	432 600	--
Maximum Daily Throughput	(a)	(bbl/day)	10 300	--
TANK PROPERTIES				
Tank Type (Fixed Roof or Internal Floating Roof Tank)	(1)	--	Fixed Roof	--
Heated or Non-heated?	(1)	--	Heated	--
Controlled or Fugitive?	(1)	--	Fugitive	--
Control Efficiency	(1)	(%)	0	--
Tank Roof Color	(1)	--	White	--
Tank Roof Condition	(1)	--	New	--
Tank Shell Color	(1)	--	White	--
Tank Shell Condition	(1)	--	New	--
Horizontal or Vertical	(1)	--	Vertical	--
Tank Diameter	(1)	(ft)	150 0	D
Tank Shell Height	(1)	(ft)	48.0	H_S
Roof Type	(2)	--	Cone	--
Maximum Liquid Height	(1)	(ft)	47.0	H_{LX}
Minimum Liquid Height	(3)	(ft)	1.00	H_{LN}
TANK CONTENT PROPERTIES				
Liquid Temperature	(1)	(°F)	120	T
Liquid Molecular Weight	(4)	(lb/lb-mole)	188	M_L
Vapor Molecular Weight	(4)	(lb/lb-mole)	130	M_V
True Vapor Pressure	(5)	(psia)	1 0E-04	P_{VA}
ENVIRONMENTAL FACTORS				
Average Daily Maximum Ambient Temperature	(6)	(°R)	520	T_{AX}
Average Daily Minimum Ambient Temperature	(6)	(°R)	504	T_{AN}
Average Daily Total Insolation on a Horizontal Surface	(6)	(Btu/ft^2-day)	1 122	I
CALCUALTED VARIABLES				
Standing Loss Calculations				
Average Daily Ambient Temperature Range	(b)	(°R)	15.9	ΔT_A
Tank Roof Surface Solar Absorptance	(8)	--	0.17	α_R
Tank Shell Surface Solar Absorptance	(8)	--	0.17	α_S
Average Tank Surface Solar Absorptance	(c)	--	0.17	α
Average Daily Vapor Temperature Range	(d)	(°R)	14.9	ΔT_V
Vapor Space Expansion Factor	(e)	--	0.027	K_E
Effective Tank Diameter (if horizontal orientation)	(1)	(ft)	Not Applicable	D_E
Liquid Height	(11)	(ft)	24.0	H_L
Tank Shell Radius	(1)	(ft)	75.0	R_S
Tank Roof Height	(12)	(ft)	4.69	H_R
Roof Outage	(13)	(ft)	1.56	H_{RO}
Vapor Space Outage	(f)	(ft)	25.6	H_{VO}
Vented Vapor Saturation Factor	(g)	--	1.00	K_S
Average Daily Ambient Temperature	(h)	(°R)	512	T_{AA}
Liquid Bulk Temperature	( )	(°R)	580	T_B
Average Vapor Temperature	( )	(°R)	534	T_V
Stock Vapor Density	(k)	(lb/ft^3)	2 3E-06	W_V
Annual Standing Loss	( )	(lb/yr)	--	L_S
Daily Standing Loss	(m)	(lb/day)	--	--
Working Loss Calculations				
Annual Net Working Loss Throughput	(n)	(ft^3/yr)	20 701 064	V_Q
Annual Sum of the Increase is Liquid Level	(o)	(ft/yr)	1 171	ΣH_{QI}
Number of Turnovers per Year	(p)	--	25.5	N
Working Loss Turnover (Saturation) Factor per Year	(q)	--	1.00	K_N
Daily Net Working Loss Throughput	(n)	(ft^3/day)	57 824	V_Q
Daily Sum of the Increase is Liquid Level	(o)	(ft/day)	3.27	ΣH_{QI}
Number of Turnovers per Day	(p)	--	0.071	N
Working Loss Turnover (Saturation) Factor per Day	(q)	--	1.00	K_N
Working Loss Product Factor	(25)	--	1.00	K_P
Vent Setting Correction Factor	(24)	--	1.00	K_B
Annual Working Loss	(r)	(lb/yr)	46.9	L_W
Daily Working Loss	(s)	(lb/day)	0.13	--
Total Annual Tank Routine Losses	**(t)**	**(lb/yr)**	**46.9**	L_T
Total Daily Tank Routine Losses	**(t)**	**(lb/day)**	**0.13**	**--**
Total Annual Emissions Estimate (All Vegetable Oil Storage Tanks)	**(u)**	**(lb/yr)**	**141**	**--**
Total Daily Emissions Estimate (All Vegetable Oil Storage Tanks)	**(u)**	**(lb/day)**	**0.39**	**--**

All notes and references are provided on the following page

Table 51 (Continued)
Raw Oil Feedstock (Vegetable Oil) Storage Tank VOC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

NOTES:

(a) Total annual or daily throughput (bbl/ unit) = (total annual or daily throughput [gal/ unit]) x bbl/42 gal)
b) Average daily ambient temperature range (°R) = ([daily maximum ambient temperature {°R}] - [daily minimum ambient temperature {°R}]); See Reference (7)
(c) Average tank surface solar absorbance = ([tank roof surface solar absorptance] + [tank shell surface solar absorptance]) / 2; See Reference (8)
(d) Average daily vapor temperature range (°R) = ([0 7] x [average daily temperature range {°R}]) + ([0 02] x [average tank surface solar absorptance] x [average daily total insolation factor {Btu/ft^2-d}]); See Reference (9)
(e) Vapor space expansion factor = (0 0018) x (average daily vapor temperature range [°R]); See Reference (10)
(f) Vapor space outage (ft) = (tank shell height [ft]) - (liquid height [ft]) + (roof outage [ft]); See Reference (14)
(g) Vented vapor saturation factor = (1) / ([1] + [0 053] x [vapor pressure at average daily liquid surface temperature {psia}] x [vapor space outage {ft}]); See Reference (15)
(h) Average daily ambient temperature (°R) = ([average daily maximum ambient temperature {°R}] + [average daily minimum ambient temperature {°R}]) / (2); See Reference (16)
(i) If non-heated tank: Liquid bulk temperature (°R) = (average daily ambient temperature [°R]) + ([0 003] x [tank shell surface solar absorptance {°R}] x [average daily total insolation factor {Btu/ft^2-day}]); See Reference (17)
For heated tanks the setpoint temperature for the storage tank is assumed to be representative of the liquid bulk temperature
(j) Average vapor temperature (°R) = ([2 2 x {tank shell height |ft|} / {tank diameter |ft|} + 1 1] x [average daily ambient temperature {°R}] + [0 8 x {liquid bulk temperature |°R|}] + [0 021 x {tank roof surface solar absorptance}
x {average daily total insolation factor |Btu/ft^2-day|}] + [0 013 x {tank shell height |ft|} / {tank diameter |ft|} x {tank shell surface solar absorptance} x {average daily total insolation factor {|Btu/ft^2-day|}]) / (2 2 x [tank shell height {ft}]
/ [tank diameter {ft}] + 1 9); See Reference (18)
(k) Vapor density (lb/ft^3) = ([vapor molecular weight {lb/lb-mole}] x [true vapor pressure {psia}]) / ([10 731 psia-ft^3/lb-mole-°R] x [average vapor temperature {°R}]); See Reference (19)
(l) Annual standing loss (lb/yr) = (365) x (vapor space exp factor per day) x ([π/4] x [diameter {ft}]^2) x (vapor space outate [ft]) x (vented vapor saturation factor) x (stock vapor density [lb/ft^3]) x (1 - [CE {%} / 100]); See Reference (20)
(m) Daily standing loss lb/day) = (annual standing loss [lb/yr]) / (365 days/yr)
(n) Net working loss throughput (ft^3/yr) = (5 614 ft^3//bbl) x (total annual throughput [bbl/yr]); See Reference (21)
(o) Annual sum of the increases in liquid level (ft/yr) = ([5 614] x [total annual throughput {bbl/yr}]) / ([π/4] x [tank diameter {ft}]^2); See Reference (22)
(p) Number of turnovers per year = (annual sum of the increases in liquid level [ft/yr]) / ([maximum liquid height {ft}] - [minimum liquid height {ft}]); See Reference (23)
(q) If N <= 36 working loss turnover factor equal to 1 or working loss turnover factor = ([180] + [number of turnovers per year]) / ([6] x [number of turnovers per year]); See Reference (24)
(r) Annual working loss (lb/yr) = (net working loss throughput [ft^3/yr]) x (working loss turnover factor) x (working loss product factor) x (vapor density [lb/ft^3]) x (vent setting correction factor) x (1- [control efficiency {%} / 100]); See Reference (26)
(s) Daily working loss (lb/day) = (net working loss throughput [ft^3/day]) x (working loss turnover factor) x (working loss product factor) x (vapor density [lb/ft^3]) x (vent setting correction factor) x (1 - [control efficiency {%} / 100]); See Reference (26)
(t) Annual or daily total tank routine losses (lb/yr or lb/day) = (annual or daily standing losses [lb/yr or lb/day]) + (annual or daily working losses [lb/yr or lb/day]); See Reference (27)
(u) Total annual or daily emissions estimate (lb/ unit) = (total annual or daily tank routine losses [lb/ unit]) x (total number of storage tanks)

REFERENCES:

(1) See Table 2 Storage Tank—Input Assumptions and Parameters
(2) Engineering judgement based on typical bulk storage tank design for representative industries
(3) AP-42 Chapter 7 (June 2020); see equation 1-36 For vertical tanks value set to 1 For horizontal tanks value set to 0
(4) AP-42 Chapter 7 (June 2020); Table 7 1-2 Assumes the liquid and vapor molecular weight for no 2 diesel as most-representative although the composition speciation will be different
(5) The raw oil feedstock is assumed to have a negligible vapor pressure The assumed vapor pressure is considered to be conservative for emission estimation purposes
(6) Site-specific meteorological data obtained from the Portland General Electric Beaver Plant meteorological tower
(7) AP-42 Chapter 7 (June 2020); see equation 1-11
(8) AP-42 Chapter 7 (June 2020); Table 7 1-6
(9) AP-42 Chapter 7 (June 2020); see equation 1-7
(10) AP-42 Chapter 7 (June 2020); see equation 1-12
(11) AP-42 Chapter 7 (June 2020); see equation 1-16 Per equation 1-16 liquid height typically assumed to be at the half-full level in the absence of site-specific data
(12) AP-42 Chapter 7 (June 2020); see equation 1-18 for cone roofs (assumes standard cone roof slope of 0 0625 ft/ft) or see equation 1-20 for dome roofs (assumes modified dome roof radius equation)
(13) AP-42 Chapter 7 (June 2020); see equation 1-17 for cone roofs or see equation 1-19 for dome roofs
(14) AP-42 Chapter 7 (June 2020); see equation 1-16
(15) AP-42 Chapter 7 (June 2020); see equation 1-21 Assumes true vapor pressure as the vapor pressure at average daily liquid surface temperature
(16) AP-42 Chapter 7 (June 2020); see equation 1-30
(17) AP-42 Chapter 7 (June 2020); see equation 1-31
(18) AP-42 Chapter 7 (June 2020); see equation 1-32 Note the simplified version of this equation (e g equation 1-33) was not used since HS/D is not equal to 0 5 and allows for variances in αR and αS
(19) AP-42 Chapter 7 (June 2020); see equation 1-22
(20) AP-42 Chapter 7 (June 2020); see equation 1-4
(21) AP-42 Chapter 7 (June 2020); see equation 1-39
(22) AP-42 Chapter 7 (June 2020); see equation 1-37
(23) AP-42 Chapter 7 (June 2020); see equation 1-36
(24) AP-42 Chapter 7 (June 2020); see notes for equation 1-35
(25) AP-42 Chapter 7 (June 2020); see notes for equation 1-35 Assumes KP = 0 75 for crude oils or 1 for all other organic liquids
(26) AP-42 Chapter 7 (June 2020); see equation 1-35
(27) AP-42 Chapter 7 (June 2020); see equation 1-1

Table 52
Raw Oil Feedstock (Animal Fats) Storage Tank VOC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		(Units)	Animal Fats	AP-42 Variable
PRODUCTION VALUES				
Storage Tank ID	(1)	--	T_ANIFATS	--
Total Number of Storage Tanks	(1)	--	3	--
Total Annual Throughput	(1)	(gal/yr)	103 247 200	--
Total Annual Throughput	(a)	(bbl/yr)	2 458 267	Q
Maximum Daily Throughput	(1)	(gal/day)	288 400	--
Maximum Daily Throughput	(a)	(bbl/day)	6 867	--
TANK PROPERTIES				
Tank Type (Fixed Roof or Internal Floating Roof Tank)	(1)	--	Fixed Roof	--
Heated or Non-heated?	(1)	--	Heated	--
Controlled or Fugitive?	(1)	--	Fugitive	--
Control Efficiency	(1)	(%)	0	--
Tank Roof Color	(1)	--	White	--
Tank Roof Condition	(1)	--	New	--
Tank Shell Color	(1)	--	White	--
Tank Shell Condition	(1)	--	New	--
Horizontal or Vertical	(1)	--	Vertical	--
Tank Diameter	(1)	(ft)	150 0	D
Tank Shell Height	(1)	(ft)	48.0	H_S
Roof Type	(2)	--	Cone	--
Maximum Liquid Height	(1)	(ft)	47.0	H_{LX}
Minimum Liquid Height	(3)	(ft)	1.00	H_{LN}
TANK CONTENT PROPERTIES				
Liquid Temperature	(1)	(°F)	120	T
Liquid Molecular Weight	(4)	(lb/lb-mole)	188	M_L
Vapor Molecular Weight	(4)	(lb/lb-mole)	130	M_V
True Vapor Pressure	(5)	(psia)	1 0E-04	P_{VA}
ENVIRONMENTAL FACTORS				
Average Daily Maximum Ambient Temperature	(6)	(°R)	520	T_{AX}
Average Daily Minimum Ambient Temperature	(6)	(°R)	504	T_{AN}
Average Daily Total Insolation on a Horizontal Surface	(6)	(Btu/ft^2-day)	1 122	I
CALCUALTED VARIABLES				
Standing Loss Calculations				
Average Daily Ambient Temperature Range	(b)	(°R)	15.9	ΔT_A
Tank Roof Surface Solar Absorptance	(8)	--	0.17	α_R
Tank Shell Surface Solar Absorptance	(8)	--	0.17	α_S
Average Tank Surface Solar Absorptance	(c)	--	0.17	α
Average Daily Vapor Temperature Range	(d)	(°R)	14.9	ΔT_V
Vapor Space Expansion Factor	(e)	--	0.027	K_E
Effective Tank Diameter (if horizontal orientation)	(1)	(ft)	Not Applicable	D_E
Liquid Height	(11)	(ft)	24.0	H_L
Tank Shell Radius	(1)	(ft)	75.0	R_S
Tank Roof Height	(12)	(ft)	4.69	H_R
Roof Outage	(13)	(ft)	1.56	H_{RO}
Vapor Space Outage	(f)	(ft)	25.6	H_{VO}
Vented Vapor Saturation Factor	(g)	--	1.00	K_S
Average Daily Ambient Temperature	(h)	(°R)	512	T_{AA}
Liquid Bulk Temperature	( )	(°R)	580	T_B
Average Vapor Temperature	( )	(°R)	534	T_V
Stock Vapor Density	(k)	(lb/ft^3)	2 3E-06	W_V
Annual Standing Loss	( )	(lb/yr)	--	L_S
Daily Standing Loss	(m)	(lb/day)	--	--
Working Loss Calculations				
Annual Net Working Loss Throughput	(n)	(ft^3/yr)	13 800 709	V_Q
Annual Sum of the Increase is Liquid Level	(o)	(ft/yr)	781	ΣH_{QI}
Number of Turnovers per Year	(p)	--	17.0	N
Working Loss Turnover (Saturation) Factor per Year	(q)	--	1.00	K_N
Daily Net Working Loss Throughput	(n)	(ft^3/day)	38 549	V_Q
Daily Sum of the Increase is Liquid Level	(o)	(ft/day)	2.18	ΣH_{QI}
Number of Turnovers per Day	(p)	--	0.047	N
Working Loss Turnover (Saturation) Factor per Day	(q)	--	1.00	K_N
Working Loss Product Factor	(25)	--	1.00	K_P
Vent Setting Correction Factor	(24)	--	1.00	K_B
Annual Working Loss	(r)	(lb/yr)	31.3	L_W
Daily Working Loss	(s)	(lb/day)	0.087	--
Total Annual Tank Routine Losses	**(t)**	**(lb/yr)**	**31.3**	L_T
Total Daily Tank Routine Losses	**(t)**	**(lb/day)**	**0.087**	**--**
Total Annual Emissions Estimate (All Animal Fats Storage Tanks)	**(u)**	**(lb/yr)**	**93.9**	**--**
Total Daily Emissions Estimate (All Animal Fats Storage Tanks)	**(u)**	**(lb/day)**	**0.26**	**--**

All notes and references are provided on the following page

Table 52 (Continued)
Raw Oil Feedstock (Animal Fats) Storage Tank VOC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

NOTES:

(a) Total annual or daily throughput (bbl/ unit) = (total annual or daily throughput [gal/ unit]) x bbl/42 gal)

b) Average daily ambient temperature range (°R) = ([daily maximum ambient temperature {°R}] - [daily minimum ambient temperature {°R}]); See Reference (7)

(c) Average tank surface solar absorbance = ([tank roof surface solar absorptance] + [tank shell surface solar absorptance]) / 2; See Reference (8)

(d) Average daily vapor temperature range (°R) = ([0 7] x [average daily temperature range {°R}]) + ([0 02] x [average tank surface solar absorptance] x [average daily total insolation factor {Btu/ft^2-d}]); See Reference (9)

(e) Vapor space expansion factor = (0 0018) x (average daily vapor temperature range [°R]); See Reference (10)

(f) Vapor space outage (ft) = (tank shell height [ft]) - (liquid height [ft]) + (roof outage [ft]); See Reference (14)

(g) Vented vapor saturation factor = (1) / ([1] + [0 053] x [vapor pressure at average daily liquid surface temperature {psia}] x [vapor space outage {ft}]); See Reference (15)

(h) Average daily ambient temperature (°R) = ([average daily maximum ambient temperature {°R}] + [average daily minimum ambient temperature {°R}]) / (2); See Reference (16)

(i) If non-heated tank: Liquid bulk temperature (°R) = (average daily ambient temperature [°R]) + ([0 003] x [tank shell surface solar absorptance {°R}] x [average daily total insolation factor {Btu/ft^2-day}]); See Reference (17)
For heated tanks the setpoint temperature for the storage tank is assumed to be representative of the liquid bulk temperature

(j) Average vapor temperature (°R) = ([2 2 x {tank shell height |ft|} / {tank diameter |ft|} + 1 1] x [average daily ambient temperature {°R}] + [0 8 x {liquid bulk temperature |°R|}] + [0 021 x {tank roof surface solar absorptance} x {average daily total insolation factor |Btu/ft^2-day|}] + [0 013 x {tank shell height |ft|} / {tank diameter |ft|} x {tank shell surface solar absorptance} x {average daily total insolation factor {|Btu/ft^2-day|}]) / (2 2 x [tank shell height {ft}] / [tank diameter {ft}] + 1 9); See Reference (18)

(k) Vapor density (lb/ft^3) = ([vapor molecular weight {lb/lb-mole}] x [true vapor pressure {psia}]) / ([10 731 psia-ft^3/lb-mole-°R] x [average vapor temperature {°R}]); See Reference (19)

(l) Annual standing loss (lb/yr) = (365) x (vapor space exp factor per day) x ([π/4] x [diameter {ft}]^2) x (vapor space outate [ft]) x (vented vapor saturation factor) x (stock vapor density [lb/ft^3]) x (1 - [CE {%} / 100]); See Reference (20)

(m) Daily standing loss lb/day) = (annual standing loss [lb/yr]) / (365 days/yr)

(n) Net working loss throughput (ft^3/yr) = (5 614 ft^3//bbl) x (total annual throughput [bbl/yr]); See Reference (21)

(o) Annual sum of the increases in liquid level (ft/yr) = ([5 614] x [total annual throughput {bbl/yr}]) / ([π/4] x [tank diameter {ft}]^2); See Reference (22)

(p) Number of turnovers per year = (annual sum of the increases in liquid level [ft/yr]) / ([maximum liquid height {ft}] - [minimum liquid height {ft}]); See Reference (23)

(q) If N <= 36 working loss turnover factor equal to 1 or working loss turnover factor = ([180] + [number of turnovers per year]) / ([6] x [number of turnovers per year]); See Reference (24)

(r) Annual working loss (lb/yr) = (net working loss throughput [ft^3/yr]) x (working loss turnover factor) x (working loss product factor) x (vapor density [lb/ft^3]) x (vent setting correction factor) x (1- [control efficiency {%} / 100]); See Reference (26)

(s) Daily working loss (lb/day) = (net working loss throughput [ft^3/day]) x (working loss turnover factor) x (working loss product factor) x (vapor density [lb/ft^3]) x (vent setting correction factor) x (1 - [control efficiency {%} / 100]); See Reference (26)

(t) Annual or daily total tank routine losses (lb/yr or lb/day) = (annual or daily standing losses [lb/yr or lb/day]) + (annual or daily working losses [lb/yr or lb/day]); See Reference (27)

(u) Total annual or daily emissions estimate (lb/ unit) = (total annual or daily tank routine losses [lb/ unit]) x (total number of storage tanks)

REFERENCES:

(1) See Table 2 Storage Tank—Input Assumptions and Parameters

(2) Engineering judgement based on typical bulk storage tank design for representative industries

(3) AP-42 Chapter 7 (June 2020); see equation 1-36 For vertical tanks value set to 1 For horizontal tanks value set to 0

(4) AP-42 Chapter 7 (June 2020); Table 7 1-2 Assumes the liquid and vapor molecular weight for no 2 diesel as most-representative although the composition speciation will be different

(5) The raw oil feedstock is assumed to have a negligible vapor pressure The assumed vapor pressure is considered to be conservative for emission estimation purposes

(6) Site-specific meteorological data obtained from the Portland General Electric Beaver Plant meteorological tower

(7) AP-42 Chapter 7 (June 2020); see equation 1-11

(8) AP-42 Chapter 7 (June 2020); Table 7 1-6

(9) AP-42 Chapter 7 (June 2020); see equation 1-7

(10) AP-42 Chapter 7 (June 2020); see equation 1-12

(11) AP-42 Chapter 7 (June 2020); see equation 1-16 Per equation 1-16 liquid height typically assumed to be at the half-full level in the absence of site-specific data

(12) AP-42 Chapter 7 (June 2020); see equation 1-18 for cone roofs (assumes standard cone roof slope of 0 0625 ft/ft) or see equation 1-20 for dome roofs (assumes modified dome roof radius equation)

(13) AP-42 Chapter 7 (June 2020); see equation 1-17 for cone roofs or see equation 1-19 for dome roofs

(14) AP-42 Chapter 7 (June 2020); see equation 1-16

(15) AP-42 Chapter 7 (June 2020); see equation 1-21 Assumes true vapor pressure as the vapor pressure at average daily liquid surface temperature

(16) AP-42 Chapter 7 (June 2020); see equation 1-30

(17) AP-42 Chapter 7 (June 2020); see equation 1-31

(18) AP-42 Chapter 7 (June 2020); see equation 1-32 Note the simplified version of this equation (e g equation 1-33) was not used since HS/D is not equal to 0 5 and allows for variances in aR and aS

(19) AP-42 Chapter 7 (June 2020); see equation 1-22

(20) AP-42 Chapter 7 (June 2020); see equation 1-4

(21) AP-42 Chapter 7 (June 2020); see equation 1-39

(22) AP-42 Chapter 7 (June 2020); see equation 1-37

(23) AP-42 Chapter 7 (June 2020); see equation 1-36

(24) AP-42 Chapter 7 (June 2020); see notes for equation 1-35

(25) AP-42 Chapter 7 (June 2020); see notes for equation 1-35 Assumes KP = 0 75 for crude oils or 1 for all other organic liquids

(26) AP-42 Chapter 7 (June 2020); see equation 1-35

(27) AP-42 Chapter 7 (June 2020); see equation 1-1

Table 53
Citric Acid Storage Tank VOC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		(Units)	Citric Acid (50% sol.) Storage	AP-42 Variable
PRODUCTION VALUES				
Storage Tank ID	(1)	--	T_CACID	--
Total Number of Storage Tanks	(1)	--	2	--
Total Annual Throughput	(1)	(gal/yr)	895 000	--
Total Annual Throughput	(a)	(bbl/yr)	21 310	Q
Maximum Daily Throughput	(1)	(gal/day)	2 500	--
Maximum Daily Throughput	(a)	(bbl/day)	59.5	--
Annual Days of Operation	(2)	(days/yr)	358	--
TANK PROPERTIES				
Tank Type (Fixed Roof or Internal Floating Roof Tank)	(1)	--	Fixed Roof	--
Insulated or Partially Insulated or Uninsulated?	(1)	--	--	--
Heated or Non-heated?	(1)	--	Non-Heated	--
Controlled or Fugitive?	(1)	--	Fugitive	--
Control Efficiency	(1)	(%)	0	--
Tank Roof Color	(1)	--	White	--
Tank Roof Condition	(1)	--	New	--
Tank Shell Color	(1)	--	White	--
Tank Shell Condition	(1)	--	New	--
Horizontal or Vertical	(1)	--	Vertical	--
Tank Diameter	(1)	(ft)	10.0	D
Tank Shell Height	(1)	(ft)	30.0	H_S
Roof Type	(3)	--	Cone	--
Maximum Liquid Height	(1)	(ft)	29.0	H_{LX}
Minimum Liquid Height	(4)	(ft)	1.00	H_{LN}
TANK CONTENT PROPERTIES				
Liquid Temperature	(1)	(°F)	77.0	T
Vapor Molecular Weight	(5)	(lb/lb-mole)	18.0	M_V
True Vapor Pressure	(6)	(psia)	0.36	P_{VA}
ENVIRONMENTAL FACTORS				
Average Daily Maximum Ambient Temperature	(7)	(°R)	520	T_{AX}
Average Daily Minimum Ambient Temperature	(7)	(°R)	504	T_{AN}
Average Daily Total Insolation on a Horizontal Surface	(7)	(Btu/ft^2-day)	1 122	I
CALCUALTED VARIABLES				
Standing Loss Calculations				
Average Daily Ambient Temperature Range	(b)	(°R)	15.9	ΔT_A
Tank Roof Surface Solar Absorptance	(9)	--	0.17	α_R
Tank Shell Surface Solar Absorptance	(9)	--	0.17	α_S
Average Tank Surface Solar Absorptance	(c)	--	0.17	α
Average Daily Vapor Temperature Range	(d)	(°R)	14.9	ΔT_V
Vapor Space Expansion Factor	(e)	--	0.027	K_E
Effective Tank Diameter (if horizontal orientation)	(1)	(ft)	Not Applicable	D_E
Liquid Height	(12)	(ft)	15.0	H_L
Tank Shell Radius	(1)	(ft)	5 0	R_S
Tank Roof Height	(13)	(ft)	0.31	H_R
Roof Outage	(14)	(ft)	0.10	H_{RO}
Vapor Space Outage	(f)	(ft)	15.1	H_{VO}
Vented Vapor Saturation Factor	(g)	--	0.78	K_S
Average Daily Ambient Temperature	(h)	(°R)	512	T_{AA}
Liquid Bulk Temperature	(i)	(°R)	512	T_B
Average Vapor Temperature	(j)	(°R)	513	T_V
Stock Vapor Density	(k)	(lb/ft^3)	1 2E-03	W_V
Annual Standing Loss	(l)	(lb/yr)	10 64	L_S
Daily Standing Loss	(m)	(lb/day)	0.029	--
Working Loss Calculations				
Annual Net Working Loss Throughput	(n)	(ft^3/yr)	119 632	V_Q
Annual Sum of the Increase is Liquid Level	(o)	(ft/yr)	1 523	ΣH_{QI}
Number of Turnovers per Year	(p)	--	54.4	N
Working Loss Turnover (Saturation) Factor per Year	(q)	--	0.72	K_N
Daily Net Working Loss Throughput	(n)	(ft^3/day)	334	V_Q
Daily Sum of the Increase is Liquid Level	(o)	(ft/day)	4.25	ΣH_{QI}
Number of Turnovers per Day	(p)	--	0.15	N
Working Loss Turnover (Saturation) Factor per Day	(q)	--	1.00	K_N
Working Loss Product Factor	(26)	--	1.00	K_P
Vent Setting Correction Factor	(25)	--	1.00	K_B
Annual Working Loss	(r)	(lb/yr)	101	L_W
Daily Working Loss	(s)	(lb/day)	0.39	--
Annual Total Tank Routine Losses	**(t)**	**(lb/yr)**	**112**	**L_T**
Daily Total Tank Routine Losses	**(t)**	**(lb/day)**	**0.42**	**--**
Total Annual Emissions Estimate (All Citric Acid Storage Tanks)	**(u)**	**(lb/yr)**	**223**	**--**
Total Daily Emissions Estimate (All Citric Acid Storage Tanks)	**(u)**	**(lb/day)**	**0.84**	**--**

All notes and references are provided on the following page See Table 53 (Continued) Citric Acid Storage Tank VOC Emission Estimates

Table 53 (Continued)
Citric Acid Storage Tank VOC Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Chemical	CAS	DEQ Sequence Number	Regulatory Category (Yes/No)			EPA Tanks Methodology			Emissions Estimate			
						[redacted]	M_i	[redacted]	L_{ti}			
			HAP	TAC	RBC		Molecular Weight (lb/lb-mol)		Maximum Daily (lb/day)		Annual (lb/yr)	
Citric acid	77-92-9	--	No	No	No	[redacted]	192 [30]	[redacted]	1 3E-04	[redacted]	0 033	[redacted]
Water	7732-18-5	--	No	No	No	[redacted]	18 0 [30]	[redacted]	0.42	[redacted]	112	[redacted]

NOTES:

(a) Total annual or daily throughput (bbl/ unit) = (total annual or daily throughput [gal/ unit]) x bbl/42 gal)
(b) Average daily ambient temperature range (°R) = ([daily maximum ambient temperature {°R}] - [daily minimum ambient temperature {°R}]); See Reference (8)
(c) Average tank surface solar absorbance = ([tank roof surface solar absorptance] + [tank shell surface solar absorptance]) / 2; See Reference (9)
(d) Average daily vapor temperature range (°R) = ([0 7] x [average daily temperature range {°R}]) + ([0 02] x [average tank surface solar absorptance] x [average daily total insolation factor {Btu/ft²-d}]); See Reference (10)
(e) Vapor space expansion factor = (0 0018) x (average daily vapor temperature range [°R]); See Reference (11)
(f) Vapor space outage (ft) = (tank shell height [ft]) - (liquid height [ft]) + (roof outage [ft]); See Reference (15)
(g) Vented vapor saturation factor = (1) / ([1] + [0 053] x [vapor pressure at average daily liquid surface temperature {psia}] x [vapor space outage {ft}]); See Reference (16)
(h) Average daily ambient temperature (°R) = ([average daily maximum ambient temperature {°R}] + [average daily minimum ambient temperature {°R}]) / (2); See Reference (17)
(i) If non-heated tank: Liquid bulk temperature (°R) = (average daily ambient temperature [°R]) + ([0 003] x [tank shell surface solar absorptance {°R}] x [average daily total insolation factor {Btu/ft²-day}]); See Reference (18)
For heated tanks the setpoint temperature for the storage tank is assumed to be representative of the liquid bulk temperature
(j) Average vapor temperature (°R) = ([2 2 x {tank shell height | ft | } / {tank diameter | ft | } + 1 1] x [average daily ambient temperature {°R}] + [0 8 x {liquid bulk temperature | °R | }] + [0 021 x {tank roof surface solar absorptance} x {average daily total insolation factor + [0 013 x {tank shell height | ft | } / {tank diameter | ft | } x {tank shell surface solar absorptance} x {average daily total insolation factor { | Btu/ft²-day | }]) / (2 2 x [tank shell height {ft}] / [tank diameter {ft}] + 1 9); See Reference (19)
(k) Vapor density (lb/ft³) = ([vapor molecular weight {lb/lb-mole}] x [true vapor pressure {psia}]) / ([10 731 psia-ft³/lb-mole-°R] x [average vapor temperature {°R}]); See Reference (20)
(l) Annual standing loss (lb/yr) = (365) x (vapor space exp factor per day) x ([π/4] x [diameter {ft}]²) x (vapor space outate [ft]) x (vented vapor saturation factor) x (stock vapor density [lb/ft³]) x (1 - [control efficiency {%} / 100]); See Reference (21)
(m) Daily standing loss lb/day) = (annual standing loss [lb/yr]) / (365 days/yr)
(n) Net working loss throughput (ft³/yr) = (5 614 ft³//bbl) x (total annual throughput [bbl/yr]); See Reference (22)
(o) Annual sum of the increases in liquid level (ft/yr) = ([5 614] x [total annual throughput {bbl/yr}]) / ([π/4] x [tank diameter {ft}]²); See Reference (23)
(p) Number of turnovers per year = (annual sum of the increases in liquid level [ft/yr]) / ([maximum liquid height {ft}] - [minimum liquid height {ft}]); See Reference (24)
(q) If N <= 36 working loss turnover factor equal to 1 or working loss turnover factor = ([180] + [number of turnovers per year]) / ([6] x [number of turnovers per year]); See Reference (25)
(r) Annual working loss (lb/yr) = (net working loss throughput [ft³/yr]) x (working loss turnover factor) x (working loss product factor) x (vapor density [lb/ft³]) x (vent setting correction factor) x (1- [control efficiency {%} / 100]); See Reference (27)
(s) Daily working loss lb/day) = (net working loss throughput [ft³/day]) x (working loss turnover factor) x (working loss product factor) x (vapor density [lb/ft³]) x (vent setting correction factor) x (1 - [control efficiency {%} / 100]); See Reference (27)
(t) Annual or daily total tank routine losses (lb/yr or lb/day) = (annual or daily standing losses [lb/yr or lb/day]) + (annual or daily working losses [lb/yr or lb/day]); See Reference (28)
(u) Total annual or daily emissions estimate (lb/ unit) = (total annual or daily tank routine losses [lb/ unit]) x (total number of storage tanks)

[redacted]

REFERENCES:

(1) See Table 2 Storage Tank—Input Assumptions and Parameters
(2) See Table 1 Input Assumptions and Parameters
(3) Engineering judgement based on typical bulk storage tank design for representative industries
(4) AP-42 Chapter 7 (June 2020); see equation 1-36 For vertical tanks value set to 1 For horizontal tanks value set to 0
(5) AP-42 Chapter 7 (June 2020); see equation 1-22 note 1 The vapor molecular weight equals the sum of the molecular weight multiplied by the vapor mole fraction
(6) AP-42 Chapter 7 (June 2020); see equation 1-22 note 2 The true vapor pressure equals the sum of equilibrium partial pressures
(7) Site-specific meteorological data obtained from the Portland General Electric Beaver Plant meteorological tower
(8) AP-42 Chapter 7 (June 2020); see equation 1-11
(9) AP-42 Chapter 7 (June 2020); Table 7 1-6
(10) AP-42 Chapter 7 (June 2020); see equation 1-7
(11) AP-42 Chapter 7 (June 2020); see equation 1-12
(12) AP-42 Chapter 7 (June 2020); see equation 1-16 Per equation 1-16 liquid height typically assumed to be at the half-full level in the absence of site-specific data
(13) AP-42 Chapter 7 (June 2020); see equation 1-18 for cone roofs (assumes standard cone roof slope of 0 0625 ft/ft) or see equation 1-20 for dome roofs (assumes modified dome roof radius equation)
(14) AP-42 Chapter 7 (June 2020); see equation 1-17 for cone roofs or see equation 1-19 for dome roofs
(15) AP-42 Chapter 7 (June 2020); see equation 1-16
(16) AP-42 Chapter 7 (June 2020); see equation 1-21 Assumes true vapor pressure as the vapor pressure at average daily liquid surface temperature
(17) AP-42 Chapter 7 (June 2020); see equation 1-30
(18) AP-42 Chapter 7 (June 2020); see equation 1-31
(19) AP-42 Chapter 7 (June 2020); see equation 1-32 Note the simplified version of this equation (e g equation 1-33) was not used since HS/D is not equal to 0 5 and allows for variances in aR and aS
(20) AP-42 Chapter 7 (June 2020); see equation 1-22
(21) AP-42 Chapter 7 (June 2020); see equation 1-4
(22) AP-42 Chapter 7 (June 2020); see equation 1-39
(23) AP-42 Chapter 7 (June 2020); see equation 1-37
(24) AP-42 Chapter 7 (June 2020); see equation 1-36
(25) AP-42 Chapter 7 (June 2020); see notes for equation 1-35
(26) AP-42 Chapter 7 (June 2020); see notes for equation 1-35 Assumes KP = 0 75 for crude oils or 1 for all other organic liquids
(27) AP-42 Chapter 7 (June 2020); see equation 1-35
(28) AP-42 Chapter 7 (June 2020); see equation 1-1
[redacted]
(30) Molecular weights obtained from National Institute of Standards and Technology Chemistry WebBook
[redacted]

Table 54
Cooling Tower Particulate Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Pollutant	Emission Factor (lb/MMgal)	Emission Estimates		
		Hourly (lb/hr)	Daily [(a)] (lb/day)	Annual [(b)] (tons/yr)
PM	--	0.032 [(c)]	0.76	0.14
PM_{10}	--	0.028 [(d)]	0.67	0.12
$PM_{2.5}$	--	0.017 [(e)]	0.40	0.072
VOC	0.70 [(5)]	0.84 [(f)]	20.2	3.61

NOTES:

gpm = gallons per minute.

MMgal = million gallons.

ppm_w = parts per million by weight.

(a) Daily emissions estimate (lb/day) = (daily emissions estimate [lb/hr]) x (daily hours of operation [hrs/day])

Daily hours of operation (hrs/day) = 24.0 (1)

(b) Annual emissions estimate (tons/yr) = (hourly emissions estimate [lb/hr]) x (annual hours of operation [hrs/yr]) / (2 000 lb/ton)

Annual hours of operation (hrs/yr) = 8 592 (1)

(c) Hourly emissions estimate (lb/hr) = (water circulation rate [gpm]) x (water density [lb/gal]) x (total dissolved concentration [ppm_w]) / (10^6) x (drift loss of circulating water [%] / 100) x (60 mins/hr) x (cycles of concentration)

Water circulation rate (gpm) = 20 000 (2)

Water density (lb/gal) = 8.34

Total dissolved concentration (ppm_w) = 105 (2)

Drift loss of circulating water (%) = 0.0005 (2)

Cycles of concentration = 6 (2)

(d) Hourly PM_{10} emissions estimate (lb/hr) = (PM emissions estimate [lb/hr]) x (PM_{10} percentage of PM emissions [%] / 100)

PM_{10} percentage of PM emissions (%) = 88.2 (3)

(e) Hourly $PM_{2.5}$ emissions estimate (lb/hr) = (PM_{10} emissions estimate [lb/hr]) x ($PM_{2.5}$ fraction of PM_{10})

$PM_{2.5}$ fraction of PM_{10} = 0.60 (4)

(f) Hourly VOC emissions estimate (lb/hr) = (emission factor [lb/MMgal]) x (MMgal/10^6 gal) x (water circulation rate [gpm]) x (60 min/hr)

Water circulation rate (gpm) = 20 000 (2)

REFERENCES:

(1) See Table 1 Input Assumptions and Parameters.

(2) See Table 3 Miscellaneous—Input Assumptions and Parameters.

(3) From the technical paper "Calculating Realistic PM_{10} Emissions from Cooling Towers" by Joel Reisman and Gordon Frisbie. The percent of PM_{10} is based on the total dissolved solids content.

(4) From Appendix A - Updated CEIDARS Table with $PM_{2.5}$ Fractions to the CEQA handbook supplemental information.

(5) AP-42 Chapter 5.1 (April 2015) Table 5.1-2 "Fugitive Emission Factors for Petroleum Refineries." Assumes controlled cooling water due to in-line hydrocarbon monitoring system.

Table 55
Emergency Fire Water Pump Criteria Pollutant and GHG Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Emergency Fire Water Pump (Diesel Fueled)
Engine Size (hp)	(1)	410
Engine Size (kW)	(1)	306
Hourly Fuel Usage (gal/hr)	(2)	23.5
Maximum Daily Fuel Usage (gal/day)	(2)	141
Annual Fuel Usage (gal/yr)	(2)	2 350
NORMAL OPERATION		
Daily Hours of Operation (hrs/day)	(2)	6.00
Annual Hours of Operation (hrs/yr)	(2)	100
COLD START		
Cold Start Duration (min/cold start)	(4)	1.00
Daily Number of Cold Starts (cold starts/day)	(4)	1.00
Annual Number of Cold Starts (cold starts/yr)	(4)	20.0

Pollutant	Emission Factor (Units)			Emission Estimates					
				Hourly (lb/hr)		Daily (lb/day)		Annual (ton/yr)	
Total PM	--			0.038	(3)	0.22	(3)	1.8E-03	(3)
Normal Operation	*0.053*	*(g/kW-hr)*	(a)	*0.036*	(c)	*0.21*	(d)	*1.8E-03*	(e)
From Cold Starts	*0.233*	*(g/kW-hr)*	(a)	*2.6E-03*	(f)	*2.6E-03*	(g)	*2.6E-05*	(h)
PM_{10}	--			0.038	(8)	0.22	(8)	1.8E-03	(8)
$PM_{2.5}$	--			0.038	(8)	0.22	(8)	1.8E-03	(8)
NO_X	0.40	(g/kW-hr)	(9)	0 27	(c)	1.62	(d)	0.013	(e)
CO	3.5	(g/kW-hr)	(9)	2 36	(c)	14.2	(d)	0.12	(e)
SO_2	--			5.0E-03	(i)	0.030	(i)	2.5E-04	( )
VOC	0.19	(g/kW-hr)	(9)	0.13	(c)	0.77	(d)	6.4E-03	(e)
CO_2	22.5	(lb/gal)	(k)	529	(l)	3 173	(l)	26.4	(m)
CH_4	9.1E-04	(lb/gal)	(n)	0.021	(l)	0.13	(l)	1.1E-03	(m)
N_2O	1 8E-04	(lb/gal)	(n)	4.3E-03	(l)	0.026	(l)	2.1E-04	(m)
CO_2e	22.6	(lb/gal)	(o)	531	(l)	3 184	(l)	26 5	(m)

NOTES:

Btu/hp-hr = British thermal units per horsepower-hour.

g/kW-hr = grams per kilowatt-hour.

MMBtu = million British thermal units.

(a) PM emission factor (g/kW-hr) = (filterable PM emission factor [g/kW-hr]) + (condensable PM emission factor [g/kW-hr])

Normal operation - filterable PM emission factor (g/kW-hr) = 0 02 (5)
Normal operation - condensable PM emission factor (g/kW-hr) = 0.033 (b)
Cold start - filterable PM emission factor (g/kW-hr) = 0 20 (5)
Cold start - condensable PM emission factor (g/kW-hr) = 0.033 (b)

(b) Condensable PM emission factor (g/kW-hr) = (condensable PM emission factor [lb/MMBtu]) x (MMBtu/10^6 Btu) x (average brake-specific fuel consumption [Btu/hp-hr]) x (453.592 g/lb) x (1.341 hp/kW)

Condensable PM emission factor (lb/MMBtu) = 0 0077 (6)
Average brake-specific fuel consumption (Btu/hp-hr) = 7 000 (7)

(c) Hourly emissions estimate (lb/hr) = (emission factor [g/kW-hr]) x (engine size [kW]) x (lb/453.592 g)

(d) Daily emissions estimate (lb/day) = (emission factor [g/kW-hr]) x (engine size [kW]) x (lb/453.592 g) x (maximum daily hours of operation [hrs/day])

(e) Annual emissions estimate (tons/yr) = (emission factor [g/kW-hr]) x (engine size [kW]) x (annual hours of operation [hrs/yr]) x (lb/453 592 g) x (ton/2 000 lb)

(f) Hourly emissions estimate (lb/hr) = (emission factor [g/kW-hr]) x (engine size [kW]) x (cold start duration [min/cold start]) x (hr/60 min) x (lb/453.592 g)

(g) Daily emissions estimate (lb/day) = (emission factor [g/kW-hr]) x (engine size [kW]) x (cold start duration [min/cold start]) x (hr/60 min) x (daily number of cold starts [cold starts/day]) x (lb/453.592 g)

(h) Annual emissions estimate (tons/yr) = (emission factor [g/kW-hr]) x (engine size [kW]) x (cold start duration [min/cold start]) x (hr/60 min) x (annual number of cold starts [cold starts/yr]) x (lb/453.592 g) x (ton/2 000 lb)

(i) Hourly or daily emissions estimate (lb/hr or lb/day) = (ULSD sulfur content [ppm] / 1 000 000) x (hourly or daily fuel usage [gal/hr or gal/day]) x (density of diesel [lb/gal]) / (sulfur molecular weight [lb/lb-mol]) x (SO_2 molecular weight [lb/lb-mol])

ULSD sulfur content (ppm) = 15 (10)
Density of diesel (lb/gal) = 7.11 (11)
Sulfur molecular weight (lb/lb-mol) = 32 065
SO_2 molecular weight (lb/lb-mol) = 64 066

(j) Annual emissions estimate (tons/yr) = (ULSD sulfur content [ppm] / 1 000 000) x (annual fuel usage [gal/yr]) x (density of diesel [lb/gal]) / (sulfur molecular weight [lb/lb-mol]) x (SO_2 molecular weight [lb/lb-mol]) x (ton/2 000 lb)

ULSD sulfur content (ppm) = 15 (10)
Density of diesel (lb/gal) = 7.11 (11)
Sulfur molecular weight (lb/lb-mol) = 32 065
SO_2 molecular weight (lb/lb-mol) = 64 066

(k) CO_2 emission factor (lb/gal) = (CO_2 emission factor [kg/MMBtu]) x (default high heat value [MMBtu/gal]) x (2 205 lb/kg)

CO_2 emission factor (kg/MMBtu) = 73.96 (12)
Default high heat value (MMBtu/gal) = 0.138 (12)

(l) Hourly or daily emissions estimate (lb/hr or lb/day) = (emission factor [lb/gal]) x (hourly or daily fuel usage [gal/hr or gal/day])

(m) Annual emissions estimate (tons/yr) = (emission factor [lb/gal]) x (annual fuel usage [gal/yr]) x (ton/2 000 lb)

(n) CH_4 or N_2O emission factor (lb/gal) = (CH_4 or N_2O emission factor [kg/MMBtu]) x (default high heat value [MMBtu/gal]) x (2 205 lb/kg)

CH_4 emission factor (kg/MMBtu) = 3 0E-03 (13)
N_2O emission factor (kg/MMBtu) = 6 0E-04 (13)
Default high heat value (MMBtu/gal) = 0.138 (12)

(o) CO_2e emission factor (lb/gal) = (CO_2 emission factor [lb/gal]) + (CH_4 emission factor [lb/gal]) x (CH_4 global warming potential) + (N_2O emission factor [lb/gal]) x (N_2O global warming potential)

CH_4 global warming potential = 25 (14)
N_2O global warming potential = 298 (14)

REFERENCES:

(1) See Table 3 Miscellaneous—Input Assumptions and Parameters.
(2) See Table 1 Input Assumptions and Parameters.
(3) Value represents the sum total of normal operation and cold-start PM emission estimates.
(4) Air Quality Implications of Backup Generators in California PIER Final Project Report prepared by the California Energy Commission dated July 2005. See section 3.4. Conservatively assumes each cold start lasts for up to one minute. Assumes only one cold start per day and up to 20 cold starts per year.
(5) USEPA Nonroad Compression-Ignition Engines: Exhaust Emission Standards (EPA-420-B-16-022) dated March 2016. Assumes Tier 4 emission factor for normal operation and Tier 2 emission factor for cold starts.
(6) AP-42 Chapter 3.4 (October 1996) Table 3.4-2 "Particulate and Particle-Sizing Emission Factors for Large Uncontrolled Stationary Diesel Engines."
(7) AP-42 Chapter 3.4 (October 1996) Table 3.4-1 "Gaseous Emission Factors for Large Stationary Diesel and All Stationary Dual Fuel Engines." See footnote e.
(8) Assumes 100% of PM is $PM_{2.5}$.
(9) USEPA Nonroad Compression-Ignition Engines: Exhaust Emission Standards (EPA-420-B-16-022) dated March 2016. Assumes Tier 4 emission factors.
(10) 40 CFR Part 80 Subpart I §80.510. All highway and nonroad locomotive marine (NRLM) diesel fuel sulfur standards must meet 15 ppm after June 1 2012.
(11) USEPA "Nationwide Emission Benefits of a Low Sulfur Diesel Fuel" dated March 3 1999. Assumes density of diesel fuel.
(12) 40 CFR Part 98 Subpart C Table C-1 "Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel." Assumes Distillate Fuel Oil No.2.
(13) 40 CFR Part 98 Subpart C Table C-2 "Default CH_4 and N_2O Emission Factors for Various Types of Fuel."
(14) 40 CFR Part 98 Subpart A Table A-1 "Global Warming Potentials."

Table 56
Emergency Generator nos. 1-2 Criteria Pollutant and GHG Emission Estimates
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Parameter		Emergency Generator no. 1 (Diesel Fuel)	Emergency Generator no. 2 (Diesel Fuel)
Engine Size (hp)	(1)	2 000	2 000
Engine Size (kW)	(1)	1 491	1 491
Hourly Fuel Usage (gal/hr)	(2)	90.1	90.1
Maximum Daily Fuel Usage (gal/day)	(2)	541	541
Annual Fuel Usage (ga /hr)	(2)	9 009	9 009
NORMAL OPERATION			
Daily Hours of Operation (hrs/day)	(2)	6.00	6.00
Annual Hours of Operation (hrs/yr)	(2)	100	100
COLD START			
Cold Start Duration (min/cold start)	(3)	1.00	1.00
Daily Number of Cold Starts (cold starts/day)	(3)	1.00	1.0
Annual Number of Cold Starts (cold starts/yr)	(3)	20.0	20.0

Pollutant	Emission Factor (Units)			Emission Estimates								
				Emergency Generator no. 1 (Diesel Fuel)			Emergency Generator no. 2 (Diesel Fuel)			Total Emergency Generator		
				Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)	Hourly (lb/hr)	Daily (lb/day)	Annual (tons/yr)
Total PM	--			0.22 (4)	1.25 (4)	0.010 (4)	0.22 (4)	1.25 (4)	0.010 (4)	**0.44**	**2.50**	**0.021**
Normal Operation	*0.063*	*(g/kW-hr)*	(a)	*0.21* (c)	*1.24* (d)	*0.010* (e)	*0.21* (c)	*1.24* (d)	*0.010* (e)	***0.41***	***2.48***	***0.021***
From Cold Starts	*0.233*	*(g/kW-hr)*	(a)	*0.013* (f)	*0.013* (g)	*1.3E-04* (h)	*0.013* (f)	*0.013* (g)	*1.3E-04* (h)	***0.026***	***0.026***	***2.6E-04***
PM_{10}	--			0.22 (8)	1.25 (8)	0.010 (8)	0.22 (8)	1.25 (8)	0.010 (8)	**0.44**	**2.50**	**0.021**
$PM_{2.5}$	--			0.22 (8)	1.25 (8)	0.010 (8)	0.22 (8)	1.25 (8)	0.010 (8)	**0.44**	**2.50**	**0.021**
NO_X	0.67	(g/kW-hr)	(9)	2.20 (c)	13.2 (d)	0.11 (e)	2.20 (b)	13.2 (d)	0.11 (e)	**4.40**	**26.4**	**0.22**
CO	3.5	(g/kW-hr)	(9)	11.5 (c)	69.0 (d)	0.58 (e)	11.5 (b)	69.0 (d)	0.58 (e)	**23.0**	**138**	**1.15**
SO_2	--			0.019 ( )	0.12 ( )	9.6E-04 (j)	0.019 (i)	0.12 (i)	9.6E-04 (j)	**0.038**	**0.23**	**1.9E-03**
VOC	0.19	(g/kW-hr)	(9)	0.62 (c)	3.75 (d)	0.031 (e)	0.62 (b)	3.75 (d)	0.031 (e)	**1.25**	**7.49**	**0.062**
CO_2	22.5	(lb/gal)	(k)	2 028 ( )	12 165 ( )	101 (m)	2 028 (l)	12 165 (l)	101 (m)	**4 055**	**24 331**	**203**
CH_4	9.1E-04	(lb/gal)	(n)	0.082 ( )	0.49 ( )	4.1E-03 (m)	0.082 (l)	0.49 (l)	4.1E-03 (m)	**0.16**	**0.99**	**8.2E-03**
N_2O	1.8E-04	(lb/gal)	(n)	0.016 ( )	0.099 ( )	8.2E-04 (m)	0.016 (l)	0.099 (l)	8.2E-04 (m)	**0.033**	**0.20**	**1.6E-03**
CO_2e	22.6	(lb/gal)	(o)	2 035 ( )	12 207 ( )	102 (m)	2 035 (l)	12 207 (l)	102 (m)	**4 069**	**24 414**	**203**

NOTES

g/kW-hr grams per kilowatt-hour.

ULSD ultra-low sulfur diesel.

(a) PM emission factor (g/kW-hr) (filterable PM emission factor [g/kW-hr]) + (condensable PM emiss on factor [g/kW-hr])

Normal operation - filterable PM emission factor (g/kW-hr)	0.03	(5)
Normal operation - condensable PM emission factor (g/kW-hr)	0.033	(b)
Cold start - f lterable PM em ssion factor (g/kW-hr)	0.20	(5)
Cold start - condensable PM em ssion factor (g/kW-hr)	0.033	(b)

(b) Condensable PM em ssion factor (g/kW-hr) (condensable PM em ssion factor [lb/MMBtu]) x (MMBtu/10^6 Btu) x (average brake-specific fuel consumption [Btu/hp-hr]) x (453.592 g/ b) x (1.341 hp/kW)

Condensable PM em ssion factor (lb/MMBtu)	0.0077	(6)
Average brake-specific fuel consumption (Btu/hp-hr)	7 000	(7)

(c) Hourly em ssions estimate (lb/hr) (emiss on factor [g/kW-hr]) x (engine s ze [kW]) x (b/453.592 g)

(d) Da ly emissions estimate (b/day) (emission factor [g/kW-hr]) x (engine size [kW]) x (lb/453.592 g) x (max mum daily hours of operation [hrs/day])

(e) Annual emissions est mate (tons/yr) (emission factor [g/kW-hr]) x (engine size [kW]) x (annual hours of operation [hrs/yr]) x (lb/453.592 g) x (ton/2 000 lb)

(f) Hourly em ssions estimate (lb/hr) (emiss on factor [g/kW-hr]) x (engine s ze [kW]) x (cold start duration [m n/cold start]) x (hr/60 min) x (lb/453.592 g)

(g) Da ly emissions estimate (b/day) (emission factor [g/kW-hr]) x (engine size [kW]) x (cold start duration [min/cold start]) x (hr/60 min) x (da ly number of cold starts [cold starts/day]) x (lb/453.592 g)

(h) Annual emissions est mate (tons/yr) (emission factor [g/kW-hr]) x (engine size [kW]) x (cold start duration [min/cold start]) x (hr/60 m n) x (annual number of cold starts [cold starts/yr]) x (b/453.592 g) x (ton/2 000 b)

( ) Hourly or da ly emissions estimate (b/ unit) (ULSD sulfur content [ppm] / 1 000 000) x (hourly or daily fuel usage [gal/ unit]) x (density of diesel [lb/gal]) / (su fur molecular weight [lb/lb-mol]) x (SO_2 molecular we ght [lb/lb-mol])

ULSD sulfur content (ppm)	15	(10)
Density of diesel (lb/gal)	7.11	(11)
Sulfur molecular weight (lb/lb-mol)	32.065	
SO_2 molecular we ght (lb/lb-mol)	64.066	

( ) Annual emissions est mate (tons/yr) (ULSD sulfur content [ppm] / 1 000 000) x (annual fuel usage [gal/yr]) x (density of diesel [b/gal]) / (sulfur molecular weight [lb/lb-mo]) x (SO_2 molecular we ght [lb/lb-mol]) x (ton/2 000 lb)

ULSD sulfur content (ppm)	15	(10)
Density of diesel (lb/gal)	7.11	(11)
Sulfur molecular weight (lb/lb-mol)	32.065	
SO_2 molecular we ght (lb/lb-mol)	64.066	

(k) CO_2 emission factor (lb/ga) (CO_2 emission factor [kg/MMBtu]) x (default high heat value [MMBtu/ga]) x (2.205 lb/kg)

CO_2 emission factor (kg/MMBtu)	73.96	(12)
Default h gh heat value (MMBtu/ga)	0.138	(12)

( ) Hourly or da ly emissions estimate (b/ unit) (emission factor [lb/ga]) x (hourly or da ly fuel usage [gal/ unit])

(m) Annual emissions est mate (tons/yr) (emission factor [b/gal]) x (annual fuel usage [gal/yr]) x (ton/2 000 lb)

(n) CH_4 or N_2O emission factor (lb/gal) (CH_4 or N_2O emission factor [kg/MMBtu]) x (default high heat value [MMBtu/gal]) x (2.205 lb/kg)

CH_4 emission factor (kg/MMBtu)	3.0E-03	(13)
N_2O emission factor (kg/MMBtu)	6.0E-04	(13)
Default h gh heat value (MMBtu/ga)	0.138	(12)

(o) CO_2e emission factor (lb/gal) (CO_2 emission factor [b/gal]) + (CH_4 emission factor [lb/gal]) x (CH_4 global warming potential) + (N_2O emission factor [b/gal]) x (N_2O global warming potential)

CH_4 global warming potential	25.0	(14)
N_2O global warming potential	298	(14)

REFERENCES

(1) See Table 3 Miscellaneous—Input Assumptions and Parameters.

(2) See Table 1 Input Assumptions and Parameters.

(3) Air Quality Implications of Backup Generators in California PIER Final Project Report prepared by the California Energy Comm ssion dated July 2005. See section 3.4. Conservatively assumes each cold start lasts for up to one m nute. Assumes only one cold start per day and up to 20 cold starts per year.

(4) Total PM represents the sum total of cold start and normal operation emissions estimates.

(5) USEPA Nonroad Compression-Ignition Engines Exhaust Emission Standards (EPA-420-B-16-022) dated March 2016. Assumes T er 4 em ssion factor for normal operation and Tier 2 emission factor for cold starts.

(6) AP-42 Chapter 3.4 (October 1996) Table 3.4-2 Particulate and Particle-Sizing Emiss on Factors for Large Uncontrolled Stat onary Diesel Engines.

(7) AP-42 Chapter 3.4 (October 1996) Table 3.4-1 Gaseous Emission Factors for Large Stat onary Diesel and A l Stationary Dual Fuel Engines. See footnote e.

(8) Assumes 100% of PM is $PM_{2.5}$.

(9) USEPA Nonroad Compression-Ignition Engines Exhaust Emission Standards (EPA-420-B-16-022) dated March 2016. Assumes T er 4 em ssion factors.

(10) 40 CFR Part 80 Subpart I §80.510. All highway and nonroad locomotive marine (NRLM) diesel fuel su fur standards must meet 15 ppm after June 1 2012.

(11) USEPA Nationw de Emission Benefits of a Low Su fur Diesel Fuel dated March 3 1999. Assumes density of diesel fuel.

(12) 40 CFR Part 98 Subpart C Table C-1 Default CO_2 Emission Factors and High Heat Values for Various Types of Fuel. Assumes D stillate Fuel Oil No.2.

(13) 40 CFR Part 98 Subpart C Table C-2 Default CH_4 and N_2O Em ssion Factors for Various Types of Fuel.

(14) 40 CFR Part 98 Subpart A Table A-1 Global Warming Potent als.

Table 57
Intermediate Tank List
NEXT Renewable Fuels Oregon, LLC—Clatskanie, OR

Intermediate Tank	Process Location
[redacted]	

REFERENCES:

(1) The intermediate tanks are not expected to have emissions of VOCs or TACs to atmosphere.

APPENDIX B
APPLICATION FORMS

DEQ USE ONLY	
Permit Number:	Type of Application:
Application No:	RNW ____ MOD ____ NEW ____
Date Received :	
Regional Office:	Check No. Amount $

1. Company			**2. Facility Location**		
Legal Name: NEXT Renewable Fuels Oregon, LLC			Name: NEXT Renewable Fuels Oregon, LLC		
Mailing Address: 11767 Katy Freeway, Suite 705			Street Address: Port Westward (To Be Determined)		
City: Houston	State: TX	Zip Code: 97016	City: Clatskanie	County: Columbia	Zip Code: 97016
Number of employees (Corporate):		TBD	Number of employees (Facility):		TBD
3. Industrial Classification Code(s)			**4. Other DEQ Permits**		
Primary SIC and NAICS: 2869 and 325199			NPDES (TBD)		
Secondary SIC and NAICS:			**5. LUCS:** ☑New facility ☐Modified facility		

6. Permit Action:

- ___Short Term Activity ACDP
- ___New Simple ACDP
- ___New Construction ACDP
- ✓ New Standard ACDP
- ___New Standard ACDP (PSD/NSR)
- ___Renewal of an existing permit without changes (include form AQ403 for Standard ACDPs)
- ___Renewal of an existing permit with changes (include any other necessary forms and form AQ403 for Standard ACDPs)
- ___Modification of existing permit

7. Signature

I hereby apply for permission to discharge air contaminants in the State of Oregon, as stated or described in this application, and certify that the information contained in this application and the schedules and exhibits appended hereto, are true and correct to the best of my knowledge and belief.

Christopher Efird	Executive Chairman
Name of official (Printed or Typed)	Title of official and phone number
[signature]	9/16/2021
Signature of official	Date

Fee Information

(Make check payable to DEQ)

Note: The initial application fees and annual fees specified below (OAR 340-216-8020, Table 2, Parts 1, 2 and 3) are only required for initial permit applications. These fees are not required for an application to renew or modify an existing permit. The appropriate specific activity fee(s) specified below (OAR 340-216-8020, Table 2, and Part 4) applies to permit modifications or may be in addition to initial permit application fees.

OAR 340-216-8020, Table 2, Part 1 – Initial Permitting Application Fees:		
Short Term Activity ACDP	☐	$4,500.00
Simple ACDP	☐	$9,000.00
Construction ACDP	☐	$14,400.00
Standard ACDP (PSD/NSR)	☑	$18,000.00
Standard ACDP (Major NSR or Type A State NSR)	☐	$63,000.00
OAR 340-216-8020, Table 2, Part 2 – Annual Fees:		
Simple ACDP – Low fee class	☐	$3,917.00
Simple ACDP – High fee class	☐	$7,834.00
Standard ACDP	☑	$15,759.00
OAR 340-216-8020, Table 2, Part 3 – Cleaner Air Oregon Annual Fees:		
Simple ACDP - Low fee class	☐	$806.00
Simple ACDP - High fee class	☐	$1,612.00
Standard ACDP	☑	$3,225.00
OAR 340-216-8020, Table 2, Part 4 – Specific Activity Fees:		
Non-Technical Permit Modification	☐	$432.00
Basic Technical Permit Modification	☐	$540.00
Simple Technical Permit Modification	☐	$1,800.00
Moderate Technical Permit Modification	☐	$9,000.00
Complex Technical Permit Modification	☐	$18,000.00
Major NSR or type A State NSR Permit Modification	☐	$63,000.00
Modeling review (outside Major NSR or type A State NSR)	☑	$9,000.00
Public Hearing at Source's Request	☐	$3,600.00
State MACT determination	☐	$9,000.00
Compliance Order Monitoring	☐	$180.00/month

Total Fees:	**$ 45,984.00**

1. Company Information:

Legal Name:	Other company name (if different than legal name):
NEXT Renewable Fuels Oregon, LLC	

2. Site Contact Person:

(A person who deals with DEQ staff about equipment problems.)

Name:	Telephone number:	Fax:
Gene Cotten	661-201-2653	Not Applicable
Title: President	Email address: gene@nextrenewables.com	
Mailing address: 11767 Katy Freeway, Suite 705	City, State, Zip Code: Houston, TX 77079	

3. Facility Contact Person:

(If other than the site contact person, a person involved with all environmental issues at the facility although they may be housed at a different site.)

Name:	Telephone number:	Fax:
Title:	Email address:	
Mailing address:	City, State, Zip Code	

4. Mailing Contact Person:

(If other than the site contact person, a person to whom the company would like all agency communications directed.)

Name:	Telephone number:	Fax:
Title:	Email address:	
Mailing address:	City, State, Zip Code	

5. Invoice Contact Person:

(If other than the site contact person, a contact to which invoices and communications related to resolving invoice questions can be directed.)

Name:	Telephone number:	Fax:
Title:	Email address:	
Mailing address:	City, State, Zip Code	

Facility Name: NEXT Renewable Fuels Oregon, LLC Permit Number: New

1. Description of facility and processes:

NEXT Renewable Fuels Oregon, LLC is proposing to construct a renewable diesel, naphtha, and jet fuel manufacturing facility in Clatskanie, Oregon (proposed facility). The proposed facility will receive and process raw oil feedstocks, including vegetable oils and animal fats, to produce renewable fuel products. See application narrative for additional details on the proposed facility processes and emission unit descriptions. See application figure attachments to for plot plan, process flow diagrams, and maps.

2. Attach plot plan.

3. Attach process flow diagram.

4. Attach a city map or drawing showing the facility location.

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

Tank Information:

	Tank Identification Number			
	RD1-3	RD/RJ1	RN/RJ1-3	HCS
1. Existing or future?	Future	Future	Future	Future
2. Manufacturer	TBD	TBD	TBD	TBD
3. Date construction commenced (month/year)	TBD	TBD	TBD	TBD
4. Date installed (month/year)	TBD	TBD	TBD	TBD
5. Rated capacity (gallons)	9,450,000	9,450,000	2,100,000	630,000
6. Height (feet)	48	48	48	40
7. Diameter (feet)	184	184	88	52
8. Submerged fill pipe? (yes or no)				
9. Type of tank	Fixed roof	Fix. roof/int. float	Fix. roof/int. float	Fix. roof/int. float
10. Underground? (yes or no)	No	No	No	No
Underground tank fill type				
11. Above ground? (yes or no)	Yes	Yes	Yes	Yes
a. Pipe material				
b. Pipe size				
c. Piping continuously drains downward? (yes or no)				
d. Description of condensate collection tank.				
e. Isolation valves? (yes or no)				
12. Pressure/vacuum relief valves				
a. vent pressure settings (psia)				
b. months				
13. Pressure conservation vent? (yes or no)				
If yes, enter psia.				
14. Fixed roof tank? (yes or no)	Yes	No	No	No
a. roof color	White			

State of Oregon
Department of Environmental Quality

	Tank Identification Number			
	RD1-3	RD/RJ1	RN/RJ1-3	HCS
b. shell color	White			
c. vapor space height (feet)	25.9			
d. shell condition	New			
15. Floating roof tank? (yes or no)	No	Yes	Yes	Yes
a. type of construction		Welded	Welded	Welded
b. condition		NEW	NEW	New
c. tank color		White	White	White
d. deck type		Welded	Welded	Welded
16. External floating roof tank seal type		N/A	N/A	N/A
17. Internal floating roof tanks				
a. seal type		Liquid primai	Liquid primai	Liquid primai
b. number of columns		0	0	0
c. effective column diameter (feet)		N/A	N/A	N/A
d. total deck seam length (feet)				
e.i deck fitting types – access hatch				
(1) bolted cover, gasketed				
(2) unbolted cover, gasketed				
(3) unbolted cover, ungasketed				
e.ii deck fitting types – automatic gauge float well				
(1) bolted cover, gasketed				
(2) unbolted cover, gasketed				
(3) unbolted cover, ungasketed				
e.iii deck fitting types – column well				
(1) built-up column, sliding cover, gasketed				

	Tank Identification Number			
	RD1-3	RD/RJ1	RN/RJ1-3	HCS
(2) built up column, sliding cover, ungasketed				
(3) pipe column, flexible fabric sleeve seal				
(4) pipe column, sliding cover, gasketed				
(5) pipe column, sliding cover, ungasketed				
e.iv deck fitting types – ladder well				
(1) sliding cover, gasketed				
(2) sliding cover, ungasketed				
e.v deck fitting types – sample well or pipe				
(1) slotted pipe, sliding cover, gasket				
(2) slotted pipe, sliding cover, ungasketed				
(3) sample well, slit fabric seal, 10% open area				
(4) stub drain, 1-inch diameter				
e.vi deck fitting types – roof leg or hanger well				
(1) adjustable				
(2) fix				
e.vii deck fitting types – vacuum breaker				
(1) weighted mechanical actuation, gasketed				
(2) weighted mechanical actuation, ungasketed				
18. Maximum liquid loading rate (gallons/hour)				
19. Description of submerged fill out-loading				
20. Vapor recovery system? (yes or no)	No	No	No	No

Material Stored:

21. Name/type of material stored in the tank	Renewable Diesel	Swing RD-RJ	Swing RN-RJ	HCS
22. Maximum projected throughput (gallons/year)	194,130,000	Varies	Varies	15,487,080
23. Maximum projected turnovers per year	21.2	Varies	Varies	24.6

	Tank Identification Number			
	RD1-3	RD/RJ1	RN/RJ1-3	HCS
24. Density (pounds/gallon)	N/A	N/A	N/A	7.1
25. Molecular weight	188	Varies	Varies	188
26. Average storage temperature (°F)	Ambient	Ambient	Ambient	120
27. Vapor pressure (psia)	0.011	Varies	Varies	0.038

Facility Name: NEXT Renewable Fuels Oregon, LLC Permit Number: New

Tank Information:

	Tank Identification Number			
	VEGOIL1-3	ANIFATS1-3	CACID1-2	OWS
1. Existing or future?	Future	Future	Future	Future
2. Manufacturer	TBD	TBD	TBD	TBD
3. Date construction commenced (month/year)	TBD	TBD	TBD	TBD
4. Date installed (month/year)	TBD	TBD	TBD	TBD
5. Rated capacity (gallons)	5,250,000	5,250,000	16,000	420,000
6. Height (feet)	48	48	30	40
7. Diameter (feet)	150	150	10	43
8. Submerged fill pipe? (yes or no)				
9. Type of tank	Fixed roof	Fixed roof	Fixed roof	Fix. roof/int. float
10. Underground? (yes or no)	No	No	No	No
Underground tank fill type				
11. Above ground? (yes or no)	Yes	Yes	Yes	Yes
a. Pipe material				
b. Pipe size				
c. Piping continuously drains downward? (yes or no)				
d. Description of condensate collection tank.				
e. Isolation valves? (yes or no)				
12. Pressure/vacuum relief valves				
a. vent pressure settings (psia)				
b. months				
13. Pressure conservation vent? (yes or no)				
If yes, enter psia.				
14. Fixed roof tank? (yes or no)	Yes	Yes	Yes	No
a. roof color	White	White	White	

	Tank Identification Number			
	VEGOIL1-3	ANIFATS1-3	CACID1-2	OWS
b. shell color	White	White	White	
c. vapor space height (feet)	25.6	25.6	15.1	
d. shell condition	New	New	New	
15. Floating roof tank? (yes or no)	No	No	No	Yes
a. type of construction				Welded
b. condition				New
c. tank color				White
d. deck type				Bolted
16. External floating roof tank seal type	N/A	N/A	N/A	N/A
17. Internal floating roof tanks				
a. seal type				Liquid prima
b. number of columns				0
c. effective column diameter (feet)				N/A
d. total deck seam length (feet)				
e.i deck fitting types – access hatch				
(1) bolted cover, gasketed				
(2) unbolted cover, gasketed				
(3) unbolted cover, ungasketed				
e.ii deck fitting types – automatic gauge float well				
(1) bolted cover, gasketed				
(2) unbolted cover, gasketed				
(3) unbolted cover, ungasketed				
e.iii deck fitting types – column well				
(1) built-up column, sliding cover, gasketed				

	Tank Identification Number			
	VEGOIL1-3	ANIFATS1-3	CACID1-2	OWS
(2) built up column, sliding cover, ungasketed				
(3) pipe column, flexible fabric sleeve seal				
(4) pipe column, sliding cover, gasketed				
(5) pipe column, sliding cover, ungasketed				
e.iv deck fitting types – ladder well				
(1) sliding cover, gasketed				
(2) sliding cover, ungasketed				
e.v deck fitting types – sample well or pipe				
(1) slotted pipe, sliding cover, gasket				
(2) slotted pipe, sliding cover, ungasketed				
(3) sample well, slit fabric seal, 10% open area				
(4) stub drain, 1-inch diameter				
e.vi deck fitting types – roof leg or hanger well				
(1) adjustable				
(2) fix				
e.vii deck fitting types – vacuum breaker				
(1) weighted mechanical actuation, gasketed				
(2) weighted mechanical actuation, ungasketed				
18. Maximum liquid loading rate (gallons/hour)				
19. Description of submerged fill out-loading				
20. Vapor recovery system? (yes or no)	No	No	No	No

Material Stored:

21. Name/type of material stored in the tank	Vegetable Oil	Animal Fats	Citric Acid (50% Soln.)	Oil Water Separator Slop
22. Maximum projected throughput (gallons/year)	154,871,800	103,247,200	895,000	15,487,080
23. Maximum projected turnovers per year	25.5	17	54.4	36.9

	Tank Identification Number			
	VEGOIL1-3	ANIFATS1-3	CACID1-2	OWS
24. Density (pounds/gallon)	N/A	N/A	N/A	7.1
25. Molecular weight	188	188	N/A	188
26. Average storage temperature (°F)	120	120	Ambient	Ambient
27. Vapor pressure (psia)	1.0E-04	1.0E-04	0.36	0.011

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

1. Boiler Information:

Boiler identification	BOILER1	BOILER2		
Manufacturer	TBD	TBD		
Date manufactured (month/year)	TBD	TBD		
Date construction commenced (month/year)	TBD	TBD		
Date installed (month/year)	TBD	TBD		
Rated design heat input capacity (million Btu per hour)	77.5	77.5		
Rated steam production capacity (pounds per hour)	50,000	50,000		
Primary fuel type	Natural Gas	Natural Gas		
Max. fuel quantity used per hour (include units)	0.071 MMCFH	0.071 MMCFH		
Max. fuel quantity used per year (include units)	612 MMCFY	612 MMCFY		
If oil is used, sulfur content (% by wt.)	N/A	N/A		
Secondary fuel type	N/A	N/A		
Max. fuel quantity used per hour (include units)	N/A	N/A		
Max. fuel quantity used per year (include units)	N/A	N/A		
If oil is used, sulfur content (% by wt.)	N/A	N/A		
Stack identification	BOIL	BOIL		
Stack height (feet)	100	100		
Stack gas flow rate at maximum load (dscf/minute)	23,476	23,476		
Control device(s) identification from AQ300	SCR-BLR	SCR-BLR		
Continuous monitoring systems	N/A	N/A		

2. Describe how the boilers(s) is operated. (Refer to instructions for guidance)

The boilers will operate continuously throughout the year, except for downtime for maintenance and plant outages. Boiler load will depend on the steam demand for process equipment. The exhaust from BOILER1 and BOILER2 will be combined and routed to an SCR control device with an oxidation catalyst for control of NOx and CO emissions.

Internal Combustion Engines and Turbines

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

Engine Information

1.	Device ID Number	EGEN1, EGEN2
2.	Existing or future?	Future
3.	Date construction/installation commenced	TBD
4.	Date construction/installation completed	TBD
5.	Manufacturer	TBD
6.	Date manufactured	TBD
7.	Maximum rating (MMbtu/hr for turbines, Hp for others)	2,000 hp
8.	Control device(s) (yes/no)	Yes
	If yes, enter the description and identification number(s)	Tier IV Engines
9.	Description and use of engine/turbine:	Emergency operation

The proposed facility will utilize two emergency generators to provide power to critical equipment during power outages. Each emergency generator will be limited to 100 hours per year for non-emergency operation and readiness testing, and will be fueled by renewable diesel manufactured at the proposed facility. Both emergency generators will utilize Tier IV rated engines.

Operating Schedule

10.	Projected maximum hours/day	6
11.	Projected maximum hours/year	100

Fuel Information

12. Fuel usage:	a. Type	b. Hourly usage	c. Annual usage
Primary	Diesel	90.1 gal/hr	9,009 gal/yr
Back-up			
Other			

Stack Information

13.	Exit height (ft)	50
14.	Exit diameter (ft)	1.5
15.	Design flowrate (dscf/min)	11,230 acfm

Monitoring Information

16. Monitoring equipment			
fuel flow (y/n)	No	recorder? (y/n)	No
engine load (y/n)	No	recorder? (y/n)	No
other (specify)	Hour meter	recorder? (y/n)	No

Internal Combustion Engines and Turbines

Facility Name: NEXT Renewable Fuels Oregon, LLC Permit Number: New

Engine Information

1.	Device ID Number	EPUMP
2.	Existing or future?	Future
3.	Date construction/installation commenced	TBD
4.	Date construction/installation completed	TBD
5.	Manufacturer	TBD
6.	Date manufactured	TBD
7.	Maximum rating (MMbtu/hr for turbines, Hp for others)	410 hp
8.	Control device(s) (yes/no)	Yes
	If yes, enter the description and identification number(s)	SCR-EPUMP
9.	Description and use of engine/turbine:	Emergency operation

The emergency fire water pump will provide water for firefighting activities if needed during an emergency. The emergency fire water pump will be limited to 100 hours per year for non-emergency operation and readiness testing, and will be fueled by renewable diesel manufactured at the proposed facility. The emergency fire water pump will utilize a Tier IV engine.

Operating Schedule

10.	Projected maximum hours/day	6
11.	Projected maximum hours/year	100

Fuel Information

12. Fuel usage:	a. Type	b. Hourly usage	c. Annual usage
Primary	Diesel	23.5 gal/hr	2,350 gal/yr
Back-up			
Other			

Stack Information

13.	Exit height (ft)	25
14.	Exit diameter (ft)	0.4
15.	Design flowrate (dscf/min)	2,341 acfm

Monitoring Information

16. Monitoring equipment

fuel flow (y/n)	No	recorder? (y/n)	No
engine load (y/n)	No	recorder? (y/n)	No
other (specify)	Hour meter	recorder? (y/n)	No

State of Oregon Department of Environmental Quality

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

Process Information

1. ID Number	1BESV1, 1BESV2, 1BESV3
2. Descriptive name	Pretreatment Train 1-Bleaching Earth Silos
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

Material transfer of bleaching earth from railcar unloading to silos for pretreatment train no. 1.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:

Raw materials	Short term capacity		Annual usage	
	Amount	Units	Amount	Units
Bleaching Earth	8,230	lb/hr	15,331	tons/yr
Products				
Consumed in process.				

12. Control devices(s) (yes/no) Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

FB-1BESV1, FB-1BESV2, FB-1BESV3

State of Oregon Department of Environmental Quality

FORM AQ230
ANSWER SHEET

MISCELLANEOUS PROCESS OR DEVICE

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

Process Information

1. ID Number	2BESV1, 2BESV2, 2BESV3
2. Descriptive name	Pretreatment Train 2-Bleaching Earth Silos
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

Material transfer of bleaching earth from railcar unloading to silos for pretreatment train no. 2.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Bleaching Earth	8,230	lb/hr	15,331	tons/yr
Products				
Consumed in process.				

12. Control devices(s) (yes/no): Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

FB-2BESV1, FB-2BESV2, FB-2BESV3

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

Process Information

1. ID Number	3BESV1, 3BESV2, 3BESV3
2. Descriptive name	Pretreatment Train 3-Bleaching Earth Silos
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

Material transfer of bleaching earth from railcar unloading to silos for pretreatment train no. 3.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:

	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Bleaching Earth	8,230	lb/hr	15,331	tons/yr
Products				
Consumed in process.				

12. Control devices(s) (yes/no): Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

FB-3BESV1, FB-3BESV2, FB-3BESV3

MISCELLANEOUS PROCESS OR DEVICE

FORM AQ230
ANSWER SHEET

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

Process Information

1. ID Number	1BEDAY1, 1BEDAY2
2. Descriptive name	Pretreatment Train 1-BE Day Tanks
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

Material transfer from bleaching earth silos to day tanks for use in wet bleaching and dry bleaching on pretreatment train no. 1.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Bleaching Earth	2,677	lb/hr	11,499	tons/yr
Products				
Consumed in process.				

12. Control devices(s) (yes/no): Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

FB-1BEDAY1, FB-1BEDAY2

State of Oregon Department of Environmental Quality

Facility Name: NEXT Renewable Fuels Oregon, LLC Permit Number: New

Process Information

1. ID Number	2BEDAY1, 2BEDAY2
2. Descriptive name	Pretreatment Train 2-BE Day Tanks
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

Material transfer from bleaching earth silos to day tanks for use in wet bleaching and dry bleaching on pretreatment train no. 2.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Bleaching Earth	2,677	lb/hr	11,499	tons/yr
Products				
Consumed in process.				

12. Control devices(s) (yes/no) Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

FB-2BEDAY1, FB-2BEDAY2

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

Process Information

1. ID Number	3BEDAY1, 3BEDAY2
2. Descriptive name	Pretreatment Train 3-BE Day Tanks
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD
6. Description of process:	

Material transfer from bleaching earth silos to day tanks for use in wet bleaching and dry bleaching on pretreatment train no. 3.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Bleaching Earth	2,677	lb/hr	11,499	tons/yr
Products				
Consumed in process.				

12. Control devices(s) (yes/no) Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

FB-3BEDAY1, FB-3BEDAY2

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

Process Information

1. ID Number	1FASV1
2. Descriptive name	Pretreatment Train 1-Filter Aid Dry Silo
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

Material transfer of filter aid material from railcar unloading to silo for pretreatment train no. 1.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Filter Aid	11,765	lb/hr	1,531	tons/yr
Products				
Consumed in process.				

12. Control devices(s) (yes/no): Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

FB-1FASV1

MISCELLANEOUS PROCESS OR DEVICE

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

Process Information

1. ID Number	2FASV1
2. Descriptive name	Pretreatment Train 2-Filter Aid Dry Silo
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

Material transfer of filter aid material from railcar unloading to silo for pretreatment train no. 2.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Filter Aid	11,765	lb/hr	1,531	tons/yr
Products				
Consumed in process.				

12. Control devices(s) (yes/no) Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

FB-2FASV1

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

Process Information

1. ID Number	3FASV1, 3FASV2, 3FASV3
2. Descriptive name	Pretreatment Train 3-Filter Aid Dry Silo
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD
6. Description of process:	

Material transfer of filter aid material from railcar unloading to silos for pretreatment train no. 3.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Filter Aid	7,843	lb/hr	2,041	tons/yr
Products				
Consumed in process.				

12. Control devices(s) (yes/no) Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

FB-3FASV1, FB-3FASV2, FB-3FASV3

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

Process Information

1. ID Number	1FADT
2. Descriptive name	Pretreatment Train 1-Filter Aid Day Tank
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

Material transfer from filter aid silo to day tank for use in absorption on pretreatment train no. 1. The fugitive emissions generated by the material transfer from the filter aid day tank to the absorption hopper are routed to the day tank vent.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Filter Aid	713	lb/hr	3,061	tons/yr
Products				
Consumed in process.				

12. Control devices(s) (yes/no): Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

FB-1FADT

State of Oregon Department of Environmental Quality

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

Process Information

1. ID Number	2FADT
2. Descriptive name	Pretreatment Train 2-Filter Aid Day Tank
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

Material transfer from filter aid silo to day tank for use in absorption on pretreatment train no. 2. The fugitive emissions generated by the material transfer from the filter aid day tank to the absorption hopper are routed to the day tank vent.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Filter Aid	713	lb/hr	3,061	tons/yr
Products				
Consumed in process.				

12. Control devices(s) (yes/no) Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

FB-2FADT

State of Oregon Department of Environmental Quality

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

Process Information

1. ID Number	3FADT1
2. Descriptive name	Pretreatment Train 3-Filter Aid Day Tanks
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

Material transfer of filter aid to day tanks for use in absorption process on pretreatment train no. 3. The fugitive emissions generated by the material transfer from the filter aid day tank to the absorption hopper will be routed to the day tank vent for control of particulate emissions.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Filter Aid (3FADT1)	958	lb/hr	4,117	tons/yr
Products				
Consumed in process.				

12. Control devices(s) (yes/no): Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

FB-3FADT1

MISCELLANEOUS PROCESS OR DEVICE

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

Process Information

1. ID Number	3FADT2,3FADT3
2. Descriptive name	Pretreatment Train 3-Filter Aid Day Tanks
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

Material transfer of filter aid to day tanks for use in polyethylene removal process on pretreatment train no. 3. The fugitive emissions generated by the material transfer from the filter aid day tanks to the polyethylene removal hopper will be routed to the day tank vent for control of particulate emissions.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Filter Aid (3FADT2)	411	lb/hr	1,768	tons/yr
Filter Aid (3FADT3)	657	lb/hr	2,824	tons/yr
Products				
Consumed in process.				

12. Control devices(s) (yes/no): Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

FB-3FADT2, FB-3FADT3

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

Process Information

1. ID Number	ECO1F, ECO2F, ECO3F
2. Descriptive name	Ecofining Unit Trains-Feed Heaters 1-3
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

The Feed Heater will be used to indirectly heat treated feed oil to the temperature required for removal of oxygen molecules from triglycerides in the hydroprocessing catalyst system (producing straight chain alkane molecules). Each Feed Heater, for each Ecofining Unit train, will have a maximum heat input capacity of 35.2 MMBtu/hr.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Natural gas (each)	0.032	MMcf/hr	278	MMcf/yr
Products				

12. Control devices(s) (yes/no) Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

SCR-ECO1, SCR-ECO2, SCR-ECO3

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

Process Information

1. ID Number	ECO1I, ECO2I, ECO3I
2. Descriptive name	Ecofining Unit Trains-Isomerization Heaters 1-3
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

In the Isomerization Heater, straight chain alkane molecules will be indirectly heated to the temperature required to enable the specialized catalyst to selectively rearrange the straight chain into branched chain alkane molecules and to crack a portion of the molecules into lighter renewable products. Each Isomerization Heater, for each Ecofining Unit train, will have a maximum heat input capacity of 5.3 MMBtu/hr.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:

	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Natural gas (each)	4.9E-03	MMcf/hr	42.1	MMcf/yr
Products				
Renewable Diesel (Maximum RD Operating Scenario)	86.6	Mgal/hr	743,816	Mgal/yr
Renewable Naphtha (Maximum RN Operating Scenario)	4.15	Mgal/hr	35,635	Mgal/yr

12. Control devices(s) (yes/no): Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

SCR-ECO1, SCR-ECO2, SCR-ECO3

MISCELLANEOUS PROCESS OR DEVICE

FORM AQ230
ANSWER SHEET

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

Process Information

1. ID Number	H2HTR
2. Descriptive name	Hydrogen Plant
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

To meet the hydrogen demand required for hydroprocessing in the Ecofining Unit trains, a hydrogen production and compression facility (referred to as the "Hydrogen Plant") will be installed. The Hydrogen Plant will contain a steam methane reforming furnace and associated catalytic reactor vessels, among other ancillary equipment. The SMR furnace will combust natural gas and PSA tail gas. PSA tail gas is a by-product of the hydrogen production process.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:

	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Natural Gas	0.11	MMcf/hr	902	MMcf/yr
PSA Tail Gas	2.60	MMcf/hr	22,365	MMcf/yr
Products				

12. Control devices(s) (yes/no): Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

SCR-H2HTR

FORM AQ230
MISCELLANEOUS PROCESS OR DEVICE **ANSWER SHEET**

Facility Name: NEXT Renewable Fuels Oregon, LLC Permit Number: New

Process Information

1. ID Number	JETFRAC
2. Descriptive name	Jet Fractionator
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

The Jet Fractionator is designed to receive the Ecofining Unit train renewable diesel product for re-fractionation (i.e., a separation process) into two different finished products, renewable jet fuel and diesel. The Jet Fractionator will have a maximum heat input capacity of 125 MMBtu/hr.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:

Raw materials	Short term capacity Amount	Short term capacity Units	Annual usage Amount	Annual usage Units
Natural Gas	0.11	MMcf/hr	987	MMcf/yr
Products				
Renewable Jet Fuel (Max JF Scenario)	14.8	Mgal/hr	126,949	Mgal/yr

12. Control devices(s) (yes/no) Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

SCR-JF

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

Process Information

1. ID Number	CT01, CT02
2. Descriptive name	Cooling Tower
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

The proposed facility will operate a cooling tower to provide heat transfer capacity to cooling water recirculation. The cooling tower will be induced draft, counter flow design with a water circulation rate of 20,000 gallons per minute. The cooling tower will have two cells, each with an induced draft fan and ultra-high efficiency drift eliminators. The cooling tower will also be equipped with an in-line hydrocarbon monitor to detect unanticipated hydrocarbon leaks in the cooling water lines.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Water	20,000	gpm	n/a	n/a
Products				

12. Control devices(s) (yes/no) No

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

State of Oregon Department of Environmental Quality

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

Process Information

1. ID Number	LOAD-CAP
2. Descriptive name	Captured/Controlled Product Loadout
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

This emission unit represents emissions generated during renewable diesel product loadout to railcars and/or trucks that are captured and routed to a vapor combustion unit for control of volatile emissions.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Renewable Diesel	12.3	Mgal/hr	105,408	Mgal/yr
Products				

12. Control devices(s) (yes/no) Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

VCU1

State of Oregon Department of Environmental Quality

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

Process Information

1. ID Number	LOAD-FUG
2. Descriptive name	Fugitives from Product Loadout
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

This emission unit represents fugitive emissions generated during renewable diesel product loadout to railcars and/or trucks that are not captured or controlled.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Renewable Diesel	12.3	Mgal/hr	105,408	Mgal/yr
Products				

12. Control devices(s) (yes/no)	No

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

State of Oregon Department of Environmental Quality

MISCELLANEOUS PROCESS OR DEVICE

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: N/A

Process Information

1. ID Number	WWT
2. Descriptive name	Wastewater Treatment System
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

The proposed facility will utilize an onsite WWT system to treat process wastewater and collected process surface water and stormwater prior to discharge to the Columbia River. Influents to the WWT system will include the following: blowdowns from the cooling tower, boilers, and Hydrogen Plant; reverse osmosis reject, ultra-filtration backwash, demineralization system regeneration from the raw water treatment process; wastewater from the sour water stripper, oily sewer water sump, and pretreatment trains; and collected process surface water and stormwater from pads.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,760

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Wastewater (Peak)	1,467	gpm	N/A	N/A
Products				
Treated Effluent	1,467	gpm	N/A	N/A

12. Control devices(s) (yes/no): No

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

MISCELLANEOUS PROCESS OR DEVICE | **FORM AQ230 ANSWER SHEET**

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

Process Information

1. ID Number	LEAK-RD, LEAK-RN, LEAK-RJ, LEAK-NG, LEAK-OF, LEAK-AM, LEAK-AG, LEAK-WG
2. Descriptive name	Fugitive Equipment Leaks
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

Fugitive leaks from equipment service components such as valves, flanges, and pumps during the pretreatment, production, and loadout processes. Includes equipment in the the following services: renewable diesel, renewable naphtha, renewable jet fuel, natural gas, offgases, amine, acid gases, and waste gas service.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,592

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Varies by equipment and	service	type.		
Products				

12. Control devices(s) (yes/no): No

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

State of Oregon Department of Environmental Quality

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

Process Information

1. ID Number	FLARE
2. Descriptive name	Flare
3. Existing or future?	Future
4. Date commenced	TBD
5. Date installed/completed	TBD

6. Description of process:

The typical normal operation of the flare will be to have the pilot light active in case of potential emergency scenarios. The pilot light will be natural gas-fired and will have a maximum heat input capacity of 1.4 MMBtu/hr.

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8,760

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Natural Gas	1.3E-03	MMcf/hr	11	MMcf/yr
Products				

12. Control devices(s) (yes/no) No

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

FORM AQ231

OPERATION AND MAINTENANCE PRACTICES ANSWER SHEET

1. Facility Name: NEXT Renewable Fuels Oregon, LLC   2. Permit Number: New

3. Emission Point or Fugitive Emission Source ID	4. Criteria Pollutants Emitted	5. Emission Level Depends on O&M (yes/no)	6. O&M Option Number(s) Selected	7. Describe specific O&M work practices or Emission Action Levels to ensure that the process, control device or fugitive emission source is operated and maintained at the highest reasonable efficiency and effectiveness to minimize emissions.
INCIN	PM, PM10, PM2.5, NOx, CO, VOC, SO2, Pb	Yes	2	Maintain manufacturer recommended combustion chamber temperature.
SBH-INCIN	PM, PM10, PM2.5, NOx, CO, VOC, SO2, Pb	Yes	2	Maintain manufacturer recommended dry sorbent injection rate and pressure drop.
SCR (all units)	PM, PM10, PM2.5, NOx, CO, VOC, SO2, Pb	Yes	2	Maintain manufacturer recommended ammonia injection rates.
VCU1	PM, PM10, PM2.5, NOx, CO, VOC, SO2, Pb	Yes	2	Maintain manufacturer recommended combustion chamber temperature.
FB (all units)	PM, PM10, PM2.5	No	1	Install particulate filters on affected units and maintain in accordance with manufacturer recommendations.
FLARE	PM, PM10, PM2.5, NOx, CO, VOC, SO2, Pb	Yes	2	Maintain manufacturer recommended pilot light operating temperature.

State of Oregon Department of Environmental Quality

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

1.	Control Device ID	INCIN	FLARE	VCU1
2.	Process/Device(s) Controlled	Acid Gas Regeneration Unit/Sour Water Stripper Offgas	ECO1-3, JETFRAC, H2HTR	LOADCAP
3.	Year installed	TBD	TBD	TBD
4.	Manufacturer/Model No.	TBD	TBD	TBD
5.	Control Efficiency (%)	99.5 (VOC/volatile HAP)	98.0 (VOC/volatile HAP)	98.0 (VOC/volatile HAP)
6.	Type of incinerator	Thermal Oxidizer	Flare	Vapor Combustion Unit
7.	Design temperature (ºF)	1,800	250	2,100
8.	Design residence time (sec.)	TBD	TBD	TBD
9.	Design inlet gas flow rate (acfm)	15,050	20.6 (based on exhaust flow in normal operation)	12,965
10.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No	No	No
11.	Fuel type	Natural Gas, AGR Acid Gas, SWS Offgas	Natural Gas	Natural Gas
12	Design maximum hourly amount of fuel (specify units)	0.017 (NG), 0.12 (AGR), 0.024 (SWS) MMcf/hr	1.3E-03 MMcf/hr	1.6E-03 MMcf/hr
13	Projected maximum annual amount of fuel (specify units)	142 (NG), 1,001 (AGR), 205 (SWS) MMcf/yr	11 MMcf/yr	13.4 MMcf/yr

MISCELLANEOUS
CONTROL DEVICE INFORMATION

FORM AQ307
ANSWER SHEET

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

1.	Control Device ID	SBH-INCIN
2.	Process/Device(s) Controlled	INCIN
3.	Year installed	TBD
4.	Manufacturer/Model No.	TBD
5.	Control Efficiency (%)	Estimate 99% or greater for PM/PM10/PM2.5.
6.	Design inlet gas flow rate (acfm)	15,050 acfm
7.	Design parameter(s)	Performance guarantee for SO2 of less than or equal to 75-ppm (at 3% oxygen-dry basis). Dry sorbent injection rate to determined by manufacturer to achieve outlet concentration guarantee. Install filter bags with greater than or equal to 99% control.
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	Yes, INCIN (upstream incinerator)
9.	Describe the control device	

Controlled exhaust from the incinerator will route to a waste heat recovery section followed by a temperature conditioning section to decrease the exhaust temperature, prior to entering a downstream baghouse. Bicarbonate sorbent will be injected upstream of the baghouse to react with sulfur oxide components in the exhaust, forming sodium sulfate particulates. These particulates will be removed from the exhaust stream by the baghouse. Exhaust from the baghouse will route to an SCR.

DEQ State of Oregon Department of Environmental Quality

MISCELLANEOUS
CONTROL DEVICE INFORMATION

FORM AQ307
ANSWER SHEET

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

1.	Control Device ID	SCR-INCIN
2.	Process/Device(s) Controlled	INCIN
3.	Year installed	TBD
4.	Manufacturer/Model No.	TBD
5.	Control Efficiency (%)	Estimated >70%
6.	Design inlet gas flow rate (acfm)	15,050 acfm
7.	Design parameter(s)	Inlet temperature = 600°F; Performance guarantees for NOx and CO of less than or equal to 9-ppm and 50-ppm (at 3% oxygen-dry basis). Ammonia injection rate to be determined by manufacturer to achieve outlet concentration guarantee.
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	Yes, INCIN & SBH-INCIN
9.	Describe the control device	
	Controlled exhaust from the baghouse will route to an SCR control device with an oxidation catalyst for control of NOx and CO emissions prior to emitting to atmosphere.	

DEQ State of Oregon Department of Environmental Quality

MISCELLANEOUS CONTROL DEVICE INFORMATION — **FORM AQ307 ANSWER SHEET**

Facility Name: NEXT Renewable Fuels Oregon, LLC — Permit Number: New

1.	Control Device ID	SCR-BLR
2.	Process/Device(s) Controlled	BOILER1 & BOILER 2
3.	Year installed	TBD
4.	Manufacturer/Model No.	TBD
5.	Control Efficiency (%)	Estimated >70%
6.	Design inlet gas flow rate (acfm)	40,208
7.	Design parameter(s)	Ammonia injection rate determined by manufacturer to achieve outlet concentration guarantee.
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No
9.	Describe the control device	
	The exhaust from BOILER1 and BOILER2 will be combined and routed to an SCR control device with an oxidation catalyst for control of NOx and CO emissions.	

MISCELLANEOUS
CONTROL DEVICE INFORMATION

FORM AQ307
ANSWER SHEET

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

1.	Control Device ID	SCR-EPUMP
2.	Process/Device(s) Controlled	EPUMP
3.	Year installed	TBD
4.	Manufacturer/Model No.	TBD
5.	Control Efficiency (%)	Estimated >70%
6.	Design inlet gas flow rate (acfm)	2,341
7.	Design parameter(s)	Control designed to meet EPA Tier 4 engine standards
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No
9.	Describe the control device	
	Selective catalytic reduction on emergency fire water pump exhaust to control NOx emissions.	

State of Oregon Department of Environmental Quality

MISCELLANEOUS CONTROL DEVICE INFORMATION

FORM AQ307 ANSWER SHEET

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

1.	Control Device ID	FB-1BESV1, FB-1BESV2, FB-1BESV3
2.	Process/Device(s) Controlled	1BESV1, 1BESV2, 1BESV3
3.	Year installed	TBD
4.	Manufacturer/Model No.	Kice/TBD
5.	Control Efficiency (%)	99.9
6.	Design inlet gas flow rate (acfm)	N/A
7.	Design parameter(s)	N/A
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No
9.	Describe the control device	
	Each silo vent will be equipped with a dedicated high-efficiency filter bag rated at 99.9% control efficiency for control of PM2.5 emissions prior to exhausting to atmosphere	

MISCELLANEOUS
CONTROL DEVICE INFORMATION

FORM AQ307
ANSWER SHEET

State of Oregon Department of Environmental Quality

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

1.	Control Device ID	FB-2BESV1, FB-2BESV2, FB-2BESV3
2.	Process/Device(s) Controlled	2BESV1, 2BESV2, 2BESV3
3.	Year installed	TBD
4.	Manufacturer/Model No.	Kice/TBD
5.	Control Efficiency (%)	99.9
6.	Design inlet gas flow rate (acfm)	N/A
7.	Design parameter(s)	N/A
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No
9.	Describe the control device	
	Each silo vent will be equipped with a dedicated high-efficiency filter bag rated at 99.9% control efficiency for control of PM2.5 emissions prior to exhausting to atmosphere.	

MISCELLANEOUS
CONTROL DEVICE INFORMATION

FORM AQ307
ANSWER SHEET

State of Oregon Department of Environmental Quality

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

1.	Control Device ID	FB-3BESV1, FB-3BESV2, FB-3BESV3
2.	Process/Device(s) Controlled	3BESV1, 3BESV2, 3BESV3
3.	Year installed	TBD
4.	Manufacturer/Model No.	Kice/TBD
5.	Control Efficiency (%)	99.9
6.	Design inlet gas flow rate (acfm)	N/A
7.	Design parameter(s)	N/A
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No
9.	Describe the control device	
	Each silo vent will be equipped with a dedicated high-efficiency filter bag rated at 99.9% control efficiency for control of PM2.5 emissions prior to exhausting to atmosphere.	

MISCELLANEOUS
CONTROL DEVICE INFORMATION

FORM AQ307
ANSWER SHEET

State of Oregon
Department of Environmental Quality

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

1.	Control Device ID	FB-1BEDAY1, FB-1BEDAY2
2.	Process/Device(s) Controlled	1BEDAY1, 1BEDAY2
3.	Year installed	TBD
4.	Manufacturer/Model No.	Kice/TBD
5.	Control Efficiency (%)	99.9
6.	Design inlet gas flow rate (acfm)	N/A
7.	Design parameter(s)	N/A
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No
9.	Describe the control device	
	Each Day Tank vent will be equipped with a dedicated high-efficiency filter bag rated at 99.9% control efficiency for control of PM2.5 emissions prior to exhausting to atmosphere.	

DEQ
State of Oregon Department of Environmental Quality

MISCELLANEOUS
CONTROL DEVICE INFORMATION

FORM AQ307
ANSWER SHEET

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

1.	Control Device ID	FB-2BEDAY1, FB-2BEDAY2
2.	Process/Device(s) Controlled	2BEDAY1, 2BEDAY2
3.	Year installed	TBD
4.	Manufacturer/Model No.	Kice/TBD
5.	Control Efficiency (%)	99.9
6.	Design inlet gas flow rate (acfm)	N/A
7.	Design parameter(s)	N/A
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No
9.	Describe the control device	
	Each Day Tank vent will be equipped with a dedicated high-efficiency filter bag rated at 99.9% control efficiency for control of PM2.5 emissions prior to exhausting to atmosphere.	

MISCELLANEOUS CONTROL DEVICE INFORMATION

FORM AQ307 ANSWER SHEET

Facility Name: NEXT Renewable Fuels Oregon, LLC Permit Number: New

1.	Control Device ID	FB-3BEDAY1, FB-3BEDAY2
2.	Process/Device(s) Controlled	3BEDAY1, 3BEDAY2
3.	Year installed	TBD
4.	Manufacturer/Model No.	Kice/TBD
5.	Control Efficiency (%)	99.9
6.	Design inlet gas flow rate (acfm)	N/A
7.	Design parameter(s)	N/A
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No
9.	Describe the control device	

Each Day Tank vent will be equipped with a dedicated high-efficiency filter bag rated at 99.9% control efficiency for control of PM2.5 emissions prior to exhausting to atmosphere.

DEQ State of Oregon Department of Environmental Quality

MISCELLANEOUS **FORM AQ307**
CONTROL DEVICE INFORMATION **ANSWER SHEET**

Facility Name: NEXT Renewable Fuels Oregon, LLC Permit Number: New

1.	Control Device ID	FB-1FASV1
2.	Process/Device(s) Controlled	1FASV1
3.	Year installed	TBD
4.	Manufacturer/Model No.	Kice/TBD
5.	Control Efficiency (%)	99.9
6.	Design inlet gas flow rate (acfm)	N/A
7.	Design parameter(s)	N/A
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No
9.	Describe the control device	
	The Filter Aid Silo vent will be equipped with a dedicated high-efficiency filter bag rated at 99.9% control efficiency for control of PM2.5 emissions prior to exhausting to atmosphere.	

State of Oregon Department of Environmental Quality

MISCELLANEOUS CONTROL DEVICE INFORMATION

FORM AQ307 ANSWER SHEET

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

1.	Control Device ID	FB-2FASV1
2.	Process/Device(s) Controlled	2FASV1
3.	Year installed	TBD
4.	Manufacturer/Model No.	Kice/TBD
5.	Control Efficiency (%)	99.9
6.	Design inlet gas flow rate (acfm)	N/A
7.	Design parameter(s)	N/A
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No
9.	Describe the control device	

The Filter Aid Silo vent will be equipped with a dedicated high-efficiency filter bag rated at 99.9% control efficiency for control of PM2.5 emissions prior to exhausting to atmosphere.

DEQ State of Oregon Department of Environmental Quality

MISCELLANEOUS CONTROL DEVICE INFORMATION

FORM AQ307 ANSWER SHEET

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

1.	Control Device ID	FB-3FASV1, FB-3FASV2, FB-3FASV3
2.	Process/Device(s) Controlled	3FASV1, 3FASV2, 3FASV3
3.	Year installed	TBD
4.	Manufacturer/Model No.	Kice/TBD
5.	Control Efficiency (%)	99.9
6.	Design inlet gas flow rate (acfm)	N/A
7.	Design parameter(s)	N/A
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No
9.	Describe the control device	
	Each Filter Aid Silo vent will be equipped with a dedicated high-efficiency filter bag rated at 99.9% control efficiency for control of PM2.5 emissions prior to exhausting to atmosphere.	

State of Oregon Department of Environmental Quality

MISCELLANEOUS CONTROL DEVICE INFORMATION

FORM AQ307 ANSWER SHEET

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

1.	Control Device ID	FB-1FADT
2.	Process/Device(s) Controlled	1FADT
3.	Year installed	TBD
4.	Manufacturer/Model No.	Kice/TBD
5.	Control Efficiency (%)	99.9
6.	Design inlet gas flow rate (acfm)	N/A
7.	Design parameter(s)	N/A
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No
9.	Describe the control device	
	The Filter Aid Day Tank vent will be equipped with a dedicated high-efficiency filter bag rated at 99.9% control efficiency for control of PM2.5 emissions prior to exhausting to atmosphere.	

DEQ State of Oregon Department of Environmental Quality

MISCELLANEOUS CONTROL DEVICE INFORMATION — **FORM AQ307 ANSWER SHEET**

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

1.	Control Device ID	FB-2FADT
2.	Process/Device(s) Controlled	2FADT
3.	Year installed	TBD
4.	Manufacturer/Model No.	Kice/TBD
5.	Control Efficiency (%)	99.9
6.	Design inlet gas flow rate (acfm)	N/A
7.	Design parameter(s)	N/A
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No
9.	Describe the control device	
	The Filter Aid Day Tank vent will be equipped with a dedicated high-efficiency filter bag rated at 99.9% control efficiency for control of PM2.5 emissions prior to exhausting to atmosphere.	

MISCELLANEOUS
CONTROL DEVICE INFORMATION

FORM AQ307
ANSWER SHEET

State of Oregon Department of Environmental Quality

Facility Name: NEXT Renewable Fuels Oregon, LLC Permit Number: New

1.	Control Device ID	FB-3FADT1
2.	Process/Device(s) Controlled	3FADT1
3.	Year installed	TBD
4.	Manufacturer/Model No.	Kice/TBD
5.	Control Efficiency (%)	99.9
6.	Design inlet gas flow rate (acfm)	N/A
7.	Design parameter(s)	N/A
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No
9.	Describe the control device	
	Each Filter Aid Day Tank vent will be equipped with a dedicated high-efficiency filter bag rated at 99.9% control efficiency for control of PM2.5 emissions prior to exhausting to atmosphere.	

MISCELLANEOUS
CONTROL DEVICE INFORMATION

FORM AQ307
ANSWER SHEET

Facility Name: NEXT Renewable Fuels Oregon, LLC

Permit Number: New

1.	Control Device ID	FB-3FADT2, FB-3FADT3
2.	Process/Device(s) Controlled	3FADT2, 3FADT3
3.	Year installed	TBD
4.	Manufacturer/Model No.	Kice/TBD
5.	Control Efficiency (%)	99.9
6.	Design inlet gas flow rate (acfm)	N/A
7.	Design parameter(s)	N/A
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No
9.	Describe the control device	

Each Filter Aid Day Tank vent will be equipped with a dedicated high-efficiency filter bag rated at 99.9% control efficiency for control of PM2.5 emissions prior to exhausting to atmosphere.

MISCELLANEOUS
CONTROL DEVICE INFORMATION

FORM AQ307
ANSWER SHEET

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

1.	Control Device ID	SCR-ECO1, SCR-ECO2, SCR-ECO3
2.	Process/Device(s) Controlled	ECO1F-1I, ECO2F-2I, ECO3F-3I
3.	Year installed	TBD
4.	Manufacturer/Model No.	TBD
5.	Control Efficiency (%)	Estimated >70%
6.	Design inlet gas flow rate (acfm)	10,189 total for each combined Ecofining unit stack (represents combined Feed Heater and Isomerization Heater exhaust flow).
7.	Design parameter(s)	Ammonia injection rate determined by manufacturer to achieve outlet concentration guarantee.
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No
9.	Describe the control device	
	The Feed Heater exhaust will combine with the Isomerization Heater exhaust, on each Ecofining Unit train, prior to routing to an SCR control device with an oxidation catalyst for control of NOx and CO emissions.	

State of Oregon Department of Environmental Quality

MISCELLANEOUS CONTROL DEVICE INFORMATION

FORM AQ307 ANSWER SHEET

Facility Name: NEXT Renewable Fuels Oregon, LLC Permit Number: New

1.	Control Device ID	SCR-H2HTR
2.	Process/Device(s) Controlled	H2HTR
3.	Year installed	TBD
4.	Manufacturer/Model No.	TBD
5.	Control Efficiency (%)	Estimated >70%
6.	Design inlet gas flow rate (acfm)	228,904
7.	Design parameter(s)	Ammonia injection rate determined by manufacturer to achieve outlet concentration guarantee.
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No
9.	Describe the control device	
	The Hydrogen Plant exhaust will be routed to an SCR control device with an oxidation catalyst for control of NOx and CO emissions prior to emitting to atmosphere.	

State of Oregon Department of Environmental Quality

MISCELLANEOUS CONTROL DEVICE INFORMATION — **FORM AQ307 ANSWER SHEET**

Facility Name: NEXT Renewable Fuels Oregon, LLC   Permit Number: New

1.	Control Device ID	SCR-JF
2.	Process/Device(s) Controlled	JETFRAC
3.	Year installed	TBD
4.	Manufacturer/Model No.	TBD
5.	Control Efficiency (%)	Estimated >70%
6.	Design inlet gas flow rate (acfm)	48,920
7.	Design parameter(s)	Ammonia injection rate determined by manufacturer to achieve outlet concentration guarantee.
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	No
9.	Describe the control device	

The 125 MMBtu/hr Jet Fractionator will be indirectly heated by natural gas combustion, and the natural gas combustion emissions will be routed to an SCR control device with an oxidation catalyst for control of NOX and CO emissions prior to emitting to atmosphere.

PLANT SITE EMISSIONS DETAIL SHEET **FORM AQ402**

CURRENT/FUTURE OPERATIONS **ANSWER SHEET**

Facility Name: NEXT Renewable Fuels Oregon, LLC Permit Number: New

Table 1

1. Emissions Point	**Production Rates**		4. Pollutant	**Emissions Factors**			**Emissions**	
	2. Short-term (Specify units)	3. Annual (Specify units)		5. Short-term	6. Long-term	7. Reference(s)	8. Short-term (Specify units)	9. Annual (tons/year)
See	emissions	inventory	in	Appendix	A.			
Example	200 tons of rock/hr	400,000 tons	PM	0.04 lb/ton	0.04 lb/ton	DEQ	8.0 lb/hr	8.0

State of Oregon
Department of Environmental Quality

PLANT SITE EMISSIONS DETAIL SHEET **FORM AQ402**
CURRENT/FUTURE OPERATIONS **ANSWER SHEET**

Facility Name: NEXT Renewable Fuels Oregon, LLC Permit Number: New

Table 2

1. Device/process ID	2. PM_{10} PSEL (tons/year)	3. $PM_{2.5}$ fraction (f)	4. Reference	5. $PM_{2.5}$ PSEL (tons/yr)
See emissions				
inventory in				
Appendix A.				
TOTAL	0.0			0.0

Facility Name: NEXT Renewable Fuels Oregon, LLC Permit Number: New

Emissions Data

1. Emissions Point	2. Annual Production Rate (specify units)	3. Pollutant	4. Emission Factor	5. EF reference	6. Annual Emissions (tons/yr)
See emissions	inventory in	Appendix A.			

Applications for Standard ACDPs must also include the most recent Toxics Release Inventory report, if applicable (see instructions).

Facility name: NEXT Renewable Fuels Oregon, LLC Permit Number: New

Indicate which of the following categorically insignificant activities are present at the facility by placing an "X" in the "Yes" or "No" column.

Yes	No	Type of activity **Categorically Insignificant Activities**
✓		Constituents of a chemical mixture present at less than 1 percent by weight of any chemical or compound regulated under divisions 200 through 268 excluding divisions 248 and 262 of this chapter, or less than 0.1 percent by weight of any carcinogen listed in the U.S. Department of Health and Human Service's Annual Report on Carcinogens when usage of the chemical mixture is less than 100,000 pounds/year
✓		Evaporative and tail pipe emissions from on-site motor vehicle operation
✓		Distillate oil, kerosene, gasoline, natural gas or propane burning equipment, provided the aggregate expected actual emissions of the equipment identified as categorically insignificant do not exceed the de minimis level for any regulated pollutant, based on the expected maximum annual operation of the equipment. If a source's expected emissions from all such equipment exceed the de minimis levels, then the source may identify a subgroup of such equipment as categorically insignificant with the remainder not categorically insignificant. The following equipment may never be included as categorically insignificant: A. Any individual distillate oil, kerosene or gasoline burning equipment with a rating greater than 0.4 million Btu/hour; B. Any individual natural gas or propane burning equipment with a rating greater than 2.0 million Btu/hour
✓		Distillate oil, kerosene, gasoline, natural gas or propane burning equipment brought on site for six months or less for maintenance, construction or similar purposes, such as but not limited to generators, pumps, hot water pressure washers and space heaters, provided that any such equipment that performs the same function as the permanent equipment, must be operated within the source's existing PSEL
✓		Office activities
	✓	Food service activities
✓		Janitorial activities
✓		Personal care activities
✓		Grounds keeping activities, including, but not limited to building painting and road and parking lot maintenance
	✓	On-site laundry activities
	✓	On-site recreation facilities
✓		Instrument calibration
✓		Maintenance and repair shop
	✓	Automotive repair shops or storage garages;
✓		Air cooling or ventilating equipment not designed to remove air contaminants generated by or released from associated equipment
✓		Refrigeration systems with less than 50 pounds of charge of ozone depleting substances regulated under Title VI, including pressure tanks used in refrigeration systems but excluding any combustion equipment associated with such systems
✓		Bench scale laboratory equipment and laboratory equipment used exclusively for chemical and physical analysis, including associated vacuum producing devices but excluding research and development facilities

Yes	No	Type of activity
✓		Temporary construction activities
✓		Warehouse activities
✓		Accidental fires
✓		Air vents from air compressors
✓		Air purification systems
	✓	Continuous emissions monitoring vent lines
	✓	Demineralized water tanks
✓		Pre-treatment of municipal water, including use of deionized water purification systems
	✓	Electrical charging stations
	✓	Fire brigade training
✓		Instrument air dryers and distribution
✓		Process raw water filtration systems
	✓	Pharmaceutical packaging
✓		Fire suppression
	✓	Blueprint making
✓		Routine maintenance, repair, and replacement such as anticipated activities most often associated with and performed during regularly scheduled equipment outages to maintain a plant and its equipment in good operating condition, including but not limited to steam cleaning, abrasive use, and woodworking
✓		Electric motors
✓		Storage tanks, reservoirs, transfer and lubricating equipment used for ASTM grade distillate or residual fuels, lubricants, and hydraulic fluids
✓		On-site storage tanks not subject to any New Source Performance Standard (NSPS), including underground storage tanks (UST), storing gasoline or diesel used exclusively for fueling of the facility's fleet of vehicles
✓		Natural gas, propane, and liquefied petroleum gas (LPG) storage tanks and transfer equipment
✓		Pressurized tanks containing gaseous compounds
	✓	Vacuum sheet stacker vents
	✓	Emissions from wastewater discharges to publicly owned treatment works (POTW) provided the source is authorized to discharge to the POTW, not including on-site wastewater treatment and/or holding facilities
	✓	Log ponds
✓		Storm water settling basins
✓		Fire suppression and training
	✓	Paved roads and paved parking lots within an urban growth boundary
✓		Hazardous air pollutant emissions in fugitive dust from paved and unpaved roads except for those sources that have processes or activities that contribute to the deposition and entrainment of hazardous air pollutants from surface soils
✓		Health, safety, and emergency response activities

Yes	No	Type of activity
	✓	Emergency generators and pumps used only during loss of primary equipment or utility service due to circumstances beyond the reasonable control of the owner or operator, or to address a power emergency, provided that the aggregate horsepower rating of all stationary emergency generator and pump engines is not more than 3,000 horsepower. If the aggregate horsepower rating of all stationary emergency generator and pump engines is more than 3,000 horsepower, then no emergency generators and pumps at the source may be considered categorically insignificant
✓		Non-contact steam vents and leaks and safety and relief valves for boiler steam distribution systems
✓		Non-contact steam condensate flash tanks
✓		Non-contact steam vents on condensate receivers, deaerators and similar equipment
✓		Boiler blow down tanks
✓		Industrial cooling towers that do not use chromium-based water treatment chemicals
	✓	Ash piles maintained in a wetted condition and associated handling systems and activities
	✓	Uncontrolled oil/water separators in effluent treatment systems, excluding systems with a throughput of more than 400,000 gallons per year of effluent located at the following sources: A. Petroleum refineries; B. Sources that perform petroleum refining and re-refining of lubricating oils and greases including asphalt production by distillation and the reprocessing of oils and/or solvents for fuels; or C. Bulk gasoline plants, bulk gasoline terminals, and pipeline facilities
✓		Combustion source flame safety purging on startup
	✓	Broke beaters, pulp and repulping tanks, stock chests and pulp handling equipment, excluding thickening equipment and repulpers
	✓	Stock cleaning and pressurized pulp washing, excluding open stock washing systems
	✓	White water storage tanks