TECHNICAL SUPPORT DOCUMENT

Permit XX-XXXX
Application 2013-01

Tesoro Savage Vancouver Energy Distribution Terminal

Final Date: XXXX XX, XXXX

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Air Quality Engineer

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Abbreviations

acfm	actual cubic feet per minute
ADP	Air Discharge Permit
AP-42	Compilation of Emission Factors, AP-42, Fifth Edition, Volume 1, Stationary Point and Area Sources – published by the US Environmental Protection Agency
BACT	Best available control technology
Btu	British thermal unit
Btu/gal	Heat content expressed in British thermal units per gallon
CAS #	Chemical Abstracts Service registry number
cfm	Cubic feet per minute
CPM	Condensable particulate matter
CFR	Code of Federal Regulations
CO	Carbon monoxide
CO_2e	Carbon dioxide equivalent
dscfm	Dry standard cubic feet per minute
EPA	U.S. Environmental Protection Agency
gr/dscf	Grains per dry standard cubic foot (68 °F, 1 atmosphere)
HAP	Hazardous air pollutant listed pursuant to Section 112 of the Federal Clean Air Act
lb/1000 gal	Pounds per thousand gallons
$lb/10^6$ scf	Pounds per million standard cubic feet
lb/dy/unit	Pounds per day per unit
lb/hr	Pounds per hour
lb/MMBtu	Pounds per million British thermal units
lb/yr	Pounds per year
MMBtu/hr	Millions of British thermal units per hour
MSDS	Material Safety Data Sheet
NO_x	Nitrogen oxides
NOV	Notice of Violation
PM	Total particulate matter (includes both filterable and condensable particulate matter as measured by EPA Methods 5 and 202)
PM_{10}	Particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (includes both filterable and condensable particulate matter as measured by EPA Methods 5 and 202)
$PM_{2.5}$	Particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers (includes both filterable and condensable particulate matter as measured by EPA Methods 5 and 202)
ppm	Parts per million
ppmv	Parts per million by volume
ppmvd	Parts per million by volume, dry
PSD	Prevention of Significant Deterioration
RCW	Revised Code of Washington
SQER	Small Quantity Emission Rate listed in WAC 173-460
SO_2	Sulfur dioxide
SWCAA	Southwest Clean Air Agency
TAP	Toxic air pollutant pursuant to Chapter 173-460 WAC
T-BACT	Best Available Control Technology for toxic air pollutants
tpy	Tons per year
TWA	Time weighted average
VOC	Volatile organic compound
WAC	Washington Administrative Code

1. FACILITY IDENTIFICATION

Applicant Name:	Tesoro Savage Petroleum Terminal, LLC (Vancouver Energy)
Applicant Address:	110 Columbia Blvd, Vancouver, WA 98660
Primary Facility Name:	Tesoro Savage Vancouver Energy Distribution Terminal
Facility Address:	5501 NW Old River Road, Vancouver, WA 98660
Contact Person:	Kelly Flint, Senior Vice President and Corporate Counsel
Primary Process:	Petroleum Bulk Stations and Terminals
SIC/NAICS Code:	5171 / 424710
Facility Classification:	Natural Minor

2. FACILITY DESCRIPTION

Tesoro Savage Petroleum Terminal, LLC (Vancouver Energy) proposes to construct a facility in Vancouver, Washington, to receive crude oil by railcar and transfer it to marine vessels. The proposed facility will be located within the Port of Vancouver. The facility will unload crude oil received via rail car from unit trains comprised of approximately 120 tank cars each. Oil will be stored onsite in above ground bulk storage tanks, for loading onto marine vessels at the marine terminal located at berths 13 and 14. Primary operations for the proposed facility will include the use of process boilers, and associated bulk liquid handling equipment.

The proposed facility has the physical capacity to receive an average of 360,000 barrels (bbl) per day of crude that will be transported over marine waters for shipment primarily to destinations located on the US West Coast. The Energy Facility Siting Evaluation Council (EFSEC) is the lead state agency responsible for environmental permitting of facilities that have the capacity to receive more than an average of 50,000 bbl of crude or refined petroleum products that has been or will be transported over marine water. Thus, EFSEC is responsible for environmental permitting of the facility, technical review of air quality concerns, and for administering applicable preconstruction permits.

3. CURRENT PERMITTING ACTION

This permitting action is in response to Application for Site Certification Agreement No. 2013-01 (Application 2013-01) dated August 29, 2013. In Application 2013-01, Vancouver Energy is requesting approval for construction and operation of a bulk petroleum terminal. All proposed emission units are new, and will be subject to New Source Review.

The current permitting action provides approval for crude oil storage and transfer operations as proposed in Application 2013-01.

4. PROCESS DESCRIPTION

4.a General. The proposed project will be located at a dedicated site within the Port of Vancouver. Some basic industrial infrastructure (primary roads, basic utilities) is already in place. Additional infrastructure (surface roads, railcar receiving, storage tanks, crude oil pipeline, and marine dock) will be added in support of the project. Crude oil will be unloaded from unit trains, and pumped through transfer pipelines to bulk storage tanks. Stored crude oil will be transferred via pipeline from the bulk storage tanks to an existing marine terminal on the Columbia River where it would be loaded onto marine vessels for transport.

4.b Railcar Unloading (Area 200). Crude oil will be received at the facility in bulk via railcar tankers. Crude oil will be transferred from the unloading area to facility storage tanks using a combination of above and below ground steel pipelines. Individual railcars will unload into a collection header. Collection headers are connected to three 24-inch-diameter pipelines that transfer crude oil from the railcar unloading area (Area 200) to the facility's bulk storage tanks (Area 300). One of these pipelines will be equipped with electric heat-tracing capable of maintaining the pipeline at a temperature of ~150 °F to facilitate the transfer of thicker crude oil mixtures. Maximum receiving capacity is specified as 360,000 bbl/dy.

The railcar unloading system will be configured to allow direct transfer of crude oil from the unloading area to the marine vessel loading system. This design is intended for occasional topping of vessel loads, as well as providing limited operation prior to construction of the storage tanks.

The railcar unloading area will contain six storage tanks that are not intended for crude oil storage. These tanks will be used to collect wash water from railcar cleaning operations, which utilize soap and/or detergent. Air emissions from storage of the wash water are expected to be negligible.

4.c Unloading Boilers (Area 600). Crude oil mixtures received at the facility may be too thick to allow for easy transfer at ambient temperatures. Railcars containing these mixtures must be heated in place prior to unloading. Railcars will be heated by circulating steam through heating loops built into each railcar. The steam will be generated by three natural gas-fired package boilers located in the Area 600 boiler building. The boilers and railcars will be connected through insulated pipelines.

4.d Bulk Storage Tanks (Area 300). Crude oil at the facility will be stored in six aboveground storage tanks. The storage tanks will be field-erected, and two tanks will be equipped with electric heating loops to allow storage and transfer of crude oil mixtures with high viscosities. Each tank will have an operational storage capacity of approximately 341,850 bbl. The tanks will be designed to accommodate an additional volume of 15,000 bbl for overfill protection, which will remain unused under normal operating conditions. All of the tanks will be equipped with mixers to prevent heavier liquid crude oil fractions from settling to the bottom of the tank and stratifying during storage. Storage tanks will be configured with internal floating roofs, equipped with a mechanical shoe primary seal and a rim-mounted secondary seal. Storage tank operations will generate air emissions from fugitive component leaks and vapor losses through the tank seals.

4.e Marine Terminal (Area 400). The marine terminal will be designed to load one tanker vessel at a time. Maximum transfer rate is specified as 32,000 bbl/hr. A submerged fill configuration will be used. The most common vessel expected is a Handymax sized vessel, which is a medium-sized tanker with a crude oil cargo capacity of 319,925 bbl. A tanker of this size typically requires at least 15 hours to load to full capacity. Each vessel is expected to remain at dock for up to 24 hours due to the time required to secure and release the vessels.

Steel pipelines will be used to convey crude oil between the storage tanks and the marine terminal. One 36-inch-diameter pipeline will transfer crude oil from the storage tanks to the marine vessel loading system. This pipeline would be equipped with electric heat-tracing capable of maintaining the pipeline at a temperature of approximately 150°F to facilitate transfer of thicker crude oil mixtures. One 6- to 12-inch-diameter pipeline will be installed to return crude oil from the vessel loading system back to the storage tanks as necessary.

Marine vessels arriving at the terminal will have their cargo tanks filled with a combination of inert gases and product vapors. Vessels are required to travel in this mode to reduce fire and explosion hazards from vapors left by previous cargoes. During loading, this vapor mixture is displaced as the cargo tanks are filled with crude oil. Displaced vapors will be captured and transferred to a treatment system that combusts the vapors in conjunction with a small amount of natural gas.

The vapor treatment system will be equipped with eight vapor combustion units (VCUs). The VCUs will be installed on a 50-by 100-foot concrete slab adjacent to the terminal area. One 16 to 22 inch diameter pipe will convey vapors from the vessel loading system to the VCUs. Each VCU will be fitted with a 25 foot high, 44 inch diameter, steel exhaust stack. The number of VCUs in operation at any one time is determined by system demand. The VCUs will use natural gas to initiate combustion and stabilize burn conditions. Primary heat input for the units will be the displaced vapor stream. Minimum combustion temperature during active use is specified as 1,400 °F.

4.f Emergency Fire Protection. Three diesel engine driven fire pumps will be installed to support fire control systems at the facility in the event of a power failure. The diesel engines will be fueled with ultralow sulfur diesel or biodiesel.

5. EQUIPMENT/ACTIVITY IDENTIFICATION

Unloading Boilers

5.a Unloading Boiler #1. This boiler generates steam for use in heating railcars in the unloading area.

Make / Model:	Cleaver Brooks 1500 CBEX Elite
Burner:	Ultra low NO_X (9 ppmv NO_X @ 3% O_2)
Fuel Type:	Natural Gas
Rated Heat Input:	61.745 MMBtu/hr
Exhaust:	42" dia vertical stack at ~65' above ground level.

5.b Unloading Boiler #2. This boiler generates steam for use in heating railcars in the unloading area.

Make / Model:	Cleaver Brooks 1500 CBEX Elite
Burner:	Ultra low NO_X (9 ppmv NO_X @ 3% O_2)
Fuel Type:	Natural Gas
Rated Heat Input:	61.745 MMBtu/hr
Exhaust:	42" dia vertical stack at ~65' above ground level.

5.c Unloading Boiler #3. This boiler generates steam for use in heating railcars in the unloading area.

Make / Model:	Cleaver Brooks 1500 CBEX Elite
Burner:	Ultra low NO_X (9 ppmv NO_X @ 3% O_2)
Fuel Type:	Natural Gas
Rated Heat Input:	61.745 MMBtu/hr
Exhaust:	42" dia vertical stack at ~65' above ground level.

Bulk Storage Tanks

5.d Storage Tank #1. This tank is used to store bulk crude oil. This tank is unheated.

Tank Type:	Fixed External Roof / Floating Internal Roof
Tank Seals:	Mechanical Shoe (Primary) / Rim-mounted Wiper (Secondary)
Shell Dimensions:	240' diameter / 48' high
Tank Capacity:	400,000 bbl (nominal) 340,000 bbl (working) 20,000 bbl (sump)

5.e Storage Tank #2. This tank is used to store bulk crude oil. This tank is unheated.

Tank Type:	Fixed External Roof / Floating Internal Roof
Tank Seals:	Mechanical Shoe (Primary) / Rim-mounted Wiper (Secondary)
Shell Dimensions:	240' diameter / 48' high
Tank Capacity:	400,000 bbl (nominal)
	340,000 bbl (working)
	20,000 bbl (sump)

5.f Storage Tank #3. This tank is used to store bulk crude oil. This tank is unheated.

Tank Type:	Fixed External Roof / Floating Internal Roof
Tank Seals:	Mechanical Shoe (Primary) / Rim-mounted Wiper (Secondary)
Shell Dimensions:	240' diameter / 48' high
Tank Capacity:	400,000 bbl (nominal)
	340,000 bbl (working)
	20,000 bbl (sump)

5.g Storage Tank #4. This tank is used to store bulk crude oil. This tank is unheated.

Tank Type:	Fixed External Roof / Floating Internal Roof
Tank Seals:	Mechanical Shoe (Primary) / Rim-mounted Wiper (Secondary)
Shell Dimensions:	240' diameter / 48' high
Tank Capacity:	400,000 bbl (nominal)
	340,000 bbl (working)
	20,000 bbl (sump)

5.h Storage Tank #5. This tank is used to store bulk crude oil. This tank may be heated using steam from the storage boilers.

Tank Type:	Fixed External Roof / Floating Internal Roof
Tank Seals:	Mechanical Shoe (Primary) / Rim-mounted Wiper (Secondary)
Shell Dimensions:	240' diameter / 48' high
Tank Capacity:	400,000 bbl (nominal)
	340,000 bbl (working)
	20,000 bbl (sump)

5.i Storage Tank #6. This tank is used to store bulk crude oil. This tank may be heated using steam from the storage boilers.

Tank Type:	Fixed External Roof / Floating Internal Roof
Tank Seals:	Mechanical Shoe (Primary) / Rim-mounted Wiper (Secondary)
Shell Dimensions:	240' diameter / 48' high
Tank Capacity:	400,000 bbl (nominal)
	340,000 bbl (working)
	20,000 bbl (sump)

Marine Terminal

5.j Marine Vessel Loading System. One marine vessel loading system used to load marine cargo tanks at a maximum rate of 32,000 bbl/hr. The loading system utilizes a submerged fill configuration. Headspace vapors displaced during loading operations are captured by vapor balancing and vented to multiple vapor combustion units operating in parallel. Capture efficiency of the vapor balancing system is estimated to be 99.89%.

Vapor Combustion Units. The marine vessel loading system is supported by eight vapor combustion units of identical make and capacity. The units are described as follows:

Make / Model:	Jordon Technologies CEB 1200
VCU Type:	Enclosed flare w/pre-mixed burner design
Supplemental Fuel:	Natural Gas
Rated Heat Input:	40.9 MMBtu/hr
Destruction Efficiency:	99.8% (VOC)
Exhaust:	44" dia vertical stack at ~24' above ground level.

Emergency Fire Pumps

5.k Fire Pump #1. This unit operates in support of facility fire suppression systems whenever utility power is interrupted.

Engine Make / Model:	TBD (Cummins CFP7E-F50 or equivalent)
Engine Power Rating:	225 bhp
Engine Fuel Consumption:	12.1 gal/hr
Engine Mfg Date:	2015 (EPA Tier 3)
Exhaust:	4" dia vertical stack at ~10' above ground level.

5.l Fire Pump #2. This unit operates in support of facility fire suppression systems whenever utility power is interrupted.

Engine Make / Model:	TBD (Cummins CFP7E-F50 or equivalent)
Engine Power Rating:	≤ 225 bhp
Engine Fuel Consumption:	≤ 12.1 gal/hr
Engine Mfg Date:	2015 (EPA Tier 3)
Exhaust:	4" dia vertical stack at ~10' above ground level.

5.m Fire Pump #3. This unit operates in support of facility fire suppression systems whenever utility power is interrupted.

Engine Make / Model:	TBD (Cummins CFP7E-F50 or equivalent)
Engine Power Rating:	≤ 225 bhp
Engine Fuel Consumption:	≤ 12.1 gal/hr
Engine Mfg Date:	2015 (EPA Tier 3)
Exhaust:	4" dia vertical stack at ~10' above ground level.

5.n Equipment/Activity Summary.

ID No.	Generating Equipment/Activity	# of Units	Control Measure/Equipment	# of Units
1	Unloading Boiler #1 (Cleaver Brooks – 61.745 MMBtu/hr)	1	Low Sulfur Fuel Ultra-low NO_X Burner	N/A
2	Unloading Boiler #2 (Cleaver Brooks – 61.745 MMBtu/hr)	1	Low Sulfur Fuel Ultra-low NO_X Burner	N/A
3	Unloading Boiler #3 (Cleaver Brooks – 61.745 MMBtu/hr)	1	Low Sulfur Fuel Ultra-low NO_X Burner	N/A
4	Storage Tank #1	1	Internal Floating Roof (Mechanical Shoe / Rim Seal)	N/A
5	Storage Tank #2	1	Internal Floating Roof (Mechanical Shoe / Rim Seal)	N/A
6	Storage Tank #3	1	Internal Floating Roof (Mechanical Shoe / Rim Seal)	N/A
7	Storage Tank #4	1	Internal Floating Roof (Mechanical Shoe / Rim Seal)	N/A
8	Storage Tank #5	1	Internal Floating Roof (Mechanical Shoe / Rim Seal)	N/A
9	Storage Tank #6	1	Internal Floating Roof (Mechanical Shoe / Rim Seal)	N/A
10	Marine Loading Rack	1	Submerged Fill, Vapor Capture, Vapor Combustion Units	8
11	Fire Pump #1 (TBD – ≤ 225 hp)	1	Ultra-low Sulfur Diesel EPA Tier Certification	N/A
12	Fire Pump #2 (TBD – ≤ 225 hp)	1	Ultra-low Sulfur Diesel EPA Tier Certification	N/A
13	Fire Pump #3 (TBD – ≤ 225 hp)	1	Ultra-low Sulfur Diesel EPA Tier Certification	N/A

6. EMISSIONS DETERMINATION

Emissions to the ambient atmosphere from terminal operations, as proposed in Application 2013-01, consist of nitrogen oxides (NO_X), carbon monoxide (CO), volatile organic compounds (VOC), particulate matter (PM) sulfur dioxide (SO_2), toxic air pollutants (TAPs), and hazardous air pollutants (HAPs).

6.a Unloading Boilers. Emissions from operation of the unloading boilers are calculated from a maximum individual heat input of 61.745 MMBtu/hr and applicable emission factors. Emission factors for all criteria pollutants except SO_2 and CO_2e are taken from manufacturer's data. NO_X and CO emission factors correspond to emission limits of 9 ppmv and 50 ppmv, respectively (corrected to 3% excess oxygen). Emission factor for CO_2e is taken from 40 CFR 98, Tables C-1 and C-2. Emission factors for SO_2 are derived using mass balance and fuel gas sulfur content (2.59 gr/100 scf hourly, 1.31 gr/100 scf annual). Emission factors for TAPs and HAPs are taken from EPA AP-42, Section 1.4 "Natural Gas Combustion" (7/98). All PM is assumed to be $PM_{2.5}$.

The facility will periodically fire all three boilers simultaneously at full fire. Potential annual operation is expected to be equivalent to two boilers continuously firing at ~70% of maximum rate (755,000 MMBtu/yr).

Annual emissions from boiler operation will be calculated based on actual fuel consumption and the most recent source test result for NO_X and CO and the emission factors listed above for all other pollutants.

		Single Boiler Emissions		Combined Emissions
Pollutant	Emission Factor	(lb/hr)	(tpy)	(tpy)
NO_X	0.0110 lb/MMBtu	0.68	2.08	4.16
CO	0.0360 lb/MMBtu	2.22	6.80	13.60
VOC	0.0050 lb/MMBtu	0.31	0.94	1.88
SO_2	0.00725 lb/MMBtu (hourly)	0.45		
	0.00367 lb/MMBtu (annual)		0.69	1.38
$PM_{10}/PM_{2.5}$	0.0075 lb/MMBtu	0.46	1.42	2.84
CO_2e	117 lb/MMBtu	7,224	22,084	44,168

HAP/TAP Pollutant	Emission Factor		Combined Emissions (lbs/yr)	
Arsenic	1.96E-07	lb/MMBtu	1.48E-01	lbs
Benzene	2.06E-06	lb/MMBtu	1.55E+00	lbs
Benzo(a)anthracene	1.76E-09	lb/MMBtu	1.33E-03	lbs
Benzo(a)pyrene	1.18E-09	lb/MMBtu	8.88E-04	lbs
Benzo(b)fluoranthene	1.76E-09	lb/MMBtu	1.33E-03	lbs
Benzo(k)fluoranthene	1.76E-09	lb/MMBtu	1.33E-03	lbs
Beryllium	1.18E-08	lb/MMBtu	8.88E-03	lbs
Cadmium	1.08E-06	lb/MMBtu	8.14E-01	lbs
Chromium - hex	5.49E-08	lb/MMBtu	4.15E-02	lbs
Chrysene	1.76E-09	lb/MMBtu	1.33E-03	lbs
Cobalt	8.24E-08	lb/MMBtu	6.22E-02	lbs
Copper	8.33E-07	lb/MMBtu	6.29E-01	lbs
Dibenzo(a,h)anthracene	1.18E-09	lb/MMBtu	8.88E-04	lbs
7,12-Dimethylbenz(a)anthracene	1.57E-08	lb/MMBtu	1.18E-02	lbs
Formaldehyde	7.35E-05	lb/MMBtu	5.55E+01	lbs
Hexane	1.76E-03	lb/MMBtu	1.33E+03	lbs
Indeno(1,2,3-cd)pyrene	1.76E-09	lb/MMBtu	1.33E-03	lbs
Manganese	3.73E-07	lb/MMBtu	2.81E-01	lbs
Mercury	2.55E-07	lb/MMBtu	1.92E-01	lbs
3-Methylchloranthrene	1.76E-09	lb/MMBtu	1.33E-03	lbs
Naphthalene	5.98E-07	lb/MMBtu	4.52E-01	lbs
Selenium	2.35E-08	lb/MMBtu	1.78E-02	lbs
Toluene	3.33E-06	lb/MMBtu	2.52E+00	lbs
Vanadium	2.25E-06	lb/MMBtu	1.70E+00	lbs

6.b Storage Tanks. Emissions from storage tank operation are calculated using the EPA TANKS 4.0 emissions model, the proposed tank configuration, and maximum proposed crude oil throughput. Calculations assume a ~342,000 bbl working volume and total crude oil throughput of 131,400,000 bbl/yr. Throughput is split evenly among the six storage tanks. Hourly emissions are calculated by dividing annual emissions by 8,760 hr/yr.

Tank ID	VOC Emissions Hourly (lb/hr)	VOC Emissions Annual (tpy)	CO_2e Emissions Annual (tpy)
Storage Tank 1	0.83	3.62	43.44
Storage Tank 2	0.83	3.62	43.44
Storage Tank 3	0.83	3.62	43.44
Storage Tank 4	0.83	3.62	43.44
Storage Tank 5	0.83	3.62	43.44
Storage Tank 6	0.83	3.62	43.44
Total:	4.96	21.72	260.61

HAP and TAP emissions from storage tank operation are calculated from potential VOC emissions using the constituent weight fractions shown below. Weight fractions are worst case assumptions based on constituent profiles for multiple crude oil types including Bakken material.

HAP/TAP Pollutant	Weight Fraction	Emissions (lb/yr)
Benzene	0.0029	128.0
Cyclohexane	0.0078	340.0
Cyclopentane	0.0014	58.9
Ethylbenzene	0.00068	29.4
Hexane	0.0125	542.0
Hydrogen sulfide	0.00320	139.0
Isooctane	0.00059	25.8
Isopropyl benzene	0.00032	14.0
Pentane	0.0177	771.0
Toluene	0.0032	140.0
124-Trimethylbenzene	0.0010	43.0
Xylene (-m)	0.00233	101.2
Xylene (-o)	0.00057	24.8
Xylene (-p)	0.00064	27.7

Tank Degassing. Storage tanks at this facility require periodic inspection and/or repair to maintain proper operational condition. Storage tanks must be completely drained and degassed prior to entry by maintenance personnel. The EPA TANKS 4.0 emission model was used to simulate this operation. Emission calculations assume a worst case scenario where all of the tanks are degassed for inspection or repair in the same calendar year.

Pollutant	Emission Factor	Events/yr	Emissions (tpy)
VOC	533 lb/event	6 (max)	1.60

Annual VOC emissions from storage tank operation will be calculated using the most recent version of EPA TANKS, actual product throughput, and the number of degassing events. Annual HAP and TAP emissions will be calculated from annual VOC emissions using the weight fractions specified above.

6.c Marine Vessel Loading / Fugitive Emissions. Fugitive emissions from marine vessel loading operations are calculated using the loading loss equation from EPA AP-42 Section 5.2 "Transportation and Marketing of Petroleum Liquids" and proposed material throughput. The fugitive emission factor for VOC is derived from an estimated uncontrolled emission rate of 1.6460 lb/1000 gal transferred (*true vapor pressure - 11 psia, molecular weight - 50.0 lb/lb-mol, vessel arrival condition - 0.86 lb/1000 gal*), a VOC-to-TOC ratio of 85% (*EPA AP-42, Section 5.2-3*), and a capture efficiency of 99.89%. Hourly and daily emission calculations assume product throughput of 32,000 bbl/hr. Annual emission calculations

assume product throughput of 360,000 bbl/dy. HAP and TAP emissions from fugitive leaks are calculated from potential VOC emissions based on the constituent weight fraction shown below.

Annual emissions will be calculated based on actual product throughput, natural gas consumption, and hours of operation.

	Fugitive E.F. (lb/1000 gal)	Fugitive Emissions (lb/hr)	(lb/dy)	(tpy)
VOC	0.001539	2.1	49.6	4.25

HAP/TAP Pollutant	Weight Fraction	Emissions (lb/yr)
Benzene	0.00219	18.6
Cyclohexane	0.00534	45.4
Cyclopentane	0.00265	22.5
Ethylbenzene	0.00087	7.4
Hexane	0.01622	137.8
Hydrogen sulfide	0.00735	62.5
Isooctane	0.00022	1.8
Isopropyl benzene	0.00020	1.7
Pentane	0.03241	275.3
Toluene	0.00334	28.4
124-Trimethylbenzene	0.00065	5.6
Xylene (-m)	0.00291	24.7
Xylene (-o)	0.00122	10.4
Xylene (-p)	0.00136	11.6

6.d Marine Vessel Loading / Vapor Combustion Units. Potential emissions from marine vessel loading operations represent a combination of displaced cargo tank inerting gas and combustion products generated by operation of the VCUs. The VCUs are assumed to burn a mixture of displaced vapors and assist gas (natural gas). Hourly and daily emission calculations assume natural gas usage of 30.6 MMBtu/hr, product throughput of 32,000 bbl/hr, and heat input of 144 MMBtu/hr from displaced vapors. Annual emission calculations assume natural gas consumption of 293 MMBtu/dy, product throughput of 360,000 bbl/dy, and heat input of ~68 MMBtu/hr from displaced vapors. Emission factors for TAPs and HAPs are taken from EPA AP-42, Section 1.4 "Natural Gas Combustion" (7/98). All PM is assumed to be $PM_{2.5}$.

Vapor Combustion. Emission factors for NO_X, CO, and CO_2e are taken from manufacturer's data. Emission factor for $PM_{10}/PM_{2.5}$ is taken from EPA AP-42, Section 1.4 (7/98). Emission factor for SO_2 assumes a maximum H_2S concentration of 100 ppmv and full conversion of H_2S into SO_2. Emission factor for VOC is derived from an estimated uncontrolled emission rate of 1.6460 lb/1000 gal transferred, a VOC-to-TOC ratio of 85% (*EPA AP-42, Section 5.2-3*), and a destruction efficiency of 99.8%. The uncontrolled VOC emission rate is a worst case estimate using Equation 2 from EPA AP-42, Section 5.2. (*true vapor pressure - 11 psia, molecular weight - 50.0 lb/lb-mol, vessel arrival condition - 0.86 lb/1000 gal*).

Assist Gas Combustion. Emission factors for NO_X and CO are taken from manufacturer's data. Emission factor for $PM_{10}/PM_{2.5}$ is taken from EPA AP-42, Section 1.4 (7/98). Emission factor for SO_2 assumes a maximum fuel sulfur content of 2.59 gr/100 scf and full conversion of H_2S into SO_2. Emissions of VOC are assumed to be negligible. Emission factor for CO_2e is a composite of CO_2, CH_4, and N_2O emission factors from 40 CFR 98, Tables C-1 and C-2.

Inerting Gas. Greenhouse gas emission calculations for the displacement of inerting gas assume proportional mixture of inerting gas and crude oil vapors during loading operations and an average CO_2 fraction of 12%.

Annual emissions will be calculated based on actual product throughput, natural gas consumption, and hours of operation.

			Emissions	
Pollutant	Emission Factor	(lb/hr)	(lb/dy)	(tpy)
NO_X	0.023 lb/MMBtu (vapor)	3.31	37.54	6.85
	0.023 lb/MMBtu (nat gas)	0.70	6.74	1.23
				8.08
CO	0.010 lb/MMBtu (vapor)	1.44	16.32	2.98
	0.010 lb/MMBtu (nat gas)	0.31	2.93	0.53
				3.51
VOC	0.002798 lb/1000 gal	3.76	90.3	7.72
SO_2	Mass Balance (vapor)	3.02	33.99	6.20
	0.00725 lb/MMBtu (nat gas)	0.22	2.12	0.39
				6.59
$PM_{10}/PM_{2.5}$	0.0075 lb/MMBtu (vapor)	1.08	12.24	2.23
	0.0075 lb/MMBtu (nat gas)	0.23	2.20	0.40
				2.63
CO_2e	135.6 lb/MMBtu (vapor)	19,526	221,299	40,150
	117 lb/MMBtu (nat gas)	3,580	34,281	6,248
	0.06309 lb/bbl (inerting gas)	2,019	22,712	4,145
				50,543

HAP/TAP Pollutant	Emission Factor		Emissions	
Arsenic	1.96E-07	lb/MMBtu	1.69E-01	lbs
Benzene	2.06E-06	lb/MMBtu	1.77E+00	lbs
Benzo(a)anthracene	1.76E-09	lb/MMBtu	1.52E-03	lbs
Benzo(a)pyrene	1.18E-09	lb/MMBtu	1.01E-03	lbs
Benzo(b)fluoranthene	1.76E-09	lb/MMBtu	1.52E-03	lbs
Benzo(k)fluoranthene	1.76E-09	lb/MMBtu	1.52E-03	lbs
Beryllium	1.18E-08	lb/MMBtu	1.01E-02	lbs
Cadmium	1.08E-06	lb/MMBtu	9.30E-01	lbs
Chromium - hex	5.49E-08	lb/MMBtu	4.73E-02	lbs
Chrysene	1.76E-09	lb/MMBtu	1.52E-03	lbs
Cobalt	8.24E-08	lb/MMBtu	7.10E-02	lbs
Copper	8.33E-07	lb/MMBtu	7.18E-01	lbs
Dibenzo(a,h)anthracene	1.18E-09	lb/MMBtu	1.01E-03	lbs
7,12-Dimethylbenz(a)anthracene	1.57E-08	lb/MMBtu	1.35E-02	lbs
Formaldehyde	7.35E-05	lb/MMBtu	6.34E+01	lbs
Hexane	1.76E-03	lb/MMBtu	1.52E+03	lbs
Hydrogen sulfide	--	lb/MMBtu	6.59E-03	lbs
Indeno(1,2,3-cd)pyrene	1.76E-09	lb/MMBtu	1.52E-03	lbs
Manganese	3.73E-07	lb/MMBtu	3.21E-01	lbs
Mercury	2.55E-07	lb/MMBtu	2.20E-01	lbs
3-Methylchloranthrene	1.76E-09	lb/MMBtu	1.52E-03	lbs
Naphthalene	5.98E-07	lb/MMBtu	5.16E-01	lbs
Selenium	2.35E-08	lb/MMBtu	2.03E-02	lbs
Toluene	3.33E-06	lb/MMBtu	2.87E+00	lbs
Vanadium	2.25E-06	lb/MMBtu	1.94E+00	lbs

6.e Fugitive Emissions - Equipment Components. Fugitive emissions from component leaks are calculated from proposed component counts and 8,760 hr/yr of operation using *Protocol for Equipment Leak Estimates* (EPA 453-R95-017, Nov 1995). 1.5% of components are assumed to be leaking at any one time. One leaking component is assumed to be pegged for 730 hr/yr. The hourly emission rate represents the worst case annual emission rate divided by 8,760 hours. CO_2e emissions are calculated based on estimated VOC emissions and the ratio of the lowest molecular weight pollutant (cyclopentane) emissions from component leaks to emissions from the tanks. HAP and TAP emissions from fugitive leaks are calculated from potential VOC emissions based on the constituent weight fraction shown below.

Annual VOC emissions will be calculated based on actual component count, hours of operation, and the emission factors/methodology listed above. Annual HAP/TAP emissions will be calculated based on estimated VOC emissions using the weight fractions listed above.

Component Type	Unit Count	VOC E.F. (lb/dy/unit)	VOC Emissions (lb/yr)	CO_2e Emissions (tpy)
Valves:				
Non-leaker	2,753	1.70E-05	410.0	-
Leaker	42	3.10E-04	114.1	-
Pegged Leaker	1	1.41E-01	103.0	-
Pump Seals:				
Non-leaker	61	5.30E-05	28.3	-
Leaker	1	7.50E-03	65.7	-
Pegged Leaker	1	1.63E-01	119.1	-
Connectors:				
Non-leaker	360	1.70E-05	53.6	-
Leaker	6	2.00E-04	10.5	-
Pegged Leaker	1	6.17E-02	45.1	-
Flanges:				
Non-leaker	2,630	6.80E-07	15.7	-
Leaker	40	4.90E-04	171.7	-
Pegged Leaker	1	1.87E-01	136.8	-
Other:				
Non-leaker	1,486	8.80E-06	114.6	-
Leaker	23	7.80E-04	157.2	-
Pegged Leaker	1	1.61E-01	117.5	-
		Total:	1,662.8	235.6

HAP/TAP Pollutant	Weight Fraction	Emissions (lb/yr)
Benzene	0.00219	3.6
Cyclohexane	0.00534	8.9
Cyclopentane	0.00265	4.4
Ethylbenzene	0.00087	1.4
Hexane	0.01622	27.0
Hydrogen sulfide	0.00735	12.2
Isooctane	0.00022	0.4
Isopropyl benzene	0.00020	0.3
Pentane	0.03241	53.9
Toluene	0.00334	5.6
124-Trimethylbenzene	0.00065	1.1
Xylene (-m)	0.00291	4.8
Xylene (-o)	0.00122	2.0
Xylene (-p)	0.00136	2.3

6.f Emergency Fire Pumps. Emissions from operation of the three emergency fire pumps are calculated from an individual engine rating of 225 hp, 34 hr/yr of routine operation per engine (0.5 hr/wk readiness testing, 8-hour annual test), maximum fuel consumption of 12.1 gal/hr per engine, maximum fuel sulfur content of 0.0015% sulfur by weight, and applicable emission factors. The emission factor for SO_2 is derived from rated fuel consumption and maximum sulfur content. The emission factor for CO_2e is taken from 40 CFR 98, Subpart C. All other criteria pollutant emission factors are taken from manufacturer's data for a Cummins CFP7E-F50 engine. All PM is assumed to be $PM_{2.5}$. HAP/TAP emission factors are taken from EPA AP-42, Section 3.3.

Actual emissions from fire pump operation shall be calculated based on actual hours of operation and the emission factors listed above.

	Emission Factor	Single Engine		Combined Emissions
Pollutant	g/kW-hr	(lb/hr)	(tpy)	(tpy)
NO_X	0.335	0.124	0.002	0.006
CO	1.6	0.590	0.010	0.03
VOC	0.37	0.137	0.002	0.007
SO_2	--	0.0025	0.00004	0.0001
$PM_{10}/PM_{2.5}$	0.17	0.063	0.001	0.003
CO_2e	717.13	264.6	4.5	13.5

HAP/TAP Pollutant	Emission Factor		Emissions	
Acenaphthene	1.42E-06	lb/MMBtu	2.35E-04	lbs
Acenaphthylene	5.06E-06	lb/MMBtu	8.37E-04	lbs
Acetaldehyde	7.67E-04	lb/MMBtu	1.27E-01	lbs
Acrolein	9.25E-05	lb/MMBtu	1.53E-02	lbs
Anthracene	1.87E-06	lb/MMBtu	3.09E-04	lbs
Benzene	9.33E-04	lb/MMBtu	1.54E-01	lbs
Benzo(a)anthracene	1.68E-06	lb/MMBtu	2.78E-04	lbs
Benzo(a)pyrene	1.88E-07	lb/MMBtu	3.11E-05	lbs
Benzo(b)fluoranthene	9.91E-08	lb/MMBtu	1.64E-05	lbs
Benzo(g,h,i)perylene	4.89E-07	lb/MMBtu	8.09E-05	lbs
Benzo(k)fluoranthene	1.55E-07	lb/MMBtu	2.56E-05	lbs
1,3-Butadiene	3.91E-05	lb/MMBtu	6.47E-03	lbs
Chrysene	3.53E-07	lb/MMBtu	5.84E-05	lbs
Dibenzo(a,h)anthracene	5.83E-07	lb/MMBtu	9.64E-05	lbs

HAP/TAP Pollutant	Emission Factor		Emissions	
Diesel Engine Particulate	-	lb/MMBtu	6.40E+00	lbs
Fluoranthene	7.61E-06	lb/MMBtu	1.26E-03	lbs
Fluorene	2.92E-05	lb/MMBtu	4.83E-03	lbs
Formaldehyde	1.18E-03	lb/MMBtu	1.95E-01	lbs
Indeno(1,2,3-cd)pyrene	3.75E-07	lb/MMBtu	6.20E-05	lbs
Naphthalene	8.48E-05	lb/MMBtu	1.40E-02	lbs
Phenanthrene	2.94E-05	lb/MMBtu	4.86E-03	lbs
Propylene	2.58E-04	lb/MMBtu	4.27E-02	lbs
Pyrene	4.78E-06	lb/MMBtu	7.91E-04	lbs
Toluene	4.09E-04	lb/MMBtu	6.76E-02	lbs
Xylenes (-m)	2.85E-04	lb/MMBtu	4.71E-02	lbs

6.g Emissions Summary/Facilitywide Potential to Emit.

Pollutant	Potential Emissions	Project Change
NO_X	12.20 tpy	12.20 tpy
CO	17.12 tpy	17.12 tpy
VOC	38.01 tpy	38.01 tpy
SO_2	7.98 tpy	7.98 tpy
PM_{10}	5.46 tpy	5.46 tpy
$PM_{2.5}$	5.46 tpy	5.46 tpy
HAP	2.15 tpy	2.15 tpy
TAP	2.46 tpy	2.46 tpy
CO_2e	94,985	94,985

HAP/TAP	CAS No.	Category	Potential Emissions (lb/yr)	Project Increase (lb/yr)	Over SQER?
Acenaphthene	83-32-9	HAP	2.35E-4	2.35E-4	--
Acenaphthylene	208-96-8	HAP	8.37E-4	8.37E-4	--
Acetaldehyde	75-07-0	HAP/TAP	1.27E-1	1.27E-1	No
Acrolein	107-02-8	HAP/TAP	1.53E-2	1.53E-2	No
Anthracene	120-12-7	HAP	3.09E-4	3.09E-4	--
Arsenic	*7440-38-2*	*HAP/TAP*	*3.17E-1*	*3.17E-1*	*Yes*
Benzene	*71-43-2*	*HAP/TAP*	*1.54E+2*	*1.54E+2*	*Yes*
Benzo(a)anthracene	56-55-3	HAP/TAP	3.13E-3	3.13E-3	No
Benzo(a)pyrene	50-32-8	HAP/TAP	1.93E-3	1.93E-3	No
Benzo(b)fluoranthene	205-99-2	HAP/TAP	2.87E-3	2.87E-3	No
Benzo(g,h,i)perylene	203-12-3	HAP	8.09E-5	8.09E-5	--
Benzo(k)fluoranthene	207-08-9	HAP/TAP	2.88E-3	2.88E-3	No
Beryllium	7440-41-7	HAP/TAP	1.90E-2	1.90E-2	No
1,3-Butadiene	106-99-0	HAP/TAP	6.47E-3	6.47E-3	No
Cadmium	*7440-43-9*	*HAP/TAP*	*1.74E+0*	*1.74E+0*	*Yes*
Chromium - hex	*18540-29-9*	*HAP/TAP*	*8.88E-2*	*8.88E-2*	*Yes*
Chrysene	218-01-9	HAP/TAP	2.91E-3	2.91E-3	No
Cobalt	7440-48-4	HAP/TAP	1.33E-1	1.33E-1	No
Copper	7440-50-8	TAP	1.35E+0	1.35E+0	No
Cyclohexane	110-82-7	TAP	3.94E+2	3.94E+2	No
Dibenzo(a,h)anthracene	53-70-3	HAP/TAP	2.00E-3	2.00E-3	No
Diesel Particulate	*DEP*	*TAP*	*6.40E+0*	*6.40E+0*	*Yes*
7,12-Dimethylbenz(a)anthracene	*57-97-6*	*HAP/TAP*	*2.54E-2*	*2.54E-2*	*Yes*

HAP/TAP	CAS No.	Category	Potential Emissions (lb/yr)	Project Increase (lb/yr)	Over SQER?
Ethylbenzene	100-41-4	HAP/TAP	3.82E+1	3.82E+1	No
Fluoranthene	206-44-0	HAP	1.26E-3	1.26E-3	--
Fluorene	86-73-7	HAP	4.83E-3	4.83E-3	--
Formaldehyde	*50-00-0*	*HAP/TAP*	*1.19E+2*	*1.19E+2*	*Yes*
Hexane	110-54-3	HAP/TAP	3.56E+3	3.56E+3	No
Hydrogen sulfide	*7783-06-4*	*TAP*	*2.14E+2*	*2.14E+2*	*Yes*
Indeno(1,2,3-cd)pyrene	133-39-5	HAP/TAP	2.92E-3	2.92E-3	No
Isooctane	540-84-1	HAP/TAP	2.80E+1	2.80E+1	No
Isopropyl benzene	98-82-8	HAP/TAP	1.60E+1	1.60E+1	No
Manganese	7439-96-5	HAP/TAP	6.02E-1	6.02E-1	No
Mercury	7439-97-6	HAP/TAP	4.12E-1	4.12E-1	No
3-Methylchloranthrene	56-49-5	HAP/TAP	2.85E-3	2.85E-3	No
Naphthalene	91-20-3	HAP/TAP	9.67E-1	9.67E-1	No
Nitrogen dioxide	*10102-44-0*	*TAP*	*2.44E+4*	*2.44E+4*	*Yes*
Phenanthrene	85-01-8	HAP	4.86E-3	4.86E-3	--
Propylene	115-07-1	TAP	4.27E-2	4.27E-2	No
Pyrene	129-00-0	HAP	7.91E-4	7.91E-4	--
Selenium	7782-49-2	HAP/TAP	3.80E-2	3.80E-2	No
Sulfur dioxide	*7446-09-5*	*TAP*	*1.59E+4*	*1.59E+4*	*Yes*
Toluene	108-88-3	HAP/TAP	1.79E+2	1.79E+2	No
124-Trimethylbenzene	95-63-6	TAP	4.97E+1	4.97E+1	No
Vanadium	7440-62-2	TAP	3.65E+0	3.65E+0	No
Xylene (-m)	108-38-3	HAP/TAP	1.31E+2	1.31E+2	No
Xylene (-o)	95-47-6	HAP/TAP	3.72E+1	3.72E+1	No
Xylene (-p)	106-42-3	HAP/TAP	4.15E+1	4.15E+1	No

7. REGULATIONS AND EMISSION STANDARDS

Under Washington Administrative Code (WAC) 463-78-005, EFSEC has adopted by reference the general air quality regulations Ecology has established in Chapter 173-400, 173-401, 173-406, and 173-460. EFSEC regulations (WAC 463-78-005(1) and (4)) adopt by reference the procedural requirements of WAC 173-400-110 and Chapter 173-460 WAC for New Source Review (NSR). NSR is the air regulatory program required by the Washington Clean Air Act under Chapter 70.94 RCW requiring review and evaluation of air quality implications prior to construction, installation, establishment or modification of any new air contaminant source. The goal of NSR is to assure new sources of air pollution, changes to air pollution controls and other actions triggering NSR are established in a manner that maintains compliance with applicable air regulations and standards, including equipment performance standards and ambient air quality standards. Regulations that have been used to evaluate the acceptability of the proposed facility and establish emission limits and control requirements include, but are not limited to, the regulations, codes, or requirements listed below.

7.a 40 CFR 60 Subpart Dc "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units" applies to any steam generating unit with a heat input greater than or equal to 10 MMBtu/hr, but less than or equal to 100 MMBtu/hr constructed, modified, or reconstructed after June 9, 1989. The boilers at this facility will be subject to this regulation, but there are no applicable emission standards.

7.b 40 CFR 60 Subpart Kb "Standards of Performance for Volatile Organic Liquid Storage Vessels for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984" applies to bulk storage vessels based on a combination of vessel size and the maximum true vapor pressure of product stored in the vessel. The crude oil storage tanks at this facility will be subject to this regulation.

7.c 40 CFR 60 Subpart IIII "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines" applies to each compression ignition (CI) internal combustion engine (ICE) that commences construction after July 11, 2005 and is manufactured after April 1, 2006, or that is modified or reconstructed after July 11, 2005. The diesel engines used to power the emergency fire pumps are subject to this regulation.

7.d 40 CFR 63 Subpart Y "National Emission Standards for Marine Tank Vessel Loading Operations" applies to marine tank vessel loading operations that are major sources of HAP emissions or sources with a throughput of greater than 1.6 billion liters (10 M barrels) of gasoline annually or 32 billion liters (200 M barrels) of crude oil annually. This facility is not a major source of HAP emissions and will have a crude oil throughput of less than 200,000,000 barrels annually. Therefore this regulation is not applicable.

7.e 40 CFR 63 Subpart ZZZZ "National Emissions Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines" establishes national emission limitations and operating limitations for HAP emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. The diesel engines used to power the emergency fire pumps meet the definition of a new stationary CI RICE so this regulation is applicable. The fire pump engines will comply with this regulation by complying with the requirements of 40 CFR 60 Subpart IIII.

7.f 40 CFR 63 Subpart JJJJJJ “National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources" establishes performance standards and requirements for industrial, commercial and institutional boilers operating at an area source of hazardous air pollutants. The boilers at this facility meet the definition of "gas-fired boiler" and not subject to Subpart JJJJJJ.

7.g Revised Code of Washington (RCW) 70.94.141 empowers any activated air pollution control authority to prepare and develop a comprehensive plan or plans for the prevention, abatement and control of air pollution within its jurisdiction. An air pollution control authority may issue such orders as may be necessary to effectuate the purposes of the Washington Clean Air Act [RCW 70.94] and enforce the same by all appropriate administrative and judicial proceedings subject to the rights of appeal as provided in Chapter 62, Laws of 1970 ex. sess.

7.h RCW 70.94.152 provides for the inclusion of conditions of operation as are reasonably necessary to assure the maintenance of compliance with the applicable ordinances, resolutions, rules and regulations when issuing an Air Discharge Permit for installation and establishment of an air contaminant source.

7.i Washington Administrative Code (WAC) 173-401 "Operating Permit Regulation" requires all major sources and other sources as defined in WAC 173-401-300 to obtain an operating permit. This regulation is not applicable because this source is not a major source and does not meet the applicability criteria set forth in WAC 173-401-300. *(Adopted by reference pursuant to EFSEC WAC 463-78-005)*

7.j WAC 173-400-040 "General Standards for Maximum Emissions" requires all new and existing sources and emission units to meet certain performance standards with respect to Reasonably Available Control Technology (RACT), visible emissions, fallout, fugitive emissions, odors, emissions detrimental to persons or property, sulfur dioxide, concealment and masking, and fugitive dust. *(Adopted by reference pursuant to EFSEC WAC 463-78-005)*

7.k WAC 173-400-050 "Emission Standards for Combustion and Incineration Units" requires that all provisions of WAC 173-400-040 be met and that no person shall cause or permit the emission of particulate matter from any combustion or incineration unit in excess of 0.23 grams per dry cubic meter (0.1 grains per dry standard cubic foot) of exhaust gas at standard conditions. *(Adopted by reference pursuant to EFSEC WAC 463-78-005)*

7.l WAC 173-400-060 "Emission Standards for General Process Units" prohibits particulate matter emissions from all new and existing process units in excess of 0.1 grains per dry standard cubic foot of exhaust gas. *(Adopted by reference pursuant to EFSEC WAC 463-78-005)*

7.m WAC 173-113 "Requirements for New Sources in Attainment or Unclassifiable Areas" requires that no approval to construct or alter an air contaminant source shall be granted unless it is evidenced that:

(1) The equipment or technology is designed and will be installed to operate without causing a violation of the applicable emission standards;
(2) Best Available Control Technology will be employed for all air contaminants to be emitted by the proposed equipment;
(3) The proposed equipment will not cause any ambient air quality standard to be exceeded; and
(4) If the proposed equipment or facility will emit any toxic air pollutant regulated under WAC 173-460, the proposed equipment and control measures will meet all the requirements of that Chapter.

(Adopted by reference pursuant to EFSEC WAC 463-78-005)

7.n WAC 173-460 "Controls for New Sources of Toxic Air Pollutants" requires Best Available Control Technology for toxic air pollutants (T-BACT), identification and quantification of emissions of toxic air pollutants and demonstration of protection of human health and safety. *(Adopted by reference pursuant to EFSEC WAC 463-78-005)*

7.o WAC 173-476 "Ambient Air Quality Standards" establishes ambient air quality standards for PM_{10}, $PM_{2.5}$, lead, sulfur dioxide, nitrogen dioxide, ozone, and carbon monoxide in the ambient air, which shall not be exceeded.

7.p SWCAA 490 "Emission Standards and Controls for Sources Emitting Volatile Organic Compounds" establishes emission standards and control requirements for sources of VOC located in ozone nonattainment or maintenance plan areas.

7.q SWCAA 490-040(2) "Petroleum liquid storage tanks" establishes specific equipment requirements for fixed-roof tanks storing volatile organic petroleum liquids with a true vapor pressure as stored greater than 78 mm of Hg (1.5 psi) and having a capacity greater than one hundred fifty thousand liters (40,000 gallons). The crude oil storage tanks at this facility are subject to this regulation.

7.r SWCAA 490-201 "Petroleum Liquid Storage in External Floating Roof Tanks" establishes specific equipment requirements for petroleum liquid storage vessels equipped with external floating roofs and having capacities greater than 150,000 liters (40,000 gallons). The crude oil storage tanks at this facility do not have external floating roofs so this regulation is not applicable.

8. RACT/BACT/BART/LAER/PSD/CAM DETERMINATIONS

The proposed equipment and control systems incorporate Best Available Control Technology (BACT) for the types and amounts of air contaminants emitted by the processes as described below:

8.a BACT Determination – Process Boilers. The proposed use of combustion equipment that fires low sulfur fuel (natural gas), employs good combustion practices, and is equipped with low emission burners (NO_X emissions ≤0.011 lb/MMBtu, CO emissions ≤0.036 lb/MMBtu) has been determined to meet the requirements of BACT and T-BACT for process boilers at this facility

8.b BACT Determination – Crude Oil Storage Tanks. The proposed use of internal floating roof storage tanks equipped with primary and secondary seals has been determined to meet the requirements of BACT and T-BACT for crude oil storage tanks at this facility.

8.c BACT Determination – Equipment Component Leaks. The proposed use of a leak detection and repair program that complies with the provisions of 40 CFR 63, Subpart H has been determined to meet the requirements of BACT and T-BACT for fugitive leaks from equipment components handling crude oil at this facility.

8.d BACT Determination – Marine Vessel Loading. The proposed use of submerged fill, a vapor capture system with a minimum demonstrated capture efficiency of 99.89%, vapor combustion units with a minimum demonstrated VOC destruction efficiency of 99.8%, natural gas as an assist fuel, and good combustion practice has been determined to meet the requirements of BACT and T-BACT for marine vessel loading operations at this facility.

8.e BACT Determination – Emergency Fire Pumps. The proposed use of diesel engines that meet the requirements of 40 CFR 60, Subpart IIII, limited hours of operation (testing, maintenance, and emergency use only), and ultra-low sulfur distillate fuel (less than 0.0015% sulfur by weight) has been determined to meet the requirements of BACT for the emergency fire pumps at this facility.

Other Determinations

8.f Prevention of Significant Deterioration (PSD) Applicability Determination: This permitting action will not result in a potential increase in emissions equal to or greater than applicable PSD thresholds. Therefore, PSD review is not applicable to this action.

8.g Compliance Assurance Monitoring (CAM) Applicability Determination. CAM is not applicable to any emission unit at this facility because it is not a major source and is not required to obtain a Part 70 permit.

9. AMBIENT IMPACT ANALYSIS

9.a TAP Small Quantity Review. The incremental increase in TAP emissions associated with this permitting action are quantified in Section 6 of this Technical Support Document. The incremental increase in individual TAP emissions is less than the applicable small quantity emission rate (SQER) identified for each compound in WAC 173-460 with the exception of the TAPs list below in section 9.b.

9.b TAP Ambient Impact Analysis. TAP emissions from the proposed project were modeled using AERMOD dispersion model. The results of the model indicate that the project will not cause an incremental increase in ambient concentrations greater than the applicable acceptable source impact level (ASIL) identified in WAC 173-460.

Toxic Compound	CAS #	Incremental Ambient Impact ($\mu g/m^3$)	Acceptable Source Impact Level ($\mu g/m^3$)
Arsenic	7440-38-2	1.05E-5 (annual)	3.03E-4 (annual)
Benzene	71-43-2	2.33E-2 (annual)	3.45E-2 (annual)
Cadmium	7440-43-9	5.78E-5 (annual)	2.38E-4 (annual)
Chromium - hex	18540-29-9	2.94E-6 (annual)	6.67E-6 (annual)
Diesel engine particulate	--	1.45E-3 (annual)	3.33E-3 (annual)
7,12-Dimethylbenz(a)anthracene	57-97-6	8.41E-7 (annual)	1.41E-5 (annual)
Formaldehyde	50-00-0	3.94E-3 (annual)	1.67E-1 (annual)
Hydrogen sulfide	7783-06-4	5.67E-1 (24-hr)	2.00E+0 (24-hr)
Nitrogen dioxide	10102-44-0	22.6 (1-hr)	470 (1-hr)
Sulfur dioxide	7446-09-5	18.6 (1-hr)	660 (1-hr)

Conclusions

9.c Handling and storage of crude oil, as proposed in Application 2013-01, will not cause the ambient air quality requirements of Title 40 Code of Federal Regulations (CFR) Part 50 "National Primary and Secondary Ambient Air Quality Standards" to be violated.

9.d Handling and storage of crude oil, as proposed in Application 2013-01, will not cause the requirements of WAC 173-460 "Controls for New Sources of Toxic Air Pollutants" (effective 8/21/98) or WAC 173-476 "Ambient Air Quality Standards" to be violated.

9.e The crude oil handling and storage operation proposed in Application 2013-01 can be operated without causing a violation of emission standards for sources as established under General Regulations Sections 173-400-040 "General Standards for Maximum Emissions," 173-400-050 "Emission Standards for Combustion and Incineration Units," and 173-400-060 "Emission Standards for General Process Units."

10. DISCUSSION OF APPROVAL CONDITIONS

EFSEC has made a determination to issue ADP XX-XXXX in response to Application 2013-01. ADP XX-XXXX contains approval requirements deemed necessary to assure compliance with applicable regulations and emission standards as discussed below.

10.a General Basis. Permit requirements for equipment affected by this permitting action incorporate the operating schemes proposed by the applicant in Application 2013-01.

10.b Monitoring and Recordkeeping Requirements. ADP XX-XXXX establishes monitoring and recordkeeping requirements sufficient to document compliance with applicable emission limits, ensure proper operation of approved equipment and provide for compliance with generally applicable requirements. Specific requirements are established for VCU combustion chamber temperature, marine vessel loading events, storage tank inspections, fuel consumption, and crude oil throughput.

10.c Reporting Requirements: ADP XX-XXXX establishes general reporting requirements for annual air emissions, upset conditions and excess emissions. Specific reporting requirements are established for fuel consumption, crude oil throughput, testing/monitoring results, and storage degassing events.

10.d Emission Limits. Emission limits for approved equipment are based on the maximum potential emissions calculated in Section 6 of this Technical Support Document. Short term limits generally reflect the maximum physical operating capacity of affected emission units. Long term limits are intended to reflect maximum practical operating capacity of affected emission units.

10.e Operating/Throughput Limits: ADP XX-XXXX establishes crude oil throughput and fuel consumption limits consistent with the operational scenarios identified in Application 2013-01. Long term (annual) throughput limits are intended to represent maximum practical operating capacity of affected emission units, and do not necessarily reflect maximum short term capacity of individual emission units. Operational limitations (vapor balancing, temperature limits, etc) have been established where necessary to minimize and/or ensure proper control of associated air emissions.

10.f Marine Vessel Loading Capture Efficiency. EPA methodology for emission calculations establishes a number of presumptions for capture efficiency at petroleum transfer facilities. For facilities utilizing emission controls equivalent to those required by MACT requirements, EPA guidance presumes a capture efficiency of 99.2%. The applicant has proposed to apply a higher capture efficiency based on guidance from the Texas Commission on Environmental Quality (TCEQ). The Air Permits Division Marine Loading Collection Efficiency Guidance *(9/21/16)* is based on actual emission data gathered from existing marine vessel loading facilities. A copy of the TCEQ guidance is available at the following web link: *http://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/marine-load-guide.pdf*

Pursuant to the TCEQ guidance, the applicant has proposed to apply a capture efficiency of 99.89% as described in "Category 3" of the guidance. Application of a "Category 3" capture efficiency requires more stringent emission testing than would typically be required by basic permitting requirements. Whereas the TCEQ guidance requires annual emission testing for a limited period of time (*3 years*), the proposed permit requires annual emission testing on an ongoing basis. The purpose of ongoing testing is to ensure proper operation and maintenance of the vapor recovery system over the life of the facility.

11. START-UP AND SHUTDOWN/ALTERNATIVE OPERATING SCENARIOS/POLLUTION PREVENTION

11.a Start-up and Shutdown Provisions. Technology based emission standards and control technology determinations shall take into consideration the physical and operational ability of a source to comply with the applicable standards during start-up or shutdown. Where it is determined that a source is not capable of achieving continuous compliance with an emission standard during start-up or shutdown, EFSEC shall include appropriate emission limitations, operating parameters, or other criteria to regulate performance of the source during start-up or shutdown.

The floating roof tanks have legs that keep the roof approximately six feet off the bottom of the tank such that during product changes or completely emptying the tank for maintenance, the roof is not floating. The tanks will be filled or emptied as rapidly as possible to minimize emissions during these periods.

11.b Alternate Operating Scenarios. EFSEC conducted a review of alternate operating scenarios applicable to equipment affected by this permitting action. The permittee did not propose or identify any applicable alternate operating scenarios. Therefore, none were included in the permit requirements.

11.c Pollution Prevention Measures. EFSEC conducted a review of possible pollution prevention measures for the facility. No pollution prevention measures were identified by either the permittee or EFSEC separate or in addition to those measures required under BACT considerations. Therefore, none were included in the permit requirements.

12. EMISSION MONITORING AND TESTING

12.a Emission Testing Requirements - Process Boilers. Permit requirements for the process boilers at this facility require the permittee to conduct emission testing within 90 days of commencing operation, and every five years thereafter, for the purpose of demonstrating compliance with applicable emission limits.

12.b Emission Monitoring Requirements - Process Boilers. Permit requirements for the process boilers at this facility require the permittee to conduct annual emission monitoring of each unit for the purpose of ensuring proper ongoing operation.

12.c Emission Testing Requirements - Marine Vapor Combustion Units. Permit requirements for marine vessel loading operations at this facility require the permittee to conduct emission testing of the associated vapor combustion units within 90 days of commencing operation, and annually thereafter, for the purpose of demonstrating compliance with applicable emission limits.

12.d Emission Testing Requirements. - Marine Vessel Vapor Capture System. Permit requirements for marine vessel loading operations at this facility require the permittee to conduct emission testing of the vapor capture system within 90 days of commencing operation, and annually thereafter, for the purpose of demonstrating compliance with applicable emission limits.

13. FACILITY HISTORY

13.a Facility History. The proposed facility is new. EFSEC has not previously issued any permits for the facility.

14. PUBLIC INVOLMENT OPPORTUNITY

Under the procedural requirements of WAC 463-78-005(1) (adopting by reference WAC 173-400-171), New Source Review (NSR) is initiated by the project proponent submitting a Notice of Construction (NOC) application containing information on the proposed project of sufficient detail to characterize air impacts. Tesoro Savage Vancouver Energy submitted a NOC application in Part 5 of the Application for Site Certification (ASC) to EFSEC on August 29, 2013. The August 2013 ASC along with subsequent ASC submittals can be accessed on EFSEC's Tesoro Savage webpage at:
http://www.efsec.wa.gov/Tesoro%20Savage/Application/TesoroApplicationPage.shtml

14.a Public Notice for Application 2013-01:
The Council made a preliminary determination to approve the issuance of this permit to the Applicant on May 2, 2017. The public notice was posted to EFSEC's website on May 3, 2017 and the Council will publish public Notice of the Draft (PNOD) in the Columbian newspaper to inform the public that a draft permit, technical support document, and attachments are available for review. Interested parties were mailed the notice on May 3, 2017 and are invited to submit written comments regarding the draft permit and related documents within the public comment period, **May 3, 2017 - June 7, 2017**.

The draft permit, technical support document, and related documents are available for viewing at the EFSEC website:
http://www.efsec.wa.gov/Tesoro%20Savage/Permits%20Page/Tesoro-Savage_Permits.shtml.

The draft permit, technical support document, and related documents are also available for inspection and copying between the hours of 8:00 a.m. ad 5:00 p.m. weekdays, by appointment, at EFSEC's office listed below:
Sonia E. Bumpus
Energy Facility Site Evaluation Council
1300 S. Evergreen Park Drive S.W.
Olympia, WA 98584-7250

14.b Public/Applicant Comment for Application 2013-01:

Written comments should be mailed to:

Sonia E. Bumpus
Energy Facility Site Evaluation Council
PO Box 43172
Olympia, WA 98504-3172

Public comment can also be submitted online at:
http://www.efsec.wa.gov/Tesoro%20Savage/Permits%20Page/Tesoro-Savage_Permits.shtml

Any interested party may comment on the draft permit document within the 36-day comment period to the address above.

A public meeting to receive public comments will be held on June 7, 2017, starting at 1 PM with a break from 4-5 PM. The meeting will end at 9 PM or last speaker, whichever comes first. The meeting will be held at Clark College in Gaiser Hall located at 1933 Fort Vancouver Way Vancouver, WA 98663. This information may be subject to change. If changes to this schedule are necessary EFSEC will notify the public as soon as possible.

Comments should reference specific text in the permit followed by proposed modifications or concerns when possible. Comment may address technical issues, accuracy, and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

EFSEC will consider all comments received during the comment period before making a final determination on whether or not to issue the permit.

For more information please contact Sonia E. Bumpus, EFSEC Siting Manager (360) 664-1363 or by email at sbumpus@utc.wa.gov.

14.c State Environmental Policy Act (SEPA) Compliance: To meet the intent of SEPA, an environmental review is being conducted by the lead agency. The Applicant submitted an ASC to EFSEC pursuant to WAC 463, following review of the ASC, EFSEC made a SEPA threshold determination of significance in October 2013. As SEPA lead agency, EFSEC prepared and published a Draft Environmental Impact Statement (DEIS) on November 24, 2015, for which approximately 230,000 public comments were received. EFSEC is expected to prepare a Final Environmental Impact Statement in 2017.