ALLEGHENY COUNTY HEALTH DEPARTMENT (ACHD)
AIR QUALITY PROGRAM

July 27, 2017

SUBJECT: Neville Island Terminals – DE LLC
Neville Island Terminal
2760 Neville Road
Neville Township, PA 15225
Allegheny County

Title V Operating Permit No. 0012
Petroleum product storage and transfer.

TO: JoAnn Truchan, P.E.
Acting Section Chief, Engineering

FROM: Helen O. Gurvich
Air Quality Engineer

FACILITY DESCRIPTION:

Neville Island Terminals – DE LLC, Neville Island Terminal is located at 2760 Neville Road, Neville Township, Allegheny County and is a major source of volatile organic compounds (VOC) as defined in section 2103.20.b.4 of Article XXI and a minor source of all other criteria pollutants and hazardous air pollutants (HAPs) as defined in section 2101.20 of Article XXI. The facility is a bulk storage and distribution terminal for gasoline, gasoline-ethanol blends, distillates, denatured ethanol, and biodiesel. The facility presently consists of the following emission units:

1. Truck Loading Rack – gasoline and distillate tank truck loading with vapor recovery units.
2. Barge Loading Dock – gasoline and distillate barge loading with vapor recovery units.
3. Rail car off-loading system.
4. Twenty storage tanks.
5. Combustion units: emergency generator, three boilers for rail car off-loading system and one warehouse space heater.
6. Miscellaneous sources.

The Neville Island Terminal is currently permitted as a Synthetic Minor facility. Due to the relaxing of throughput restrictions that made the facility a synthetic minor, and the addition of equipment under Installation Permits No. 0012-I005 and No. 0012-I006, the facility's site-wide potential VOC emissions will exceed 50 tons per year. For that reason, it is requested that the terminal be permitted as a Title V major facility for VOC emissions. The terminal will remain an area (minor) source with respect to individual HAP emissions and total HAP emissions.

OPERATING PERMIT APPLICATION COMPONENTS:

1. Title V Operating Permit Application No.0012 dated January 2015.
2. Installation Permit No. 0012-I001 issued June 15, 1988.
3. Installation Permit No. 0012-I002 issued November 19, 2007.
4. Installation Permit No. 0012-I003 issued April 28, 2009.
5. Installation Permit No. 0012-I004 issued May 11, 2011.
6. Synthetic Minor Operating Permit No.0012 issued March 11, 2013.
7. Installation Permit No. 0012-I005 issued April 25, 2013.
8. Installation Permit No. 0012-I006 issued November 24, 2015 (Tanks D011, D012 and D013 were never installed)

9. Neville Island Terminal email with additional information dated December 7, 2016.

PROCESS DESCRIPTIONS:

Neville Island Terminals – DE LLC, Neville Island Terminal is a bulk storage and distribution terminal for gasoline, gasoline-ethanol blends, distillates, denatured ethanol, and biodiesel, with a maximum potential throughput of 325,000,000 gallons/yr of gasoline, 220,000,000 gallons/yr of distillate products and 70,500,000 gallons of denatured ethanol. The Neville Island terminal receives bulk petroleum products, such as gasoline and distillate oil from their distribution pipeline and stores them in the aboveground storage tanks (AST's). Petroleum liquids and distillate products are transferred from these AST's, upon demand, via pipelines to the terminal's truck loading rack (TLR) and vapor recovery and disposal system (VRU) for loading of tanker trucks.
The components of this process are as follows:

1. Truck Loading Rack Data:

Maximum throughput:	200,000 gallons/hr
Controls:	Activated carbon adsorption

Primary Vapor Recovery Unit Data:

Make:	Jordan Technologies Inc.
Model:	JT-13390-2000D
Type:	Fixed bed
Adsorbing material:	Activated carbon
Maximum Emissions:	2 mg VOC/L gasoline loaded
Efficiency:	>99%

Back-up Vapor Recovery Unit Data:

Make:	Jordan Technologies Inc.
Model:	JT-10096-2200D
Type:	Fixed bed
Adsorbing material:	Activated carbon
Maximum Emissions:	2 mg VOC/L gasoline loaded
Efficiency:	>99%

2. Barge Loading Dock Data:

Maximum throughput:	200,000 gallons/hr
Controls:	Activated carbon adsorption

Primary Vapor Recovery Unit Data:

Make:	Jordan Technologies Inc.
Model:	JT-10096-2200D
Type:	Fixed bed
Adsorbing material:	Activated carbon
Maximum Emissions:	2 mg VOC/L gasoline loaded
Efficiency:	>99%

Back-up Vapor Recovery Unit Data:

Make:	Jordan Technologies Inc.
Model:	JT-13390-2000D
Type:	Fixed bed
Adsorbing material:	Activated carbon
Maximum Emissions:	2 mg VOC/L gasoline loaded
Efficiency:	>99%

The following restrictions/limitations are for the truck loading rack and barge loading dock (combined):

- Maximum gasoline and gasoline-ethanol blends facility throughput – 325,000,000 gal/12-month consecutive period;
- Maximum distillate and distillate-biodiesel blends facility throughput – 220,000,000 gal/12-month consecutive period;
- Maximum denatured ethanol facility throughput – 70,500,000 gal/12-month consecutive period;

3. Rail Car Off-Loading System Data:

Maximum throughput: 144,000 gallons/hr
Maximum rail car siding: 28 standard-sized rail cars (56 rail cars per day)
Controls: None

4. Combustion units:

Emergency generator 1,214 bhp (diesel fuel)
Three boilers for rail car off-loading system 6.695 MMBTU/hr each (natural gas)
One warehouse space heater 0.125 MMBTU/hr each (propane)

5. Fugitive emission sources:

Piping components in volatile liquid service (valves, pumps, flanges, etc.).

6. Miscellaneous sources:

One 10,000-gallon underground oil/water separator used to treat storm water runoff.
One 300-gallon fuel oil storage tank.
Paved road: Estimated 1 mile
Unpaved road: Estimated 1 mile
Parking lot: Estimated 80,000 ft^2

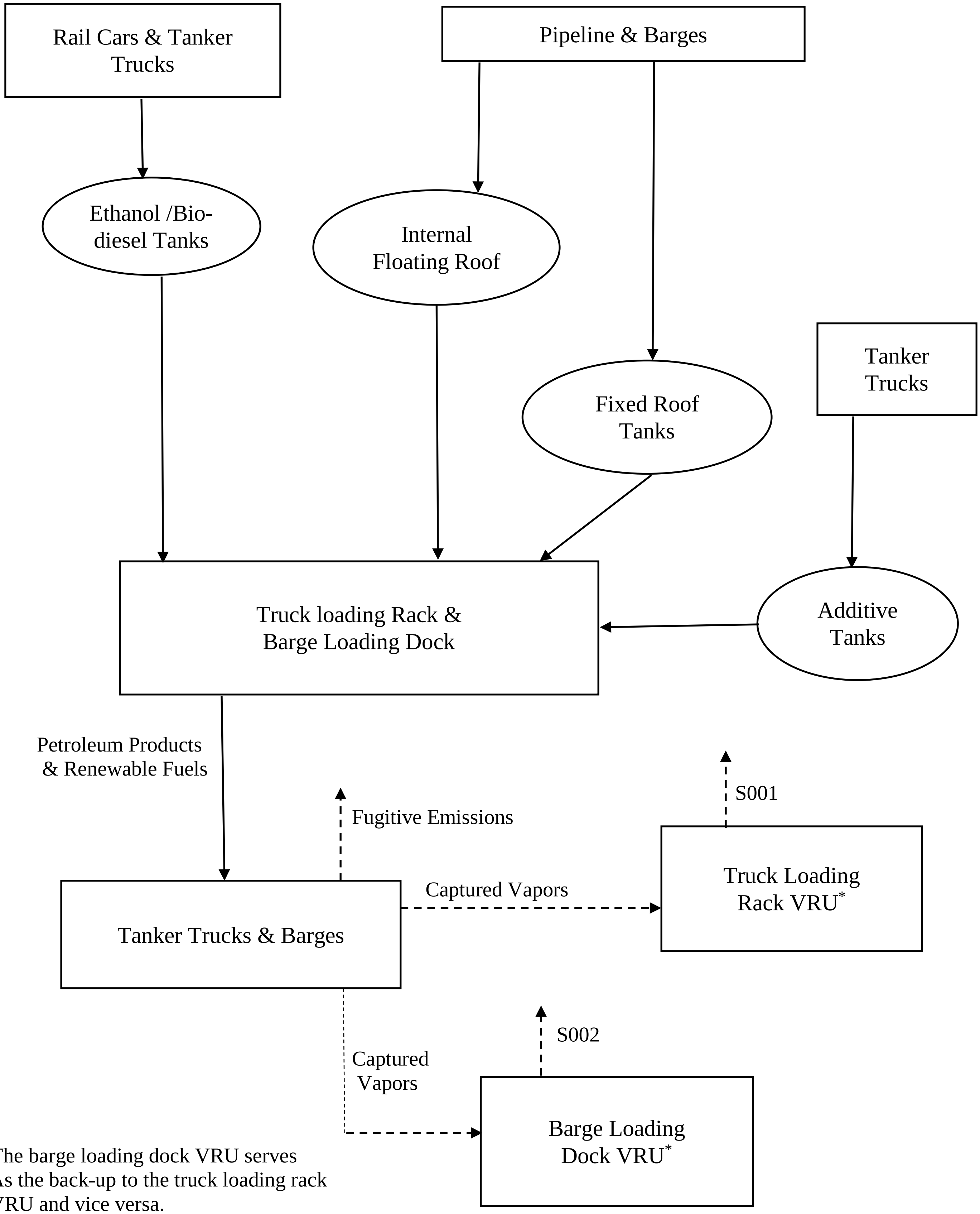
7. Storage Tank Data:

See pages 74 to 119, Form D of the Operating Permit Application (2015) for further storage tank information.

Tank ID	Capacity, gal	Year built	Type	Controls	Storage material
D001	3,774,584	1978	Vertical aboveground	Internal floating roof with mechanical shoe seal	Gasoline, diesel, kerosene or ethanol
D002	2,098,689	1978	Vertical aboveground	Internal floating roof with mechanical shoe seal	Gasoline, diesel, kerosene or ethanol
D003	3,178,854	1978	Vertical aboveground	Internal floating roof with mechanical shoe seal	Gasoline, diesel, kerosene or ethanol
D004	3,122,667	1978	Vertical aboveground	Fixed roof with pressure relief valve	Diesel, fuel oil or kerosene
D005	2,477,092	1978	Vertical aboveground	Internal floating roof with mechanical shoe seal	Gasoline, diesel, kerosene, ethanol or biodiesel

Tank ID	Capacity, gal	Year built	Type	Controls	Storage material
D006	101,608	1978	Vertical aboveground	Internal floating roof with mechanical shoe seal	Gasoline, diesel, kerosene, ethanol or biodiesel
D007	3,627,000	2009	Vertical aboveground	Internal floating roof with mechanical shoe seal with rim-mounted seal	Gasoline, diesel, kerosene, ethanol or biodiesel
D008	3,627,000	2008	Vertical aboveground	Internal floating roof with mechanical shoe seal with rim-mounted seal	Gasoline, diesel, kerosene, ethanol or biodiesel
D009	3,627,000	2009	Vertical aboveground	Internal floating roof with mechanical shoe seal with rim-mounted seal	Gasoline, diesel, kerosene, ethanol or biodiesel
D010	3,627,000	2009	Vertical aboveground	Internal floating roof with mechanical shoe seal with rim-mounted seal	Gasoline, diesel, kerosene, ethanol or biodiesel
D014	1,000	2012	Vertical aboveground	Fixed roof with pressure relief valve	Additives
D015	2,000	2012	Vertical aboveground	Fixed roof with pressure relief valve	Additives
D016	10,000	2012	Vertical aboveground	Fixed roof with pressure relief valve	Additives
D017	10,000	2012	Vertical aboveground	Fixed roof with pressure relief valve	Additives
D018	11,000	2012	Vertical aboveground	Fixed roof with pressure relief valve	Additives
D019	11,000	2012	Vertical aboveground	Fixed roof with pressure relief valve	Additives
D020	11,000	2012	Vertical aboveground	Fixed roof with pressure relief valve	Additives
D021	11,000	2012	Vertical aboveground	Fixed roof with pressure relief valve	Additives
D022	12,000	2012	Vertical aboveground	Fixed roof with pressure relief valve	Additives
D023	10,000	2013	Vertical aboveground	Fixed roof with pressure relief valve	Additives

Process Flow Diagram



*The barge loading dock VRU serves As the back-up to the truck loading rack VRU and vice versa.

EMISSION SOURCES OF MINOR SIGNIFICANCE:

1. Rail car off-loading system is a source of minor significance with potential emissions of all criteria pollutants less than one ton per year (see emission calculations below).
2. Additive storage tanks from D014 through D023 ranging in capacity from 1,000 to 12,000 gallons and storing liquid with vapor pressure less than 0.5 psia (tanks have negligible emissions of VOC and HAP due to a negligible vapor pressure - see emission calculations below).
3. Paved and unpaved areas are source of minor significance with emissions of TSP = 23.4 tons/year and PM10 = 4.6 tons/year as per US EPA, AP-42, Section 13.2.1 "Paved road" and Section 13.2.2 "Unpaved road".
4. Fugitive VOC and HAP emissions from piping components (valves, pumps, flanges, etc.) are a source of minor significance with potential of VOC emissions = 1.7 tons/yr and HAP = 0.27 tons/yr (see emission calculations below).
5. The three (3) 10,000-gallons underground oil/water separators have negligible emissions of VOCs and HAPs.
6. One warehouse space heaters at 0.125 MMBTU/hr is a source of minor significance with potential emissions of all criteria pollutants less than one ton per year (see emission calculations, based on Emission Factors from U.S.EPA Web/FIRE, in the Title V Permit Application).

EMISSION POINTS AND EMISSION CONTROLS:

Storage tanks D001 through D003 and D005 through D010 are equipped with internal floating roofs; storage tank D004 is equipped with pressure relief valves; the gasoline loading rack and barge loading dock are equipped with an activated carbon adsorption/absorption control units (primary - with >99% control efficiency and back-up - with >99% control efficiency).

EMISSION CALCULATIONS:

1. Truck Loading Rack emission calculations:

Gasoline/E10 VOC emissions:

The calculations of maximum potential VOC emissions from truck loading rack were based on the true vapor pressure and loading losses. The maximum short term loading rates for the racks are 200,000 gal/hr, being limited by the capacity of the VRU (see Attachment 4 from the Title V Operating Permit Application).

Gasoline:

Stack emissions:

(325,000,000 gal/yr) x (2 mg VOC/liter) x (3.7854 liter/gal) x (1 lb/453,592 mg) x (1 ton/2000 lb) = 2.71 tons/yr
(200,000 gal/hr) x (2 mg VOC/liter) x (3.7854 liter/gal) x (1 lb/453,592 mg) = 3.34 lbs/hr

Fugitive emissions:

Example of calculations for January:
(325,000,000 gal/yr: 12 months) x (8.14 lb/1000 gal for January) x (1 - 0.994) x (1 ton/2000 lb) = 0.66 tons/mo.
(200,000 gal/hr) x (8.14 lb/1000 gal) x (1 - 0.994) = 9.76 lbs/hr
For the year maximum potential fugitive VOC emissions will be: 8.59 tons/yr or 13.68 lbs/hr

E10:

Stack emissions:

(325,000,000 gal/yr) x (2 mg VOC/liter) x (3.7854 liter/gal) x (1 lb/453,592 mg) x (1 ton/2000 lb) = 2.71 tons/yr
(200,000 gal/hr) x (2 mg VOC/liter) x (3.7854 liter/gal) x (1 lb/453,592 mg) = 3.34 lbs/hr

Fugitive emissions:

Example of calculations for January:
(325,000,000 gal/yr: 12 months) x (8.58 lb/1000 gal for January) x (1 - 0.994) x (1 ton/2000 lb) = 0.70 tons/mo.
(200,000 gal/hr) x (8.58 lb/1000 gal) x (1 - 0.994) = 10.30 lbs/hr
For the year maximum potential fugitive VOC emissions will be: 9.19 tons/yr or 14.38 lbs/hr

The throughput limit will be 325,000,000 gallons of gasoline or E10 per year. The calculations indicates that maximum emissions would occur if the entire 325,000,000 gallons were E10, not gasoline. Worst case is E10 loading and, therefore, the gasoline loading emissions are not included in the totals.

Denatured Ethanol VOC emissions:

The calculations of maximum potential VOC emissions from Denatured Ethanol loading were based on the true vapor pressure and loading losses (see Attachment 4 from the Title V Operating Permit Application).

For the year maximum potential VOC emissions will be:
stack - 0.236 tons/yr or 1.68 lbs/hr;
fugitive - 0.284 tons/yr or 2.02 lbs/hr

Distillate VOC emissions:

Basis: VOC loading loss factor of 0.016 lb/10^3gals for loading jet kerosene into tank trucks (from AP-42, Table 5.2-6); 99.4% capture efficiency; 99.5% removal efficiency and the maximum short term loading rates for the racks are 200,000 gal/hr, being limited by the capacity of the VRU.

(220,000,000 gal/yr) x (0.016 lb/1000 gal) x (0.994) x (1 - 0.995) x (1 ton/2000 lb) = 0.009 tons/yr (stack)
(220,000,000 gal/yr) x (0.016 lb/1000 gal) x (1 - 0.994) x (1 ton/2000 lb) = 0.011 tons/yr (fugitive)
(200,000 gal/hr) x (0.016 lb/1000 gal) x (0.994) x (1 - 0.995) = 0.016 lbs/hr (stack)
(200,000 gal/hr) x (0.016 lb/1000 gal) x (1 - 0.994) = 0.019 lbs/hr (fugitive)

HAP emissions:

a) Due to gasoline loading at rack:
Emissions of HAP compounds are determined by applying typical vapor mass fractions to the total VOC emissions from the source. Vapor mass fractions are based on "Emission Inventory Improvement Program, Gasoline Marketing (Stage I and Stage II), Volume III, Chapter 11", Revised Final January 2001, Table 11.3-2.

b) Due to E10 loading:
Emissions of HAP compounds are determined by applying typical vapor mass fractions to the total VOC emissions from the source. E10 is comprised of 90% gasoline and 10% ethanol. Hence the vapor mass fraction of E10 are developed by multiplying 0.90 by the vapor mass fraction of gasoline.

c) Due to Denatured Ethanol loading:
Emissions of HAP compounds are determined by applying typical vapor mass fractions to the total VOC emissions from the source. Denatured Ethanol is comprised of 2.5% gasoline (or other denaturant) and 97.5% ethanol. Hence the vapor mass fraction of Denatured Ethanol are developed by multiplying 0.025 by the vapor mass fraction of gasoline.

d) Due to distillate loading:
Emissions of HAP compounds are determined by applying worst case vapor mass fractions to the total VOC emissions from the source. The vapor mass fractions for fuel oil/diesel fuel and kerosene can be founded from the EPA TANKS Program. Based on the review of this program information for both kerosene and for fuel oil storage on a month-by-month basis was founded that the highest vapor mass fraction for total HAPs would occur during kerosene storage. This data will be used like a worst-case information for emission calculations.

Vapor mass fraction

Component	VOC	Benzene	Ethylbenzene	Hexane	Toluene	POM	Xylene	2,2,4-trimethylpentane	Total HAP
Gasoline	100.0	0.9	0.1	1.6	1.3	0.05	0.5	0.8	5.25
E10	100.0	0.81	0.09	1.44	1.17	0.05	0.45	0.72	4.73
Den.Ethanol	100.0	0.023	0.003	0.04	0.033	0.001	0.013	0.02	0.131
Distillate*	100.0	0.79	2.05	1.67	6.91	-	4.17	-	15.59

*Vapor mass fraction for distillate (ethylbenzene and xylene) was changed compare to Installation permit No.0012-I004, because EPA TANKS Program was updated.

The throughput limit will be 325,000,000 gallons of gasoline or E10 per year. The calculations indicates that maximum HAP emissions would occur if the entire 325,000,000 gallons were gasoline, not E10. Worst case is gasoline loading and, therefore, the E10 loading emissions are not included in the totals.

SUMMARY OF MAXIMUM POTENTIAL EMISSIONS FROM TRUCK LOADING RACK

The requested combined throughput limit for gasoline and E10 is 325,000,000 gallons per year. Worst case for truck loading is during E10 loading for VOC and during gasoline for HAP. Therefore, those emissions are included in the totals.

Pollutant	E10/Gasoline		Denatured Ethanol		Distillate		Total Emissions tons/yr[1]
	Stack tons/yr[1]	Fugitive tons/yr[1]	Stack tons/yr[1]	Fugitive tons/yr[1]	Stack tons/yr[1]	Fugitive tons/yr[1]	
VOC	2.71	9.19	0.236	0.284	0.009	0.011	12.44
Benzene	0.024	0.077	0.00005	0.00006	0.0001	0.0001	0.101
Ethylbenzene	0.003	0.009	0.00001	0.00001	0.0002	0.0002	0.012
Hexane	0.043	0.137	0.00009	0.00011	0.0001	0.0002	0.181
Toluene	0.035	0.112	0.00008	0.00009	0.0006	0.0007	0.148
POM	0.001	0.004	-	-	-	-	0.005
Xylene	0.014	0.043	0.00003	0.00004	0.0004	0.0004	0.058
2,2,4-trimethylpentane	0.022	0.069	0.00005	0.00006	-	-	0.091
Total HAP	0.142	0.451	0.00031	0.00037	0.0014	0.0016	0.597

[1]A year is defined as any 12 consecutive months.

2. Barge Loading Dock emission calculations:

VRU Capture Efficiency:
Due to the unavailability of capture efficiency data that was specific to barge loading, it was assumed that the capture efficiency for barge loading will be similar to the capture efficiency for truck loading. Since a capture efficiency of 99.4% has been used for truck loading, the 99.4% was used for barge loading at the dock.

VRU Removal Control Efficiency:
The VRU manufacturer has guaranteed emissions of 1 mg VOC/liter of gasoline loaded. Neville Island Terminals has opted to go with a more conservative estimate of 2 mg VOC/liter of gasoline loaded. Term "gasoline" includes

unblended gasoline, as well as gasoline that is blended with ethanol, such as the E10 blend. Using the 2 mg VOC/liter concentration and throughput of 325,000,000 gallons of gasoline (or E10) per year, the VRU mass emission rate will be 2.71 tons VOC/year (see calculations below).

The mass of VOC at the inlet to the VRU was calculated using:

- loading loss of 4.71 lb VOC/Mgal gasoline (or E10) - average VOC loading loss (see Attachment 4);
- throughput of 325,000,000 gallons of gasoline (or E10)/ year; and
- capture efficiency of 99.4%.

(4.71 lb/1000 gal) x (325,000,000 gal/yr) x (99.4%) x (1 ton/2000 lb) = 760.8 tons/yr

Using the calculated VOC at the inlet and outlet, the VRU control efficiency will be:

1.00 - ((2.71 tons/yr)/(760.78 tons/yr)) = 0.996 or 99.6%

Gasoline/E10 VOC emissions:

a) Gasoline

Basis: VOC loading loss factor of 3.9 lb/10^3gals (from AP-42, Table 5.2-2); 99.4% capture efficiency; stack emissions of 2 mg VOC/liter of gasoline and the maximum short term loading rates for the racks are 200,000 gal/hr, being limited by the capacity of the VRU.

(325,000,000 gal/yr) x (2 mg VOC/liter) x (3.7854 liter/gal) x (1 lb/453,592 mg) x (1 ton/2000 lb) = 2.71 tons/yr (stack)
(325,000,000 gal/yr) x (3.9 lb/1000 gal) x (1 - 0.994) x (1 ton/2000 lb) = 3.80 tons/yr (fugitive)
(200,000 gal/hr) x (2 mg VOC/liter) x (3.7854 liter/gal) x (1 lb/453,592 mg) = 3.34 lbs/hr (stack)
(200,000 gal/hr) x (3.9 lb/1000 gal) x (1 - 0.994) = 4.68 lbs/hr (fugitive)

b) E10:

The calculations of maximum potential VOC emissions from E10 loading were based on the true vapor pressure and loading losses (see Attachment 4 from the Title V Operating Permit Application).

Example of calculations for January:
(325,000,000 gal/yr: 12 months) x (2 mg VOC/liter) x (3.7854 liter/gal) x (1 lb/453,592 mg) x (1 ton/2000 lb) = 0.226 tons/mo. (stack)
(325,000,000 gal/yr: 12 months) x (4.29 lb/1000 gal for January) x (1 - 0.994) x (1 ton/2000 lb) = 0.35 tons/mo. (fugitive)
(200,000 gal/hr) x (2 mg VOC/liter) x (3.7854 liter/gal) x (1 lb/453,592 mg) = 3.34 lbs/hr (stack)
(200,000 gal/hr) x (4.29 lb/1000 gal) x (1 - 0.994) = 5.15 lbs/hr (fugitive)
For the year maximum potential VOC emissions will be:
stack - 2.71 tons/yr or 3.34 lbs/hr;
fugitive - 4.60 tons/yr or 7.19 lbs/hr

The throughput limit will be 325,000,000 gallons of gasoline or E10 per year. The calculations indicates that maximum emissions would occur if the entire 325,000,000 gallons were E10, not gasoline. Worst case is E10 loading and, therefore, the gasoline loading emissions are not included in the totals.

Denatured Ethanol VOC emissions:

The calculations of maximum potential VOC emissions from Denatured Ethanol loading were based on the true vapor pressure and loading losses (see Attachment 4 from the Title V Operating Permit Application).

For the year maximum potential VOC emissions will be:
stack - 0.21 tons/yr or 1.51 lbs/hr;
fugitive - 0.14 tons/yr or 1.01 lbs/hr

Distillate VOC emissions:

Basis: VOC loading loss factor of 0.013 lb/10^3gals for loading jet kerosene into barges (from AP-42, Table 5.2-6); 99.4% capture efficiency; 99.1% removal efficiency and the maximum short term loading rates for the racks are 200,000 gal/hr, being limited by the capacity of the VRU.

(220,000,000 gal/yr) x (0.013 lb/1000 gal) x (0.994) x (1 - 0.991) x (1 ton/2000 lb) = 0.013 tons/yr (stack)
(220,000,000 gal/yr) x (0.013 lb/1000 gal) x (0.994) x (1 ton/2000 lb) = 0.009 tons/yr (fugitive)
(200,000 gal/hr) x (0.013 lb/1000 gal) x (0.994) x (1 - 0.991) = 0.023 lbs/hr (stack)
(200,000 gal/hr) x (0.013 lb/1000 gal) x (0.994) = 0.016 lbs/hr (fugitive)

HAP emissions:

a) Due to gasoline loading:
Emissions of HAP compounds are determined by applying typical vapor mass fractions to the total VOC emissions from the source. Vapor mass fractions are based on "Emission Inventory Improvement Program, Gasoline Marketing (Stage I and Stage II), Volume III, Chapter 11", Revised Final January 2001, Table 11.3-2.

b) Due to E10 loading:
Emissions of HAP compounds are determined by applying typical vapor mass fractions to the total VOC emissions from the source. E10 is comprised of 90% gasoline and 10% ethanol. Hence the vapor mass fraction of E10 are developed by multiplying 0.90 by the vapor mass fraction of gasoline.

c) Due to Denatured Ethanol loading:
Emissions of HAP compounds are determined by applying typical vapor mass fractions to the total VOC emissions from the source. Denatured Ethanol is comprised of 2.5% gasoline (or other denaturant) and 97.5% ethanol. Hence the vapor mass fraction of Denatured Ethanol are developed by multiplying 0.025 by the vapor mass fraction of gasoline.

d) Due to distillate loading:
Emissions of HAP compounds are determined by applying worst case vapor mass fractions to the total VOC emissions from the source. The vapor mass fractions for fuel oil/diesel fuel and kerosene can be founded from the EPA TANKS Program. Based on the review of this program information for both kerosene and for fuel oil storage on a month-by-month basis was founded that the highest vapor mass fraction for total HAPs would occur during kerosene storage. This data will be used like a worst-case information for emission calculations.

Vapor mass fraction

Component	VOC	Benzene	Ethylbenzene	Hexane	Toluene	POM	Xylene	2,2,4-trimethylpentane	Total HAP
Gasoline	100.0	0.9	0.1	1.6	1.3	0.05	0.5	0.8	5.25
E10	100.0	0.81	0.09	1.44	1.17	0.05	0.45	0.72	4.73
Den.Ethanol	100.0	0.023	0.003	0.04	0.033	0.001	0.013	0.02	0.131
Distillate*	100.0	0.79	2.05	1.67	6.91	-	4.17	-	15.59

*Vapor mass fraction for distillate (ethylbenzene and xylene) was changed compare to Installation permit No.0012-I005, because EPA TANKS Program was updated.

SUMMARY OF MAXIMUM POTENTIAL EMISSIONS FROM BARGE LOADING DOCK

The requested combined throughput limit for gasoline and E10 is 325,000,000 gallons per year. Worst case for barge loading is during E10 loading. Therefore, those emissions are included in the totals.

Pollutant	E10/Gasoline		Denatured Ethanol		Distillate		Total Emissions tons/yr[1]
	Stack tons/yr[1]	Fugitive tons/yr[1]	Stack tons/yr[1]	Fugitive tons/yr[1]	Stack tons/yr[1]	Fugitive tons/yr[1]	
VOC	2.71	4.60	0.212	0.142	0.013	0.009	7.68
Benzene	0.022	0.037	0.00005	0.00003	-	0.0001	0.059
Ethylbenzene	0.002	0.004	-	-	0.0003	0.0002	0.006
Hexane	0.039	0.066	0.00008	0.00006	0.0002	0.0001	0.105
Toluene	0.032	0.054	0.00007	0.00005	0.0009	0.0006	0.087
POM	0.001	0.002	-	-	-	-	0.003
Xylene	0.012	0.021	0.00003	0.00002	0.0005	0.0003	0.033
2,2,4-trimethylpentane	0.020	0.033	0.00004	0.00003	-	-	0.054
Total HAP	0.128	0.218	0.00027	0.00019	0.0020	0.0013	0.346

[1]A year is defined as any 12 consecutive months.

3. Rail Car Off-Loading System emission calculations:

In estimating emissions from the off-loading of denatured ethanol (ethanol) and biodiesel fuel from rail cars to terminal storage tanks, the following was considered:

1. Due to comparative chemical characteristics of biodiesel and ethanol, the emissions from handling of biodiesel will be less than the emissions from handling of ethanol. Therefore, the emissions estimates will be for the scenario of ethanol off-loading as a "worst-case" scenario.

2. In considering the possibility of emissions during the off-loading process, the process was regarded as having three phases:

    a. The first phase is the period of time between the opening of the rail car's top hatch and the start of the liquid pumping stage. During this time, the possibility exists for the loss of a minor amount of vapors from the hatch. This stage would probably last for several minutes.

    b. The second phase is the liquid pumping phase. The liquid is normally pumped from the rail car via a discharge valve near the bottom of the rail car. The top hatch is open during the pumping, but the loss of vapors is unlikely due to the constant natural influx of outside air into the hatch to replace the liquid that is being removed from the rail car. At the pumping rate of 2,400 gals/min., a single rail car of 30,000 gallons capacity can be emptied in approx. 12.5 min. (30,000:2,400 = 12.5). If multiple cars are being emptied simultaneously, the off-loading will take longer to accomplish. After the rail car unloading operation is completed, the terminal's transfer hose is disconnected from the rail car. The system pump will continue to operate to transfer any of the residual liquid remaining in the hose to the terminal's collection piping. After the hose is empty, a cap will be placed over the open end of the hose. The loss of VOC during the pumping phase was considered to be at or near zero.

    c. The third phase is the period of time between the end of the liquid pumping and the closing of the top hatch of the rail car. At this stage, the rail car may contain some vapors from the ethanol, but it is likely that the air inside the rail car is predominantly outside air that displaced the liquid during the pumping phase. Therefore, there would not be a great likelihood of significant VOC loss during this brief phase, which would probably last for several minutes.

3. It appears that if any VOC losses did occur during the off-loading process, they would be most likely to occur during the first phase, or pre-pumping phase. The rate of evaporation from the open hatch was calculated based on the "Industrial Ventilation: Engineering Principles" by R.J.Heinsohn, the closest application that was founded for the off-loading of ethanol from a transportation vehicle process. The rate of evaporation from the open hatch is approximately 0.011 lb/hr (see Attachment 4, Title V Operating Permit Application).

4. In the absence of any directly applicable emission estimating procedures for rail car unloading of ethanol, the referenced methods were used to estimate VOC emissions, and then an uncertainty factor of 10 was applied to the estimates.

Loads/day	= 56	gals/min	= 2,400
Days/wk.	= 5	gals/rail car	= 30,000
Loads/wk.	= 280	min. hatch is open prior to pumping	= 5
Wks. /yr	= 52	min. pumping/rail car	= 12.5
Loads/yr	= 14,560	min. hatch is open after pumping	= 5
Open hatch min/load	= 5	hatch open time: min/rail car	= 22.5
Open hatch min/yr	= 72,800	rail cars/yr	= 14,560
Open hatch hr/yr	= 1,213	MM gals/yr	= 436.8
Rate of evaporation	= 0.011 lb/hr	hatch open time: hr/yr	= 5,460
VOC emissions	= 12.9 lbs/yr		
VOC emissions	= 0.0064 tons/yr		
VOC emissions	(0.0064 x 2000 / 5,460) = 0.0024 lbs/hr		
With factor of 10	= 0.064 tons/yr = 0.024 lbs/hr		

3. Storage Tanks emission calculations:

a) Gasoline Storage Tanks

The maximum potential VOC and HAP emissions were calculated for each gasoline storage tank individually. In order to provide "worst case" potential emissions, the following activities were considered:

1. *Tank breathing and working losses during normal operations*, that is during daily activity of transferring product into or out of the tank. The VOC emissions were calculated using the EPA TANKS 4.09D program. The TANKS 4.09D Emissions Reports are provided in Attachment E, Synthetic Minor Operating Permit Application.

2. *Tank losses during the landing of the internal floating roof due to the need for a product change in the tank*. The basis for the potential emission calculations was one such landing per gasoline storage tank per year. The VOC emissions were estimated using API methodology contained in Evaporative Loss from Storage Tank Floating Roof Landings, Technical Report 2567, April 2005 and US EPA, AP-42, Section 7.1, November 2006 (see Attachment E, Synthetic Minor Operating Permit Application).

3. *Tank losses during the landing of the internal floating roof due to inspection, maintenance, or emergency situations*. Annually, two to five gasoline storage tanks throughout the terminal might be expected to experience a roof landing for inspection, maintenance, or emergency situation. Potential emissions from each individual tank were based on one such landing per year. Potential emissions from tank groups were based on a total of five gasoline storage tanks experiencing a roof landing for these reasons each year. The VOC emissions were estimated using API methodology contained in Evaporative Loss from Storage Tank Floating Roof Landings, Technical Report 2567, April 2005 and US EPA, AP-42, Section 7.1, November 2006 (see Attachment E, Synthetic Minor Operating Permit Application).

Emission of HAP compounds from gasoline storage tanks are determined by applying typical vapor mass fractions to the total VOC emissions from the source. Vapor mass fractions are based on "Emission Inventory Improvement Program, Gasoline Marketing (Stage I and Stage II), Volume III, Chapter 11, Table 11.3-2.

Vapor mass fraction (%)

Component	Benzene	Ethylbenzene	Hexane	Toluene	POM	Xylene	2,2,4-trimethylpentane	Total HAP
Gasoline	0.9	0.1	1.6	1.3	0.05	0.5	0.8	5.25

SUMMARY OF MAXIMUM POTENTIAL EMISSIONS FROM GASOLINE STORAGE TANKS (D001-D003, D005-D010):

VOC t/yr[1]	Benzene t/yr[1]	Ethylbenzene t/yr[1]	Hexane t/yr[1]	Toluene t/yr[1]	POM t/yr[1]	Xylene t/yr[1]	2,2,4-trimethylpentane t/yr[1]	Total HAP t/yr[1]
35.47	0.32	0.04	0.57	0.46	0.02	0.18	0.28	1.87

[1]A year is defined as any 12 consecutive months.

b) Distillate Storage Tank (D004)

VOC and HAP emissions are greatest while storing kerosene, as opposed to no.2 fuel oil/diesel fuel. VOC emissions are based on tank breathing and working losses during normal operations, that is, during daily activity of transferring product into or out of the tank. The VOC emissions were calculated using the EPA TANKS 4.09D computer program. The TANKS 4.09D Emissions Reports are provided in Attachment 5, Title 5 Operating Permit Application.

Emissions of HAP compounds are determined are determined by applying calculated vapor mass fractions to the total VOC emissions from the source. Vapor mass fractions are calculated by the Tanks 4.09D computer program based on the US EPA HAP speciation profile for kerosene contained in the Tanks 4.09D computer program.

Vapor mass fraction (%)

Component	Benzene	Ethylbenzene	Hexane	Toluene	Xylene	Total HAP
Kerosene	0.74	2.05	1.54	6.74	4.16	15.23

SUMMARY OF MAXIMUM POTENTIAL EMISSIONS FROM DISTILLATE (KEROSENE) STORAGE TANK (D004):

VOC tons/yr[1]	Benzene tons/yr[1]	Ethylbenzene tons/yr[1]	Hexane tons/yr[1]	Toluene tons/yr[1]	Xylene tons/yr[1]	Total HAP tons/yr[1]
1.01	0.01	0.02	0.02	0.07	0.04	0.15

[1]A year is defined as any 12 consecutive months.

c) Additive Storage Tanks (D014-D023)

VOC emissions were calculated based on the storage of xylene, with total HAP emissions estimated to be 75% (maximum) of the VOC emissions. VOC emissions are based on tank breathing and working losses during normal operations, that is, during daily activity of transferring product into or out of the tank. The VOC emissions were calculated using the EPA TANKS 4.09D computer program. The TANKS 4.09D Emissions Reports are provided in Attachment 6, Title V Operating Permit Application.

Based on the calculations maximum potential VOC emissions for all additive tanks = 0.21 tons/yr and maximum potential HAP (Xylene) emissions = 0.16 tons/yr. (A year is defined as any 12 consecutive months).

SUMMARY OF MAXIMUM POTENTIAL EMISSIONS FROM STORAGE TANKS AT THE TERMINAL:

Tanks	VOC tons/yr[1]	Total HAP tons/yr[1]
Gasoline	35.47	1.87
Distillate	1.01	0.15
Additive	0.21	0.16
Total	36.69	2.18

[1]A year is defined as any 12 consecutive months.

4. Roadway emissions:

Particulate emissions were calculated based on AP-42, Section 13.2.1, using the following equation:

$E = k * (sL/2)^{0.65} * (W/3)^{1.5} - C$

where: E = particulate emission factor (lb/VMT);
k = particle size multiplier for particle size range and units of interest (PM = 0.082 lb/VMT and PM10 = 0.016 lb/VMT, based on AP-42);
sL = road surface silt loading (for a public road, with less than 500 vehicles per day, the value is 0.6 g/m^2, based on AP-42);
W = average weight of the vehicles traveling the road (HDDV empty -12.5 tons, HDDV full - 40 tons, and LDGV - 2 tons);
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear.

Based on the calculations, the maximum potential particulate emissions equal: PM = 26.5 tons/yr or 6.1 lbs/hr and PM10 = 5.2 tons/yr or 1.2 lbs/hr. Vehicle operations assumed to operate 8,760 hours per year.

In order to correct for precipitation the following equation is used:

$E_{ext} = [k * (sL/2)^{0.65} * (W/3)^{1.5} - C] * [1 - (P/4N)]$

where: E_{ext} = average emission factor, corrected for precipitation;
P = 170 = number of days with at least 0.01" of precipitation per year;
N = 365 = number of days in the averaging period.

The correction factor of [1 - (P/4N)] equates to 88.36%. Therefore, the precipitation-corrected potential emissions are: PM = 23.4 tons/yr or 5.3 lbs/hr and PM10 = 4.6 tons/yr or 1 lbs/hr.

5. Fugitive emissions from Valves, Pump Seals, Flanges and others:

Based on VOC emission factors (US EPA factors EPA-453/R-95-017, 1995 Protocol for Equipment Leak Emission Estimates), maximum potential fugitive VOC emissions for valves, pump seals, fittings, and others (compressors/open ended lines, etc.) equal 0.39 lbs/hr or 1.7 tons/yr (see Title V Permit Application, Attachment

6).
The HAP emissions dependent on whether gasoline or distillate is being conveyed, since the HAP content of gasoline is different than the HAP content of distillate products. This applies to individual HAPs as well as total HAPs. Emissions of HAP compounds are determined by applying typical vapor mass fractions to the total VOC emissions from the source. Emissions were estimated for two scenarios: one is handling gasoline exclusively and the other is handling distillate exclusively. Worst case HAP emissions was taken for maximum potential emissions - the highest between gasoline and distillate and the total HAP emissions not the sum of the individuals, but this is the highest "total HAP" between gasoline and distillate (see Title V Permit Application, Attachment 6).

Benzene ton/yr	Ethylbenzene ton/yr	Hexane ton/yr	Toluene ton/yr	POM ton/yr	Xylene ton/yr	2,2,4-trimethylpentane ton/yr	Total HAP ton/yr
0.015	0.035	0.029	0.118	0.00086	0.071	0.014	0.267

6. Combustion emissions:

Boilers

Maximum potential emissions calculations are based on Chapter 1.4 - Natural Gas Combustion, published July 1998 for CO_2; emission factors for all another pollutants taken from US EPA Web Fire, SCC 10200603. All PM was assumed to be PM_{10}; all PM_{10} was assumed to be $PM_{2.5}$. Appendix 4 in Permit Application includes detailed emission calculations for the boilers. Average natural gas higher heating value of 1,020 BTU/scf used to convert BTU's to scf.

Input data for each boiler:
Rating – 6.695 MM BTU/hr
Operating hours - 8760 hr/yr
Emission factors (lb/10^6 scf): PM - 7.6; NOx - 50; SOx - 0.6; CO - 84; VOC - 5.5; CO_2 - 120,000

Emergency generator
Facility requests a limitation on operating hours for this generator - 500 hours per year and the unit may not participate in an Emergency Load Response Program or any peak shaving programs without first obtaining a permit modification. Maximum potential emissions calculations are based on emissions factors provided by engine manufacturer (see permit application). Emissions for SOx calculated according to US EPA AP-42 Sections 3.3 & 3.4; emission factor for CO_2 taken from US EPA Emission Factors for GHG Inventories, 11/07/2011. The generator uses 57.2 gal/hr of diesel fuel when it is running.

SUMMARY OF MAXIMUM POTENTIAL COMBUSTION EMISSIONS:

Pollutant	One boiler		Three boilers		Generator		Total	
	lbs/hr	tons/yr[1]	lbs/hr	tons/yr[1]	lbs/hr	tons/yr[1]	lbs/hr	tons/yr[1]
PM(PM_{10}, $PM_{2.5}$)	0.06	0.26	0.18	0.78	0.22	0.055	0.40	0.84
SO_2	0.005	0.02	0.015	0.06	2.49	0.622	2.51	0.68
NOx	0.39	1.71	1.17	5.13	17.02	4.26	18.19	9.39
VOC	0.043	0.19	0.129	0.57	0.20	0.05	0.329	0.62
CO	0.66	2.89	1.98	8.67	1.41	0.353	3.39	9.02
CO_2	942	4,126	2,826	12,378	1,288	322	4,114	12,700

[1] A year is defined as any consecutive 12-month period.

SUMMARY OF MAXIMUM POTENTIAL VOC AND HAP EMISSIONS FROM THE FACILITY

Pollutant	Truck Loading Rack	Barge Loading Dock	Rail Car Off-Loading	Storage Tanks	Fugitive Emissions	Boilers, Generator	Total[2]
	tons/yr[1]	tons/yr[1]	tons/yr[1]	tons/yr[1]	tons/yr[1]	tons/yr[1]	tons/yr[1]
VOC	12.44	7.68	0.06	36.69	1.7	0.62	51.51
Benzene	0.10	0.06	0.00	0.33	0.02	0.08	0.53
Ethylbenzene	0.01	0.01	0.00	0.06	0.04	0.01	0.12
Hexane	0.18	0.11	0.00	0.59	0.03	0.15	0.95
Toluene	0.15	0.09	0.00	0.53	0.12	0.12	0.92
POM	0.01	0.003	0.00	0.02	0.001	0.01	0.04
Xylene	0.06	0.03	0.00	0.38	0.07	0.05	0.56
2,2,4-trimethylpentane	0.09	0.05	0.00	0.28	0.01	0.08	0.46
Total HAP	0.60	0.35	0.00	2.18	0.27	0.50	3.55

[1] A year is defined as any consecutive 12-month period.
[2] VOC total emissions are based on a combined facility throughput of 325 MM gal of gasoline through either the Truck Loading Rack or Barge Loading Dock – not both. Worst case is Truck Loading Rack and, therefore, Barge Loading Dock emissions are not included in the totals.

TESTING REQUIREMENTS:

The permittee shall test the loading process and VRUs for compliance with the requirements of the permit, Section 40 CFR 60.503 and Article XXI, §2105.13, every five years or after a modification to the loading rack or VRUs. Testing shall be conducted according to the procedures of 40 CFR 60.503 and Article XXI, §2105.13 and shall follow the requirements of Article XXI, §2108.02.

APPLICABLE REGULATIONS:

Article XXI, Requirements for Issuance:

The requirements of Article XXI, Parts B and C for the issuance of Title V operating permits have been met for this facility. Article XXI, Part D, Part E & Part H will have the necessary sections addressed individually.

Article XXI, *§*2105.13 Gasoline Loading Facilities:

This facility is a bulk gasoline terminal. The facility is subject to Article XXI, §2105.13 by definition. See Operating Permit No. 0012 for specific regulatory provisions.

40 CFR Part 60, Subpart K, Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978:

This section is applicable to tanks D001, D002, D003, D005 and D006 due to capacity and installation date of the tanks. See the Operating Permit for specific regulatory provisions.

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

This section is applicable to tanks D007 through D010 due to the capacity and installation date of the tanks. See the Operating Permit for specific regulatory provisions.

40 CFR 60, Subpart XX, Standards of Performance for Bulk Gasoline Terminals:

The total of all gasoline loading racks at the facility are affected units under Subpart XX due to the installation of the new VRUs in 2011 and 2013. See the Operating Permit No. 0012 for specific regulatory provisions.

40 CFR Part 60, Subpart IIII - Standards of Performance for Stationary Compression Ignition Internal Combustion Engines:

This section is applicable to the emergency generator. As part of the requirements in 40 CFR §60.4200, the engine manufacturer is required to certify the equipment to meet the standards of 40 CFR §60.4205(b), which for this generator, are the standards listed in 40 CFR §89.112 and 40 CFR §89.113.

40 CFR Part 63 Subpart BBBBBB, National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Distribution Bulk Terminals, Bulk Plants, and Pipeline Facilities:

The terminal must be in compliance with the regulatory requirements delineated in 40 CFR Part 63, Subpart BBBBBB. See Operating Permit No. 0012 for specific regulatory provisions.

40 CFR Part 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Source Categories: Stationary Reciprocating Internal Combustion Engines:

This section is applicable to the emergency generator. Compliance with 40 CFR Part 60, Subpart IIII satisfies all compliance requirements under Part 63, Subpart ZZZZ (Section 63.6590(c)).

40 CFR 64, Compliance Assurance Monitoring:

The Compliance Assurance Monitoring (CAM) rule found in 40 CFR 64 is applicable to this facility. CAM applies to VOC emissions from the barge loading dock and truck loading rack due to the presence of a VRUs (control devices) and the magnitude of emissions. A CAM plan was submitted with the Title V Permit Application and all monitoring conditions have been included in the Title V Operating Permit.

METHOD OF COMPLIANCE DETERMINATION:

Compliance with the emission standards set in this permit will be demonstrated by compliance with the above applicable regulations, testing of the VRUs and loading racks every five years, monitoring of the carbon bed temperatures, carbon bed maximum vacuum and absorber column pressure on a weekly basis, and carbon testing every two years along with record keeping and reporting requirements.

See the Operating Permit No.0012 for the specific compliance methods, record keeping and reporting requirements for the facility.

RECOMMENDATIONS:

The facility is in compliance with all applicable Federal, State and County regulations and it is recommended that the operating permit be issued with the emission limitations, terms and conditions in Operating Permit No. 0012.