OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

MEMORANDUM **September 4, 2019**

TO: Phillip Fielder, P.E., Chief Engineer

THROUGH: Phil Martin, P.E., Engineering Manager, Existing Source Permits Section

THROUGH: Ryan Buntyn, P.E., Existing Source Permits Section

FROM: Joseph K. Wills, P.E., Existing Source Permits Section

SUBJECT: Evaluation of Permit Application No. **2016-1066-C (M-1) (PSD)**
Keyera Energy, Inc.
Wildhorse Terminal
Facility ID No. 16676
Latitude: 35.93083°N, Longitude: 96.76277°W
Section 22, Township 17N, Range 5E
Cushing, Lincoln County, Oklahoma
Directions: Travel 3.5 miles south on N. Little Ave. from the intersection of N. Little Ave. and Hwy. 33 in Cushing. The facility is on the east side of the road.

SECTION I. INTRODUCTION

Keyera Energy, Inc. (KEI or the applicant) has submitted an application requesting to modify a Prevention of Significant Deterioration (PSD) construction permit which authorized construction of a new bulk terminal located in Cushing, Oklahoma. The proposed changes are summarized in Section II of this memorandum. The facility is currently authorized to construct under Permit No. 2016-1066-C (PSD), issued on June 29, 2017. The facility is classified under NAICS Code 486110 – Pipeline Transportation of Crude Oil. The proposed tanks will be subject to New Source Performance Standards, 40 CFR Part 60 (NSPS), Subpart Kb.

The facility is a listed PSD major source, a crude oil storage facility exceeding 300,000-barrel (bbl) storage capacity with proposed permitted emissions in excess of 100 TPY. Potential VOC emissions have been estimated at 181.78 TPY.

Potential emissions of any single Hazardous Air Pollutant (HAP) are less than 10 TPY, and potential emissions of total HAP are less than 25 TPY. Therefore, the facility will be considered a minor source of HAP emissions.

SECTION II. PROPOSED PROJECT

One of the tanks authorized by Permit No. 2016-1066-C (PSD) was a 20,000-bbl external floating roof (EFR) tank (T-201). KEI is requesting to convert this proposed tank from an EFR to an internal floating roof (IFR) tank. This proposed change is considered a significant modification because it involves a change in a permit condition that is required to be based on a case-by-case determination; therefore, the application will be processed as a Tier II. While converting an EFR tank to an IFR tank will result in a decrease in emissions from normal operations, a safety factor was incorporated into the emissions to account for as-built changes with roof fittings, resulting in a net change of zero emissions from the previously issued PSD permit limits. Emissions from tank roof landings and cleanings are not affected by the proposed change.

In addition to the significant modification discussed above, the applicant requested to incorporate the additional changes in this permit action, which are listed as follows:

- Change one of the 176-hp emergency-use diesel fire water pump engines to a 700-hp emergency-use diesel fire water pump engine.
- Add crude oil lab equipment (one 500 gallon solvent container and one 1,000 gallon sump tank) to the facility to allow for testing of crude oil on-site.

No other sources are being affected by this change. BACT analyses for the proposed permit modifications were submitted and are discussed in Section VII of this memorandum.

SECTION III. PROCESS DESCRIPTION

The new facility will be designed to receive crude oil via pipeline and tank trucks and store crude in tanks for later transportation via pipeline. No outbound loading stations for tank trucks will be located at the terminal.

Crude oil samples are routinely acquired in closed containers for further on-site analysis. Approximately 18,000 gallons of crude oil are used annually for this testing. A solvent (mineral spirits) is used to cut the crude oil samples and to clean up the sample containers after analysis is complete. The solvent is stored in a 500 gallon container, and approximately 6,000 gallons of solvent are used annually. The crude oil and solvent is eventually routed to a 1,000 gallon sump tank where it is eventually blended back into on-site crude oil storage.

SECTION IV. EQUIPMENT

VOC emissions from the storage of crude oil prior to final transportation are controlled by either an external or internal floating roof design and good operating procedures during startup, shutdown, and maintenance including tank filling, roof landings, and tank cleaning. Following is a full list of equipment at the Wildhorse Terminal:

- Six (6) 250,000-bbl storage tanks,
- Eight (8) 350,000-bbl storage tanks,

- Four (4) 500,000-bbl storage tanks,
- One (1) 20,000-bbl surge tank,
- Two (2) 4,000 gallon sump tanks,
- One (1) 1,000 gallon sump tank,
- One (1) 500 gallon lab solvent container,
- Eight (8) pig launchers and receivers,
- One (1) emergency generator,
- One (1) portable stripping pump,
- Three (3) firewater pump engines, and
- Associated piping components.

Each storage tank is equipped with a welded pontoon-type deck external floating roof with a mechanical shoe primary seal and a rim mounted secondary seal system to reduce evaporative losses of the stored liquid. The surge tank is equipped with a welded pontoon-type deck internal floating roof with a mechanical shoe seal to reduce evaporative losses of the stored liquid.

Table 1. NSPS Subpart Kb Tanks

EU ID#	Contents	Roof Type	Bottom Design	Capacity (bbl)	Height (ft)	Diameter (ft)	Construction Date
T-2501	Crude Oil	EFR	Drain-Dry	250,000	55.5	197	TBD
T-2502	Crude Oil	EFR	Drain-Dry	250,000	55.5	197	TBD
T-2503	Crude Oil	EFR	Drain-Dry	250,000	55.5	197	TBD
T-2504	Crude Oil	EFR	Drain-Dry	250,000	55.5	197	TBD
T-2505	Crude Oil	EFR	Drain-Dry	250,000	55.5	197	TBD
T-2506	Crude Oil	EFR	Drain-Dry	250,000	55.5	197	TBD
T-3501	Crude Oil	EFR	Drain-Dry	350,000	55.5	232	TBD
T-3502	Crude Oil	EFR	Drain-Dry	350,000	55.5	232	TBD
T-3503	Crude Oil	EFR	Drain-Dry	350,000	55.5	232	TBD
T-3504	Crude Oil	EFR	Drain-Dry	350,000	55.5	232	TBD
T-3505	Crude Oil	EFR	Drain-Dry	350,000	55.5	232	TBD
T-3506	Crude Oil	EFR	Drain-Dry	350,000	55.5	232	TBD
T-3507	Crude Oil	EFR	Drain-Dry	350,000	55.5	232	TBD
T-3508	Crude Oil	EFR	Drain-Dry	350,000	55.5	232	TBD
T-5001	Crude Oil	EFR	Drain-Dry	500,000	55.5	277	TBD
T-5002	Crude Oil	EFR	Drain-Dry	500,000	55.5	277	TBD
T-5003	Crude Oil	EFR	Drain-Dry	500,000	55.5	277	TBD
T-5004	Crude Oil	EFR	Drain-Dry	500,000	55.5	277	TBD
T-201	Crude Oil	IFR	Drain-Dry	20,000	45.0	60	TBD

TBD – To be determined.

SECTION V. EMISSIONS

Emission units have been arranged into Emission Unit Groups (EUGs) as outlined as follows:

A. EUG 1A: NSPS Subpart Kb External Floating Roof Tanks

VOC emissions from the external floating roof NSPS Subpart Kb tanks were estimated using EPA's TANKS 4.09D, program assuming the contents to be crude oil with a Reid vapor pressure (RVP) of 10 and the throughputs listed in the following table.

Table 2a. External Floating Roof Tank Emissions (Normal Operations)

EU ID#	Throughput (bbl/yr)	Standing Losses (lb/yr)	Withdrawal Losses (lb/yr)	Total Emissions (TPY)
T-2501	25,000,000	7,770.52	5,097.94	6.44
T-2502	25,000,000	7,770.52	5,097.94	6.44
T-2503	25,000,000	7,770.52	5,097.94	6.44
T-2504	25,000,000	7,770.52	5,097.94	6.44
T-2505	25,000,000	7,770.52	5,097.94	6.44
T-2506	25,000,000	7,770.52	5,097.94	6.44
T-3501	35,000,000	8,884.07	6,060.40	7.47
T-3502	35,000,000	8,884.07	6,060.40	7.47
T-3503	35,000,000	8,884.07	6,060.40	7.47
T-3504	35,000,000	8,884.07	6,060.40	7.47
T-3505	35,000,000	8,884.07	6,060.40	7.47
T-3506	35,000,000	8,884.07	6,060.40	7.47
T-3507	35,000,000	8,884.07	6,060.40	7.47
T-3508	35,000,000	8,884.07	6,060.40	7.47
T-5001	50,000,000	10,309.83	7,251.23	8.78
T-5002	50,000,000	10,309.83	7,251.23	8.78
T-5003	50,000,000	10,309.83	7,251.23	8.78
T-5004	50,000,000	10,309.83	7,251.23	8.78
TOTAL		**158,935.00**	**108,075.76**	**133.52**

B. EUG 1B: NSPS Subpart Kb Internal Floating Roof Tanks

VOC emissions from the internal floating roof NSPS Subpart Kb tank were estimated using EPA's TANKS 4.09D, program assuming the contents to be crude oil with an RVP of 10 the throughputs listed in the following table, and were multiplied by a safety factor of 1.49.

Table 2b. Internal Floating Roof Tank Emissions (Normal Operations)

EU ID#	Throughput (bbl/yr)	Standing Losses (lb/yr)	Withdrawal Losses (lb/yr)	Total Emissions (TPY)
T-201	1,000,000	3,315.67 [1]	1,009.24 [1]	2.16
TOTAL		**3,315.67**	**1,009.24**	**2.16**

[1] – Includes an added safety factor of 1.49.

C. EUG 2: Roof Landings

The nineteen (19) tanks are drain-dry floating roof tanks. During normal operation, a floating roof is in contact with the liquid inside the tank, reducing evaporative losses. However, when the tank is emptied to the point that the roof lands on its deck legs, a vapor space is created. After the roof is landed, evaporative losses occur during idle standing and subsequent filling.

VOC emissions from roof landings were calculated using AP-42 (11/06), Section 7.1 for drain-dry floating roof tanks. For a conservative estimate, it is assumed that 15 of the highest emitting tanks are landed once per year during July. In Equation 2-10, roof landing emissions are the sum of standing idle losses during each roof landing episode and filling losses during each roof landing episode.

Standing idle losses for each roof landing event were calculated based on Equation 2-20 as follows:

$$L_C = 0.042 C_S W_l (Area)$$

Where:

L_C	=	clingage loss from the drain-dry tank, lb,
0.042	=	conversion factor, gal/bbl,
C_S	=	clingage factor, 0.006 bbl/1,000 ft^2,
W_l	=	density of the liquid, 7.1 lb/gal, and
Area	=	area of the tank bottom, ft^2.

Filling losses were calculated for each roof landing event based on Equation 2-26, as follows:

$$L_{FL} = \left(\frac{PV_V}{RT}\right) M_V S$$

Where:

L_{FL}	=	filling loss during roof landing, lb,
P	=	true vapor pressure of the liquid within the tank, 10.55 psia,
V_V	=	volume of the vapor space, ft^3,
R	=	ideal gas constant, 10.731 psia-ft^3/(lb-mol-°R),
T	=	average temperature of the vapor and liquid below the floating roof, 541.7 °R,
M_v	=	stock vapor molecular weight, 50 lb/lb-mol,
S	=	filling saturation factor, dimension less (0.15 for a drain-dry tank).

The following table summarizes the estimated roof landing losses for each roof landing event for each tank.

Table 3. Roof Landing Emissions

EU ID#	Area (ft^2)	V_V (ft^3)	L_C (lb/event)	L_{FL} (lb/event)	Total (tons/event)
T-2501	30,480.5	137,162	54.5	1,867.7	0.96
T-2502	30,480.5	137,162	54.5	1,867.7	0.96
T-2503	30,480.5	137,162	54.5	1,867.7	0.96
T-2504	30,480.5	137,162	54.5	1,867.7	0.96
T-2505	30,480.5	137,162	54.5	1,867.7	0.96
T-2506	30,480.5	137,162	54.5	1,867.7	0.96
T-3501	42,273.3	190,230	75.6	2,590.3	1.33
T-3502	42,273.3	190,230	75.6	2,590.3	1.33
T-3503	42,273.3	190,230	75.6	2,590.3	1.33
T-3504	42,273.3	190,230	75.6	2,590.3	1.33
T-3505	42,273.3	190,230	75.6	2,590.3	1.33
T-3506	42,273.3	190,230	75.6	2,590.3	1.33
T-3507	42,273.3	190,230	75.6	2,590.3	1.33
T-3508	42,273.3	190,230	75.6	2,590.3	1.33
T-5001	60,262.8	271,183	107.8	3,692.7	1.90
T-5002	60,262.8	271,183	107.8	3,692.7	1.90
T-5003	60,262.8	271,183	107.8	3,692.7	1.90
T-5004	60,262.8	271,183	107.8	3,692.7	1.90
T-201	2,827.4	12,723	5.1	173.3	0.09
TOTAL[1]			**1,199.5**	**41,096.3**	**21.15**

[1] – Based on the sum of the 15 highest emitting tanks being landed once per year.

D. EUG 3: Tank Cleanings

Each tank is periodically cleaned, requiring liquid evacuation and vapor purging. Emissions occur during an initial purge, subsequent daily purges, and sludge removal. Tank cleaning VOC emissions were calculated based on the American Petroleum Institute's (API) Technical Report 2568, "Evaporative Loss from the Cleaning of Storage Tanks" (November 2007). For a conservative estimate, tank cleaning calculations assume three (3) of the highest emitting tanks are cleaned once per year during July. Per Equation 4, total tank cleaning emissions are the sum of standing idle losses, vapor purge losses, sludge removal losses, and refilling losses per cleaning. Since standing idle emissions and refilling emissions were accounted for in EUG 2 for roof landing emissions, only vapor purge losses and sludge removal losses will be associated with EUG 3.

Vapor purge losses for each cleaning event were calculated based on Equation 14, as follows:

$$L_P = \left(\frac{PV_V}{RT}\right) M_V S$$

Where:

L_P = vapor purge loss per cleaning, lb,

P = true vapor pressure of the exposed volatile material within the tank, 4.56 psia,
V_V = volume of the vapor space, ft^3,
R = ideal gas constant, 10.731 psia-ft^3/(lb-mol-°R),
T = average temperature of the vapor space, 544.2 °R,
M_v = stock vapor molecular weight, 50 lb/lb-mol,
S = filling saturation factor, dimension less (equals 0 for a drain dry tank; however 0.5 was used for a conservative estimation of emissions).

Sludge removal losses for each cleaning event were calculated based on Equation 25, as follows:

$$L_{SR} = 0.57 n_{SR} D P^* M_v$$

Where:

L_{SR} = sludge removal loss per cleaning, lb,
n_{SR} = time for sludge removal, 8 days,
D = tank diameter, ft, and
P^* = vapor pressure function based on Equation 26, dimensionless.

$$P^* = \frac{P/P_a}{(1 + (1 - P/P_a)^{1/2})^2}$$

Where:

P_a = atmospheric pressure at the tank location, 14.7 psia, and
P = true vapor pressure of the exposed volatile material within the tank, 4.56 psia.

The following table summarizes the estimated tank cleaning losses for each cleaning event for each tank.

Table 4. Tank Cleaning Emissions

EU ID#	Diameter (ft)	V_V (ft^3)	L_P (lb/event)	L_{SR} (lb/event)	Total (tons)
T-2501	197	175,263	3,418.69	4,154.55	3.79
T-2502	197	175,263	3,418.69	4,154.55	3.79
T-2503	197	175,263	3,418.69	4,154.55	3.79
T-2504	197	175,263	3,418.69	4,154.55	3.79
T-2505	197	175,263	3,418.69	4,154.55	3.79
T-2506	197	175,263	3,418.69	4,154.55	3.79
T-3501	232	243,071	4,741.37	4,892.67	4.82
T-3502	232	243,071	4,741.37	4,892.67	4.82
T-3503	232	243,071	4,741.37	4,892.67	4.82
T-3504	232	243,071	4,741.37	4,892.67	4.82
T-3505	232	243,071	4,741.37	4,892.67	4.82
T-3506	232	243,071	4,741.37	4,892.67	4.82
T-3507	232	243,071	4,741.37	4,892.67	4.82

Table 4. Tank Cleaning Emissions

EU ID#	Diameter (ft)	V_V (ft^3)	L_P (lb/event)	L_{SR} (lb/event)	Total (tons)
T-3508	232	243,071	4,741.37	4,892.67	4.82
T-5001	277	346,511	6,759.08	5,841.68	6.30
T-5002	277	346,511	6,759.08	5,841.68	6.30
T-5003	277	346,511	6,759.08	5,841.68	6.30
T-5004	277	346,511	6,759.08	5,841.68	6.30
T-201	60	16,258	317.12	1,265.35	0.79
TOTAL[1]			**20,277.24**	**17,525.04**	**18.90**

[1] – Based on the sum of the three (3) highest emitting tanks being cleaned per year.

E. EUG 4: Fugitive Equipment Leaks

Fugitive VOC emissions from piping components were calculated using emission factors for light oil service at petroleum marketing terminals in EPA's "Protocol for Equipment Leak Emission Estimates" (EPA-453/R-95-017) and an estimated number of components.

Table 5. Fugitive Emissions

Component	Component Count	Emission Factor (lb/hr/comp)	Emissions	
			(lb/hr)	(TPY)
Valves	1,000	9.47E-05	0.09	0.41
Flanges	3,000	1.76E-05	0.05	0.23
Other	40	2.86E-04	0.01	0.05
Pumps	40	1.19E-03	0.05	0.21
Total	**4,080**	**--**	**0.20**	**0.90**

F. EUG 5: Emergency-Use Engines

Emergency-use diesel engine emissions are based on an assumed runtime of 500 hours per year. Emission factors are derived from EPA's Tier 3 standards (NSPS Subpart IIII, Table 4), and are listed in the table below.

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Table 6. NSPS Subpart IIII Emission Standards (Table 4)

Maximum Engine Power	Model year(s)	NMHC + NO_X (g/hp-hr)	CO (g/hp-hr)	PM (g/hp-hr)
175≤HP<300	2009 +	3.0	2.6	0.15
600≤HP≤750	2009 +	3.0	2.6	0.15

Table 7. Emergency Use Engines

Unit ID	Rating (HP)	NO_X[1] (TPY)	CO (TPY)	VOC[1] (TPY)	PM (TPY)
GEN-1	275	0.46	0.39	0.46	0.02
FP-1	176	0.29	0.25	0.29	0.01

Table 7. Emergency Use Engines

Unit ID	Rating (HP)	NO_X[1] (TPY)	CO (TPY)	VOC[1] (TPY)	PM (TPY)
FP-2	700	1.16	1.00	1.16	0.06
FP-3	700	1.16	1.00	1.16	0.06
Total	**---**	**3.07**	**2.64**	**3.07**	**0.15**

[1] – Emissions based on Emission limitation of NMHC + NO_X.

G. Insignificant Activities

In addition to the equipment/operations in the EUG's listed above, the facility also includes a portable stripping pump, pigging equipment, two (2) 4,000 gallon underground horizontal sump tanks, one 1,000 gallon above ground horizontal lab sump tank, and one 500 gallon lab solvent tank, which are included for PSD purposes. VOC is emitted from the pig traps after each pigging event. VOC emissions from the pig traps were estimated from AP-42 (11/06), Section 7.1 for clingage losses. The entire inner surface area of the aboveground segment of the pig trap is assumed to cause evaporative losses of residual crude oil. Evaporative losses for each pigging event were calculated based on Equation 2-22, as follows:

$$L_C = 0.042 C_S W_l (Area)$$

Where:

L_C	=	clingage loss from each event, lb,
0.042	=	conversion factor, gal/bbl,
C_S	=	clingage factor, 0.006 bbl/1,000 ft^2 (from AP-42 (11/06) Table 7.1-10),
W_l	=	density of the liquid, 7.1 lb/gal, and
Area	=	Surface area of the pipe, 251 ft^2 (based on a 40 ft pipe 2 ft in diameter).

Based on the above methodology, emissions from each pigging event were calculated to be 0.45 pounds per event. Based on the assumption that 50 events will occur each year, total VOC emissions from pigging events were calculated to be 0.01 TPY.

VOC emissions from the two (2) 4,000 gallon underground sump tanks (T-S1 and T-S2) and the one 1,000 gallon horizontal above ground lab sump tank (T-S3) were estimated using EPA's TANKS 4.09D program, assuming the contents to be crude oil with a Reid vapor pressure (RVP) of 10 psia and the throughputs listed in the following table. VOC emissions from the 500 gallon lab solvent container (T-L1) were estimated using EPA's TANKS 4.09D program, assuming the contents to be jet naphtha (JP-4), used as a conservative surrogate for mineral spirits (i.e., true vapor pressure less than 1.0 psia), and the throughput listed in the following table.

Table 8. Sump Tank and Ancillary Tank Emissions

EU ID#	Throughput (bbl/yr)	Standing Losses[1] (TPY)	Working Losses (TPY)	Total Emissions (TPY)
T-S1	208,000	---	0.56	0.56
T-S2	208,000	---	0.56	0.56

Table 8. Sump Tank and Ancillary Tank Emissions

EU ID#	Throughput (bbl/yr)	Standing Losses[1] (TPY)	Working Losses (TPY)	Total Emissions (TPY)
T-S3	18,000	0.38	0.07	0.45
T-L1	6,000	0.02	0.01	0.03
Total	**416,000**	**0.40**	**1.20**	**1.60**

[1] – There are no standing losses associated with underground storage tanks.

For the portable stripping pump, emission factors are derived from EPA's Tier 3 standards (NSPS Subpart IIII, Table 4), and are listed in the table below.

Table 9. NSPS Subpart IIII Emission Standards (Table 4)

Maximum Engine Power	Model year(s)	NMHC + NO_X (g/hp-hr)	CO (g/hp-hr)	PM (g/hp-hr)
175≤HP<300	2010 +	3.0	3.7	0.22

Table 10. Portable Engine Emissions

Unit ID	Rating (HP)	NO_X [1] (TPY)	CO (TPY)	VOC [1] (TPY)	PM (TPY)
SP-1	156	0.45	0.56	0.45	0.03

[1] – Emissions based on Emission limitation of NMHC + NO_X.

H. Facility-Wide Emissions

Table 11. Facility-Wide Emissions

EUG	Description	VOC (TPY)	Xylenes [1,2] (TPY)	Total HAP [1] (TPY)
1A	EFR NSPS Subpart Kb Tanks	133.52	0.81	3.08
1B	IFR NSPS Subpart Kb Tanks	2.16	<0.01	0.04
2	Roof Landings	21.15	0.02	0.24
3	Tank Cleanings	18.90	0.01	0.22
4	Fugitive Equipment Leaks	0.90	0.01	0.04
5	Emergency Use Engines	3.07	0.04	0.12
---	Insignificant Activities	2.08	0.09	0.25
TOTAL		**181.78**	**0.99**	**3.99**

[1] – HAP emissions calculated were based on the default speciation of crude oil in TANKS 4.09D and sample calculations presented in AP-42 (11/06), Section 7.1.5 for the conversion of liquid fraction to vapor fraction.
[2] – Xylene was estimated to be the greatest single HAP emitted from the facility.

I. Greenhouse Gas (GHG) Emissions

Based on EPA default speciations, there is typically less than 1% of methane (CH_4) and carbon dioxide (CO_2) in stabilized crude oil stocks (e.g., Sample IDs 1208 and 1210 in EPA's SPECIATE 4.3). If each of these GHGs were conservatively assumed to represent 5% of the emissions from crude oil evaporative losses, the emissions would be 240 TPY CO_{2e}. Using 40

CFR Part 98, Subpart C factors, the engines have the potential to generate an additional 1,163 TPY CO_2e.

J. Hydrogen Sulfide (H_2S) Emissions

Emissions of H_2S were estimated using a mass emission ratio based on the methodologies provided in "Using K factors to Estimate Quantities of Individual Vapor Species Emitted During the Storage and Transfer of Hydrocarbon Liquids" by Jeffery L. Meling, et al. and the information presented in the following table.

Table 12. Crude Oil Parameters

Parameter	Value
H_2S Concentration[1] (ppmw)	135
H_2S Molecular Weight (lb/lb-mol)	34.08
Vapor Molecular Weight (lb/lb-mol)	50.0
Liquid Molecular Weight (lb/lb-mol)	207.0
True Vapor Pressure (psia)	10.96
K Factor[2]	19

[1] – H_2S ppmw based on concentration typically found in crude oils with 5 wt% sulfur content.
[2] – K factor obtained from the nomograph for H_2S in crude oil and an ambient temperature of 60°F.

Emission estimates for H_2S are provided in the following table.

Table 13. H_2S Emissions

Emissions Source	VOC (lb/yr)	VOC (lb/24-hr)	H_2S (ppmw)	H_2S (lb/hr)
EFR Standing Losses	158,935.00	435.44	14,241 [4]	2.58E-01
EFR Withdrawal Losses	108,075.76	296.10	135 [5]	1.68E-03
EFR Landing Refill Event[1]	---	3,692.70	14,241 [4]	2.19E+00
EFR Cleaning Purge Event[2]	---	6,759.08	14,241 [4]	4.01E+00
EFR Maximum Emissions [3]		**7,490.62**	**---**	**4.27E+00**
IFR Standing Losses	3,315.67	9.08	14,241 [4]	5.39E-03
IFR Withdrawal Losses	1,009.24	2.77	135 [5]	1.56E-05
IFR Landing Refill Event[1]	---	173.18	14,241 [4]	1.03E-01
IFR Cleaning Purge Event[2]	---	317.12	14,241 [4]	1.88E-01
IFR Maximum Emissions [3]		**328.97**	**---**	**0.19E+00**
Maximum Emissions [3]	**---**	**7,8119.59**	**---**	**4.46**

[1] – Worst-case landing emissions assume one tank is refilled in a 24-hour period.
[2] – Worst-case cleaning emissions assume one tank is purged in a 24-hour period.
[3] – Maximum emissions assume that refill and purge emissions will not occur concurrently.
[4] – Involves evaporation from standing liquid utilizing the weight fraction of H_2S in the crude vapor (calculated using K factors).
[5] – Involves complete evaporation of the liquid layer utilizing the weight fraction of H_2S in the crude liquid.

SECTION VI. INSIGNIFICANT ACTIVITIES

No insignificant activities were claimed as part of the application.

SECTION VII. PSD REVIEW

The project is subject to a PSD review because it is a listed PSD-major source, a crude oil storage facility exceeding 300,000-barrel (bbl) storage capacity with proposed permitted emissions in excess of 100 TPY. The pollutants subject to PSD review are listed in the following table.

Table 14. PSD Applicability

Pollutant	Project Emissions (TPY)	PSD Threshold (TPY)	Subject to PSD?
NO_X	7.59	100	No
CO	8.21	100	No
VOC	185.82	100	**Yes**
PM_{10}	<1.0	100	No
$PM_{2.5}$	<1.0	100	No
SO_2	<1.0	100	No

The full PSD review consists of the following:

A. Determination of Best Available Control Technology (BACT);
B. Evaluation of existing air quality and determination of monitoring requirements;
C. Air Quality Impact Analysis
D. Evaluation of source-related impacts on growth, soils, vegetation, and visibility; and
E. Evaluation of Class I area impacts.

A. Best Available Control Technology (BACT)

Any major stationary source or major modification subject to PSD review must undergo an analysis to ensure the use of best available control technology (BACT). The requirement to conduct a BACT analysis is set forth in 40 CFR 52.21. BACT is defined in 40 CFR 52.21 as:

"…best available control technology means an emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant…"

A BACT analysis is required for each new or physically modified emission unit for each pollutant that exceeds an applicable PSD significant emission rate (SER). Since the VOC emissions from the proposed project exceed the applicable PSD SER, a BACT analysis is required to assess the necessary levels of control for this pollutant.

The following methodology for performing a top-down BACT analysis has been developed from the US EPA's 1990 Draft New Source Review Workshop Manual - BACT Guidance. The analysis utilizes five key steps to identify the most suited BACT option for the project. The first step in this approach is to determine, for the emission unit in question, the most stringent control available for a similar or identical source or source category. If it is shown that this level of control is technically, environmentally, or economically infeasible for the unit in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

Step 1: Identify Available Control Technologies

Available control technologies are identified for each emission unit in question. The following methods are used to identify potential technologies: 1) researching the Reasonably Available Control Technology (RACT)/BACT/Lowest Achievable Emission Rate (LAER) Clearinghouse (RBLC) database, 2) surveying regulatory agencies, 3) drawing from previous engineering experience, 4) surveying air pollution control equipment vendors, and 5) surveying available literature.

Step 2: Eliminate Technically Infeasible Options

After the identification of control options, an analysis is conducted to eliminate technically infeasible options. A control option is eliminated from consideration if there are process-specific conditions that prohibit the implementation of the control technology or if the highest control efficiency of the option would result in an emission level that is higher than any applicable regulatory limits, such as an NSPS.

Step 3: Rank Remaining Control Options by Control Effectiveness

Once technically infeasible options are removed from consideration, the remaining options are ranked based on their control effectiveness. If there is only one remaining option, or all of the remaining technologies could achieve equivalent control efficiencies, ranking based on control efficiency is not required.

Step 4: Evaluate and Eliminate Control Technologies Based on Energy, Environmental, and Economic Impacts

Beginning with the most efficient control option in the ranking, detailed economic, energy, and environmental impact evaluations are performed. If a control option is determined to be economically feasible without adverse energy or environmental impacts, it is not necessary to evaluate the remaining options with lower control efficiencies.

The economic evaluation centers on the cost effectiveness of the control option. Costs of installing and operating control technologies are estimated following the methodologies outlined in the EPA's OAQPS Control Cost Manual (CCM) and other industry resources. Cost effectiveness is expressed as dollars per ton of pollutant controlled. Objective analyses of energy and environmental impacts associated with each option are also conducted. Both beneficial and adverse impacts are discussed and quantified.

Step 5: Select BACT and Document the Selection as BACT

In the final step, one pollutant specific control option is proposed as BACT for each emission unit under review based on evaluations from the previous step. The resulting BACT standard is an emission limit unless technological or economic limitations of the measurement methodology would make the imposition of an emissions standard infeasible, in which case a work practice standard can be imposed.

BACT Analysis for Storage Tanks – Normal Operations (Standing and Withdrawal Losses)

Step 1: Identify Available Control Technologies

Several different control options have been selected for BACT top-down analysis for control of emissions from normal tank operations (standing and withdrawal losses). The following table lists commercially available controls for petroleum liquid storage. The control technologies are listed in order of decreasing emission reduction potential.

Table 15. Control Technologies for Normal Operations

Control Technologies
Routing Vapor Space to a Control Device • Thermal Incinerator • Flare • Vapor Combustor • Refrigerated Condenser • Carbon Adsorption Roof Selection • EFRs, IFRs • Fixed Roof Seal Selection • Double Seal • Liquid, Mechanical Shoe • Wiper Submerged Fill Good Operating and Maintenance Practices

Routing Vapor Space to a Control Device
Evaporative losses from tanks can be routed to a variety of control devices with varying destruction efficiencies. Combustion type controls, including flares, combustors, and incinerators, destroy VOCs with auxiliary fuel injection. Destruction efficiencies range from 98-99.9%, depending on the material. Adsorption technologies, which physically filter VOC, have capture efficiencies that range from 50-90%, depending on the material. Condensation techniques can achieve removal efficiencies above 90% relative to VOC composition and concentration in the emission stream. Refrigerated condensers are used as air pollution control devices for treating emissions streams with high VOC concentrations for sources such as gasoline bulk terminals. Pressure/vacuum conservation vents reduce evaporation of tank contents when vapor space is increased or decreased due to liquids being pumped in or out of the tank. These vents are typically mounted to a flange or pipe that connects to the vapor space above the liquid level in the tank.

Roof Selection
Three basic roof types are considered: external floating roof, internal floating roof, and fixed roof.

Fixed roof tanks – These tanks consist of a cylindrical steel shell with a permanently fixed roof that can be either cone-shaped, dome-shaped, or flat. Evaporative losses occur in these tanks through vapor expansion and contraction and from working losses as filling vapors are expelled from the tank.

External floating roof tanks (EFRs) – These tanks consist of an open cylindrical steel shell with a roof, or deck, which floats on the surface of the stored liquid. The roof height changes with the liquid level of the material stored within the tank, effectively minimizing vapor space. A rim seal system is attached to the deck's perimeter and makes contact with the tank wall. These two systems combine to reduce VOC emissions from the stored material. Losses from these tanks originate from exposed liquid at the rim seal system and deck fittings. In addition to the basic tank configuration, there are several add-on options to further reduce emissions and are listed as follows:

- Cone Roof Add-on with Vapor Space Routed to a Control Device. This option would involve installing a fixed cone roof over the top of each tank at the terminal, thereby creating internal floating roof tanks from the previous EFR tank. The coned exterior roofs would be supported by columns that penetrate through the floating roof inside each tank. The fixed coned roof design acts to block the wind flow across the top of each tank and be part of a system to collect emissions coming out the top of the floating roof of each tank. A dedicated vapor collection system would be installed to route emissions from each tank to a dedicated control device as listed in the previous control technology category (Routing Vapor Space to a Control Device).

- Cone Roof Add-on Only – This option involves installing a fixed coned roof as in the previous option except without installation of a control device as discussed in the previous control technology category and associated collection piping. The primary function of the fixed external roof in this alternative would be to block the wind and

decrease standing and withdrawal emissions from each tank. This option is estimated to provide a control efficiency of up to 44%.

- Domed External Floating Roof – This option involves constructing a self-supporting geodesic dome over the existing external floating roof on each tank at the terminal. Similar to the cone roof add-on option, geodesic domes are utilized to minimize the wind over the top of the external floating roof. The domed tanks are generally vented with circulation vents at the top of each roof. Emissions from each domed EFR tank would not be piped to a control device. Since the geodesic domes would be self-supporting, the installation of column supports penetrating through the floating roof would not be necessary and gaps in the floating roof would be minimized. This design is still referred to as an external floating roof because it utilizes the existing heavier-duty, double-sealed fully intact EFR, though for emission estimation purposes it is treated as an IFR with no support columns. This option is estimated to provide a control efficiency of up to 73%.

Internal floating roof tanks (IFRs) – These tanks are simply EFRs with an additional, fixed roof above the floating roof. The fixed roof serves as a vapor barrier and blocks air movement. Additionally, the internal floating roof tank deck is lighter than those used in external roof tanks. Losses from these tanks are the same as EFRs, with the exception that emissions induced by air movement are reduced.

Seal Selection

Rim seals are used in floating roof tanks, and allow the tank to rise and fall with the level of the liquid in the tank. Seals minimize the annular space between the tank wall and rim, reducing emissions. A rim seal can consist of a single primary seal or also be paired with a secondary seal, which is mounted above the primary seal (double seal).

Mechanical shoe seals use a light-gauge metallic band as the contact with the tank shell. This seal consists of a series of sheets, or shoes, joined in a ring. The sheets are held against the tank shell mechanically. The shoes' bottoms extend below the liquid surface and confine the vapor space between the shoe and floating roof. Primary seal fabric extends from the shoe to the rim and seals the vapor space from the atmosphere.

Resilient filled seals either eliminate the vapor space between the rim seal and liquid surface (liquid mounted) or allow vapor space between the rim seal and liquid surface (vapor mounted). These seals are made of an open-cell foam covered in a coated fabric and attach to the deck's perimeter. Filled seals expand and contract while maintaining contact with the tank wall and accommodate variable annular rim space widths. These seals give room for the floating roof to move with the material surface without binding. To effectively reduce emissions, seal joints must be vapor tight, and the seal must be in contact with the tank wall.

Wiper seals consist of a continuous annular blade made of flexible material which is fixed to a mounting bracket on the floating roof perimeter. This blade spans the annular rim space and contacts the tank wall. These seals are vapor mounted, and a vapor space exists between the liquid surface and the seal. The blades are either made of a cellular, elastomeric material, or a

foam core wrapped in fabric. To effectively reduce emissions, the mounting must be vapor tight, and the seal must extend around the deck while maintaining contact with the tank wall.

In a double seal configuration, secondary seals are either resilient filled or flexible wiper seals, which can further reduce evaporative loss. Secondary seals can be either shoe or rim mounted; although rim mounted seals are more effective due to coverage of the entire rim vapor space.

Submerged Fill
Submerged loading can be accomplished using the bottom loading method. A bottom-loading fill pipe is permanently attached to the bottom of the tank, significantly controlling liquid turbulence. Subsequently, much lower vapor generation occurs than during splash loading, where the tank is filled from the top of the tank.

Good Operating and Maintenance Practices
Good operating and maintenance practices for normal operations include, but are not limited to, white paint color, routine inspections, and timely repairs.

Step 2: Eliminate Technically Infeasible Options

All control options are technically feasible when considered individually. These options are further considered in the following steps of the top-down BACT analysis.

Step 3: Rank Remaining Control Options by Control Effectiveness

Floating roof tanks reduce vapor space emissions more effectively than fixed roof tanks because the deck rests atop the liquid surface and reduces the vapor space within the tank.

Liquid-mounted seals provide better emission control than mechanical-shoe and vapor mounted seals, but do not greatly out-perform mechanical-shoe seals. The maintenance and reliability of mechanical-shoe seals may be advantageous as compared to liquid-mounted seals.

Add-on control options add additional emission control beyond the basic required components of each tank.

Routing Vapor Space to a Control Device is the most effective option (50-99.9%), followed by geodesic dome installation (~73%), cone roof installation (~44%), seal selection, submerged fill, and then good operating and maintenance practices.

In addition to control effectiveness and emissions considerations, each BACT option must also be evaluated for economic impacts, environmental, and energy impacts. These considerations are further discussed in Step 4.

Step 4: Evaluate and Eliminate Control Technologies Based on Energy, Environmental, and Economic Impacts

Since NSPS Subpart Kb requires an EFR or IFR roof, KEI has assumed this control option to be the baseline requirement. Under this assumption, submerged fill would be meaningless since there will be no vapor space for splash loading to occur.

The economic consideration for each remaining BACT option is based on a cost analysis, in part, total capital costs, direct costs, and total derived annualized cost. The cost analysis was based on industry cost estimates for similar tanks constructed in Cushing and EPA's Cost Control Manual. Note, sizing of the thermal oxidizer (TO) depends on the hourly rate of controlled VOC, and annual operating costs (utilities, pilot fuel, etc.) vary based on mode of operation (e.g. continuously for normal operations and intermittently for landings and cleanings).

Table 16. Initial Costs (Storage Tanks – Normal Operations)

Proposed Tanks		EFR w/Cone Roof & Vapor Collection		EFR w/Cone Roof Only		Geodesic Dome EFR	
Capacity	**Qty.**	**Cost/Tank**	**Total Cost**	**Cost/Tank**	**Total Cost**	**Cost/Tank**	**Total Cost**
250,000	6	$1,087,983	$6,527,898	$1,087,983	$6,527,898	$863,294	$5,179,764
350,000	8	$1,386,123	$11,088,984	$1,386,123	$11,088,984	$1,147,374	$9,178,992
500,000	4	$1,833,333	$7,333,332	$1,833,333	$7,333,332	$1,573,494	$6,293,976
20,000	1	$0	$0	$0	$0	$0	$0
Total	**19**	**---**	**$24,950,214**	**---**	**$24,950,214**	**---**	**$20,652,732**

The following tables present the cost analysis of each of the add-on control options. Costs were evaluated on a unit-by-unit basis as well as a grouped basis in order to account for the efficiencies from all tanks sharing one control device and from using the same control device for multiple landing/cleaning events.

Table 17. Grouped Cost Analysis (Storage Tanks – Normal Operations)

	EFR w/Cone Roof & Vapor Collection	EFR w/Cone Roof Only	Geodesic Dome EFR
Purchased Equipment Cost			
Tank Roofs	$24,950,214	$23,335,214	$20,652,732
Thermal Oxidizer	$1,246,000	---	---
Piping from Tanks to Thermal Oxidizer	$423,009	---	---
Direct Costs			
Total Capital Investment	$26,619,223	$23,335,214	$20,652,732
Total Annual Cost	$269,000	---	---
Annualized Cost Estimation			
Interest	6%	6%	6%
Equipment Life (yrs)	15	15	15
Total Annual Cost	$3,009,789	$2,402,658	$2,126,462
Emission Reductions			
Baseline Emissions (TPY)	135.7	135.7	135.7
Control Efficiency	99%	44%	73%
Emissions Reduced (TPY)	134.3	59.7	99.9
BACT Cost ($/Ton Reduced)	**$22,410**	**$40,251**	**$21,472**

[1] Equipment cost of the cone roof and vapor collection option includes a portion of vapor piping of the tanks; therefore, the piping from tanks to thermal oxidizer represents additional piping required to route all the tanks to the thermal oxidizer.

[2] Cone and Geodesic Dome roof designs reduce standing emissions, but do not affect landing and cleaning emissions.

Table 18. Unit Cost Analysis for Storage Tanks w/ Cone Roof & Vapor Collection

Capacity (bbl)	250,000	350,000	500,000	20,000
Tank Roofs	$1,087,983	$1,386,123	$1,833,333	$0
Thermal Oxidizer	$228,000	$228,000	$228,000	$228,000
Piping to TO	$25,000	$25,000	$25,000	$25,000
Direct Costs				
Total Capital Investment	$1,340,983	$1,639,123	$2,086,333	$253,000
Total Annual Cost	$59,300	$59,300	$59,300	$59,300
Interest	6%	6%	6%	6%
Equipment Life (yrs)	15	15	15	15
Total Annual Cost	$197,371	$228,069	$274,115	$85,350
Emission Reductions				
Baseline Emission (TPY)	6.4	7.5	8.8	2.2
Control Efficiency	99%	99%	99%	99%
Emissions Reduced (TPY)	6.4	7.4	8.7	2.1
BACT Cost ($/ton)	**$31,005**	**$30,840**	**$31,536**	**$39,913**

Table 19. Unit Cost Analysis for EFR w/ Cone Roof

Capacity (bbl)	250,000	350,000	500,000	20,000
Tank Roofs	$1,087,983	$1,386,123	$1,833,333	NA
Direct Costs				
Total Capital Investment	$1,087,983	$1,386,123	$1,833,333	---
Total Annual Cost	0	0	0	---
Interest	6%	6%	6%	---
Equipment Life (yrs)	15	15	15	---
Total Annual Cost	$112,022	$142,719	$188,765	---
Emission Reductions				
Baseline Emission (TPY)	6.4	7.5	8.8	---
Control Efficiency	44%	44%	44%	---
Emissions Reduced (TPY)	2.8	3.3	3.9	---
BACT Cost ($/ton)	**$39,595**	**$43,422**	**$48,862**	**---**

Table 20. Unit Cost Analysis for EFR w/ Geodesic Dome

Capacity (bbl)	250,000	350,000	500,000	20,000
Tank Roofs	$863,294	$1,147,374	$1,573,494	NA
Direct Costs				
Total Capital Investment	$863,294	$1,147,374	$1,573,494	---
Total Annual Cost	0	0	0	---
Interest	6%	6%	6%	---
Equipment Life (yrs)	15	15	15	---
Total Annual Cost	$88,887	$118,137	$162,011	---
Emission Reductions				
Baseline Emission (TPY)	6.4	7.5	8.8	---
Control Efficiency	73%	73%	73%	---
Emissions Reduced (TPY)	4.7	5.5	6.4	---
BACT Cost ($/ton)	**$18,937**	**$21,664**	**$25,277**	**---**

From the tables above, the lowest available cost per ton reduced is approximately $18,937. This value represents a significant economic impact. Due to the extremely high and unreasonable economic impact for each of these BACT options, they are inappropriate BACT alternatives beyond the baseline NSPS Subpart Kb standards for new tanks.

Environmental and energy impacts from the EFR with cone roof & vapor collection option are as follows: increase in NOx emissions, increase in CO emissions, noise, and fuel consumption. The other control options evaluated have no considerable environmental or energy impacts. However, since the economic impacts for each of the options are unreasonably high, these impacts were not further considered.

Step 5: Select BACT and Document the Selection as BACT

KEI has proposed to implement the following design elements and work practices:

- Floating roofs compliant with NSPS Subpart Kb standards,
- Primary mechanical shoe seal and secondary seal for EFR tanks,
- Primary mechanical shoe seal for IFR tanks, and
- Good operation and maintenance practices.

As mentioned previously, the resulting BACT standard is an emission limit unless technological or economic limitations of the measurement methodology would make the imposition of an emissions standard infeasible, in which case a work practice or operating standard can be imposed. For the proposed storage tanks, KEI proposes a VOC BACT emission limit of 6.44 tons of VOC per year for each of the 250K-bbl tanks, 7.47 tons of VOC per year for each of the 350K-bbl tanks, 8.78 tons of VOC per year for each of the 500K-bbl tanks, and 2.16 tons of VOC per year for the 20K-bbl tank, based on a 12-month rolling average basis.

DEQ selects a VOC BACT emission limit of 6.44 tons of VOC per year for each of the 250K-bbl tanks, 7.47 tons of VOC per year for each of the 350K-bbl tanks, 8.78 tons of VOC per year for each of the 500K-bbl tanks, and 2.16 tons of VOC per year for the 20K-bbl tank, based on a 12-month rolling average basis. The chosen level of BACT is consistent with findings from EPA's RBLC for similar conditions and operations. The clearinghouse listed several facilities (e.g. RBLC IDs OK-0139, OK-0175, OK-0176, LA-0286, and TX-0653) with crude oil storage tanks. Acceptable PSD BACT controls for these facilities were external floating roofs equipped with primary mechanical shoe and secondary seals (double seals), or internal floating roofs equipped with primary mechanical shoe.

BACT Analysis for Storage Tanks – Landings

Step 1: Identify Available Control Technologies

The following table lists commercially available controls for landings in order of decreasing emission reduction potential. Control technologies for each pollutant were considered in order of decreasing emission reduction potential.

Table 21. Control Technologies for Landings

Control Technologies
Routing Vapor Space to a Control Device • Thermal Incinerator • Flare • Vapor Combustor • Refrigerated Condenser • Carbon Adsorption Mobile Degassing • Thermal Oxidizer • Carbon Adsorption Drain-Dry Design Submerged Fill Good Operating and Maintenance Practices

Routing Vapor Space to a Control Device

In addition to the discussion in the BACT analysis for Storage Tanks – Normal Operations (Standing and Withdrawal Losses), over the top fixed vapor collection is another option that involves installing a fixed (or permanent) vapor collection line going over the top of the side wall of each EFR tank at the terminal. The line would go through the existing external floating roof to collect emissions from the vapor space formed underneath the floating roof as it lands. The use of this option would only be good during landing events when a vapor space is created. During other times, the tank would be filled with liquid and the line would be submerged underneath the floating roof. Vapors that are collected would be piped to a common control device at the site. A thermal oxidizer would be the chosen control device to control volatile emissions from tanks at the site. The implementation and operation of this effort would be led by site personnel. In addition to the operation and maintenance of the vapor collection device that runs over the top of each tank, operators at the site would also be responsible for the maintenance and operation of the thermal oxidizer.

Mobile Degassing

Mobile degassing units are an alternative to running a fixed line to each tank. The units are portable and can be utilized during individual emissions events. The vapors generated during activities such as tank landings would be evacuated out of the vapor space in the tank and collected by the units. The gases collected are treated by a control device (e.g., carbon adsorber or thermal oxidizer). Efficiencies in excess of 95% are estimated by vendors.

Drain-Dry Design

Drain-dry design is the construction of the tank bottom with a slope which drains the liquid contents to the sump or sumps when liquid levels fall below the pipe outlet. The amount of remaining liquid is minimized during tank draining. Design may be cone-up, where the liquid drains to multiple sumps around the perimeter, or cone-down, typically with a single sump in the center of the tank.

Submerged Fill
See discussion in the BACT analysis for Storage Tanks – Normal Operations (Standing and Withdrawal Losses).

Good Operating and Maintenance Practices
NSPS Subpart Kb requires that the process of filling, emptying, and refilling be continuous and completed as rapidly as possible.

Step 2: Eliminate Technically Infeasible Options

All control options are technically feasible. These options are further considered in the following steps of the top-down BACT analysis.

Step 3: Rank Remaining Control Options by Control Effectiveness

Routing vapor space to a control device and mobile degassing reduces emissions from landing events more or less effectively dependent on the destruction technology.

Drain dry design reduces the emissions associated with landing and events by reducing the amount of material remaining on the bottom of the tank subject to volatilization.

Good operating and maintenance practices do not reduce emissions associated with individual emissions events, but instead limit event frequency and duration, decreasing potential emissions.

Routing Vapor Space to a Control Device is the most effective option (50-99.9%), followed by Mobile Degassing (~95%), drain dry design, submerged fill, and then good operating and maintenance practices.

In addition to control effectiveness and emissions considerations, each BACT option must also be evaluated for economic impacts, environmental, and energy impacts. These considerations are further discussed in Step 4.

Step 4: Evaluate and Eliminate Control Technologies Based on Energy, Environmental, and Economic Impacts

As with the BACT analysis for Normal Operations (Standing and Withdrawal Losses), KEI has assumed NSPS Subpart Kb requirements to be the baseline requirement since NSPS Subpart Kb requires an EFR or IFR roof. Under this assumption, submerged fill would be meaningless since there will be no vapor space for splash loading to occur.

The economic consideration for each remaining BACT option is based on a cost analysis, in part, total capital costs, direct costs, and total derived annualized cost. The initial cost of the cone roof and vapor collection option for landings remains the same as presented in the BACT analysis for normal operation of the storage tanks and therefore was not duplicated here. The cost analysis for the over the top fixed vapor collection was also based on industry cost estimates for similar tanks constructed in Cushing. Cost estimates for the mobile degassing and vapor collection option are based on a recent vendor quote. The following table shows the initial costs of the

potential control options. Cleaning hours are included in the total costs for use in the grouped cost analysis discussed below.

Table 22. Initial Costs (Storage Tanks – Landings and Cleanings)

Proposed Tanks			**Over the Top Fixed Vapor Collection**		**Mobile Degassing and Vapor Collection**	
Capacity	**Landings (hr/yr)**	**Cleanings (hr/yr)**	**Cost/Tank**	**Total Cost**	**Cost/Hour**	**Total Cost**
250,000	21.0	19.2	$350,000	$2,100,000	$1,480	$59,496
350,000	80.0	28.8	$350,000	$2,800,000	$1,480	$161,024
500,000	52.0	16.0	$350,000	$1,400,000	$1,480	$100,640
20,000	---	---	---	---	$1,480	---
Total			**---**	**$6,300,000**	**---**	**$321,160**

The following tables present the cost analysis of each of the control options. Costs were evaluated on a unit-by-unit basis as well as a grouped basis in order to account for the efficiencies from all tanks sharing one control device and from using the same control device for multiple landing/cleaning events.

Table 23. Grouped Cost Analysis (Storage Tanks – Landings and Cleanings)

	EFR w/Cone Roof & Vapor Collection	Over the Top Fixed Vapor Collection	Mobile Degassing and Vapor Collection
Purchased Equipment Cost			
Tank Roofs	$24,950,214	$6,300,000	$0
Thermal Oxidizer	$1,265,000	$1,509,000	$321,160
Piping from Tanks to Thermal Oxidizer	$423,009	$423,009	$0
Tank Mobilization	---	---	$7,500
Direct Costs			
Total Capital Investment	$26,638,223	$8,232,000	$328,660
Total Annual Cost	$305,400	$114,000	---
Annualized Cost Estimation			
Interest	6%	6%	1%
Equipment Life (yrs)	15	15	1
Total Annual Cost	$3,048,145	$961,590	$332,196
Emission Reductions			
Baseline Emissions (TPY)	165.6	29.9	29.9
Control Efficiency	99%	99%	95%
Emissions Reduced (TPY)	163.9	29.6	28.4
BACT Cost ($/Ton Reduced)	**$18,595**	**$32,507**	**$11,703**

[1] Since the Cone Roof & Vapor Collection option also controls standing/withdrawal emissions, these were included as part of the reduced emissions.

[2] Mobile Degassing costs and durations are based on a recent vendor quote from ENVENT.

[3] Landing durations assume the 15 largest emitting tanks are landed annually (7 hours per refill event for 250K tanks, 10 hours per 350K tank, and 13 hours per 500K tank).

[4] Based on industry practice, tanks are typically cleaned once every 10 years, and the tank cleaning baseline emissions and durations have been annualized based on this conservative assumption:
- Cleaning Baseline Emissions (tpy) = 87.3 tons (assuming all tanks cleaned once) / 10 years.
- Cleaning Duration = 32 hr (duration for 250K cleaning) * 6 tank cleanings / 10 years (36 hours per cleaning event for 350K tanks and 40 hours for 500K tanks).

Table 24. Landings Cost Analysis for Storage Tanks w/ Cone Roof & Vapor Collection

Capacity (bbl)	250,000	350,000	500,000	20,000
Tank Roofs	$1,087,983	$1,386,123	$1,833,333	$0
Thermal Oxidizer	$692,000	$692,000	$692,000	$692,000
Piping to TO	$25,000	$25,000	$25,000	$25,000
Direct Costs				
Total Capital Investment	$1,804,983	$2,103,123	$2,550,333	$717,000
Total Annual Cost	$30,500	$30,500	$30,500	$30,500
Interest	6%	6%	6%	6%
Equipment Life (yrs)	15	15	15	15
Total Annual Cost	$216,346	$247,043	$293,089	$104,324
Emission Reductions				
Baseline Emission (TPY)	6.7	12.0	9.5	0.2
Control Efficiency	99%	99%	99%	99%
Emissions Reduced (TPY)	6.7	11.9	9.4	0.2
BACT Cost ($/ton)	**$35,520**	**$20,847**	**$31,163**	**$585,434**

[1] Baseline emissions are based on each tank being landed once annually with one extra landing added per tank group. All landings for each tank group are shown occurring at a single tank.

Table 25. Landings Cost Analysis for Over the Top Fixed Vapor Collection

Capacity (bbl)	250,000	350,000	500,000	20,000
Collection System	$350,000	$350,000	$350,000	NA
Thermal Oxidizer	$692,000	$692,000	$692,000	---
Piping to TO	$25,000	$25,000	$25,000	---
Direct Costs				
Total Capital Investment	$1,067,000	$1,067,000	$1,067,000	---
Total Annual Cost	$30,500	$30,500	$30,500	---
Interest	6%	6%	6%	---
Equipment Life (yrs)	15	15	15	---
Total Annual Cost	$140,361	$140,361	$140,361	---
Emission Reductions				
Baseline Emission (TPY)	6.7	12.0	9.5	---
Control Efficiency	99%	99%	99%	---
Emissions Reduced (TPY)	6.7	11.9	9.4	---
BACT Cost ($/ton)	**$21,098**	**$11,845**	**$14,924**	**---**

[1] Baseline emissions are based on each tank being landed once annually with one extra landing added per tank group. All landings for each tank group are shown occurring at a single tank.

Table 26. Landings Cost Analysis for Mobile Degassing

Capacity (bbl)	250,000	350,000	500,000	20,000
Hour/Landing	7	10	13	5
Thermal Oxidizer ($/hr)	$1,480	$1,480	$1,480	$1,480
Thermal Oxidizer ($/event)	$10,360	$14,800	$19,240	$7,400
Tank Mobilization	$500	$500	$500	$500
Direct Costs				
Total Capital Investment	$10,860	$15,300	$19,740	$7,900
Total Annual Cost	0	0	0	0
Interest	1%	1%	1%	1%
Equipment Life (yrs)	1	1	1	1
Total Annual Cost	$10,969	$15,453	$19,937	$7,979
Emission Reductions				
Baseline Emission (TPY)	1.0	1.3	1.9	0.1
Control Efficiency	95%	95%	95%	95%
Emissions Reduced (TPY)	0.9	1.3	1.8	0.1
BACT Cost ($/ton)	**$12,027**	**$12,230**	**$11,046**	**$93,322**

[1] The mobile degassing cost for each tank group is proportionally related to the number of landing events. Therefore, baseline emissions are based on a single landing event for each tank group.

From the tables above, the lowest available cost per ton reduced is approximately $11,046. This value represents a significant economic impact. Due to the extremely high and unreasonable economic impact for each of these BACT options, they are inappropriate BACT alternatives beyond the baseline NSPS Subpart Kb standards for new tanks.

Furthermore, environmental impacts associated with the mobile degassing option include additional pollutants (NO_X, PM, SO_2, CO, and CO_2) from a mobile thermal oxidizer and a power generator. There are further impacts associated with mobilizing the degassing unit since it would need to be brought to the site for each landing event. The energy demands for this option include fuel usage for generators, the thermal oxidizer, and mobilization of equipment and crew. These energy demands are not common with the other BACT options presented in this analysis and are a considerable impact. Also, the uncertainty of a long-term agreement with a vendor and the uncertainty of future control costs, which can widely vary based on the vapor space composition, can significantly impact the effectiveness of this option. Therefore, the use of mobile degassing to control landings does not represent an option that would be appropriate given consideration of overall economic, environmental, and energy impacts, and this determination is in line with other EPA determinations for this control option at similar facilities. The clearinghouse listed several facilities (e.g. RBLC IDs LA-0228 and TX-0653) with crude oil storage tanks. Acceptable PSD BACT controls for these facilities were limits on the frequency and duration of tank landings. Note that some facilities listed in the RBLC (e.g., RBLC IDs TX-0800 and TX-0799) used vapor recovery controls. However, these facilities are either located in non-attainment zones or are subject to state-specific regulations.

Step 5: Select BACT and Document the Selection as BACT

KEI proposes the following design elements and work practices as BACT:

- Drain Dry Design, and
- Good operation and maintenance practices.

DEQ evaluated the BACT proposal from KEI and agrees that their proposal is acceptable as BACT. The chosen level of BACT is consistent with findings from EPA's RBLC for similar conditions and operations.

As mentioned previously, the resulting BACT standard is an emission limit unless technological or economic limitations of the measurement methodology would make the imposition of an emissions standard infeasible, in which case a work practice or operating standard can be imposed. For the proposed storage tanks, DEQ selects a VOC BACT emission limit of 0.96 tons of VOC per landing for 250K-bbl tanks, 1.33 tons of VOC per landing for 350K-bbl tanks, 1.90 tons of VOC per landing for 500K-bbl tanks, and 0.09 tons of VOC per landing for the 20K-bbl tank. DEQ also selects BACT as drain dry design of each of the tanks and good operation and maintenance practices.

BACT Analysis for Storage Tanks – Cleanings

Step 1: Identify Available Control Technologies

See BACT analysis for landings. All control technologies are the same except that submerged fill does not apply to cleanings.

Step 2: Eliminate Technically Infeasible Options

All control options are technically feasible. These options are further considered in the following steps of the top-down BACT analysis.

Step 3: Rank Remaining Control Options by Control Effectiveness

See BACT analysis for landings.

Step 4: Evaluate and Eliminate Control Technologies Based on Energy, Environmental, and Economic Impacts

The economic consideration for each BACT option is based on a cost analysis, in part, total capital costs, direct costs, and total derived annualized cost. The initial costs for each option remain the same as presented in the BACT analysis for normal operations and landings and therefore were not duplicated here.

The following tables present the cost analysis of each of the control options.

Table 27. Cleanings Cost Analysis for Storage Tanks w/ Cone Roof & Vapor Collection

Capacity (bbl)	250,000	350,000	500,000	20,000
Tank Roofs	$1,087,983	$1,386,123	$1,833,333	$0
Thermal Oxidizer	$679,000	$679,000	$679,000	$679,000
Piping to TO	$25,000	$25,000	$25,000	$25,000
Direct Costs				
Total Capital Investment	$1,791,983	$2,090,123	$2,537,333	$704,000
Total Annual Cost	$34,300	$34,300	$34,300	$34,300
Interest	6%	6%	6%	6%
Equipment Life (yrs)	15	15	15	15
Total Annual Cost	$218,808	$249,505	$295,551	$106,786
Emission Reductions				
Baseline Emission (TPY)	11.4	14.5	12.6	0.8
Control Efficiency	99%	99%	99%	99%
Emissions Reduced (TPY)	11.3	14.3	12.5	0.8
BACT Cost ($/ton)	**$19,439**	**$17,429**	**$23,693**	**$136,537**

[1] Baseline emissions for each tank group are based on three (3) 250K barrel tank cleanings, three (3) 350K barrel tank cleanings, two (2) 500K barrel tank cleanings, and one (1) 20K barrel tank cleanings in a year. All cleaning events for each tank group are shown occurring at a single tank.

Table 28. Cleanings Cost Analysis for Over the Top Fixed Vapor Collection

Capacity (bbl)	250,000	350,000	500,000	20,000
Collection System	$350,000	$350,000	$350,000	NA
Thermal Oxidizer	$679,000	$679,000	$679,000	---
Piping to TO	$25,000	$25,000	$25,000	---
Direct Costs				
Total Capital Investment	$1,054,000	$1,054,000	$1,054,000	---
Total Annual Cost	$34,300	$34,300	$34,300	---
Interest	6%	6%	6%	---
Equipment Life (yrs)	15	15	15	---
Total Annual Cost	$142,823	$142,823	$142,823	---
Emission Reductions				
Baseline Emission (TPY)	11.4	14.5	12.6	---
Control Efficiency	99%	99%	99%	---
Emissions Reduced (TPY)	11.3	14.3	12.5	---
BACT Cost ($/ton)	**$12,688**	**$9,977**	**$11,450**	**---**

[1] Baseline emissions for each tank group are based on three (3) 250K barrel tank cleanings, three (3) 350K barrel tank cleanings, two (2) 500K barrel tank cleanings, and one (1) 20K barrel tank cleanings in a year. All cleaning events for each tank group are shown occurring at a single tank.

Table 29. Cleanings Cost Analysis for Mobile Degassing

Capacity (bbl)	250,000	350,000	500,000	20,000
Hour/Landing	32	36	40	16
Thermal Oxidizer ($/hr)	$1,480	$1,480	$1,480	$1,480
Thermal Oxidizer ($/event)	$47,360	$53,280	$59,200	$23,680
Tank Mobilization	$500	$500	$500	$500
Direct Costs				
Total Capital Investment	$47,860	$53,780	$59,700	$24,180
Total Annual Cost	0	0	0	0
Interest	1%	1%	1%	1%
Equipment Life (yrs)	1	1	1	1
Total Annual Cost	$48,339	$54,318	$60,297	$24,422
Emission Reductions				
Baseline Emission (TPY)	3.8	4.8	6.3	0.8
Control Efficiency	95%	95%	95%	95%
Emissions Reduced (TPY)	3.6	4.6	6.0	0.8
BACT Cost ($/ton)	**$13,426**	**$11,862**	**$10,075**	**$32,541**

[1] The mobile degassing cost for each tank group is proportionally related to the number of cleaning events. Therefore, baseline emissions are based on a single cleaning event for each tank group.

From the tables above, the lowest available cost per ton reduced is approximately $9,977. This value represents a significant economic impact. Due to the extremely high and unreasonable economic impact for each of these BACT options, they are inappropriate BACT alternatives.

Furthermore, environmental impacts associated with the mobile degassing option include additional pollutants (NO_X, PM, SO_2, CO, and CO_2) from a mobile thermal oxidizer and a power generator. There are further impacts associated with mobilizing the degassing unit since it would need to be brought to the site for each landing event. The energy demands for this option include fuel usage for generators, the thermal oxidizer, and mobilization of equipment and crew. These energy demands are not common with the other BACT options presented in this analysis and are a considerable impact. Also, the uncertainty of a long-term agreement with a vendor and the uncertainty of future control costs, which can widely vary based on the vapor space composition, can significantly impact the effectiveness of this option. Therefore, the use of mobile degassing to control cleanings does not represent an option that would be appropriate given consideration of overall economic, environmental, and energy impacts, and this determination is in line with other EPA determinations for this control option at similar facilities. The clearinghouse listed several facilities (e.g. RBLC IDs LA-0228 and TX-0653) with crude oil storage tanks. Acceptable PSD BACT controls for these facilities were limits on the frequency and duration of tank cleanings. Note that some facilities listed in the RBLC (e.g., RBLC IDs TX-0800 and TX-0799) used vapor recovery controls. However, these facilities are either located in non-attainment zones or are subject to state-specific regulations.

Step 5: Select BACT and Document the Selection as BACT

KEI proposes the following design elements and work practices as BACT:

- Drain Dry Design, and
- Good operation and maintenance practices.

DEQ evaluated the BACT proposal from KEI and agrees that their proposal is acceptable as BACT. The chosen level of BACT is consistent with findings from EPA's RBLC for similar conditions and operations.

As mentioned previously, the resulting BACT standard is an emission limit unless technological or economic limitations of the measurement methodology would make the imposition of an emissions standard infeasible, in which case a work practice or operating standard can be imposed. For the proposed storage tanks, DEQ selects a VOC BACT emission limit of 3.79 tons of VOC per cleaning for 250K-bbl tanks, 4.82 tons of VOC per cleaning for 350K-bbl tanks, 6.30 tons of VOC per cleaning for 500K-bbl tanks, and 0.79 tons of VOC per cleaning for the 20K-bbl tank. DEQ also selects BACT as drain dry design of each of the tanks and good operation and maintenance practices.

BACT Analysis for Fugitive Equipment Leaks

Step 1: Identify Available Control Technologies

For most source types, the EPA's RACT/BACT/LAER Clearinghouse (RBLC) is the preferred reference. However, there were no results found for this source type at a crude oil terminal in the RBLC. The following table lists commercially available controls based on results found for other types of petroleum liquid storage and the control techniques outlined in EPA's Background Technical Support Document for NSPS Subpart OOOOa. The control technologies are listed in order of decreasing emission reduction potential.

Table 30. Control Technologies for Fugitive Equipment Leaks

Control Technologies
Leak Detection and Repair Program (LDAR) • Method 21 • Optical Gas Imaging (OGI) • Audio, Visual, & Olfactory (AVO) Good Operating and Maintenance Practices

Leak Detection and Repair Program

An LDAR program is a system of procedures that an operator utilizes to locate and repair leaking fugitive components (e.g., valves, pumps, connectors, compressors, etc.) in order to minimize

VOC emissions. LDAR programs involving Method 21, OGI, and AVO monitoring are already required by a number of NSPS Subparts, but none of these currently affect crude oil terminals.

Good Operating and Maintenance Practices
Good operating and maintenance practices involve good housekeeping, timely repair of leaking components, and compliance with other federal regulations such as the inspection requirements in a Spill Prevention, Control, and Countermeasures (SPCC) Plan.

Step 2: Eliminate Technically Infeasible Options

All control options are technically feasible when considered individually. These options are further considered in the following steps of the top-down BACT analysis.

Step 3: Rank Remaining Control Options by Control Effectiveness

The reductions associated with LDAR Programs vary depending on the frequency, leak definition, and type of monitoring. Quarterly monitoring using Method 21 can achieve an emissions reduction as high as 95 percent for valves in light liquid service.[1] Up to 80 percent control efficiency is achievable via quarterly OGI monitoring.[2] The control efficiency for weekly AVO inspections is 30 percent.[3]

Step 4: Evaluate and Eliminate Control Technologies Based on Energy, Environmental, and Economic Impacts

Since good operating and maintenance are already required by the SPCC Plan, this is considered the baseline option.

The economic consideration for each remaining option is based on the cost analysis in the following table.

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[1] U.S. EPA, *Protocol for Equipment Leak Emission Estimates*, November 1995, p. 5-10. (EPA-453/R-95-017)
[2] U.S. EPA, *Background Technical Support Document for NSPS Subpart OOOOa*.
[3] Texas Commission on Environmental Quality, *TCEQ publication RG-360A - Technical Supplement 3: Equipment Fugitive Leaks*, January 2007, p. A-33.
(https://www.tceq.texas.gov/assets/public/comm_exec/pubs/rg/rg360/rg-360-06/techsupp_3.pdf)

Table 31. Cost Analysis for Fugitive Equipment Leaks

Analysis Element	LDAR Program with Method 21 Monitoring	LDAR Program with OGI Monitoring	LDAR Program with AVO Monitoring
Inspection Labor ($/hr)	$120	$128	$39
Annual Inspection Hours	64	48	48
Maintenance Labor & Parts ($/hr)	$86	$86	$86
Annual Maintenance Hours	32	32	32
Annual Program Records/Reports ($)	$2,500	$1,500	$1,500
Total Annual Cost ($)	**$12,932**	**$10,012**	**$6,124**
Baseline Emissions (TPY)	0.90	0.90	0.90
Control Efficiency	95%	80%	30%
Emissions Reduced (TPY)	0.13	0.11	0.04
BACT Cost ($/ton reduced)	**$15,125**	**$13,906**	**$22,681**

[1] Inspection labor for M21 & OGI based on contractor quote.
[2] Inspection labor for AVO based on average engineering wages for Tulsa, OK published by the Bureau of Labor Statistics.
[3] Inspection/maintenance hours based on quarterly inspections for similarly-sized facilities.
[4] Maintenance labor and parts based on guidance in EPA's Control Cost Manual (labor is 110% of inspection labor and the cost for parts is equivalent to maintenance labor).
[5] LDAR program recordkeeping and reporting based on contractor quote.
[6] M21 reduction is for valves in light liquid service – the reduction for other components would be less.

From the table above, the lowest available cost per ton reduced is $13,906. This value represents an infeasible economic impact. Due to the extremely high and unreasonable economic impact for each of these BACT options, they are inappropriate BACT alternatives beyond the assumed baseline. Additionally, these estimates do not include the costs associated with the initial development of an LDAR program.

The control options evaluated have no significant environmental or energy impacts other than the impacts associated with contractor mobilization. Since the economic impacts for each of the options are unreasonably high, these impacts were not considered in greater detail.

Step 5: Select BACT and Document the Selection as BACT

Given the small quantity of emissions from these activities, the applicant proposes good housekeeping and compliance with the quarterly inspection requirements in the SPCC Plan as BACT. Further, the Texas Commission on Environmental Quality (TCEQ) has published NSR guidance for equipment leak fugitives indicating no control is necessary for fugitives below 10 TPY, which has been relied upon in other applications in Region 6 of EPA. Therefore, DEQ selects BACT as good housekeeping and compliance with the quarterly inspection requirements in the SPCC Plan.

BACT Analysis for Pigging Operations

Step 1: Identify Available Control Technologies

After reviewing the RBLC, there were no results found for this emission source. No additional control options were identified after reviewing air permits from similar facilities in Oklahoma and surrounding states. After reviewing typical industry practices, the only option identified was good operating and maintenance practices.

Good operating and maintenance practices involve good housekeeping, minimizing the duration and frequency of the pigging operations, and minimizing spills in accordance with an SPCC Plan.

Step 2: Eliminate Technically Infeasible Options

The one control option identified is technically feasible.

Step 3: Rank Remaining Control Options by Control Effectiveness

Only one control option was identified.

Step 4: Evaluate and Eliminate Control Technologies Based on Energy, Environmental, and Economic Impacts

Only one control option was identified, and it is assumed to be economically feasible without significant adverse energy or environmental impacts.

Step 5: Select BACT and Document the Selection as BACT

KEI proposes good housekeeping including compliance with the quarterly inspection requirements in the SPCC Plan as BACT. DEQ selects BACT as good housekeeping and compliance with the quarterly inspection requirements in the SPCC Plan.

BACT Analysis for Sump Tanks

Step 1: Identify Available Control Technologies

After reviewing the RBLC, there were no results found for this emission source at a petroleum terminal. No additional control options were identified after reviewing air permits from similar facilities in Oklahoma and surrounding states. After expanding the RBLC search to include other types of facilities, and after reviewing typical industry practices, the following control options were identified:

Routing Vapor Space to a Control Device
See discussion in the BACT analysis for Storage Tanks – Normal Operations (Standing and Withdrawal Losses).

Submerged Fill
See discussion in the BACT analysis for Storage Tanks – Normal Operations (Standing and Withdrawal Losses).

Good Operating and Maintenance Practices
Good operating and maintenance practices involve good housekeeping and compliance with other federal regulations such as the inspection requirements in an SPCC Plan.

Step 2: Eliminate Technically Infeasible Options

All control options are technically feasible when considered individually. These options are further considered in the following steps of the top-down BACT analysis.

Step 3: Rank Remaining Control Options by Control Effectiveness

The most effective option is Routing Vapor Space to a Control Device, followed by Submerged Fill, and Good Operating and Maintenance Practices.

Step 4: Evaluate and Eliminate Control Technologies Based on Energy, Environmental, and Economic Impacts

Since good operating and maintenance are already required by the SPCC Plan, this is considered the baseline option.

Submerged fill is assumed to be economically feasible without significant adverse energy or environmental impacts.

For the Routing Vapor Space to a Control Device option, the annualized cost of piping is $37,180 using estimates from the *EPA Air Pollution Control Cost Manual*, which represents an infeasible economic impact since the emissions reduction would only be 1.6 TPY assuming a 99% destruction efficiency. Due to the extremely high and unreasonable economic impact for this BACT option, it is an inappropriate BACT alternative beyond the other options. Additionally, environmental and energy impacts from this option include an increase in NO_X and CO emissions, noise, and fuel consumption.

Step 5: Select BACT and Document the Selection as BACT

KEI proposes submerged fill and good housekeeping including compliance with the quarterly inspection requirements in the SPCC Plan as BACT. DEQ selects BACT as good housekeeping and compliance with the quarterly inspection requirements in the SPCC Plan and these tanks shall be equipped for submerged filling.

BACT Analysis for Reciprocating Internal Combustion Engines

Step 1: Identify Available Control Technologies

KEI will operate one stationary diesel-fired RICE (GEN-1) for the purpose of generating electric power during emergencies, three stationary diesel-fired RICE (FP-1, FP-2, and FP-3) for the purpose of pumping water for emergency fire suppression, and one mobile (non-road) diesel-fired RICE (SP-1) to drive a stripping pump. The four stationary RICE will be subject to NSPS Subpart IIII and National Emission Standards for Hazardous Air Pollutants, 40 CFR Part 63 (NESHAP), Subpart ZZZZ[4]. These regulations require purchasing RICE certified to applicable Tier standards, combusting only ultra-low sulfur diesel, and various monitoring, recordkeeping, and reporting. SP-1 will be subject to the same Tier standards, which are established for non-road engines in 40 CFR Part 89. These Tier standards and accompanying requirements are taken as the baseline for this BACT analysis.

Available VOC emissions control options for diesel-fired, i.e., compression ignition (CI), RICE include:

(a) Oxidation catalyst, or, more specifically, diesel oxidation catalyst (DOC) and
(b) Good combustion practices (GCP).

DOC utilizes a catalyst such as platinum or palladium to further oxidize the engine's exhaust, which includes hydrocarbons (HC), e.g., VOC, to carbon dioxide (CO_2) and water. Use of DOC can result in approximately 90 percent reduction in HC/VOC emissions.[5] However, for emergency-use or intermittent-use engines, "[b]ecause these engines are typically used only a few number of hours per year…[s]uch engines rarely if ever use the [DOC] type of emission controls."[6] Queries of the RBLC reveals no installations of DOC on emergency, diesel-fired engines or on non-road, diesel-fired engines[7] DOC is nonetheless carried forward in this BACT analysis.

GCP for CI RICE for VOC control consist of minimizing startup and idling time. This is achieved in normal practice for emergency-use engines that, by design, only operate for maintenance purposes, readiness testing, and during emergency events.

Step 2: Eliminate Technically Infeasible Options

Both control options identified in step 1 are technically feasible.

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[4] For new RICE at area sources the only requirement under NESHAP Subpart ZZZZ is to comply with NSPS Subpart IIII.
[5] U.S. EPA, *Alternative Control Techniques Document: Stationary Diesel Engines*, March 5, 2010, p. 41. (https://www.epa.gov/sites/production/files/2014-02/documents/3_2010_diesel_eng_alternativecontrol.pdf)
[6] U.S. EPA, Memorandum: *Response to Public Comments on Proposed National Emission Standards for Hazardous Air Pollutants for Existing Stationary Reciprocating Internal Combustion Engines Located at Area Sources of Hazardous Air Pollutant Emissions or Have a Site Rating Less Than or Equal to 500 Brake HP Located at Major Sources of Hazardous Air Pollutant Emissions*, August 10, 2010, p. 172-173. (EPA-HQ-OAR-2008-0708)
[7] RBLC Basic Search queries were completed on December 22, 2016, for process types 17.110 and 17.210. Query results were filtered to only show records for VOC emissions from diesel fuel-fired engines.

Step 3: Rank Remaining Control Options by Control Effectiveness

The more effective control option from steps 1 and 2 is DOC, which can theoretically achieve approximately 90 percent reduction in VOC emissions. GCP is a part of normal practice for emergency-use engines so no additional VOC reduction can be attributed.

Step 4: Evaluate and Eliminate Control Technologies Based on Energy, Environmental, and Economic Impacts

The use of DOC reduces the effective power output of RICE and results in a solid waste stream. However, for the purposes of this analysis, no formal consideration of these adverse energy and environmental impacts is presented. GCP is part of normal practice for emergency-use engines so no cost is associated with that option.

In its 2010 MACT/GACT evaluation for engines, EPA concluded for emergency engines: "Because these engines are typically used only a few number of hours per year [a minimum of 27 hours per year as required per National Fire Protection Association codes], the costs of emission control are not warranted when compared to the emission reductions that would be achieved."[8] The same conclusion would be true for intermittent-use engines such as SP-1, which is expected to operate less than 10 percent of the year. Based on EPA's assessment and the fact that the RBLC contains no records of DOC installation on emergency-use or non-road engines, DOC is eliminated from consideration as BACT.

Step 5: Select BACT and Document the Selection as BACT

DEQ selects the remaining control option, GCP, as BACT for the terminal's four stationary, emergency-use engines and its non-road, intermittent-use engine. As stated above, GCP for emergency engines is normal practice, i.e., operating the engines only for maintenance purposes, readiness testing, and during emergencies. Additionally, GEN-1 and the fire pump engines shall be limited to not more than 500 hours of operation annually. For SP-1, KEI will ensure that the engine is operated only when needed for intermittent stripping purposes, and will be limited to operate 876 hours annually. At a minimum, all engines shall be certified to meet the EPA Tier 3 emissions standards for a NO_X+NMHC emission factor of 3.0 g/hp-hr.

BACT Analysis for Lab Solvent Container

Step 1: Identify Available Control Technologies

After reviewing the RBLC, there were no results found for this emission source at a petroleum terminal. No additional control options were identified after reviewing air permits from similar facilities in Oklahoma and surrounding states. After expanding the RBLC search to include other types of facilities, and after reviewing typical industry practices, the following control options were identified:

[8] Ibid.

Routing Vapor Space to a Control Device
See discussion in the BACT analysis for Storage Tanks – Normal Operations (Standing and Withdrawal Losses).

Submerged Fill
See discussion in the BACT analysis for Storage Tanks – Normal Operations (Standing and Withdrawal Losses).

Closed Top Design
Closed top design involves maintaining the container cover in a closed, sealed position (e.g., covered by a gasketed lid or cap) to reduce evaporative losses whenever not in use.

Good Operating and Maintenance Practices
Good operating and maintenance practices involve good housekeeping and compliance with other federal regulations such as the inspection requirements in an SPCC Plan.

Step 2: Eliminate Technically Infeasible Options

All control options are technically feasible when considered individually. These options are further considered in the following steps of the top-down BACT analysis.

Step 3: Rank Remaining Control Options by Control Effectiveness

The most effective option is Routing Vapor Space to a Control Device, followed by Submerged Fill, Closed Top Design, and Good Operating and Maintenance Practices.

Step 4: Evaluate and Eliminate Control Technologies Based on Energy, Environmental, and Economic Impacts

Since good operating and maintenance are already required by the SPCC Plan, this is considered the baseline option.

Submerged fill and closed top design are assumed to be economically feasible without significant adverse energy or environmental impacts.

For the Routing Vapor Space to a Control Device option, the annualized cost of piping is $31,917 using estimates from the *EPA Air Pollution Control Cost Manual*, which represents an infeasible economic impact since the emissions reduction would only be 0.3 TPY assuming a 99% destruction efficiency. Due to the extremely high and unreasonable economic impact for this BACT option, it is an inappropriate BACT alternative beyond the other options. Additionally, environmental and energy impacts from this option include an increase in NO_X and CO emissions, noise, and fuel consumption.

Step 5: Select BACT and Document the Selection as BACT

KEI proposes submerged fill, closed top design, and good housekeeping including compliance with the quarterly inspection requirements in the SPCC Plan as BACT. DEQ selects BACT as submerged fill, closed top design, good housekeeping, and compliance with the quarterly inspection requirements in the SPCC Plan.

B. Evaluation of Existing Air Quality and Determination of Monitoring Requirements

Ozone (O_3) Monitoring

Pre-construction monitoring for ozone is required for any new source or modified existing source located in an unclassified or attainment area with greater than 100 tons per year of VOC emissions. Continuous ozone monitoring data must be used to establish existing air quality concentrations in the vicinity of the proposed source or modification.

The siting guidance for ozone monitors in the "Ambient Monitoring Guidelines for Prevention of Significant Deterioration", EPA-450/4-87-007, is less prescriptive than the guidance for primary pollutants. The guidance provides that, where the NO interactions may be minimal, the travel time to expected maximum ozone concentrations may be 3 to 4 hours downwind; but "in general, the downwind distance for the maximum ozone site should not be more than 15 to 20 miles from the source because a lower wind speed (2-3 miles per hour) with less dilution would be a more critical case." Reviewing wind roses from met stations in Cushing, Stillwater, and Oilton, wind speeds are generally greater than a minimum of 5 miles per hour with primary flow vectors (blowing to) ranging between NW and NE.

The nearest existing ozone monitoring site is the Tulsa West site, 40-037-0144 at 25 miles NE of the proposed project. The current ozone design value for Tulsa West is 0.065 ppm.

The Tulsa West monitoring site is part of the Tulsa Metropolitan Statistical Area and would be impacted by pollution from urban area sources and significant individual point sources. Ozone concentrations measured at this site should be considered conservative for the community of Cushing and the surrounding area including the crude oil tank farms. This determination is corroborated by the fact that the terrain in both areas is relatively flat, emission inventories and photochemical modeling[9] have shown the area to be NO_X limited and there are no significant NO_X emission sources in or around Cushing. While Cushing has a large number of crude oil storage tanks and associated VOC emissions, due to the relative scarcity of NO_X emissions, increases in VOC are not expected to significantly impact ozone concentrations. Therefore, use of the monitoring data collected at the Tulsa West monitoring site is presumed to satisfy preconstruction monitoring requirements.

[9] Ramboll Environ US Corporation. 2015Assessment of the Ozone Impacts Associated with New Emissions from Tinker Air Force Base in Oklahoma City.

Table 32. List of Nearby Oklahoma Ozone Monitors

Site	Name	Distance	Average 4th High 2015-2017	Average 4th High 2016-2018
40-143-0174	Tulsa South	42 miles E	0.063 ppm	0.065 ppm
40-037-0144	**Tulsa West**	**25 miles NE**	**0.063 ppm**	**0.065 ppm**
40-109-0096	Choctaw	44 miles SW	0.067 ppm	0.067 ppm
40-109-1037	OKC North	46 miles SW	0.069 ppm	0.070 ppm

C. Air Quality Impacts Analysis

Ozone Modeling

EPA conducted photochemical modeling studies to provide guidance on the development of Modeled Emission Rates for Precursors (MERPs). These MERPs are intended to be used, where appropriate, as a Tier I demonstration tool for ozone and secondary formation $PM_{2.5}$ evaluation requirements under PSD. The final guidance was released on April 30, 2019. The guidance uses conservative assumptions to evaluate hypothetical single-source impacts on downwind O_3. The parameters relied upon are documented in EPA document number EPA-454/R-19-003, April 2009.

The new VOC emission sources under review in this permit are six (6) 250,000-bbl, eight (8) 350,000-bbl, four (4) 500,000-bbl external floating roof tanks, one (1) 20,000-bbl internal floating roof tank, and associated fugitives. The facility also anticipates 3.52 tons per year of NO_X emissions from several intermittent limited use engines. The highest and most common release height for emissions is 16.9 meters. Emissions from the storage tanks were developed with the calculation methodology outlined in AP-42 (11/06) Section 7.1 and assuming crude with an RVP of 10 psia.

In EPA's final guidance, Table 4-1 breaks the country up into nine regions and identifies the most conservative (lowest), median, and highest illustrative MERP values in tons per year by precursor, pollutant, and region. The analysis identified an Ozone MERP for VOC precursors of 2,307 tons per year for the southern region. When narrowing it down to a low level VOC source in Canadian, Muskogee, Pushmataha, and Washita counties, the MERP increases to 7,343, 3,472, 30,381, and 13,937 tons per year, respectively. In deriving the lowest MERP values, EPA explored impacts from surface level releases and high level, 90 meter, releases of precursor pollutants. Emissions were modeled using a typical industrial speciation for VOCs. Sensitivity analyses identified that using more reactive assumptions such as speciating VOCs as formaldehyde increased concentration by a factor of 1.5 to 2. The critical air quality threshold for ozone or Significant Impact Level, SIL, used to derive the MERP was 1.0 part per billion (ppb).

Table 33. Oklahoma MERP Values based on EPA

Location	Modeled Emission Rate	Modeled Concentration	MERP	MERP adjusted for Reactivity
	TPY	PPB	TPY	TPY
Canadian County	500	0.068	7,343	3,672
Muskogee County	500	0.144	3,472	1,736
Pushmataha County	500	0.016	30,381	15,191
Washita County	500	0.036	13,937	6,969

Photochemical modeling was conducted in August of 2015 on behalf of Tinker Air Force Base by Ramboll Environ. The modeling study was based on a Texas Commission on Environmental Quality (TCEQ) developed Photochemical Grid Model (PGM) modeling database for ozone episodes in June of 2012. The TCEQ episodes included high monitored ozone concentrations in Oklahoma as well. The Comprehensive Air-quality Model with extensions version 6.11 with the Carbon Bond 6 revision 2 chemical mechanism was used in the study. The TCEQ database used a 36 km continental U.S. (CONUS) and a 12 km Texas-Oklahoma domain. These domains were retained and a new 4 km Oklahoma City (OKC)/Tulsa modeling domain was added. This new domain included the Cushing area. The 4 km domain-wide 8-hour ozone performance statistics achieved EPA's performance goals with a slight overestimation bias.

Using the method provided in the draft EPA guidance, modeling conducted on behalf of Tinker for 608 tons per year of VOCs would yield an unadjusted MERP consistent with the values provided by EPA.

Table 34. Calculated MERP Based on Tinker Modeling

Location	Modeled Emission Rate	Modeled Concentration	MERP
	TPY	PPB	TPY
Tinker	608	0.10	6,080

The critical air quality threshold for ozone or SIL, of 1.0 ppb should not be relied upon without justification. However, given the conservative design value for the Cushing area was established by the Tulsa West monitor at 65 ppb and that the ozone impact from the tank farm expansion and VOC increase of 182 TPY would be a relative ozone increase in the neighborhood of 0.03 ppb, the project is anticipated to be well below any reasonably established significant impact level and therefore no further evaluation is necessary.

D. Evaluation of Additional Source-Related Impacts

Growth Impact Analysis

A growth analysis is intended to quantify the amount of new growth that is likely to occur in support of the facility and to estimate emissions resulting from that associated growth. Associated growth includes residential and commercial/industrial growth resulting from the new facility. Residential growth depends on the number of new employees and the availability of

housing in the area, while associated commercial and industrial growth consists of new sources providing services to the new employees and the facility. It is estimated that the Wildhorse Terminal will employ approximately 25 new employees, but KEI does not expect that any additional residential and commercial or industrial growth will result from these new employees since the facility is located in an area that has an available population to supply employees and the area is already commercially and industrially developed. Therefore, additional growth from the facility is expected to be minimal.

Soils and Vegetation

The following discussion will review the project's potential to impact its agricultural surroundings based on the facility's allowable emission rates and resulting ground level concentrations of VOC.

The effects of gaseous air pollutants on vegetation may be classified into three rather broad categories: acute, chronic, and long-term. Acute effects are those that result from relatively short (less than 1 month) exposures to high concentrations of pollutants. Chronic effects occur when organisms are exposed for months or even years to certain threshold levels of pollutants. Long-term effects include abnormal changes in ecosystems and subtle physiological alterations in organisms. Acute and chronic effects are caused by the gaseous pollutant acting directly on the organism, whereas long-term effects may be indirectly caused by secondary agents such as changes in soil pH.

VOC is regulated by the EPA as a precursor to tropospheric ozone. Elevated ground-level ozone concentrations can damage plant life and reduce crop production. Also, VOC interferes with the ability of plants to produce and store food, making them more susceptible to disease, insects, other pollutants and harsh weather. The terminal is located in an area with elevated VOC background emissions due to the vegetation and existing tank farms in Cushing. Therefore, the formation of ozone as a result of the new storage tank emissions of precursors is NO_X limited. Since there are no NO_X emissions from the facility, no significant impact on soil and vegetation is expected due to VOC emissions from the project.

Visibility Impairment

The project is not expected to produce any perceptible visibility impacts in the immediate vicinity of the terminal. Given the limitation of 20% opacity of emissions, and a reasonable expectation that normal operation of the Wildhorse Terminal will result in < 20% opacity, no immediate visibility impairment is anticipated.

E. Evaluation Of Class I Area Impacts

One of the purposes of the PSD program is "to preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreational, scenic, or historic value." Under the PSD provisions, Congress established a land classification scheme for these areas of the country (Class I), specifically including:

- international parks;
- national wilderness areas which exceed 5,000 acres in size;
- national memorial parks which exceed 5,000 acres in size; and
- national parks which exceed six thousand acres in size.

Class I area analyses, when requested, typically include a Class I PSD Increment Assessment for NOx, SO_2, and PM_{10}, and an Air Quality Related Values (AQRV) assessment including a visibility analysis for increases in visibility impairing pollutants and a deposition analysis for nitrogen and sulfur deposition.

In October 2010, The Federal Land Managers AQRV Workgroup (FLAG) Phase I Report – Revised (FLAG 2010) set a threshold ratio of emissions to distance, below which an AQRV review is not required. Specifically, if Q (tpy) / d (km) < 10, no AQRV analysis is required. 'Q' is the combined emissions increase of sulfur dioxide (SO_2), oxides of nitrogen (NOX), particulate matter less than 10 microns (PM_{10}), and sulfuric acid mist (H_2SO_4) in tons per year (tpy) based on 24-hour maximum allowable emissions (which are annualized) and 'd' is the nearest distance to a Class I area in kilometers (km).

For the original project, the expected emissions of SO_2, NO_X, PM_{10}, and H_2SO_4 are 7.3 TPY and no increase is expected as a result of converting T-201 from and EFR to an IFR tank. The closest Class I area to the Wildhorse Terminal is the Wichita Mountains at about 200 km, but this project is not expected to impact any AQRVs because the ratio of Q/d is less than 10. Therefore, further analysis is not required.

SECTION VIII. OKLAHOMA AIR POLLUTION CONTROL RULES

OAC 252:100-1 (General Provisions) [Applicable]
Subchapter 1 includes definitions but there are no regulatory requirements.

OAC 252:100-2 (Incorporation by Reference) [Applicable]
This subchapter incorporates by reference applicable provisions of Title 40 of the Code of Federal Regulations. These requirements are addressed in the "Federal Regulations" section.

OAC 252:100-3 (Air Quality Standards and Increments) [Applicable]
Subchapter 3 enumerates the primary and secondary ambient air quality standards and the PSD increments. The primary standards are enumerated in Appendix E and the secondary standards are enumerated in Appendix F of the Air Pollution Control Rules (OAC 252:100). NAAQs are established by the EPA. The actual ambient air concentrations of criteria pollutants are monitored within the State of Oklahoma by the DEQ Air Quality Division. At this time, all of Oklahoma is in "attainment" of these standards.

OAC 252:100-5 (Registration, Emissions Inventory, and Annual Operating Fees) [Applicable]
Subchapter 5 requires sources of air contaminants to register with Air Quality, file emission inventories annually, and pay annual operating fees based upon total annual emissions of regulated pollutants. The owner/operator will be required to submit emissions inventories and pay the appropriate fees.

OAC 252:100-8 (Permits for Part 70 Sources) [Applicable]
Part 5 includes the general administrative requirements for part 70 permits. Any planned changes in the operation of the facility which result in emissions not authorized in the permit and which exceed the "Insignificant Activities" or "Trivial Activities" thresholds require prior notification to AQD and may require a permit modification. Insignificant activities mean individual emission units that either are on the list in Appendix I (OAC 252:100) or whose actual calendar year emissions do not exceed the following limits:

- 5 TPY of any one criteria pollutant; and
- 2 TPY of any one hazardous air pollutant (HAP) or 5 TPY of multiple HAPs or 20% of any threshold less than 10 TPY for a HAP that the EPA may establish by rule.

Emission limitations and operational requirements necessary to assure compliance with all applicable requirements for all sources are taken from the existing permit or from the current permit application, or are developed from the applicable requirement.

OAC 252:100-9 (Excess Emissions Reporting Requirements) [Applicable]
Except as provided in OAC 252:100-9-7(a)(1), the owner or operator of a source of excess emissions shall notify the Director as soon as possible but no later than 4:30 p.m. the following working day of the first occurrence of excess emissions in each excess emission event. No later than thirty (30) calendar days after the start of any excess emission event, the owner or operator of an air contaminant source from which excess emissions have occurred shall submit a report for each excess emission event describing the extent of the event and the actions taken by the owner or operator of the facility in response to this event. Request for mitigation, as described in OAC 252:100-9-8, shall be included in the excess emission event report. Additional reporting may be required in the case of ongoing emission events and in the case of excess emissions reporting required by 40 CFR Parts 60, 61, or 63.

OAC 252:100-13 (Open Burning) [Applicable]
Open burning of refuse and other combustible material is prohibited except as authorized in the specific examples and under the conditions listed in this subchapter.

OAC 252:100-19 (Particulate Matter) [Applicable]
Section 19-4 regulates emissions of PM from new and existing fuel-burning equipment, with emission limits based on maximum design heat input rating. Fuel-burning equipment is defined in OAC 252:100-19 as any internal combustion engine or gas turbine, or other combustion device used to convert the combustion of fuel into usable energy. Thus, the engines are subject to the requirements of this subchapter. OAC 252:100 Appendix C specifies a PM emission limitation of 0.60 lbs/MMBTU for all equipment at this facility with a heat input rating of 10 MMBUTH or less. Appendix C specifies a PM emission limitation for all equipment at this facility with a heat input rating of greater than 10 MMBTUH but less than 1,000 MMBTUH based on the following calculation: $E = 1.0428080X^{-0.238561}$, where E is the allowable emission rate and X is the maximum heat input. Based on the emission factors derived from EPA's Tier 3 standards (NSPS Subpart IIII, Table 4), the engines will be in compliance.

Table 35. Appendix C Emission Limitations

Unit ID	Maximum Heat Input (MMBTUH)	Emissions (lb/MMBTU)	
		Appendix C	Potential
GEN-1	1.93	0.60	0.05 [1]
FP-1	1.24	0.60	0.05 [1]
FP-2	4.90	0.60	0.05 [1]
FP-3	4.90	0.60	0.05 [1]
SP-1	1.09	0.60	0.07 [1]

[1] – Based on EPA's Tier 3 standards (NSPS Subpart IIII, Table 4)

This subchapter also limits emissions of particulate matter from industrial processes and direct-fired fuel-burning equipment based on their process weight rates. Since there are no significant particulate emissions from the nonfuel-burning processes at the facility compliance with the standard is assured without any special monitoring provisions.

OAC 252:100-25 (Visible Emissions and Particulates) [Applicable]
No discharge of greater than 20% opacity is allowed except for short-term occurrences that consist of not more than one six-minute period in any consecutive 60 minutes, not to exceed three such periods in any consecutive 24 hours. In no case shall the average of any six-minute period exceed 60% opacity. Since there are no significant fuel-burning or PM producing activities, compliance is assured.

OAC 252:100-29 (Fugitive Dust) [Applicable]
No person shall cause or permit the discharge of any visible fugitive dust emissions beyond the property line on which the emissions originate in such a manner as to damage or to interfere with the use of adjacent properties, or cause air quality standards to be exceeded, or interfere with the maintenance of air quality standards. Under normal operating conditions, this facility ae not expected to cause a problem in this area, therefore it is not necessary to require specific precautions to be taken.

OAC 252:100-31 (Sulfur Compounds) [Applicable]
Part 2 limits ambient air concentration impacts of hydrogen sulfide (H_2S) to 0.2 parts per million (ppm) (24-hour average). The majority of the crude stored at the tank farm is of the "sweet" variety (i.e., negligible-to-very low sulfur content, < 0.5%), but sour crude (sulfur content < 5.0 wt%) may occasionally be stored. Sour crude < 5.0 wt % sulfur typically contains < 135 parts per million by weight (ppmw) H_2S on average. Screen modeling using AERSCREEN (version 15181) was submitted for the initial PSD construction permit application to demonstrate compliance with the ambient standard. AERSCREEN estimates the worst-case 1-hr average concentrations based on meteorological data, terrain, and building downwash. AERSCREEN automatically provides impacts for other averaging periods (3-hr, 8-hr, 24-hr, and annual) using worst-case scaling ratios or averaging time factors; however, for area sources, all other averaging periods are equal to the 1-hour average concentration.

In the initial submitted modeling, the entire facility was modeled as a circular area source representing a single EFR tank during a cleaning event in July to represent the worst-case emissions scenario. The formulation used to address plume meander has not been implemented

for area sources and may cause overestimated concentration prediction under very light wind conditions (i.e., wind speeds less than 1.0 m/s). Therefore, a minimum wind speed of 1.0 m/s was utilized rather than the default minimum wind speed of 0.5 m/s. AERSCREEN is a single source model; therefore, impacts are directly related to emission rates. The modeling was conducted with an emission rate of 1.0 lb/hr, resulting in a maximum modeled 24-hr average concentration of 52.0 $\mu g/m^3$ per 1 lb/hr of emissions.

Additional modeling was submitted for the inclusion of the IFR tank. The IFR tank was modeled as a pseudo point source using AERSCREEN (version 16216) with an emission rate of 1.0 lb/hr, resulting in a maximum modeled 24-hr average concentration of 558.7 $\mu g/m^3$ per 1 lb/hr of emissions. The modeled 24-hr average concentration from both modeling analyses were then multiplied by the maximum H_2S emission rate of each EFR and IFR tank operation as shown in the following table. The maximum 24-hour average concentration as shown in the following table was determined based on the following: standing and withdrawal emissions from the EFR and IFR tanks occur simultaneously; worst-case landing emissions assume one tank is refilled in a 24-hour period; worst-case cleaning emissions assume one tank is purged in a 24-hour period; and maximum emissions assume that refill and purge emissions will not occur concurrently.

Table 36: H_2S Modeled Impacts

Emissions Source	H2S (lb/hr)	Modeled 24-hr Impact ($\mu g/m^3$)/(lb/hr)	24-hr Impact ($\mu g/m^3$)	Included in Maximum Impact?
EFR Standing Losses	2.58E-01	52.0	13.43	**Y**
EFR Withdrawal Losses	1.68E-03	52.0	0.09	**Y**
EFR Landing Refill Event	2.19E+00	52.0	113.95	N
EFR Cleaning Purge Event	4.01E+00	52.0	208.58	**Y**
IFR Standing Losses	5.39E-03	558.7	3.01	**Y**
IFR Withdrawal Losses	1.56E-05	558.7	0.01	**Y**
IFR Landing Refill Event	1.03E-01	558.7	57.42	N
IFR Cleaning Purge Event	1.88E-01	558.7	105.14	N
Sum of Maximum Impacts	**---**	**---**	**225.12**	**---**

The resulting modeled impact for H_2S is 225.12 $\mu g/m^3$ (24-hr average), which is in compliance with the limit of 0.2 ppm (283 $\mu g/m^3$ based on EPA standard conditions) (24-hour average). Furthermore, estimates based on refined modeling using AERMOD indicate modeled 24-hr impacts are approximately 20% of the modeled 1-hr impacts.

OAC 252:100-33 (Nitrogen Oxides) [Not Applicable]

This subchapter limits NOx emissions from new fuel-burning equipment with rated heat input greater than or equal to 50 MMBTUH to emissions of 0.2 lb of NOx per MMBTU. There are not fuel burning equipment items that exceed the 50 MMBTUH threshold.

OAC 252:100-35 (Carbon Monoxide) [Not Applicable]
None of the following affected processes are located at this facility: gray iron cupola, blast furnace, basic oxygen furnace, petroleum catalytic cracking unit, or petroleum catalytic reforming unit.

OAC 252:100-37 (Volatile Organic Compounds) [Applicable]
Part 3 requires storage tanks constructed after December 28, 1974, with a capacity between 400 and 40,000 gallons and storing a VOC with a vapor pressure greater than 1.5 psia to be equipped with a permanent submerged fill pipe or with an organic vapor recovery system. All of the new external floating roof tanks have a capacity greater than 40,000 gallons. The two (2) 4,000-gallon and one (1) 1,000 gallon sump tanks will be subject to this section and these tanks will be equipped with submerged fill pipes. The mineral spirits stored in the 500 gallon lab solvent container will have a vapor pressure less than 1.5 psia, and is therefore exempt from the requirements of this part.
Part 3 requires storage tanks constructed after December 28, 1974, with a capacity greater than 40,000 gallons to be equipped with a floating roof or a vapor-recovery system capable of collecting 85% or more of the uncontrolled VOCs. Excluding sump tanks T-S1, T-S2, TS-3, and the lab solvent container T-L1, all of the proposed tanks potentially subject to this requirement will be equipped with external or internal floating roofs. However, these external and internal floating roof tanks wills be subject to the equipment standards of NSPS Subpart Kb and are therefore exempt from this section.
Part 5 limits the VOC content of coatings from any coating line or other coating operation. Painting operations will involve maintenance coatings of buildings and equipment emitting less than 100 pounds per day of VOC, which are exempt.
Part 7 requires fuel-burning and refuse-burning equipment to be operated to minimize emissions of VOC. The engines will be operated based on manufacturer's recommendations to ensure proper combustion.
Part 7 requires all effluent water separator openings which receive water containing more than 200 gallons per day of any VOC, to be sealed or the separator to be equipped with an external floating roof or a fixed roof with an internal floating roof or a vapor recovery system. No effluent water separators are located at this facility.

OAC 252:100-42 (Toxic Air Contaminants (TAC)) [Not Applicable]
This subchapter regulates toxic air contaminants (TAC) that are emitted into the ambient air in areas of concern (AOC). Any work practice, material substitution, or control equipment required by the Department prior to June 11, 2004, to control a TAC, shall be retained, unless a modification is approved by the Director. Since no AOC has been designated there are no specific requirements for this facility at this time.

OAC 252:100-43 (Testing, Monitoring, and Recordkeeping) [Applicable]
This subchapter provides general requirements for testing, monitoring and recordkeeping and applies to any testing, monitoring or recordkeeping activity conducted at any stationary source. To determine compliance with emissions limitations or standards, the Air Quality Director may require the owner or operator of any source in the state of Oklahoma to install, maintain and operate monitoring equipment or to conduct tests, including stack tests, of the air contaminant source. All required testing must be conducted by methods approved by the Air Quality Director

and under the direction of qualified personnel. A notice-of-intent to test and a testing protocol shall be submitted to Air Quality at least 30 days prior to any EPA Reference Method stack tests. Emissions and other data required to demonstrate compliance with any federal or state emission limit or standard, or any requirement set forth in a valid permit shall be recorded, maintained, and submitted as required by this subchapter, an applicable rule, or permit requirement. Data from any required testing or monitoring not conducted in accordance with the provisions of this subchapter shall be considered invalid. Nothing shall preclude the use, including the exclusive use, of any credible evidence or information relevant to whether a source would have been in compliance with applicable requirements if the appropriate performance or compliance test or procedure had been performed.

The following Oklahoma Air Pollution Control Rules are not applicable to this facility:

OAC 252:100-11	Alternative Emissions Reduction	Not requested
OAC 252:100-15	Mobile Sources	Not in source category
OAC 252:100-17	Incinerators	Not type of emission unit
OAC 252:100-23	Cotton Gins	Not type of emission unit
OAC 252:100-24	Grain Elevators	Not in source category
OAC 252:100-39	Nonattainment Areas	Not in area category
OAC 252:100-47	Municipal Solid Waste Landfills	Not in source category

SECTION IX. FEDERAL REGULATIONS

PSD, 40 CFR Part 52 [Applicable]

The facility is a listed source having petroleum storage and transfer units with a total storage capacity exceeding 300,000-barrels (bbl) which emits, or has the potential to emit, 100 TPY or more of any regulated NSR pollutant. The potential emissions of the facility are greater than 100 TPY for VOC. Therefore, the facility is a major source and is subject to PSD review. The PSD review is discussed in Section VI of this memorandum.

NSPS, 40 CFR Part 60 [Subparts Kb and IIII are Applicable]

Subpart Kb, VOL Storage Vessels. This subpart applies to volatile organic liquids storage vessels (including petroleum liquids storage vessels) for which construction, reconstruction, or modification commenced after July 23, 1984, and which have a capacity of 19,813 gallons (75 cubic meters) or more. 40 CFR Part 60.112b specifies that vessels with a design capacity greater than or equal to 39,980 gallons containing a VOL that, as stored, has a maximum true vapor pressure greater than or equal to 0.75 psia but less than 11 psia shall have one of the following vapor control devices: an external fixed roof in combination with an internal floating roof; an external floating roof; a closed vent system to a control device (flare, condenser, or absorber); or an equivalent system. The storage tanks (EUG 1A and EUG 1B) are all subject to this subpart. The permittee shall comply with this subpart by using either internal or external floating roofs as defined in §60.112b(a)(1) and (2), respectively. The permit will also require compliance with the testing (§60.113b), reporting and recordkeeping (§60.115b), and monitoring (§60.116b) of this subpart. In addition, the facility shall comply with all the applicable requirements 40 CFR Part 60 Subpart A including the notifications as described in §60.7.

Subpart GG, Stationary Gas Turbines. This subpart affects combustion turbines which commenced construction, reconstruction, or modification after October 3, 1977, and which have a heat input rating of 10 MMBTUH or more. There are no turbines at this facility.
Subpart KKK, Equipment Leaks of VOC from Onshore Natural Gas Processing Plants. This subpart applies to natural gas processing plants constructed, reconstructed or modified after January 20, 1984 but prior to August 23, 2011. The facility does not engage in natural gas processing.
Subpart LLL, Onshore Natural Gas Processing: SO_2 Emissions. This subpart affects sweetening units and sweetening units followed by sulfur recovery units. This facility does not have a sweetening unit.
Subpart IIII, Stationary Compression Ignition (CI) Internal Combustion Engines (ICE). This subpart affects CI ICE based on power and displacement ratings, depending on date of construction, beginning with those constructed after July 11, 2005. For the purposes of this subpart, the date that construction commences is the date the engine is ordered by the owner or operator. The emergency generator and firewater pumps are diesel-fired CI ICE. These engines will comply with the monitoring, recordkeeping, and reporting requirements of this subpart. The stripping pump is a portable engine that qualifies for non-road status, and is therefore not subject.
Subpart JJJJ, Stationary Spark Ignition Internal Combustion Engines (SI-ICE). This subpart promulgates emission standards for all new SI engines ordered after June 12, 2006, and all SI engines modified or reconstructed after June 12, 2006, regardless of size. There are no SI engines at this facility.
Subpart OOOO, Crude Oil and Natural Gas Production, Transmission, and Distribution. This subpart affects natural gas wells, centrifugal compressors, reciprocating compressors, pneumatic controllers, storage vessels, onshore natural gas processing plants, and onshore natural gas sweetening units that commence construction, modification, or reconstruction after August 23, 2011, and on or before September 18, 2015. All equipment at the facility will commence construction after September 18, 2015. Therefore, this subpart does not apply.
Subpart OOOOa, Crude Oil and Natural Gas Facilities. This subpart applies to hydraulically fractured wells, centrifugal compressors, reciprocating compressors, pneumatic controllers and pumps, natural gas processing plants, storage vessels, equipment leaks, and natural gas sweetening units that commence construction, modification, or reconstruction after September 18, 2015. All equipment at the facility will commence construction after this date and the storage vessels and equipment leaks at this facility are potentially subject. However, this subpart only affects facilities located in the crude oil production source category, which includes the well and extends to the point of custody transfer to the crude oil transmission pipeline or any other forms of transportation. All liquids received by this facility will have already passed the point of custody transfer to a crude oil transmission pipeline. Therefore, this subpart does not apply.

NESHAP, 40 CFR Part 61 [Not Applicable]
There are no emissions of any of the regulated pollutants: arsenic, asbestos, benzene, beryllium, coke oven emissions, mercury, radionuclides, or vinyl chloride except for trace amounts of benzene. Subpart J, Equipment Leaks of Benzene, concerns only process streams that contain more than 10% benzene by weight. All process streams at this facility are below this threshold.

NESHAP, 40 CFR Part 63 [Subpart ZZZZ is Applicable]

Subpart R, Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout Stations). This subpart only applies to gasoline facilities which are major sources of HAPs. The facility is not a major source of HAPs. This facility does not store gasoline. Therefore, this facility is not subject to this subpart.

Subpart EEEE, Organic Liquids Distribution (Non-Gasoline). This subpart affects organic liquid distribution (OLD) operations only at major sources of HAP emissions with an organic liquid throughput greater than 7.29 million gallons per year (173,571 bbl/yr). This facility is not a major source of HAPs. Therefore, this facility is not subject to this subpart.

Subpart BBBBBB, Gasoline Distribution Bulk Terminals, Bulk Plants, and Pipeline Facilities. This subpart affects area sources that are bulk gasoline terminals that are not subject to the control requirements of 40 CFR Part 63, Subpart R or 40 CFR Part 63, Subpart CC, pipeline beakout stations that are not subject to the control requirements of 40 CFR Part 63 Subpart R, pipeline pumping stations, and bulk gasoline plants. The facility does not handle gasoline and is therefore not subject to this subpart.

Subpart ZZZZ, Reciprocating Internal Combustion Engines (RICE). This subpart affects any existing, new, or reconstructed stationary RICE located at a major or area source of HAP emissions. Owners and operators of the following new or reconstructed RICE must meet the requirements of Subpart ZZZZ by complying with either 40 CFR Part 60 Subpart IIII (for CI engines) or 40 CFR Part 60 Subpart JJJJ (for SI engines):

1) Stationary RICE located at an area source;
2) The following Stationary RICE located at a major source of HAP emissions:
   i) 2SLB and 4SRB stationary RICE with a site rating of ≤ 500 brake HP;
   ii) 4SLB stationary RICE with a site rating of < 250 brake HP;
   iii) Stationary RICE with a site rating of ≤ 500 brake HP which combust landfill or digester gas equivalent to 10% or more of the gross heat input on an annual basis;
   iv) Emergency or limited use stationary RICE with a site rating of ≤ 500 brake HP; and
   v) CI stationary RICE with a site rating of ≤ 500 brake HP.

No further requirements apply for engines subject to NSPS under this part. Based on emission calculations, the terminal is an area source of HAP emissions and the stationary engines are subject to this subpart. The stationary engines will comply with this subpart.

Compliance Assurance Monitoring (CAM), 40 CFR Part 64 [Not Applicable]

Compliance Assurance Monitoring as published in the Federal Register on October 22, 1997, applies to any pollutant specific emission unit at a major source, that is required to obtain a Title V permit, if it meets all of the following criteria:

- It is subject to an emission limit or standard for an applicable regulated air pollutant.
- It uses a control device to achieve compliance with the applicable emission limit or standard.
- It has potential emissions, prior to the control device, of the applicable regulated air pollutant greater than major source threshold.

There are no individual emission units at this facility that meet all of the above criteria. Although the facility is a major source required to obtain a part 70 permit, the storage tanks will not be equipped with control devices and is not subject to CAM monitoring. Control devices do not include passive control measures such as seals, lids or roofs.

Chemical Accident Prevention Provisions, 40 CFR Part 68 [Not Applicable]
The definition of a stationary source does not apply to transportation, including storage incident to transportation, of any regulated substance or any other extremely hazardous substance under the provisions of this part. Naturally occurring hydrocarbon mixtures, prior to entry into a natural gas processing plant or a petroleum refining process unit, including: condensate, crude oil, field gas, and produced water, are exempt for the purpose of determining whether more than a threshold quantity of a regulated substance is present at the stationary source. More information on this federal program is available on the web page: *www.epa.gov/rmp*.

Stratospheric Ozone Protection, 40 CFR Part 82 [Subpart A and F are Applicable]
These standards require phase out of Class I & II substances, reductions of emissions of Class I & II substances to the lowest achievable level in all use sectors, and banning use of nonessential products containing ozone-depleting substances (Subparts A & C); control servicing of motor vehicle air conditioners (Subpart B); require Federal agencies to adopt procurement regulations which meet phase out requirements and which maximize the substitution of safe alternatives to Class I and Class II substances (Subpart D); require warning labels on products made with or containing Class I or II substances (Subpart E); maximize the use of recycling and recovery upon disposal (Subpart F); require producers to identify substitutes for ozone-depleting compounds under the Significant New Alternatives Program (Subpart G); and reduce the emissions of halons (Subpart H).
Subpart A identifies ozone-depleting substances and divides them into two classes. Class I controlled substances are divided into seven groups; the chemicals typically used by the manufacturing industry include carbon tetrachloride (Class I, Group IV) and methyl chloroform (Class I, Group V). A complete phase-out of production of Class I substances is required by January 1, 2000 (January 1, 2002, for methyl chloroform). Class II chemicals, which are hydrochlorofluorocarbons (HCFCs), are generally seen as interim substitutes for Class I CFCs. Class II substances consist of 33 HCFCs. A complete phase-out of Class II substances, scheduled in phases starting by 2002, is required by January 1, 2030.
Subpart F requires that any persons servicing, maintaining, or repairing appliances except for motor vehicle air conditioners; persons disposing of appliances, including motor vehicle air conditioners; refrigerant reclaimers, appliance owners, and manufacturers of appliances and recycling and recovery equipment comply with the standards for recycling and emissions reduction.

The standard conditions of the permit address the requirements specified at §82.156 for persons opening appliances for maintenance, service, repair, or disposal; §82.158 for equipment used during the maintenance, service, repair, or disposal of appliances; §82.161 for certification by an approved technician certification program of persons performing maintenance, service, repair, or disposal of appliances; §82.166 for recordkeeping; § 82.158 for leak repair requirements; and §82.166 for refrigerant purchase records for appliances normally containing 50 or more pounds of refrigerant.

This facility does not utilize any Class I or Class II substances.

SECTION X. COMPLIANCE

A. Tier Classification and Public Review

This application has been determined to be a Tier II based on the fact that the applicant has requested modification to a PSD construction permit which requires a case-by-case determination.

The applicant published the DEQ "Notice of Tier II Permit Application Filing" in *The Cushing Citizen*, a twice weekly newspaper published in Cushing, Payne County, Oklahoma, on March 20, 2019. The notice stated that the application was available for public review in the Cushing City Library at 215 N Steele Avenue, Cushing, Oklahoma 74023, or at the DEQ main office at 707 N. Robinson, Oklahoma City, Oklahoma.

The applicant published the DEQ "Notice of Tier II Draft Permit" in *The Cushing Citizen* on July 31, 2019. The notice stated that the draft/proposed permit and application were available for public review for a 30-day comment period beginning on the date of the publication in the Cushing City Library at 215 N Steele Avenue, Cushing, Oklahoma 74023, or at the DEQ main office at N. Robinson, Oklahoma City, Oklahoma. The public comment period ended on August 30, 2019. No comments were received.

The permittee has submitted an affidavit that they are not seeking a permit for land use or for any operation upon land owned by others without their knowledge. The affidavit certifies that the applicant (or applicant business) has notified the landowner(s) by means of an actual notice, for which the applicant has a signed and dated receipt. Information on all permits is available for review by the public in the Air Quality Section of the DEQ Web Page: *https://www.deq.ok.gov*.

B. State Review

This facility is not located within 50 miles of the Oklahoma border. Therefore, no bordering states will be notified of the draft permit.

C. EPA Review

KEI requested and was granted concurrent public and EPA review periods. The draft/proposed permit was sent to EPA for a minimum review period of 45-days. EPA review began on July 10, 2019. The EPA review period was extended to end on August 30, 2019, to ensure that the EPA review period did not end before the public comment period. No comments were received from EPA.

SECTION XI. FEES PAID

A fee of $5,000 is required for a significant modification to a major source construction permit. A payment of $5,000 was received on March 8, 2019.

SECTION XII. SUMMARY

The facility has demonstrated the ability to comply with the requirements of the several air pollution control rules and regulations. Ambient air quality standards are not threatened at this site. There are no active Air Quality compliance or enforcement issues concerning this facility. Issuance of this construction permit is recommended.

PERMIT TO CONSTRUCT
AIR POLLUTION CONTROL FACILITY
SPECIFIC CONDITIONS

Keyera Energy, Inc. **Permit No. 2016-1066-C (M-1) (PSD)**
Wildhorse Terminal

The permittee is authorized to construct in conformity with the specifications submitted to Air Quality on March 12, 2019 and supplemental information submitted thereafter. The evaluation Memorandum, dated September 4, 2019, explains the derivation of applicable permit requirements and estimates of emissions; however, it does not contain operating limitations or permit requirements. Commencing construction or continuing operations under this permit constitutes acceptance of, and consent to, the conditions contained herein:

1. Points of emissions limitations for each point: [OAC 252:100-8-6(a)(1)]

A. EUG 1A: NSPS Subpart Kb External Floating Roof Tanks

EU ID#	Contents	Roof Type[1]	Capacity (bbl)	W/S VOC (TPY)	Landing VOC (ton/event)	Cleaning VOC (ton/event)
T-2501	Crude Oil	EFR	250,000	6.44	0.96	3.79
T-2502	Crude Oil	EFR	250,000	6.44	0.96	3.79
T-2503	Crude Oil	EFR	250,000	6.44	0.96	3.79
T-2504	Crude Oil	EFR	250,000	6.44	0.96	3.79
T-2505	Crude Oil	EFR	250,000	6.44	0.96	3.79
T-2506	Crude Oil	EFR	250,000	6.44	0.96	3.79
T-3501	Crude Oil	EFR	350,000	7.47	1.33	4.82
T-3502	Crude Oil	EFR	350,000	7.47	1.33	4.82
T-3503	Crude Oil	EFR	350,000	7.47	1.33	4.82
T-3504	Crude Oil	EFR	350,000	7.47	1.33	4.82
T-3505	Crude Oil	EFR	350,000	7.47	1.33	4.82
T-3506	Crude Oil	EFR	350,000	7.47	1.33	4.82
T-3507	Crude Oil	EFR	350,000	7.47	1.33	4.82
T-3508	Crude Oil	EFR	350,000	7.47	1.33	4.82
T-5001	Crude Oil	EFR	500,000	8.78	1.90	6.30
T-5002	Crude Oil	EFR	500,000	8.78	1.90	6.30
T-5003	Crude Oil	EFR	500,000	8.78	1.90	6.30
T-5004	Crude Oil	EFR	500,000	8.78	1.90	6.30

[1] – EFR = External Floating Roof.

a. Each tank shall be equipped with an external floating roof.
b. Each external floating roof shall be equipped with a primary mechanical shoe seal and a secondary seal.

c. Each tank bottom shall be drain-dry by design with a slope which drains the liquid contents to the sump or sumps when liquid levels fall below the pipe outlet.

B. EUG 1B: NSPS Subpart Kb Internal Floating Roof Tanks

EU ID#	Contents	Roof Type[1]	Capacity (bbl)	W/S VOC (TPY)	Landing VOC (ton/event)	Cleaning VOC (ton/event)
T-201	Crude Oil	IFR	20,000	2.16	0.09	0.79

[1] – IFR = Internal Floating Roof.

a. Each tank shall be equipped with an internal floating roof.
b. Each internal floating roof shall be equipped with a primary mechanical shoe seal.
c. Each tank bottom shall be drain-dry by design with a slope which drains the liquid contents to the sump or sumps when liquid levels fall below the pipe outlet.

C. EUG 2: Roof Landings

In any continuous 12-month period, facility-wide VOC emissions from tank roof landings shall not exceed 21.15 TPY, and tank landing VOC emissions shall be limited as follows:

a. The sum of emissions from all 250K barrel tank landings shall not exceed 6.7 TPY.
b. The sum of emissions from all 350K barrel tank landings shall not exceed 12.0 TPY.
c. The sum of emissions from all 500K barrel tank landings shall not exceed 9.5 TPY.
d. The sum of emissions from all 20K barrel tank landings shall not exceed 0.2 TPY.

D. EUG 3: Tank Cleanings

In any continuous 12-month period, facility-wide VOC emissions from tank cleanings shall not exceed 18.90 TPY, and tank cleaning VOC emissions shall be limited as follows:

a. The sum of emissions from all 250K barrel tank cleanings shall not exceed 11.4 TPY.
b. The sum of emissions from all 350K barrel tank cleanings shall not exceed 14.5 TPY.
c. The sum of emissions from all 500K barrel tank cleanings shall not exceed 12.6 TPY.
d. The sum of emissions from all 20K barrel tank cleanings shall not exceed 0.8 TPY.

E. EUG 4: Fugitive Equipment Leaks

Fugitive equipment items are not limited in number or VOC emissions. The associated emissions shall be included to demonstrate compliance with the facility-wide emission limits. The facility shall maintain an updated list of all fugitive emission sources. The facility shall prepare, implement, and maintain a Spill Prevention, Control, and Countermeasure (SPCC) Plan as required by 40 CFR Part 112. This plan requires regular inspection of all aboveground valves, piping, and appurtenances. Records of quarterly inspections and any identified visual leaks shall be maintained. Visual leaks shall be repaired as soon as practical, and records of corrective actions shall be maintained. The SPCC inspection requirement also applies to pigging equipment, sump tanks, and lab solvent container, which are otherwise classified as Insignificant Activities.

F. EUG 5: Limited-Use Engines

All engines at the facility shall be certified to meet the EPA Tier 3 emissions standard of 3.0 g/hp-hr NMHC + NO_X. The facility is authorized to operate the limited-use engines as listed below.

Unit ID	Rating (hp)	Fuel	Operation (hrs/yr)
GEN-1	275	Diesel	500
FP-1	176	Diesel	500
FP-2	700	Diesel	500
FP-3	700	Diesel	500
SP-1	156	Diesel	876

G. Facility-Wide Emission Limit

Facility-wide emissions of Hazardous Air Pollutants (HAP) from all sources (tanks, fugitives, and any other HAP emission source) are limited to not more than 9.9 tons of any single HAP or 24.9 tons of any combination of HAPs in any continuous 12-month period. Emission calculations shall be modeled based on the actual contents of the tanks. The facility shall be limited to not more than 631,000,000 barrels in any continuous 12-month period. Emissions and throughputs may be freely exchanged between tanks as long as the total emission limit for the facility is not exceeded. Compliance shall be demonstrated by:

a. A rolling 12-month total of VOC throughput calculated monthly no later than 30 days after the end of each month.
b. TANKS 4.09D or other emission estimation software approved by AQD.
c. Records of material stored and throughput for each tank.
d. Calculations of emissions from roof landing events.
e. Calculations of emissions from tank cleaning events.
f. Inclusion of emission estimates for fugitive HAP sources and any other identified sources of HAP emissions.

2. Each tank in EUG 1A and EUG 1B is subject to 40 CFR Part 60, Subpart Kb, Standards of Performance for Volatile Organic Liquid Storage Vessels, and shall comply with all applicable requirements for external or internal floating roof tanks which shall include, but are not limited to, the following requirements: [40 CFR 60.110b through 60.116b]

   a. § 60.110b Applicability and designation of affected facility.
   b. § 60.111b Definitions.
   c. § 60.112b Standard for volatile organic compounds (VOC).
   d. § 60.113b Testing procedures.
   e. § 60.114b Alternative means of emission limitation.
   f. § 60.115b Reporting and recordkeeping requirements.
   g. § 60.116b Monitoring of operations.

3. For each stationary engine in EUG 5, the permittee shall comply with all applicable requirements of 40 CFR Part 60, Subpart IIII, Standards of Performance for Stationary

Compression Ignition Internal Combustion Engines and shall comply with all applicable requirements including but not limited to the following: [40 CFR 60.4200 through 60.4219]

a. § 60.4200 Am I subject to this subpart?
b. § 60.4201 What emission standards must I meet for non-emergency engines if I am a stationary CI internal combustion engine manufacturer?
c. § 60.4202 What emission standards must I meet for emergency engines if I am a stationary CI internal combustion engine manufacturer?
d. § 60.4203 How long must my engines meet the emission standards if I am a stationary CI internal combustion engine manufacturer?
e. § 60.4204 What emission standards must I meet for non-emergency engines if I am an owner or operator of a stationary CI internal combustion engine?
f. § 60.4206 How long must I meet the emission standards if I am an owner or operator of a stationary CI internal combustion engine?
g. § 60.4207 What fuel requirements must I meet if I am an owner or operator of a stationary CI internal combustion engine subject to this subpart?
h. § 60.4209 What are the monitoring requirements if I am an owner or operator of a stationary CI internal combustion engine?
i. § 60.4210 What are my compliance requirements if I am a stationary CI internal combustion engine manufacturer?
j. § 60.4211 What are my compliance requirements if I am an owner or operator of a stationary CI internal combustion engine?
k. § 60.4212 What test methods and other procedures must I use if I am an owner or operator of a stationary CI internal combustion engine with a displacement of less than 30 liters per cylinder?
l. §60.4214 What are my notification, reporting, and recordkeeping requirements if I am an owner or operator of a stationary CI internal combustion engine?
m. § 60.4217 What emission standards must I meet if I am an owner or operator of a stationary internal combustion engine using special fuels?
n. § 60.4218 What parts of the General Provisions apply to me?
o. § 60.4219 What definitions apply to this subpart?

4. The owner/operator shall comply with all applicable requirements of the 40 CFR Part 63, Subpart ZZZZ, Stationary Reciprocating Internal Combustion Engines, for each affected facility including but not limited to: [40 CFR 63.6580 through 63.6675]

<u>What This Subpart Covers</u>

a. § 63.6580 What is the purpose of subpart ZZZZ?
b. § 63.6585 Am I subject to this subpart?
c. § 63.6590 What parts of my plant does this subpart cover?
d. § 63.6595 When do I have to comply with this subpart?

<u>Emission and Operating Limitations</u>

e. § 63.6603 What emission limitations, operating limitations, and other requirements must I meet if I own or operate an existing stationary RICE located at an area source of HAP emissions?

<u>General Compliance Requirements</u>

f. § 63.6605 What are my general requirements for complying with this subpart?
Testing and Initial Compliance Requirements
g. § 63.6625 What are my monitoring, installation, collection, operation, and maintenance requirements?
h. § 63.6630 How do I demonstrate initial compliance with the emission limitations, operating limitations, and other requirements?
Continuous Compliance Requirements
i. § 63.6640 How do I demonstrate continuous compliance with the emission limitations, operating limitations, and other requirements?
Notifications, Reports, and Records
j. § 63.6650 What reports must I submit and when?
k. § 63.6655 What records must I keep?
l. § 63.6660 In what form and how long must I keep my records?
Other Requirements and Information
m. § 63.6665 What parts of the General Provisions apply to me?
n. § 63.6670 Who implements and enforces this subpart?
o. § 63.6675 What definitions apply to this subpart?

5. Upon issuance of an operating permit, the permittee shall be authorized to operate this facility continuously (24 hours per day, every day of the year). [OAC 252:100-8-6(a)]

6. Alternative materials other than crude oil may be stored in the tanks provided the true vapor pressure of alternative material is less than 11.1 psia at storage conditions and there will be no exceedance of the permitted 12-month VOC emission limits. HAP emission from such alternate storage, combined with HAP emissions from storage of crude oil, may not exceed major source thresholds for any 12-month period. The permittee must provide 30 days advance written notice to DEQ and EPA of such a change. The notice shall provide a brief description of the change, effective date, any change in emissions (including HAPs) between the storage of alternative material and the storage of crude oil in the tank, and list (if any) permit terms or conditions no longer applicable as a result. [OAC 252:100-8-6(f)]

7. Each tank to which these specific conditions apply shall have a permanent means of identification which distinguishes it from other equipment. [OAC 252:100-8-5(e)(3)(B)]

8. Crude oil stored at the facility shall be limited to not exceed a Reid vapor pressure of 10 psia. [OAC 252:100-8-6(a)]

9. The facility shall not handle crude oil with an average sulfur content >5 wt%. Records of classification and sulfur content shall be kept each month for each tank of crude oil classification and sulfur content. [OAC 252:100-8-6(a)(1) & (3)]

10. The two (2) 4,000 gallon sump tanks (T-S1 and T-S2) and one (1) 1,000 gallon sump tank (T-S3) shall be operated with submerged fill pipes. The one (1) 500 gallon lab solvent container (T-L1) shall be designed with a closed top (e.g., covered by a gasketed lid or cap) and operated with a submerged fill pipe. [OAC 252:100-8-6(a)(1)]

11. The permittee shall maintain records of operations as listed below. These records shall be retained on-site for at least five years from the date of recording, inspection, testing, or repair, and shall be made available to regulatory personnel upon request.
[OAC 252:100-8-6(a)(3)(B)]

    a. Throughput for each tank in Specific Condition No. 1 (monthly and 12-month rolling totals calculated no later than 30 days after the end of each month). Throughput shall be derived from flow measurement.
    b. Records of emissions calculations to show compliance with VOC emission limits in Specific Condition No. 1.
    c. Records of number of roof landings and cleanings.
    d. Type of liquid material, maximum true vapor pressure, and period of storage for each tank.
    e. Records of crude oil classification ("sour" or "sweet") and sulfur content of crude oil in each tank (monthly).
    f. Records required by 40 CFR Part 60, Subparts Kb and IIII.
    g. Records required by 40 CFR Part 63, Subpart ZZZZ.

12. The Permit Shield (Standard Conditions, Section VI) is extended to the following requirements that have been determined to be inapplicable to this facility.
[OAC 252:100-8-6(d)(2)]

    a. OAC 252:100-7 Permits for Minor Facilities
    b. OAC 252:100-11 Alternative Emissions Reduction
    c. OAC 252:100-15 Mobile Sources
    d. OAC 252:100-39 Nonattainment Areas

13. The permittee shall submit an administratively complete operating permit application for an initial Title V operating permit within 180 days of start-up of any new unit authorized by this construction permit. [OAC 252:100-8-4(b)(5)(A)]

MAJOR SOURCE AIR QUALITY PERMIT
STANDARD CONDITIONS
(June 21, 2016)

SECTION I. DUTY TO COMPLY

A. This is a permit to operate / construct this specific facility in accordance with the federal Clean Air Act (42 U.S.C. 7401, et al.) and under the authority of the Oklahoma Clean Air Act and the rules promulgated there under. [Oklahoma Clean Air Act, 27A O.S. § 2-5-112]

B. The issuing Authority for the permit is the Air Quality Division (AQD) of the Oklahoma Department of Environmental Quality (DEQ). The permit does not relieve the holder of the obligation to comply with other applicable federal, state, or local statutes, regulations, rules, or ordinances. [Oklahoma Clean Air Act, 27A O.S. § 2-5-112]

C. The permittee shall comply with all conditions of this permit. Any permit noncompliance shall constitute a violation of the Oklahoma Clean Air Act and shall be grounds for enforcement action, permit termination, revocation and reissuance, or modification, or for denial of a permit renewal application. All terms and conditions are enforceable by the DEQ, by the Environmental Protection Agency (EPA), and by citizens under section 304 of the Federal Clean Air Act (excluding state-only requirements). This permit is valid for operations only at the specific location listed.
[40 C.F.R. §70.6(b), OAC 252:100-8-1.3 and OAC 252:100-8-6(a)(7)(A) and (b)(1)]

D. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of the permit. However, nothing in this paragraph shall be construed as precluding consideration of a need to halt or reduce activity as a mitigating factor in assessing penalties for noncompliance if the health, safety, or environmental impacts of halting or reducing operations would be more serious than the impacts of continuing operations. [OAC 252:100-8-6(a)(7)(B)]

SECTION II. REPORTING OF DEVIATIONS FROM PERMIT TERMS

A. Any exceedance resulting from an emergency and/or posing an imminent and substantial danger to public health, safety, or the environment shall be reported in accordance with Section XIV (Emergencies). [OAC 252:100-8-6(a)(3)(C)(iii)(I) & (II)]

B. Deviations that result in emissions exceeding those allowed in this permit shall be reported consistent with the requirements of OAC 252:100-9, Excess Emission Reporting Requirements.
[OAC 252:100-8-6(a)(3)(C)(iv)]

C. Every written report submitted under this section shall be certified as required by Section III (Monitoring, Testing, Recordkeeping & Reporting), Paragraph F.
[OAC 252:100-8-6(a)(3)(C)(iv)]

SECTION III. MONITORING, TESTING, RECORDKEEPING & REPORTING

A. The permittee shall keep records as specified in this permit. These records, including monitoring data and necessary support information, shall be retained on-site or at a nearby field office for a period of at least five years from the date of the monitoring sample, measurement, report, or application, and shall be made available for inspection by regulatory personnel upon request. Support information includes all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by this permit. Where appropriate, the permit may specify that records may be maintained in computerized form.

[OAC 252:100-8-6 (a)(3)(B)(ii), OAC 252:100-8-6(c)(1), and OAC 252:100-8-6(c)(2)(B)]

B. Records of required monitoring shall include:

(1) the date, place and time of sampling or measurement;
(2) the date or dates analyses were performed;
(3) the company or entity which performed the analyses;
(4) the analytical techniques or methods used;
(5) the results of such analyses; and
(6) the operating conditions existing at the time of sampling or measurement.

[OAC 252:100-8-6(a)(3)(B)(i)]

C. No later than 30 days after each six (6) month period, after the date of the issuance of the original Part 70 operating permit or alternative date as specifically identified in a subsequent Part 70 operating permit, the permittee shall submit to AQD a report of the results of any required monitoring. All instances of deviations from permit requirements since the previous report shall be clearly identified in the report. Submission of these periodic reports will satisfy any reporting requirement of Paragraph E below that is duplicative of the periodic reports, if so noted on the submitted report. [OAC 252:100-8-6(a)(3)(C)(i) and (ii)]

D. If any testing shows emissions in excess of limitations specified in this permit, the owner or operator shall comply with the provisions of Section II (Reporting Of Deviations From Permit Terms) of these standard conditions. [OAC 252:100-8-6(a)(3)(C)(iii)]

E. In addition to any monitoring, recordkeeping or reporting requirement specified in this permit, monitoring and reporting may be required under the provisions of OAC 252:100-43, Testing, Monitoring, and Recordkeeping, or as required by any provision of the Federal Clean Air Act or Oklahoma Clean Air Act. [OAC 252:100-43]

F. Any Annual Certification of Compliance, Semi Annual Monitoring and Deviation Report, Excess Emission Report, and Annual Emission Inventory submitted in accordance with this permit shall be certified by a responsible official. This certification shall be signed by a responsible official, and shall contain the following language: "I certify, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete."

[OAC 252:100-8-5(f), OAC 252:100-8-6(a)(3)(C)(iv), OAC 252:100-8-6(c)(1), OAC 252:100-9-7(e), and OAC 252:100-5-2.1(f)]

G. Any owner or operator subject to the provisions of New Source Performance Standards ("NSPS") under 40 CFR Part 60 or National Emission Standards for Hazardous Air Pollutants ("NESHAPs") under 40 CFR Parts 61 and 63 shall maintain a file of all measurements and other information required by the applicable general provisions and subpart(s). These records shall be maintained in a permanent file suitable for inspection, shall be retained for a period of at least five years as required by Paragraph A of this Section, and shall include records of the occurrence and duration of any start-up, shutdown, or malfunction in the operation of an affected facility, any malfunction of the air pollution control equipment; and any periods during which a continuous monitoring system or monitoring device is inoperative.

[40 C.F.R. §§60.7 and 63.10, 40 CFR Parts 61, Subpart A, and OAC 252:100, Appendix Q]

H. The permittee of a facility that is operating subject to a schedule of compliance shall submit to the DEQ a progress report at least semi-annually. The progress reports shall contain dates for achieving the activities, milestones or compliance required in the schedule of compliance and the dates when such activities, milestones or compliance was achieved. The progress reports shall also contain an explanation of why any dates in the schedule of compliance were not or will not be met, and any preventive or corrective measures adopted. [OAC 252:100-8-6(c)(4)]

I. All testing must be conducted under the direction of qualified personnel by methods approved by the Division Director. All tests shall be made and the results calculated in accordance with standard test procedures. The use of alternative test procedures must be approved by EPA. When a portable analyzer is used to measure emissions it shall be setup, calibrated, and operated in accordance with the manufacturer's instructions and in accordance with a protocol meeting the requirements of the "AQD Portable Analyzer Guidance" document or an equivalent method approved by Air Quality.

[OAC 252:100-8-6(a)(3)(A)(iv), and OAC 252:100-43]

J. The reporting of total particulate matter emissions as required in Part 7 of OAC 252:100-8 (Permits for Part 70 Sources), OAC 252:100-19 (Control of Emission of Particulate Matter), and OAC 252:100-5 (Emission Inventory), shall be conducted in accordance with applicable testing or calculation procedures, modified to include back-half condensables, for the concentration of particulate matter less than 10 microns in diameter (PM_{10}). NSPS may allow reporting of only particulate matter emissions caught in the filter (obtained using Reference Method 5).

K. The permittee shall submit to the AQD a copy of all reports submitted to the EPA as required by 40 C.F.R. Part 60, 61, and 63, for all equipment constructed or operated under this permit subject to such standards. [OAC 252:100-8-6(c)(1) and OAC 252:100, Appendix Q]

SECTION IV. COMPLIANCE CERTIFICATIONS

A. No later than 30 days after each anniversary date of the issuance of the original Part 70 operating permit or alternative date as specifically identified in a subsequent Part 70 operating permit, the permittee shall submit to the AQD, with a copy to the US EPA, Region 6, a certification of compliance with the terms and conditions of this permit and of any other applicable requirements which have become effective since the issuance of this permit.

[OAC 252:100-8-6(c)(5)(A), and (D)]

B. The compliance certification shall describe the operating permit term or condition that is the basis of the certification; the current compliance status; whether compliance was continuous or intermittent; the methods used for determining compliance, currently and over the reporting period. The compliance certification shall also include such other facts as the permitting authority may require to determine the compliance status of the source.

[OAC 252:100-8-6(c)(5)(C)(i)-(v)]

C. The compliance certification shall contain a certification by a responsible official as to the results of the required monitoring. This certification shall be signed by a responsible official, and shall contain the following language: "I certify, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete." [OAC 252:100-8-5(f) and OAC 252:100-8-6(c)(1)]

D. Any facility reporting noncompliance shall submit a schedule of compliance for emissions units or stationary sources that are not in compliance with all applicable requirements. This schedule shall include a schedule of remedial measures, including an enforceable sequence of actions with milestones, leading to compliance with any applicable requirements for which the emissions unit or stationary source is in noncompliance. This compliance schedule shall resemble and be at least as stringent as that contained in any judicial consent decree or administrative order to which the emissions unit or stationary source is subject. Any such schedule of compliance shall be supplemental to, and shall not sanction noncompliance with, the applicable requirements on which it is based, except that a compliance plan shall not be required for any noncompliance condition which is corrected within 24 hours of discovery.

[OAC 252:100-8-5(e)(8)(B) and OAC 252:100-8-6(c)(3)]

SECTION V. REQUIREMENTS THAT BECOME APPLICABLE DURING THE PERMIT TERM

The permittee shall comply with any additional requirements that become effective during the permit term and that are applicable to the facility. Compliance with all new requirements shall be certified in the next annual certification. [OAC 252:100-8-6(c)(6)]

SECTION VI. PERMIT SHIELD

A. Compliance with the terms and conditions of this permit (including terms and conditions established for alternate operating scenarios, emissions trading, and emissions averaging, but excluding terms and conditions for which the permit shield is expressly prohibited under OAC 252:100-8) shall be deemed compliance with the applicable requirements identified and included in this permit. [OAC 252:100-8-6(d)(1)]

B. Those requirements that are applicable are listed in the Standard Conditions and the Specific Conditions of this permit. Those requirements that the applicant requested be determined as not applicable are summarized in the Specific Conditions of this permit. [OAC 252:100-8-6(d)(2)]

SECTION VII. ANNUAL EMISSIONS INVENTORY & FEE PAYMENT

The permittee shall file with the AQD an annual emission inventory and shall pay annual fees based on emissions inventories. The methods used to calculate emissions for inventory purposes shall be based on the best available information accepted by AQD.
[OAC 252:100-5-2.1, OAC 252:100-5-2.2, and OAC 252:100-8-6(a)(8)]

SECTION VIII. TERM OF PERMIT

A. Unless specified otherwise, the term of an operating permit shall be five years from the date of issuance. [OAC 252:100-8-6(a)(2)(A)]

B. A source's right to operate shall terminate upon the expiration of its permit unless a timely and complete renewal application has been submitted at least 180 days before the date of expiration. [OAC 252:100-8-7.1(d)(1)]

C. A duly issued construction permit or authorization to construct or modify will terminate and become null and void (unless extended as provided in OAC 252:100-8-1.4(b)) if the construction is not commenced within 18 months after the date the permit or authorization was issued, or if work is suspended for more than 18 months after it is commenced. [OAC 252:100-8-1.4(a)]

D. The recipient of a construction permit shall apply for a permit to operate (or modified operating permit) within 180 days following the first day of operation. [OAC 252:100-8-4(b)(5)]

SECTION IX. SEVERABILITY

The provisions of this permit are severable and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.
[OAC 252:100-8-6 (a)(6)]

SECTION X. PROPERTY RIGHTS

A. This permit does not convey any property rights of any sort, or any exclusive privilege.
[OAC 252:100-8-6(a)(7)(D)]

B. This permit shall not be considered in any manner affecting the title of the premises upon which the equipment is located and does not release the permittee from any liability for damage to persons or property caused by or resulting from the maintenance or operation of the equipment for which the permit is issued. [OAC 252:100-8-6(c)(6)]

SECTION XI. DUTY TO PROVIDE INFORMATION

A. The permittee shall furnish to the DEQ, upon receipt of a written request and within sixty (60) days of the request unless the DEQ specifies another time period, any information that the DEQ may request to determine whether cause exists for modifying, reopening, revoking,

reissuing, terminating the permit or to determine compliance with the permit. Upon request, the permittee shall also furnish to the DEQ copies of records required to be kept by the permit.
[OAC 252:100-8-6(a)(7)(E)]

B. The permittee may make a claim of confidentiality for any information or records submitted pursuant to 27A O.S. § 2-5-105(18). Confidential information shall be clearly labeled as such and shall be separable from the main body of the document such as in an attachment.
[OAC 252:100-8-6(a)(7)(E)]

C. Notification to the AQD of the sale or transfer of ownership of this facility is required and shall be made in writing within thirty (30) days after such sale or transfer.
[Oklahoma Clean Air Act, 27A O.S. § 2-5-112(G)]

SECTION XII. REOPENING, MODIFICATION & REVOCATION

A. The permit may be modified, revoked, reopened and reissued, or terminated for cause. Except as provided for minor permit modifications, the filing of a request by the permittee for a permit modification, revocation and reissuance, termination, notification of planned changes, or anticipated noncompliance does not stay any permit condition.
[OAC 252:100-8-6(a)(7)(C) and OAC 252:100-8-7.2(b)]

B. The DEQ will reopen and revise or revoke this permit prior to the expiration date in the following circumstances: [OAC 252:100-8-7.3 and OAC 252:100-8-7.4(a)(2)]

(1) Additional requirements under the Clean Air Act become applicable to a major source category three or more years prior to the expiration date of this permit. No such reopening is required if the effective date of the requirement is later than the expiration date of this permit.
(2) The DEQ or the EPA determines that this permit contains a material mistake or that the permit must be revised or revoked to assure compliance with the applicable requirements.
(3) The DEQ or the EPA determines that inaccurate information was used in establishing the emission standards, limitations, or other conditions of this permit. The DEQ may revoke and not reissue this permit if it determines that the permittee has submitted false or misleading information to the DEQ.
(4) DEQ determines that the permit should be amended under the discretionary reopening provisions of OAC 252:100-8-7.3(b).

C. The permit may be reopened for cause by EPA, pursuant to the provisions of OAC 100-8-7.3(d). [OAC 100-8-7.3(d)]

D. The permittee shall notify AQD before making changes other than those described in Section XVIII (Operational Flexibility), those qualifying for administrative permit amendments, or those defined as an Insignificant Activity (Section XVI) or Trivial Activity (Section XVII). The notification should include any changes which may alter the status of a “grandfathered source,” as defined under AQD rules. Such changes may require a permit modification.
[OAC 252:100-8-7.2(b) and OAC 252:100-5-1.1]

E. Activities that will result in air emissions that exceed the trivial/insignificant levels and that are not specifically approved by this permit are prohibited. [OAC 252:100-8-6(c)(6)]

SECTION XIII. INSPECTION & ENTRY

A. Upon presentation of credentials and other documents as may be required by law, the permittee shall allow authorized regulatory officials to perform the following (subject to the permittee's right to seek confidential treatment pursuant to 27A O.S. Supp. 1998, § 2-5-105(17) for confidential information submitted to or obtained by the DEQ under this section):

(1) enter upon the permittee's premises during reasonable/normal working hours where a source is located or emissions-related activity is conducted, or where records must be kept under the conditions of the permit;
(2) have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit;
(3) inspect, at reasonable times and using reasonable safety practices, any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit; and
(4) as authorized by the Oklahoma Clean Air Act, sample or monitor at reasonable times substances or parameters for the purpose of assuring compliance with the permit.

[OAC 252:100-8-6(c)(2)]

SECTION XIV. EMERGENCIES

A. Any exceedance resulting from an emergency shall be reported to AQD promptly but no later than 4:30 p.m. on the next working day after the permittee first becomes aware of the exceedance. This notice shall contain a description of the emergency, the probable cause of the exceedance, any steps taken to mitigate emissions, and corrective actions taken.

[OAC 252:100-8-6 (a)(3)(C)(iii)(I) and (IV)]

B. Any exceedance that poses an imminent and substantial danger to public health, safety, or the environment shall be reported to AQD as soon as is practicable; but under no circumstance shall notification be more than 24 hours after the exceedance. [OAC 252:100-8-6(a)(3)(C)(iii)(II)]

C. An "emergency" means any situation arising from sudden and reasonably unforeseeable events beyond the control of the source, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the source to exceed a technology-based emission limitation under this permit, due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventive maintenance, careless or improper operation, or operator error. [OAC 252:100-8-2]

D. The affirmative defense of emergency shall be demonstrated through properly signed, contemporaneous operating logs or other relevant evidence that: [OAC 252:100-8-6 (e)(2)]

(1) an emergency occurred and the permittee can identify the cause or causes of the emergency;
(2) the permitted facility was at the time being properly operated;
(3) during the period of the emergency the permittee took all reasonable steps to minimize levels of emissions that exceeded the emission standards or other requirements in this permit.

E. In any enforcement proceeding, the permittee seeking to establish the occurrence of an emergency shall have the burden of proof. [OAC 252:100-8-6(e)(3)]

F. Every written report or document submitted under this section shall be certified as required by Section III (Monitoring, Testing, Recordkeeping & Reporting), Paragraph F.
[OAC 252:100-8-6(a)(3)(C)(iv)]

SECTION XV. RISK MANAGEMENT PLAN

The permittee, if subject to the provision of Section 112(r) of the Clean Air Act, shall develop and register with the appropriate agency a risk management plan by June 20, 1999, or the applicable effective date. [OAC 252:100-8-6(a)(4)]

SECTION XVI. INSIGNIFICANT ACTIVITIES

Except as otherwise prohibited or limited by this permit, the permittee is hereby authorized to operate individual emissions units that are either on the list in Appendix I to OAC Title 252, Chapter 100, or whose actual calendar year emissions do not exceed any of the limits below. Any activity to which a State or Federal applicable requirement applies is not insignificant even if it meets the criteria below or is included on the insignificant activities list.

(1) 5 tons per year of any one criteria pollutant.
(2) 2 tons per year for any one hazardous air pollutant (HAP) or 5 tons per year for an aggregate of two or more HAP's, or 20 percent of any threshold less than 10 tons per year for single HAP that the EPA may establish by rule.
[OAC 252:100-8-2 and OAC 252:100, Appendix I]

SECTION XVII. TRIVIAL ACTIVITIES

Except as otherwise prohibited or limited by this permit, the permittee is hereby authorized to operate any individual or combination of air emissions units that are considered inconsequential and are on the list in Appendix J. Any activity to which a State or Federal applicable requirement applies is not trivial even if included on the trivial activities list.
[OAC 252:100-8-2 and OAC 252:100, Appendix J]

SECTION XVIII. OPERATIONAL FLEXIBILITY

A. A facility may implement any operating scenario allowed for in its Part 70 permit without the need for any permit revision or any notification to the DEQ (unless specified otherwise in the

permit). When an operating scenario is changed, the permittee shall record in a log at the facility the scenario under which it is operating. [OAC 252:100-8-6(a)(10) and (f)(1)]

B. The permittee may make changes within the facility that:

(1) result in no net emissions increases,
(2) are not modifications under any provision of Title I of the federal Clean Air Act, and
(3) do not cause any hourly or annual permitted emission rate of any existing emissions unit to be exceeded;

provided that the facility provides the EPA and the DEQ with written notification as required below in advance of the proposed changes, which shall be a minimum of seven (7) days, or twenty four (24) hours for emergencies as defined in OAC 252:100-8-6 (e). The permittee, the DEQ, and the EPA shall attach each such notice to their copy of the permit. For each such change, the written notification required above shall include a brief description of the change within the permitted facility, the date on which the change will occur, any change in emissions, and any permit term or condition that is no longer applicable as a result of the change. The permit shield provided by this permit does not apply to any change made pursuant to this paragraph. [OAC 252:100-8-6(f)(2)]

SECTION XIX. OTHER APPLICABLE & STATE-ONLY REQUIREMENTS

A. The following applicable requirements and state-only requirements apply to the facility unless elsewhere covered by a more restrictive requirement:

(1) Open burning of refuse and other combustible material is prohibited except as authorized in the specific examples and under the conditions listed in the Open Burning Subchapter. [OAC 252:100-13]

(2) No particulate emissions from any fuel-burning equipment with a rated heat input of 10 MMBTUH or less shall exceed 0.6 lb/MMBTU. [OAC 252:100-19]

(3) For all emissions units not subject to an opacity limit promulgated under 40 C.F.R., Part 60, NSPS, no discharge of greater than 20% opacity is allowed except for: [OAC 252:100-25]

(a) Short-term occurrences which consist of not more than one six-minute period in any consecutive 60 minutes, not to exceed three such periods in any consecutive 24 hours. In no case shall the average of any six-minute period exceed 60% opacity;
(b) Smoke resulting from fires covered by the exceptions outlined in OAC 252:100-13-7;
(c) An emission, where the presence of uncombined water is the only reason for failure to meet the requirements of OAC 252:100-25-3(a); or
(d) Smoke generated due to a malfunction in a facility, when the source of the fuel producing the smoke is not under the direct and immediate control of the facility and the immediate constriction of the fuel flow at the facility would produce a hazard to life and/or property.

(4) No visible fugitive dust emissions shall be discharged beyond the property line on which the emissions originate in such a manner as to damage or to interfere with the use of adjacent properties, or cause air quality standards to be exceeded, or interfere with the maintenance of air quality standards. [OAC 252:100-29]

(5) No sulfur oxide emissions from new gas-fired fuel-burning equipment shall exceed 0.2 lb/MMBTU. No existing source shall exceed the listed ambient air standards for sulfur dioxide. [OAC 252:100-31]

(6) Volatile Organic Compound (VOC) storage tanks built after December 28, 1974, and with a capacity of 400 gallons or more storing a liquid with a vapor pressure of 1.5 psia or greater under actual conditions shall be equipped with a permanent submerged fill pipe or with a vapor-recovery system. [OAC 252:100-37-15(b)]

(7) All fuel-burning equipment shall at all times be properly operated and maintained in a manner that will minimize emissions of VOCs. [OAC 252:100-37-36]

SECTION XX. STRATOSPHERIC OZONE PROTECTION

A. The permittee shall comply with the following standards for production and consumption of ozone-depleting substances: [40 CFR 82, Subpart A]

(1) Persons producing, importing, or placing an order for production or importation of certain class I and class II substances, HCFC-22, or HCFC-141b shall be subject to the requirements of §82.4;
(2) Producers, importers, exporters, purchasers, and persons who transform or destroy certain class I and class II substances, HCFC-22, or HCFC-141b are subject to the recordkeeping requirements at §82.13; and
(3) Class I substances (listed at Appendix A to Subpart A) include certain CFCs, Halons, HBFCs, carbon tetrachloride, trichloroethane (methyl chloroform), and bromomethane (Methyl Bromide). Class II substances (listed at Appendix B to Subpart A) include HCFCs.

B. If the permittee performs a service on motor (fleet) vehicles when this service involves an ozone-depleting substance refrigerant (or regulated substitute substance) in the motor vehicle air conditioner (MVAC), the permittee is subject to all applicable requirements. Note: The term "motor vehicle" as used in Subpart B does not include a vehicle in which final assembly of the vehicle has not been completed. The term "MVAC" as used in Subpart B does not include the air-tight sealed refrigeration system used as refrigerated cargo, or the system used on passenger buses using HCFC-22 refrigerant. [40 CFR 82, Subpart B]

C. The permittee shall comply with the following standards for recycling and emissions reduction except as provided for MVACs in Subpart B: [40 CFR 82, Subpart F]

(1) Persons opening appliances for maintenance, service, repair, or disposal must comply with the required practices pursuant to § 82.156;
(2) Equipment used during the maintenance, service, repair, or disposal of appliances must

comply with the standards for recycling and recovery equipment pursuant to § 82.158;

(3) Persons performing maintenance, service, repair, or disposal of appliances must be certified by an approved technician certification program pursuant to § 82.161;

(4) Persons disposing of small appliances, MVACs, and MVAC-like appliances must comply with record-keeping requirements pursuant to § 82.166;

(5) Persons owning commercial or industrial process refrigeration equipment must comply with leak repair requirements pursuant to § 82.158; and

(6) Owners/operators of appliances normally containing 50 or more pounds of refrigerant must keep records of refrigerant purchased and added to such appliances pursuant to § 82.166.

SECTION XXI. TITLE V APPROVAL LANGUAGE

A. DEQ wishes to reduce the time and work associated with permit review and, wherever it is not inconsistent with Federal requirements, to provide for incorporation of requirements established through construction permitting into the Source's Title V permit without causing redundant review. Requirements from construction permits may be incorporated into the Title V permit through the administrative amendment process set forth in OAC 252:100-8-7.2(a) only if the following procedures are followed:

(1) The construction permit goes out for a 30-day public notice and comment using the procedures set forth in 40 C.F.R. § 70.7(h)(1). This public notice shall include notice to the public that this permit is subject to EPA review, EPA objection, and petition to EPA, as provided by 40 C.F.R. § 70.8; that the requirements of the construction permit will be incorporated into the Title V permit through the administrative amendment process; that the public will not receive another opportunity to provide comments when the requirements are incorporated into the Title V permit; and that EPA review, EPA objection, and petitions to EPA will not be available to the public when requirements from the construction permit are incorporated into the Title V permit.

(2) A copy of the construction permit application is sent to EPA, as provided by 40 CFR § 70.8(a)(1).

(3) A copy of the draft construction permit is sent to any affected State, as provided by 40 C.F.R. § 70.8(b).

(4) A copy of the proposed construction permit is sent to EPA for a 45-day review period as provided by 40 C.F.R.§ 70.8(a) and (c).

(5) The DEQ complies with 40 C.F.R. § 70.8(c) upon the written receipt within the 45-day comment period of any EPA objection to the construction permit. The DEQ shall not issue the permit until EPA's objections are resolved to the satisfaction of EPA.

(6) The DEQ complies with 40 C.F.R. § 70.8(d).

(7) A copy of the final construction permit is sent to EPA as provided by 40 CFR § 70.8(a).

(8) The DEQ shall not issue the proposed construction permit until any affected State and EPA have had an opportunity to review the proposed permit, as provided by these permit conditions.

(9) Any requirements of the construction permit may be reopened for cause after incorporation into the Title V permit by the administrative amendment process, by

DEQ as provided in OAC 252:100-8-7.3(a), (b), and (c), and by EPA as provided in 40 C.F.R. § 70.7(f) and (g).

(10) The DEQ shall not issue the administrative permit amendment if performance tests fail to demonstrate that the source is operating in substantial compliance with all permit requirements.

B. To the extent that these conditions are not followed, the Title V permit must go through the Title V review process.

SECTION XXII. CREDIBLE EVIDENCE

For the purpose of submitting compliance certifications or establishing whether or not a person has violated or is in violation of any provision of the Oklahoma implementation plan, nothing shall preclude the use, including the exclusive use, of any credible evidence or information, relevant to whether a source would have been in compliance with applicable requirements if the appropriate performance or compliance test or procedure had been performed.

[OAC 252:100-43-6]

PART 70 PERMIT

AIR QUALITY DIVISION
STATE OF OKLAHOMA
DEPARTMENT OF ENVIRONMENTAL QUALITY
707 N. ROBINSON, SUITE 4100
P.O. BOX 1677
OKLAHOMA CITY, OKLAHOMA 73101-1677

Permit No. 2016-1066-C (M-1) (PSD)

Keyera Energy, Inc.,

having complied with the requirements of the law, is hereby granted permission to construct the Wildhorse Terminal at Section 22, Township 17N, Range 5E, Lincoln County, Oklahoma, subject to the Standard Conditions dated June 21, 2016, and the Specific Conditions both of which are attached.

In the absence of commencement of construction, this permit shall expire 18 months from the issuance date, except as authorized under Section VIII of the Standard Conditions.

Director, Air Quality Division **Date**

Keyera Energy, Inc.
Attn: Alaina Szlavy
10613 W. Sam Houston Pkwy N, Suite 160
Houston, TX 77064

SUBJECT: Major Source Construction Permit No. **2016-1066-C (M-1) (PSD)**
Keyera Energy, Inc.
Wildhorse Terminal
Facility ID No. 16676
Section 22, Township 17N, Range 5E
Cushing, Lincoln County, Oklahoma

Dear Ms. Szlavy:

Enclosed is the permit authorizing operation of the facility referenced above. Please note that this permit is issued subject to standard and specific conditions, which are attached. These conditions must be carefully followed since they define the limits of the permit and will be confirmed by periodic inspections.

Also note that you are required to annually submit an emissions inventory for this facility. An emissions inventory must be completed on approved AQD forms and submitted (hardcopy or electronically) by April 1st of every year. Any questions concerning the form or submittal process should be referred to the Emissions Inventory Staff at (405) 702-4100.

Thank you for your cooperation in this matter. If we may be of further service, or you have any questions about this permit, please refer to the permit number above and contact our office at (405) 702-4100.

Sincerely,

Phillip Fielder, P.E.
Chief Engineer
AIR QUALITY DIVISION