

PIONEER NATURAL RESOURCES USA, INC.

ET O'DANIEL 37-3H TANK BATTERY

IMPACTS REVIEW

(1)

Based on receptor and property line distances, is a full impacts review required for any air contaminant? (Is there a receptor or property line within the specified distance of the registration? The distances are 1/4 mile for PBR Level 1, 1/2 mile for PBR Level 2, and 1 mile for Standard Permit.) First the level of authorization must be known.

Based on the Registration Total Emission Rates, this authorization falls under:

Non-Rule Standard Permit

What is the shortest distance in feet to any receptor from any facility/unit included in this registration?	1,300	ft
What is the shortest distance in feet to any property line from any facility/unit included in this registration?	50	ft

Based on the nearest receptor distance:

A full impacts review is required for benzene.

Based on the nearest property line distance:

A full impacts review is required for H2S, SO2, and NO2.

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ET O'DANIEL 37-3H TANK BATTERY

IMPACTS REVIEW

(2)

Based on the net project emission increases, is a full impacts review required for any air contaminant? (Are the net project emission increases less than any of the de-minimis rates?)

Net Project Emission Increases				
Air Contaminant Name	Emission Rates			
	steady state lb/hr	< 30 psig periodic lb/hr	≥ 30 psig periodic lb/hr	tpy
Benzene	0.02	0.11	0.37	0.15
H ₂ S	0.00	0.01	0.03	0.01
SO ₂	0.02	0.22	1.23	0.47
NO _x	6.94	10.25	64.76	48.34
Notes:				

De-minimis Rates	
Air contaminant	lb/hr
Benzene	0.039
H ₂ S	0.025
SO ₂	2
NO _x	4

Based on the net project emission increases:

A full impacts review is required for benzene.
A full impacts review is required for H₂S.
A full impacts review is NOT required for SO₂.
A full impacts review is required for NO₂.

PIONEER NATURAL RESOURCES USA, INC.
ET O'DANIEL 37-3H TANK BATTERY
BENZENE IMPACTS EVALUATION

Benzene Short Term ESL ($\mu\text{g}/\text{m}^3$):	170.00
Benzene Long Term ESL ($\mu\text{g}/\text{m}^3$):	4.50

Benzene Hourly Steady State - Impact Review							
EPN	Source Name	Steady state hourly estimated emissions for each EPN (lb/hr)	WR_{EPN_x}	Distance from emission point to nearest receptor (ft)	Height of emission release point (ft)	G_{EPN_x}	E_{max,EPN_x} , hourly,steadystate (lb/hr)
FUG	Site Fugitives	0.001	0.065	1,300	3	189	0.059
HT1	Heater Treater 1	1.67E-06	7.70E-05	1,300	18	88	1.49E-04
HT2	Heater Treater 2	1.67E-06	7.70E-05	1,300	18	88	1.49E-04
HT3	Heater Treater 3	1.67E-06	7.70E-05	1,300	18	88	1.49E-04
HT4	Heater Treater 4	1.67E-06	7.70E-05	1,300	18	88	1.49E-04
HT5	Heater Treater 5	1.67E-06	7.70E-05	1,300	18	88	1.49E-04
HT6	Heater Treater 6	1.67E-06	7.70E-05	1,300	18	88	1.49E-04
HT7	Heater Treater 7	1.67E-06	7.70E-05	1,300	18	88	1.49E-04
HT8	Heater Treater 8	1.67E-06	7.70E-05	1,300	18	88	1.49E-04
HT9	Heater Treater 9	3.34E-06	1.54E-04	1,300	18	88	2.98E-04
DEHYBLR1	Glycol Dehy Reboiler 1	5.01E-07	2.31E-05	1,300	14	88	4.46E-05
ENG1	Compressor Engine 1	0.004	0.181	1,300	25	8	3.849
ENG2	Compressor Engine 2	0.004	0.181	1,300	25	8	3.849
DEHYBLR1	Glycol Dehydrator - 1	0.012	0.566	1,300	14	88	1.093
FL1	Flare	1.24E-04	0.006	1,300	40	23	0.042
		$E_{\text{estimated,total,hourly,steadystate}}$ (lb/hr)	Total	Passed			$E_{\text{max,total,hourly,steadystate}}$ (lb/hr)
		0.02	1.00				8.89

Benzene Hourly Low Pressure Periodic - Impact Review							
EPN	Source Name	Periodic (low P) hourly estimated emissions for each EPN (lb/hr)	WR_{EPN_x}	Distance from emission point to nearest receptor (ft)	Height of emission release point (ft)	G_{EPN_x}	E_{max,EPN_x} , hourly,periodic(low pressure) (lb/hr)
FUG	Site Fugitives	0.001	0.013	1,300	3	189	0.012
HT1	Heater Treater 1	1.67E-06	1.58E-05	1,300	18	88	3.05E-05
HT2	Heater Treater 2	1.67E-06	1.58E-05	1,300	18	88	3.05E-05
HT3	Heater Treater 3	1.67E-06	1.58E-05	1,300	18	88	3.05E-05
HT4	Heater Treater 4	1.67E-06	1.58E-05	1,300	18	88	3.05E-05
HT5	Heater Treater 5	1.67E-06	1.58E-05	1,300	18	88	3.05E-05
HT6	Heater Treater 6	1.67E-06	1.58E-05	1,300	18	88	3.05E-05
HT7	Heater Treater 7	1.67E-06	1.58E-05	1,300	18	88	3.05E-05
HT8	Heater Treater 8	1.67E-06	1.58E-05	1,300	18	88	3.05E-05
HT9	Heater Treater 9	3.34E-06	3.16E-05	1,300	18	88	6.10E-05
DEHYBLR1	Glycol Dehy Reboiler 1	5.01E-07	4.74E-06	1,300	14	88	9.16E-06
ENG1	Compressor Engine 1	0.004	0.037	1,300	25	8	0.790
ENG2	Compressor Engine 2	0.004	0.037	1,300	25	8	0.790
DEHYBLR1	Glycol Dehydrator - 1	0.012	0.116	1,300	14	88	0.224
FL1	Flare	0.001	0.008	1,300	40	23	0.058
LOAD1	Uncontrolled and Uncaptured Oil Loading	0.036	0.338	1,300	10	233	0.246
LOAD2	Water Loading	0.004	0.036	1,300	10	233	0.026
AOS-FL1	AOS-2 Flare Operations	0.025	0.237	1,300	40	23	1.750
MSS	Tank Breathing Emissions during Maintenance	0.010	0.093	1,300	16	221	0.072
MSS	Tank Degassing	0.009	0.084	1,300	16	221	0.065
		$E_{\text{estimated,total,hourly,periodic (low pressure)}}$ (lb/hr)	Total	Passed			$E_{\text{max,total,hourly,periodic (low pressure)}}$ (lb/hr)
		0.11	1.00				4.03

PIONEER NATURAL RESOURCES USA, INC.

ET O'DANIEL 37-3H TANK BATTERY

BENZENE IMPACTS EVALUATION

<u>Benzene Hourly High Pressure Periodic - Impact Review</u>							
EPN	Source Name	Periodic (high P) hourly estimated emissions for each EPN (lb/hr)	WR _{EPNx}	Distance from emission point to nearest receptor (ft)	Height of emission release point (ft)	G _{EPNx}	E _{max,EPNx} , hourly,periodic(high pressure) (lb/hr)
FUG	Site Fugitives	0.001	0.003	1,300	3	189	0.003
HT1	Heater Treater 1	1.67E-06	3.67E-06	1,300	18	88	7.08E-06
HT2	Heater Treater 2	1.67E-06	3.67E-06	1,300	18	88	7.08E-06
HT3	Heater Treater 3	1.67E-06	3.67E-06	1,300	18	88	7.08E-06
HT4	Heater Treater 4	1.67E-06	3.67E-06	1,300	18	88	7.08E-06
HT5	Heater Treater 5	1.67E-06	3.67E-06	1,300	18	88	7.08E-06
HT6	Heater Treater 6	1.67E-06	3.67E-06	1,300	18	88	7.08E-06
HT7	Heater Treater 7	1.67E-06	3.67E-06	1,300	18	88	7.08E-06
HT8	Heater Treater 8	1.67E-06	3.67E-06	1,300	18	88	7.08E-06
HT9	Heater Treater 9	3.34E-06	7.33E-06	1,300	18	88	1.42E-05
DEHYBLR1	Glycol Dehy Reboiler 1	5.01E-07	1.10E-06	1,300	14	88	2.13E-06
ENG1	Compressor Engine 1	0.004	0.009	1,300	25	8	0.183
ENG2	Compressor Engine 2	0.004	0.009	1,300	25	8	0.183
DEHYBLR1	Glycol Dehydrator - 1	0.012	0.027	1,300	14	88	0.052
FL1	Flare	0.001	0.002	1,300	40	23	0.013
LOAD1	Uncontrolled and Uncaptured Oil Loading	0.036	0.078	1,300	10	233	0.057
LOAD2	Water Loading	0.004	0.008	1,300	10	233	0.006
AOS-FL1	AOS-2 Flare Operations	0.025	0.055	1,300	40	23	0.406
MSS	Tank Breathing Emissions during Maintenance	0.010	0.022	1,300	16	221	0.017
MSS	Tank Degassing	0.009	0.020	1,300	16	221	0.015
AOS-FL1	AOS-1 Flare Operations	0.146	0.320	1,300	40	23	2.362
MSS	Blowdown Emissions	0.204	0.448	1,300	18	17	4.483
		E _{estimated,total,hourly,periodic (high pressure) (lb/hr)}	Total	Passed			E _{max,total, hourly,periodic(high pressure) (lb/hr)}
		0.46	1.00				7.78

<u>Benzene Annual - Impact Review</u>							
EPN	Source Name	Annual estimated emissions for each EPN (tpy)	WR _{EPNx}	Distance from emission point to nearest receptor (ft)	Height of emission release point (ft)	G _{EPNx}	E _{max,EPNx} , annual (tpy)
FUG	Site Fugitives	0.006	0.041	1,300	3	189	0.012
HT1	Heater Treater 1	7.32E-06	4.88E-05	1,300	18	88	3.12E-05
HT2	Heater Treater 2	7.32E-06	4.88E-05	1,300	18	88	3.12E-05
HT3	Heater Treater 3	7.32E-06	4.88E-05	1,300	18	88	3.12E-05
HT4	Heater Treater 4	7.32E-06	4.88E-05	1,300	18	88	3.12E-05
HT5	Heater Treater 5	7.32E-06	4.88E-05	1,300	18	88	3.12E-05
HT6	Heater Treater 6	7.32E-06	4.88E-05	1,300	18	88	3.12E-05
HT7	Heater Treater 7	7.32E-06	4.88E-05	1,300	18	88	3.12E-05
HT8	Heater Treater 8	7.32E-06	4.88E-05	1,300	18	88	3.12E-05
HT9	Heater Treater 9	1.46E-05	9.76E-05	1,300	18	88	6.24E-05
DEHYBLR1	Glycol Dehy Reboiler 1	2.20E-06	1.46E-05	1,300	14	88	9.36E-06
ENG1	Compressor Engine 1	0.017	0.115	1,300	25	8	0.807
ENG2	Compressor Engine 2	0.017	0.115	1,300	25	8	0.807
DEHYBLR1	Glycol Dehydrator - 1	0.054	0.359	1,300	14	88	0.229
FL1	Flare	0.001	0.008	1,300	40	23	0.019
LOAD1	Uncontrolled and Uncaptured Oil Loading	0.004	0.024	1,300	10	233	0.006
LOAD2	Water Loading	0.001	0.009	1,300	10	233	0.002
AOS-FL1	AOS-2 Flare Operations	0.003	0.020	1,300	40	23	0.049
MSS	Tank Breathing Emissions during Maintenance	2.46E-04	0.002	1,300	16	221	4.18E-04
MSS	Tank Degassing	0.001	0.004	1,300	16	221	0.001
AOS-FL1	AOS-1 Flare Operations	0.044	0.291	1,300	40	23	0.713
MSS	Blowdown Emissions	0.002	0.011	1,300	18	17	0.038
		E _{estimated,total,annual (tpy)}	Total	Passed			E _{max,total, annual (tpy)}
		0.15	1.00				2.68

PIONEER NATURAL RESOURCES USA, INC.
ET O'DANIEL 37-3H TANK BATTERY
H₂S IMPACTS EVALUATION

H ₂ S Hourly SPLS (State Property Line Standard) (µg/m ³):	162.00
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H ₂ S Hourly Steady State - Impact Review							
EPN	Source Name	Steady state hourly estimated emissions for each EPN (lb/hr)	WR _{EPNx}	Distance from emission point to property line (ft)	Height of emission release point (ft)	G _{EPNx}	E _{max,EPNx, hourly,steadystate} (lb/hr)
FUG	Site Fugitives	5.40E-05	0.220	50	3	4375	0.008
DEHYBLR1	Glycol Dehydrator - 1	1.83E-04	0.742	50	14	469	0.256
FL1	Flare	9.56E-06	0.039	50	40	26	0.242
		E _{estimated,total,hourly,steadystate} (lb/hr)	Total	Passed			E _{max,total, hourly,steadystate} (lb/hr)
		2.46E-04	1.00				0.51

H ₂ S Hourly Low Pressure Periodic - Impact Review							
EPN	Source Name	Periodic (low P) hourly estimated emissions for each EPN (lb/hr)	WR _{EPNx}	Distance from emission point to property line (ft)	Height of emission release point (ft)	G _{EPNx}	E _{max,EPNx, hourly,periodic(low pressure)} (lb/hr)
FUG	Site Fugitives	5.40E-05	0.007	50	3	4375	2.56E-04
DEHYBLR1	Glycol Dehydrator - 1	1.83E-04	0.023	50	14	469	0.008
FL1	Flare	6.08E-05	0.008	50	40	26	0.048
LOAD1	Uncontrolled and Uncaptured Oil Loading	0.003	0.332	50	10	1232	0.044
LOAD2	Water Loading	0.001	0.103	50	10	1232	0.014
AOS-FL1	AOS-2 Flare Operations	0.002	0.271	50	40	26	1.689
MSS	Tank Breathing Emissions during Maintenance	0.001	0.173	50	16	791	0.035
MSS	Tank Degassing	0.001	0.083	50	16	791	0.017
		E _{estimated,total,hourly,periodic (low pressure)} (lb/hr)	Total	Passed			E _{max,total, hourly,periodic (low pressure)} (lb/hr)
		0.01	1.00				1.86

H ₂ S Hourly High Pressure Periodic - Impact Review							
EPN	Source Name	Periodic (high P) hourly estimated emissions for each EPN (lb/hr)	WR _{EPNx}	Distance from emission point to property line (ft)	Height of emission release point (ft)	G _{EPNx}	E _{max,EPNx, hourly,periodic(high pressure)} (lb/hr)
FUG	Site Fugitives	5.40E-05	0.001	50	3	4375	5.49E-05
DEHYBLR1	Glycol Dehydrator - 1	1.83E-04	0.005	50	14	469	0.002
FL1	Flare	6.08E-05	0.002	50	40	26	0.010
LOAD1	Uncontrolled and Uncaptured Oil Loading	0.003	0.071	50	10	1232	0.009
LOAD2	Water Loading	0.001	0.022	50	10	1232	0.003
AOS-FL1	AOS-2 Flare Operations	0.002	0.058	50	40	26	0.362
MSS	Tank Breathing Emissions during Maintenance	0.001	0.037	50	16	791	0.008
MSS	Tank Degassing	0.001	0.018	50	16	791	0.004
AOS-FL1	AOS-1 Flare Operations	0.013	0.353	50	40	26	2.199
MSS	Blowdown Emissions	0.016	0.433	50	18	25	2.803
		E _{estimated,total,hourly,periodic (high pressure)} (lb/hr)	Total	Passed			E _{max,total, hourly,periodic (high pressure)} (lb/hr)
		0.04	1.00				5.40

PIONEER NATURAL RESOURCES USA, INC.
ET O'DANIEL 37-3H TANK BATTERY
NAAQS ANNUAL IMPACTS EVALUATION

Annual NAAQS ($\mu\text{g}/\text{m}^3$): 100

FIN	NO _x Emissions	NO ₂ /NO _x Ratio	NO ₂ Emissions (T/yr)	Stack Parameters		Generic Modeling Results ($\mu\text{g}/\text{m}^3/\text{lb}/\text{hr}$)	Weighted Ratio of Emissions (WR) (annual)	Calculated NAAQS (T/yr)
	(T/yr)			Distance (ft)	Height (ft)			
HT1 / Heater Treater 1	0.3485	0.80	0.2788	50	18.42	469	0.72%	0.0842
HT2 / Heater Treater 2	0.3485	0.80	0.2788	50	18.42	469	0.72%	0.0842
HT3 / Heater Treater 3	0.3485	0.80	0.2788	50	18.42	469	0.72%	0.0842
HT4 / Heater Treater 4	0.3485	0.80	0.2788	50	18.42	469	0.72%	0.0842
HT5 / Heater Treater 5	0.3485	0.80	0.2788	50	18.42	469	0.72%	0.0842
HT6 / Heater Treater 6	0.3485	0.80	0.2788	50	18.42	469	0.72%	0.0842
HT7 / Heater Treater 7	0.3485	0.80	0.2788	50	18.42	469	0.72%	0.0842
HT8 / Heater Treater 8	0.3485	0.80	0.2788	50	18.42	469	0.72%	0.0842
HT9 / Heater Treater 9	0.6970	0.80	0.5576	50	18.42	469	1.44%	0.1683
DEHYBLR1 / Glycol Dehy Reboiler 1	0.1046	0.80	0.0836	50	13.92	469	0.22%	0.0253
ENG1 / Compressor Engine 1	13.3257	0.20	2.6651	50	25.00	10	27.57%	150.9383
ENG2 / Compressor Engine 2	13.3257	0.20	2.6651	50	25.00	10	27.57%	150.9383
FL1 / Flare	0.3799	0.80	0.3039	50	40.00	23	0.79%	1.8708
AOS-FL1 / AOS-1 Flare Operations	17.3449	0.80	13.8759	50	40.00	23	35.88%	85.4186
AOS-FL1 / AOS-2 Flare Operations	0.3707	0.80	0.2966	50	40.00	23	0.77%	1.8258
Total	48.3364		22.6783					391.8587

Impacts Analysis:

	Annual
Calculated NO_x Emissions:	22.68
Calculated NO_x NAAQS:	391.86

The site's air contaminant maximum predicted concentrations are less than the appropriate NAAQS standard. Therefore the impacts analysis meets the requirements of the Standard Permit.

Calculations, Impact factors such as G, WR, and equations are from the 30 TAC §106.352 Tables:

Table 1: Emission Impact Tables Limits and Descriptions

Table 2: Fugitives and Process Vents Table

Table 3: Flares and Thermal Destruction Devices

Table 5D: Engines Greater Than 1,000 and Less Than or Equal to 1,500 hp

PIONEER NATURAL RESOURCES USA, INC.
ET O'DANIEL 37-3H TANK BATTERY
NAAQS IMPACTS EVALUATION

FIN	Description	PTE(NO _x ,HR) ^a (lb/hr)	Stack Parameters		C(NO _x ,HR) ^b μg/m ³ /lb/hr	GLC(NO _x ,HR) ^c (μg/m ³)	1-Hour	
			Height (ft)	Diam (ft)			R(NO ₂ /NO _x) ^d	GLC(NO ₂ ,HR) ^e (μg/m ³)
HT1	Heater Treater 1	0.0796	18.42	1.67	120.73	9.61	0.80	7.68
HT2	Heater Treater 2	0.0796	18.42	1.67	120.73	9.61	0.80	7.68
HT3	Heater Treater 3	0.0796	18.42	1.67	120.73	9.61	0.80	7.68
HT4	Heater Treater 4	0.0796	18.42	1.67	120.73	9.61	0.80	7.68
HT5	Heater Treater 5	0.0796	18.42	1.67	120.73	9.61	0.80	7.68
HT6	Heater Treater 6	0.0796	18.42	1.67	120.73	9.61	0.80	7.68
HT7	Heater Treater 7	0.0796	18.42	1.67	120.73	9.61	0.80	7.68
HT8	Heater Treater 8	0.0796	18.42	1.67	120.73	9.61	0.80	7.68
HT9	Heater Treater 9	0.1591	18.42	1.67	71.19	11.33	0.80	9.06
DEHYBLR1	Glycol Dehy Reboiler 1	0.0239	13.92	0.72	313.66	7.49	0.80	5.99
ENG1	Compressor Engine 1	3.0424	25.00	1.33	5.55	16.88	0.20	3.38
ENG2	Compressor Engine 2	3.0424	25.00	1.33	5.55	16.88	0.20	3.38
FL1	Flare	0.2609	40.00	0.98	6.85	1.79	0.80	1.43
AOS-FL1	AOS-1 Flare Operations	57.8162	40.00	15.55	0.07	3.80	0.80	3.04
AOS-FL1	AOS-2 Flare Operations	3.0896	40.00	3.39	0.97	2.98	0.80	2.39
Total NO₂ Concentration (μg/m³):								90.14
Significant Impact Level (μg/m³):								7.50
Midland County NO₂ Background Concentration (μg/m³)^f:								70.00
Total Off-Property Concentration (μg/m³):								160.14
NO₂ NAAQS (μg/m³):								188

^a PTE(NO_x,HR) = Hourly PTE NO_x.

^b C(NO_x,HR) = Hourly NO_x concentration predicted by SCREEN3 model, using a nominal 1 lb/hr NO_x emission rate.

^c GLC(NO_x,HR) = Hourly ground level concentration of NO_x.

An example calculation for hourly NO_x ground level concentration for FIN HT1 follows:

$$GLC(NO_{x,HR}) = PTE(NO_{x,HR}) * C(NO_{x,HR})$$

$$GLC(NO_{x,HR}) = (0.08 \text{ lb/hr}) * (120.73 \text{ μg/m}^3/1 \text{ lb/hr})$$

$$GLC(NO_{x,HR}) = 9.61 \text{ μg/m}^3 \text{ NO}_x$$

^d R(NO₂/NO_x) = NO₂/NO_x ratio from TCEQ Guidance Memo.

^e GLC(NO₂,HR) = Hourly ground level concentration of NO₂.

An example calculation for hourly NO₂ ground level concentration for FIN HT1 follows:

$$GLC(NO_{2,HR}) = GLC(NO_{x,HR}) * R(NO_2/NO_x)$$

$$GLC(NO_{2,HR}) = (9.61 \text{ μg/m}^3 \text{ NO}_x) * (0.80 \text{ NO}_2/\text{NO}_x)$$

$$GLC(NO_{2,HR}) = 7.68 \text{ μg/m}^3 \text{ NO}_2$$

^f The hourly NO₂ background concentration is from TCEQ Interim 1-Hour NO₂ Screening Background Concentrations and the annual NO₂ background concentration is from TCEQ Screening Background Concentration Memo - September 1998.

^g SCREEN3 model results are included in Attachment 7.