

Ovintiv USA Inc
Broken Spoke West Sat Pad

Impacts Analysis

Initial Screening

Air Contaminants	Screening Emission Rate (lb/hr)	Total Emission Rate (lb/hr)	Further Demonstration Required?	Nearest receptor (miles)	Nearest receptor (ft)	Screening Distance (miles)	Further Demonstration Required?
Benzene	0.039	0.09	Yes	>1	>5280	1.00	No
Hydrogen Sulfide	0.0250	0.0123	No	N/A	N/A	N/A	N/A
Sulfur Dioxide	2.0	1.04	No	N/A	N/A	N/A	N/A
Nitrogen Oxide	4.0	47.02	Yes	N/A	N/A	N/A	N/A

			Emission rates			Screen3 Input					Stack parameters					SCREEN3 Results [3]		
EPN	FIN	Emission Source Name	NOx	NO ₂ /NOx ratio [1]	NO ₂	Heat Release	Stack Height	Stack Diameter	Stack Gas Exit		Heat Release	Stack Height	Stack Diameter	Stack Gas Exit		Distance to max	SCREEN3 Ghourly	NO ₂ ³ µg/m ³
			lb/hr		lb/hr	cal/s	m	m	Velocity (m/s)	Temp (K)	MMBtu/hr	ft	ft	Flow [2] (cfm)	Temp (F)	m	(µg/m ³) / (lb/hr)	Normal
ENG-1	ENG-1	Generator - PSI 21.9L	0.642	0.2	0.128		2.438	0.152	60.4	840.4		8.00	0.50	2.333	1.053	60	45.82	5.879
ENG-2	ENG-2	Generator - PSI 21.9L	0.642	0.2	0.128		2.438	0.152	60.4	840.4		8.00	0.50	2.333	1.053	60	45.82	5.879
ENG-3	ENG-3	Generator - PSI 21.9L	0.642	0.2	0.128		2.438	0.152	60.4	840.4		8.00	0.50	2.333	1.053	60	45.82	5.879
ENG-4	ENG-4	Generator - PSI 21.9L	0.642	0.2	0.128		2.438	0.152	60.4	840.4		8.00	0.50	2.333	1.053	60	45.82	5.879
ENG-5	ENG-5	Generator - PSI 21.9L	0.642	0.2	0.128		2.438	0.152	60.4	840.4		8.00	0.50	2.333	1.053	60	45.82	5.879
ENG-6	ENG-6	Generator - PSI 21.9L	0.642	0.2	0.128		2.438	0.152	60.4	840.4		8.00	0.50	2.333	1.053	60	45.82	5.879
ENG-7	ENG-7	Generator - PSI 21.9L	0.642	0.2	0.128		2.438	0.152	60.4	840.4		8.00	0.50	2.333	1.053	60	45.82	5.879
FLR-01	FLR-01	Flare Pilot	0.012	0.8	0.010	21,586,138	12.192				308.173	40.00				1,075	0.13	0.001
		Combustion Products from Produced Gas	42.516	0.8	34.013													4.299
	PROD-GAS	--	--	--	--													
	Project Impacts (µg/m ³)																	45.454
Background (µg/m ³)																	70	
Total Impacts (µg/m ³)																	115.454	
Applicable Standard (µg/m ³)																	188	
Pass?																	Yes	

Notes:

[1] NO2 to NOx conversion factors determined in accordance with the TCEQ APDG 6232v2 Air Quality Modeling Guidelines (04/2015), and with paragraph (k)(4)(A) of 30 TAC §(k)(4)(A) of 30 TAC §116.602 – NON RULE 2012-NOV-08 for engines.

[2] Stack Gas Flow Rate was determined using the following formula: $Q = F_g \cdot [20.9 / (20.9 - \%O_2)] \cdot H_{in} / 60$, where F_g = Fuel factor, dry basis (from EPA Method 19) in dscf/MMBtu; $\%O_2$ = Measured oxygen concentration, dry basis expressed as a percentage; and H_{in} = Heat input rate in MMBtu/hr (Preferred and Alternative Methods for Estimating Air Emissions from Boilers, EPA, January 2001, Volume II, Chapter 2).

[3] Each EPN was modeled in SCREEN3 using a unit emission rate of 1 lb/hr (0.126 g/s). The Screen3 generic impact, Ghourly (µg/m3) / (lb/hr) was determined for each EPN. Emission rate from each source was multiplied by Ghourly. All maximum impacts were summed for each pollutant and evaluated against the appropriate NAAQS.

11:46:25

ENG PSI 22L

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	0.126000
STACK HEIGHT (M)	=	2.4380
STK INSIDE DIAM (M)	=	0.1520
STK EXIT VELOCITY (M/S)	=	60.4000
STK GAS EXIT TEMP (K)	=	840.4000
AMBIENT AIR TEMP (K)	=	308.0000
RECEPTOR HEIGHT (M)	=	0.0000
URBAN/RURAL OPTION	=	RURAL
BUILDING HEIGHT (M)	=	0.0000
MIN HORIZ BLDG DIM (M)	=	0.0000
MAX HORIZ BLDG DIM (M)	=	0.0000

BUOY. FLUX = 2.167 M**4/S**3; MOM. FLUX = 7.723 M**4/S**2.

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*** SCREEN AUTOMATED DISTANCES ***
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	DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)
DWASH	-----	-----	----	-----	-----	-----	-----	-----	-----
NO	1.	0.000	1	1.0	1.0	320.0	40.71	1.69	1.65
NO	100.	42.95	4	10.0	10.0	3200.0	6.26	8.27	4.78
NO	200.	30.02	4	5.0	5.0	1600.0	10.09	15.72	8.78
NO	300.	22.66	4	3.5	3.5	1120.0	13.37	22.83	12.49
NO	400.	18.17	4	2.5	2.5	800.0	17.75	29.78	15.88

NO	500.	15.18	4	2.0	2.0	640.0	21.57	36.56	19.10
NO	600.	13.09	4	2.0	2.0	640.0	21.57	43.07	21.90
NO	700.	11.53	4	1.5	1.5	480.0	27.95	49.73	25.12
NO	800.	10.35	4	1.5	1.5	480.0	27.95	56.05	27.76
NO	900.	9.252	4	1.5	1.5	480.0	27.95	62.31	30.35
NO	1000.	8.338	4	1.0	1.0	320.0	40.71	69.00	33.90
NO	1100.	8.214	6	1.0	1.0	10000.0	34.89	38.11	17.48
NO	1200.	8.537	6	1.0	1.0	10000.0	34.89	41.08	18.20
NO	1300.	8.770	6	1.0	1.0	10000.0	34.89	44.03	18.90
NO	1400.	8.926	6	1.0	1.0	10000.0	34.89	46.97	19.59
NO	1500.	9.017	6	1.0	1.0	10000.0	34.89	49.90	20.28
NO	1600.	9.053	6	1.0	1.0	10000.0	34.89	52.81	20.95
NO	1700.	9.044	6	1.0	1.0	10000.0	34.89	55.72	21.61
NO	1800.	8.998	6	1.0	1.0	10000.0	34.89	58.61	22.26
NO	1900.	8.922	6	1.0	1.0	10000.0	34.89	61.48	22.90
NO	2000.	8.823	6	1.0	1.0	10000.0	34.89	64.35	23.53
NO	2100.	8.670	6	1.0	1.0	10000.0	34.89	67.20	24.07
NO	2200.	8.511	6	1.0	1.0	10000.0	34.89	70.04	24.60
NO	2300.	8.348	6	1.0	1.0	10000.0	34.89	72.87	25.11
NO	2400.	8.183	6	1.0	1.0	10000.0	34.89	75.69	25.62
NO	2500.	8.016	6	1.0	1.0	10000.0	34.89	78.50	26.13
NO	2600.	7.850	6	1.0	1.0	10000.0	34.89	81.30	26.62
NO	2700.	7.685	6	1.0	1.0	10000.0	34.89	84.08	27.11
NO	2800.	7.521	6	1.0	1.0	10000.0	34.89	86.86	27.59
NO	2900.	7.360	6	1.0	1.0	10000.0	34.89	89.63	28.06
NO	3000.	7.202	6	1.0	1.0	10000.0	34.89	92.39	28.53
NO	3500.	6.440	6	1.0	1.0	10000.0	34.89	106.06	30.43

	4000.	5.793	6	1.0	1.0	10000.0	34.89	119.53	32.20
NO	4500.	5.244	6	1.0	1.0	10000.0	34.89	132.83	33.87
NO	5000.	4.775	6	1.0	1.0	10000.0	34.89	145.97	35.44
NO									

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

NO	60.	45.82	4	20.0	20.0	6400.0	4.35	5.21	3.06
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DWASH= MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, $X < 3 \cdot LB$

 *** SUMMARY OF SCREEN MODEL RESULTS ***

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
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SIMPLE TERRAIN	45.82	60.	0.

 ** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **

13:33:35

FLR-01

SOURCE TYPE	=	FLARE
EMISSION RATE (G/S)	=	0.126000
FLARE STACK HEIGHT (M)	=	12.1920
TOT HEAT RLS (CAL/S)	=	0.215861E+08
RECEPTOR HEIGHT (M)	=	0.0000
URBAN/RURAL OPTION	=	RURAL
EFF RELEASE HEIGHT (M)	=	26.8037
BUILDING HEIGHT (M)	=	0.0000
MIN HORIZ BLDG DIM (M)	=	0.0000
MAX HORIZ BLDG DIM (M)	=	0.0000

BUOY. FLUX = 357.905 M**4/S**3; MOM. FLUX = 218.243 M**4/S**2.

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*** SCREEN AUTOMATED DISTANCES ***
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	DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)
DWASH	-----	-----	----	-----	-----	-----	-----	-----	-----
NO	1.	0.000	1	1.0	1.1	1258.4	1257.39	4.48	4.47
NO	100.	0.1696E-02	6	1.0	1.7	10000.0	172.96	40.86	40.72
NO	200.	0.3580E-02	5	1.0	1.4	10000.0	214.90	54.99	54.10
NO	300.	0.3829E-02	5	1.0	1.4	10000.0	214.90	56.34	54.44
NO	400.	0.4105E-02	5	1.0	1.4	10000.0	214.90	58.08	54.82
NO	500.	0.4427E-02	5	1.0	1.4	10000.0	214.90	60.15	55.25

NO	600.	0.1778E-01	1	3.0	3.2	960.0	437.00	151.05	169.87
NO	700.	0.5056E-01	1	3.0	3.2	960.0	437.00	171.86	227.70
NO	800.	0.7377E-01	1	3.0	3.2	960.0	437.00	192.22	296.08
NO	900.	0.1039	1	2.0	2.1	643.1	642.09	236.86	389.61
NO	1000.	0.1230	1	2.0	2.1	643.1	642.09	257.87	478.46
NO	1100.	0.1261	1	2.0	2.1	643.1	642.09	278.52	578.28
NO	1200.	0.1212	1	2.0	2.1	643.1	642.09	298.85	689.15
NO	1300.	0.1152	1	2.0	2.1	643.1	642.09	316.29	810.14
NO	1400.	0.1101	1	2.0	2.1	643.1	642.09	331.14	941.69
NO	1500.	0.1054	1	2.0	2.1	643.1	642.09	346.12	1084.94
NO	1600.	0.1010	1	2.0	2.1	643.1	642.09	361.19	1239.83
NO	1700.	0.9693E-01	1	2.0	2.1	643.1	642.09	376.33	1406.37
NO	1800.	0.9317E-01	1	2.0	2.1	643.1	642.09	391.52	1584.57
NO	1900.	0.8968E-01	1	2.0	2.1	643.1	642.09	406.74	1774.45
NO	2000.	0.8644E-01	1	2.0	2.1	643.1	642.09	421.98	1976.05

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:

NO	1075.	0.1264	1	2.0	2.1	643.1	642.09	273.19	551.26
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DWASH= MEANS NO CALC MADE (CONC = 0.0)
 DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, $X < 3 \cdot LB$

 *** SUMMARY OF SCREEN MODEL RESULTS ***

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	0.1264	1075.	0.

 ** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
