

ATTACHMENT G

Impacts Evaluation and Supporting Documentation

Ovintiv USA Inc
Balmorhea F258X

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	0.26	Yes	>1	>5280	1.00	No
Hydrogen Sulfide	0.0250	0.0108	No	N/A	N/A	N/A	N/A
Sulfur Dioxide	2.0	0.63	No	N/A	N/A	N/A	N/A
Nitrogen Oxide	4.0	49.65	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 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	VRU Engine - Cummins G855	0.207	0.2	0.041	2.438		0.101	50.5	919.0		8.00	0.33	866	1,195	41	99.60	4.128										
ENG-2	ENG-2	VRU Engine - Cummins G855	0.207	0.2	0.041	2.438		0.101	50.5	919.0		8.00	0.33	866	1,195	41	99.60	4.128										
ENG-3	ENG-3	VRU Engine - GM 5.7L	0.543	0.2	0.109	2.438		0.101	37.9	922.0		8.00	0.33	650	1,200	37	121	13.168										
ENG-4	ENG-4	VRU Engine - GM 5.7L	0.543	0.2	0.109	2.438		0.101	37.9	922.0		8.00	0.33	650	1,200	37	121	13.168										
H-1	H-1	Heater Treater 1	0.098	0.8	0.078	6.096		0.152	11.3	755.4	1.00	20.00	0.50	435	900	120	72.13	5.655										
H-2	H-2	Heater Treater 2	0.098	0.8	0.078	6.096		0.152	11.3	755.4	1.00	20.00	0.50	435	900	120	72.13	5.655										
FLR-01	FLR-01	Flare Pilot	0.011	0.8	0.009	17,459,105		12.192		249.254		40.00				1,068		0.13	0.001									
		Combustion Products from Produced Gas	34.386	0.8	27.509	3.595																						
	PROD-GAS	Produced Gas	--	--	--	--	--																					
FLR-02	FLR-02	Flare Pilot	0.011	0.8	0.009	6,879,378		12.192		98.213		40.00				979		0.27	0.002									
		Combustion Products from Controlled Tanks	13.542	0.8	10.834	2.965																						
	TK-6010, TK-6020, TK-6030, TK-5010, TK-5020, TK-5030	Controlled Tanks	--	--	--																							
Project Impacts (µg/m³)																		52.466										
Background (µg/m³)																		70										
Total Impacts (µg/m³)																		122.466										
Applicable Standard (µg/m³)																		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: $Q = F_d * [20.9/(20.9 - \%O_2)] * H_{tr}/60$, where F_d = Fuel factor, dry basis (from EPA Method 19) in dscf/MMBtu; $\%O_2$ = Measured oxygen concentration, dry basis expressed as a percentage; and H_{tr} = 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. 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.

09:50:31

FLR-01

SOURCE TYPE	=	FLARE
EMISSION RATE (G/S)	=	0.126000
FLARE STACK HEIGHT (M)	=	12.1920
TOT HEAT RLS (CAL/S)	=	0.174591E+08
RECEPTOR HEIGHT (M)	=	0.0000
URBAN/RURAL OPTION	=	RURAL
EFF RELEASE HEIGHT (M)	=	25.3944
BUILDING HEIGHT (M)	=	0.0000
MIN HORIZ BLDG DIM (M)	=	0.0000
MAX HORIZ BLDG DIM (M)	=	0.0000

BUOY. FLUX = 289.478 M**4/S**3; MOM. FLUX = 176.517 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	1114.0	1112.97	4.19	4.17
NO	100.	0.2648E-02	6	1.0	1.7	10000.0	162.93	39.23	39.09
NO	200.	0.4108E-02	5	1.0	1.4	10000.0	201.76	51.71	50.77
NO	300.	0.4435E-02	5	1.0	1.4	10000.0	201.76	53.15	51.13
NO	400.	0.4799E-02	5	1.0	1.4	10000.0	201.76	54.99	51.54
NO	500.	0.5227E-02	5	1.0	1.4	10000.0	201.76	57.17	51.99

NO	600.	0.3478E-01	1	3.0	3.2	960.0	387.92	148.89	167.96
NO	700.	0.7489E-01	1	3.0	3.2	960.0	387.92	169.53	225.95
NO	800.	0.9413E-01	1	3.0	3.2	960.0	387.92	189.74	294.47
NO	900.	0.1096	1	2.0	2.1	640.0	569.18	231.53	386.39
NO	1000.	0.1279	1	2.0	2.1	640.0	569.18	252.24	475.44

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:
 1068. 0.1307 1 2.0 2.1 640.0 569.18 265.92 541.23
 NO

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	0.1307	1068.	0.

 ** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **

	600.	0.1997	1	3.0	3.2	960.0	231.00	141.96	161.85
NO									
	700.	0.2298	4	20.0	22.3	6400.0	48.33	49.81	25.28
NO									
	800.	0.2595	4	20.0	22.3	6400.0	48.33	56.22	28.10
NO									
	900.	0.2713	4	20.0	22.3	6400.0	48.33	62.47	30.67
NO									
	1000.	0.2735	4	20.0	22.3	6400.0	48.33	68.66	33.20
NO									

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 1. M:
 979. 0.2737 4 20.0 22.3 6400.0 48.33 67.42 32.70
 NO

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*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	0.2737	979.	0.

 ** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **

10:54:34

*** ENG Cummins G855

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	0.126000
STACK HEIGHT (M)	=	2.4400
STK INSIDE DIAM (M)	=	0.1000
STK EXIT VELOCITY (M/S)	=	50.5100
STK GAS EXIT TEMP (K)	=	919.0000
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 = 0.823 M**4/S**3; MOM. FLUX = 2.138 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								
-----	-----	----	-----	-----	-----	-----	-----	-----

1.	0.000	1	1.0	1.0	320.0	20.96	1.14	1.08
NO								
100.	88.73	4	5.0	5.0	1600.0	6.14	8.27	4.77
NO								
200.	61.99	4	2.5	2.5	800.0	9.85	15.71	8.76
NO								
300.	46.58	4	1.5	1.5	480.0	14.78	22.88	12.60
NO								
400.	36.86	4	1.5	1.5	480.0	14.78	29.66	15.67
NO								

NO	500.	31.47	4	1.0	1.0	320.0	20.96	36.53	19.05
NO	600.	26.92	4	1.0	1.0	320.0	20.96	43.04	21.86
NO	700.	22.92	4	1.0	1.0	320.0	20.96	49.47	24.61
NO	800.	19.60	4	1.0	1.0	320.0	20.96	55.82	27.30
NO	900.	18.03	6	1.0	1.0	10000.0	25.94	31.50	14.62
NO	1000.	18.42	6	1.0	1.0	10000.0	25.94	34.54	15.48
NO	1100.	18.40	6	1.0	1.0	10000.0	25.94	37.57	16.27
NO	1200.	18.20	6	1.0	1.0	10000.0	25.94	40.57	17.04
NO	1300.	17.87	6	1.0	1.0	10000.0	25.94	43.56	17.79
NO	1400.	17.45	6	1.0	1.0	10000.0	25.94	46.53	18.52
NO	1500.	16.97	6	1.0	1.0	10000.0	25.94	49.49	19.24
NO	1600.	16.46	6	1.0	1.0	10000.0	25.94	52.43	19.95
NO	1700.	15.93	6	1.0	1.0	10000.0	25.94	55.35	20.64
NO	1800.	15.40	6	1.0	1.0	10000.0	25.94	58.26	21.32
NO	1900.	14.87	6	1.0	1.0	10000.0	25.94	61.15	21.99
NO	2000.	14.35	6	1.0	1.0	10000.0	25.94	64.03	22.65
NO	2100.	13.83	6	1.0	1.0	10000.0	25.94	66.89	23.20
NO	2200.	13.33	6	1.0	1.0	10000.0	25.94	69.75	23.75
NO	2300.	12.86	6	1.0	1.0	10000.0	25.94	72.59	24.29
NO	2400.	12.41	6	1.0	1.0	10000.0	25.94	75.42	24.81
NO	2500.	11.98	6	1.0	1.0	10000.0	25.94	78.24	25.33
NO	2600.	11.57	6	1.0	1.0	10000.0	25.94	81.04	25.84
NO	2700.	11.18	6	1.0	1.0	10000.0	25.94	83.84	26.34
NO	2800.	10.81	6	1.0	1.0	10000.0	25.94	86.63	26.83
NO	2900.	10.46	6	1.0	1.0	10000.0	25.94	89.40	27.32
NO	3000.	10.13	6	1.0	1.0	10000.0	25.94	92.17	27.80
NO	3500.	8.706	6	1.0	1.0	10000.0	25.94	105.87	29.75

	4000.	7.594	6	1.0	1.0	10000.0	25.94	119.36	31.56
NO									
	4500.	6.705	6	1.0	1.0	10000.0	25.94	132.67	33.26
NO									
	5000.	5.981	6	1.0	1.0	10000.0	25.94	145.83	34.86
NO									

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

	41.	99.60	3	8.0	8.0	2560.0	4.75	5.62	3.43
NO									

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	99.60	41.	0.

 ** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **

10:56:47

ENG GM 5.7L

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	0.126000
STACK HEIGHT (M)	=	2.4400
STK INSIDE DIAM (M)	=	0.1000
STK EXIT VELOCITY (M/S)	=	37.9100
STK GAS EXIT TEMP (K)	=	922.0000
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 = 0.619 M**4/S**3; MOM. FLUX = 1.200 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	17.39	0.96	0.88
NO	100.	109.9	4	4.0	4.0	1280.0	6.18	8.27	4.77
NO	200.	76.81	4	2.0	2.0	640.0	9.92	15.71	8.76
NO	300.	57.36	4	1.5	1.5	480.0	12.41	22.79	12.42
NO	400.	46.58	4	1.0	1.0	320.0	17.39	29.76	15.86

NO	500.	38.21	4	1.0	1.0	320.0	17.39	36.40	18.79
NO	600.	31.26	4	1.0	1.0	320.0	17.39	42.93	21.64
NO	700.	25.82	4	1.0	1.0	320.0	17.39	49.37	24.41
NO	800.	21.96	6	1.0	1.0	10000.0	23.81	28.30	13.44
NO	900.	22.47	6	1.0	1.0	10000.0	23.81	31.38	14.35
NO	1000.	22.53	6	1.0	1.0	10000.0	23.81	34.43	15.23
NO	1100.	22.15	6	1.0	1.0	10000.0	23.81	37.46	16.03
NO	1200.	21.61	6	1.0	1.0	10000.0	23.81	40.48	16.81
NO	1300.	20.96	6	1.0	1.0	10000.0	23.81	43.47	17.57
NO	1400.	20.24	6	1.0	1.0	10000.0	23.81	46.45	18.31
NO	1500.	19.50	6	1.0	1.0	10000.0	23.81	49.41	19.04
NO	1600.	18.75	6	1.0	1.0	10000.0	23.81	52.35	19.75
NO	1700.	18.01	6	1.0	1.0	10000.0	23.81	55.28	20.45
NO	1800.	17.29	6	1.0	1.0	10000.0	23.81	58.19	21.13
NO	1900.	16.59	6	1.0	1.0	10000.0	23.81	61.09	21.81
NO	2000.	15.92	6	1.0	1.0	10000.0	23.81	63.97	22.47
NO	2100.	15.27	6	1.0	1.0	10000.0	23.81	66.84	23.03
NO	2200.	14.66	6	1.0	1.0	10000.0	23.81	69.69	23.58
NO	2300.	14.08	6	1.0	1.0	10000.0	23.81	72.54	24.12
NO	2400.	13.54	6	1.0	1.0	10000.0	23.81	75.37	24.66
NO	2500.	13.03	6	1.0	1.0	10000.0	23.81	78.19	25.18
NO	2600.	12.54	6	1.0	1.0	10000.0	23.81	81.00	25.69
NO	2700.	12.09	6	1.0	1.0	10000.0	23.81	83.79	26.19
NO	2800.	11.66	6	1.0	1.0	10000.0	23.81	86.58	26.69
NO	2900.	11.25	6	1.0	1.0	10000.0	23.81	89.36	27.18
NO	3000.	10.87	6	1.0	1.0	10000.0	23.81	92.13	27.66
NO	3500.	9.262	6	1.0	1.0	10000.0	23.81	105.83	29.62

	4000.	8.026	6	1.0	1.0	10000.0	23.81	119.33	31.44
NO									
	4500.	7.048	6	1.0	1.0	10000.0	23.81	132.64	33.14
NO									
	5000.	6.260	6	1.0	1.0	10000.0	23.81	145.80	34.75
NO									

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

	37.	121.2	3	8.0	8.0	2560.0	4.31	5.11	3.12
NO									

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	121.2	37.	0.

 ** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **

10:18:22

*** VERSION DATED 13043 ***

SIMPLE TERRAIN INPUTS:

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

*** FULL METEOROLOGY ***

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING
DISTANCES ***

	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	16.22	0.64	0.52
NO	100.	71.35	3	2.0	2.0	640.0	11.16	12.55	7.58
NO	200.	66.01	4	1.5	1.5	480.0	12.85	15.68	8.72
NO	300.	60.43	4	1.0	1.0	320.0	16.22	22.79	12.43
NO	400.	50.58	4	1.0	1.0	320.0	16.22	29.60	15.54

NO	500.	40.70	4	1.0	1.0	320.0	16.22	36.26	18.52
NO	600.	32.84	4	1.0	1.0	320.0	16.22	42.82	21.41
NO	700.	26.86	4	1.0	1.0	320.0	16.22	49.27	24.21
NO	800.	22.32	4	1.0	1.0	320.0	16.22	55.65	26.94
NO	900.	20.83	6	1.0	1.0	10000.0	24.07	31.20	13.96
NO	1000.	21.23	6	1.0	1.0	10000.0	24.07	34.27	14.87
NO	1100.	21.11	6	1.0	1.0	10000.0	24.07	37.32	15.68
NO	1200.	20.76	6	1.0	1.0	10000.0	24.07	40.34	16.48
NO	1300.	20.27	6	1.0	1.0	10000.0	24.07	43.35	17.25
NO	1400.	19.68	6	1.0	1.0	10000.0	24.07	46.33	18.01
NO	1500.	19.03	6	1.0	1.0	10000.0	24.07	49.30	18.75
NO	1600.	18.36	6	1.0	1.0	10000.0	24.07	52.25	19.47
NO	1700.	17.69	6	1.0	1.0	10000.0	24.07	55.18	20.18
NO	1800.	17.01	6	1.0	1.0	10000.0	24.07	58.09	20.87
NO	1900.	16.35	6	1.0	1.0	10000.0	24.07	61.00	21.56
NO	2000.	15.72	6	1.0	1.0	10000.0	24.07	63.88	22.23
NO	2100.	15.09	6	1.0	1.0	10000.0	24.07	66.75	22.80
NO	2200.	14.50	6	1.0	1.0	10000.0	24.07	69.61	23.35
NO	2300.	13.95	6	1.0	1.0	10000.0	24.07	72.46	23.90
NO	2400.	13.42	6	1.0	1.0	10000.0	24.07	75.29	24.43
NO	2500.	12.92	6	1.0	1.0	10000.0	24.07	78.12	24.96
NO	2600.	12.45	6	1.0	1.0	10000.0	24.07	80.93	25.47
NO	2700.	12.00	6	1.0	1.0	10000.0	24.07	83.73	25.98
NO	2800.	11.58	6	1.0	1.0	10000.0	24.07	86.52	26.48
NO	2900.	11.18	6	1.0	1.0	10000.0	24.07	89.30	26.98
NO	3000.	10.80	6	1.0	1.0	10000.0	24.07	92.07	27.46
NO	3500.	9.221	6	1.0	1.0	10000.0	24.07	105.78	29.43

	4000.	7.997	6	1.0	1.0	10000.0	24.07	119.28	31.26
NO									
	4500.	7.028	6	1.0	1.0	10000.0	24.07	132.60	32.97
NO									
	5000.	6.244	6	1.0	1.0	10000.0	24.07	145.76	34.59
NO									

	MAXIMUM 1-HR CONCENTRATION AT OR BEYOND					1. M:			
	120.	72.13	3	1.5	1.5	480.0	12.85	14.99	9.07
NO									

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	72.13	120.	0.

 ** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
