Appendix B

Modeling

SCREEN3 Model Inputs

Parameter	Heater #1 Stack	Heater #2 Stack	Input - Worst-case Parameter
Stack height	25 feet, 4 inches	22 feet, 0 inches	6.7 meters (22 feet, 0 inches)
Diameter	2.50 ft	2.50 ft	0.76 meters (2.5 feet)
Exhaust Temp	550 F	650 F	561 K (550F)
Exit Flow Rate	9666 acfm	9425 acfm	9425 acfm

SCREEN3 Modeling Results

Maximum Concentration (µg/m³)	
41.68	max 1-hr @ 1gram per second emission rate
37.512	3-hr (0.9 * 1-hr)
29.176	8-hr (0.7 * 1-hr)
16.672	24-hr (0.4 * 1-hr)
5.21	Annual (0.125 * 1-hr)

Pollutant	Averaging Period	Emission Rate lb/hr	Emission Rate g/s	Max off-site concentration µg/m³	Standard µg/m³	Below MSL Standard?
Formaldehyde	Annual	9.03E-04	1.14E-04	5.93E-04	7.70E-02	Yes
Arsenic	Annual	2.41E-06	3.04E-07	1.58E-06	2.30E-04	Yes
Cadmium	Annual	1.33E-05	1.68E-06	8.73E-06	5.60E-04	Yes
Chromium +2,+3	Annual	1.69E-05	2.13E-06	1.11E-05	~~8.30E-05~~	Yes

natural gas

25 µg/m³ for $Cr^{+2,3}$
Ken K. 3-10-06

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                                                                    10/06/05
                                                                    11:22:08
  ***  SCREEN3 MODEL RUN  ***
  *** VERSION DATED 96043 ***

 Agrium SPA Project - Hot Oil Heater TAPs Modeling - Complex Terrain Included

 COMPLEX TERRAIN INPUTS:
    SOURCE TYPE              =        POINT
    EMISSION RATE (G/S)      =      1.00000
    STACK HT (M)             =       6.7000
    STACK DIAMETER (M)       =        .7600
    STACK VELOCITY (M/S)     =       9.8052
    STACK GAS TEMP (K)       =     561.0000
    AMBIENT AIR TEMP (K)     =     293.0000
    RECEPTOR HEIGHT (M)      =        .0000
    URBAN/RURAL OPTION       =        RURAL

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


 BUOY. FLUX =    6.633 M**4/S**3;  MOM. FLUX =    7.251 M**4/S**2.


 FINAL STABLE PLUME HEIGHT (M) =   40.8
 DISTANCE TO FINAL RISE (M)    =  151.3

                          *VALLEY 24-HR CALCS*   **SIMPLE TERRAIN 24-HR
CALCS**
  TERR          MAX 24-HR              PLUME HT              PLUME HT
   HT    DIST     CONC        CONC    ABOVE STK    CONC    ABOVE STK    U10M
USTK
  (M)    (M)   (UG/M**3)   (UG/M**3)  BASE (M)  (UG/M**3)  HGT (M)  SC   (M/S)
 ----- ------- ----------  ---------- ------   ---------- ------  -- ----
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   23.    456.  25.95       12.86        40.8    25.95       17.7   4  5.0
5.0
  123.   1000.  10.04       10.04        40.8    .0000         .0   0   .0
.0
  223.   1200.  7.925       7.925        40.8    .0000         .0   0   .0
.0
  323.   1500.  5.867       5.867        40.8    .0000         .0   0   .0
.0
                                                                    10/06/05
                                                                    11:22:08
  ***  SCREEN3 MODEL RUN  ***
  *** VERSION DATED 96043 ***

 Agrium SPA Project - Hot Oil Heater TAPs Modeling - Complex Terrain Included

 SIMPLE TERRAIN INPUTS:
    SOURCE TYPE              =        POINT
    EMISSION RATE (G/S)      =      1.00000
    STACK HEIGHT (M)         =       6.7000
    STK INSIDE DIAM (M)      =        .7600
    STK EXIT VELOCITY (M/S)=        9.8052
    STK GAS EXIT TEMP (K)    =     561.0000
    AMBIENT AIR TEMP (K)     =     293.0000
    RECEPTOR HEIGHT (M)      =        .0000
    URBAN/RURAL OPTION       =        RURAL
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   BUILDING HEIGHT (M)     =        .0000
   MIN HORIZ BLDG DIM (M) =         .0000
   MAX HORIZ BLDG DIM (M) =         .0000

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

   STACK EXIT VELOCITY WAS CALCULATED FROM
   VOLUME FLOW RATE =   9425.0000      (ACFM)

BUOY. FLUX =    6.633 M**4/S**3;  MOM. FLUX =    7.251 M**4/S**2.

*** FULL METEOROLOGY ***

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*** SCREEN AUTOMATED DISTANCES ***
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*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING 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
456.	41.68	4	8.0	8.0	2560.0	17.35	33.37	17.27	NO
500.	40.20	4	5.0	5.0	1600.0	24.41	36.50	18.98	NO
600.	36.33	4	4.5	4.5	1440.0	26.38	43.09	21.94	NO
700.	32.93	4	4.0	4.0	1280.0	28.84	49.59	24.85	NO
800.	30.07	4	3.5	3.5	1120.0	32.00	56.04	27.74	NO
900.	27.59	4	3.5	3.5	1120.0	32.00	62.30	30.34	NO
1000.	25.68	4	3.0	3.0	960.0	36.22	68.65	33.18	NO
1100.	23.74	4	3.0	3.0	960.0	36.22	74.79	35.15	NO
1200.	22.28	4	2.5	2.5	800.0	42.12	81.07	37.48	NO
1300.	20.94	4	2.5	2.5	800.0	42.12	87.11	39.33	NO
1400.	19.68	4	2.5	2.5	800.0	42.12	93.10	41.12	NO
1500.	19.82	5	1.0	1.0	10000.0	62.54	75.40	32.17	NO
1600.	20.35	5	1.0	1.0	10000.0	62.54	79.76	33.18	NO
1700.	20.76	5	1.0	1.0	10000.0	62.54	84.10	34.18	NO
1800.	21.05	5	1.0	1.0	10000.0	62.54	88.43	35.16	NO
1900.	21.24	5	1.0	1.0	10000.0	62.54	92.73	36.14	NO
2000.	21.65	6	1.0	1.0	10000.0	53.04	65.04	25.36	NO

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MAXIMUM 1-HR CONCENTRATION AT OR BEYOND   456. M:
   456.   41.68        4     8.0     8.0  2560.0   17.35   33.37   17.27    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

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     *** SUMMARY OF SCREEN MODEL RESULTS ***
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CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	41.68	456.	0.

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COMPLEX TERRAIN     25.95          456.       23. (24-HR CONC)

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** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
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