APPENDIX J

AIR DISPERSION MODELING REPORT

ALBERTA ENVIRONMENTAL PROTECTION & ENHANCEMENT ACT
AGRIUM JOFFRE RENEWAL APPLICATION
APPROVAL NUMBER 9998-01-00

APPENDIX CONTENTS:

Air Dispersion Modeling Report

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March 16, 2007 J2007-48

Agrium Products Inc.
Box 666
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Attention: Mr. Will Kanda, Process Engineer, P.Eng.

Subject: Dispersion Modelling for Agrium Products Inc.
Joffre Nitrogen Operation Plant and Chigwell Distribution Terminal
LSD 07-03-039-25 W4M and 07, 08, 09 and 10-34-040-25 W4M

As requested, Calvin Consulting Group Ltd. (Calvin Consulting) completed dispersion modelling for the Agrium Products Inc. (Agrium) Joffre Nitrogen Operation (JNO) Plant and Chigwell Distribution Terminal (CDT), which are located at LSD 07-03-039-25 W4M and LSDs 07, 08, 09 and 10-34-040-25 W4M, respectively. Other NO_x emission sources within 7 km of the JNO Plant were also included in the dispersion modelling. It should be noted that there are no other NO_x emission sources within the CDT modelling domain.

Modelling Approach and Emission Parameters

Information describing the normal operation and various flaring scenarios was provided by Agrium. Stack and emission parameters associated with the JNO Plant and CDT sources and other sources within the JNO 7 km modelling domain are shown in the following tables:

- **Table 1**. Stack and emission parameters for the Agrium JNO Plant and CDT point sources.
- **Table 2**. Fugitive emission rates associated with the Agrium JNO Plant and CDT.
- **Table 3.** Stack and emission parameters for other sources in the JNO Plant modelling domain.

The dispersion modelling was performed as per the latest Alberta Environment (AENV) Air Quality Model Guidelines, the U.S. EPA ISC-PRIME model, five years of meteorology data from the Red Deer Airport and complex terrain using the following receptor grids:

- Every 20 m out to 200 m
- Every 50 m out to 500 m
- Every 250 m out to 2500 m
- Every 500 m out to 5000 m
- Every 1000 m out to 7000 m
- Every 20 m along the perimeter fenceline
- Every 20 m out to 200 m surrounding the maximum predicted concentration obtained from the previous runs

Table 1. Stack and emission parameters for the Agrium JNO Plant and CDT point sources.

Source ID and Type	No. of Sources	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temp (°C)	NO_x Emission Rate (g/s)	NH_3 Emission Rate (g/s)
JNO Plant							
Steam Superheater / Boiler Stack (J-1)	1	45.6	2.22	2.94	365	1.296	0
CDT – Normal							
Flare Stack (C-1)	1	15.2	0.2	0.0027	711	0.0003	0
CDT – Sphere Vapour to Flare							
Flare Stack (C-1)	1	15.2	0.2	21.41	2094	4.408	8.3
CDT – Rail Car Venting to Flare							
Flare Stack (C-1)	1	15.2	0.2	69.93	2079	14.655	27.8

Table 2. Fugitive emission rates associated with the Agrium JNO Plant and CDT.

Location and Type	Total Area (m^2)	NH_3 Emission Rate (g/s)
JNO Plant		
Ammonia Fugitive Emission Area	24,019	0.504
CDT		
Ammonia	13,332	0.957

Table 3. Stack and emission parameters for other sources in the JNO Plant modelling domain.

Source ID and Type	No. of Sources	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temp (°C)	NO_x Emission Rate (g/s)
INEOS Joffre Flare Stacks						
Q5980	1	61	1.01	91.4	618	0.0444
INEOS Joffre Heaters / Furnaces						
F5901	1	42.2	2.61	5.35	310	1.2565
F5902	1	42.2	2.61	4.28	308	1.6919
F5601	1	42.2	1.52	7.24	347	0.4722
F5907	1	34.7	0.956	2.73	259	0.1389
F5903	1	6.426	1.03	0.72	870	0.0417
Nova Flare Stacks						
FS749 – E1 Flare Stack	1	76.3	1.22	0.016	1000	0.054
FS745 – E2 Flare Stack	1	76.3	1.22	0.016	1000	0.096
FS734 – E2 Vapour Comb. Unit	1	13.72	2.13	2.4	605	0.072
93S001 – HOG Flare Stack	1	50.29	0.902	0.010	1000	0.181
FS761 – E3 Primary Flare Stack	1	83.8	0.91	0.056	1000	0.182
FS763 – E3 Secondary Flare Stack	1	83.8	0.91	0.005	1000	0
51S001 – PE1 Flare Stack	1	50.29	0.902	1.27	1000	0.528
105S001 – PE2 Flare Stack	1	50.29	0.902	0.015	1000	0.068
105FH001 – PE2 V/L Comb. Unit	1	17.3	2.13	7.49	851	0.182
FS409 – Co-Products Flare Stack	1	13.72	2.08	2.21	604	0.075
Nova Heaters and Furnaces						
H101 – Cracking Furnace	1	67.1	2.03	6.6	262	2.250
H102 – Cracking Furnace	1	67.1	2.03	6.6	262	2.250
H103 – Cracking Furnace	1	67.1	2.03	6.6	262	2.250
H104 – Cracking Furnace	1	67.1	2.03	6.6	262	2.250
H105 – Cracking Furnace	1	67.1	2.03	6.6	262	2.250
H106 – Cracking Furnace	1	67.1	2.03	6.6	262	2.250
H107 – Cracking Furnace	1	34.4	1.52 x 1.68[(a)]	9.2	156	1.522
H108 – Cracking Furnace	1	34.4	1.52 x 1.68[(a)]	9.2	156	1.522
H109 – Cracking Furnace	1	34.4	0.91 x 1.12[(a)]	16	170	1.359
WHB601 – E1 Recovery Boiler	1	15.24	3.05	15.5	214	5.749
FB901A – E1 Steam Boiler	1	10.67	2.34	3.1	149	1.174
FB901B – E1 Steam Boiler	1	10.67	2.34	3.1	149	1.174
SH902A – Super Heater	1	27.74	1.75	2.4	279	0.657
H902B – Super Heater	1	27.74	1.75	2.4	279	0.657
H141 – Cracking Furnace	1	33.5	0.91 x 1.12[(a)]	16.6	187	1.568
H142 – Cracking Furnace	1	33.5	0.91 x 1.12[(a)]	16.6	187	1.568
H143 – Cracking Furnace	1	33.5	0.91 x 1.12[(a)]	16.6	187	1.568
H144 – Cracking Furnace	1	33.5	0.91 x 1.12[(a)]	16.6	187	1.568
H145 – Cracking Furnace	1	33.5	0.91 x 1.12[(a)]	16.6	187	1.568
H146 – Cracking Furnace	1	33.5	0.91 x 1.12[(a)]	16.6	187	1.568
H147 – Cracking Furnace	1	33.5	0.91 x 1.12[(a)]	16.6	187	1.568

Continued…

Table 3. Concluded.

Source ID and Type	No. of Sources	Stack Height (m)	Stack Diameter (m)	Exit Velocity (m/s)	Exit Temp (°C)	NO_x Emission Rate (g/s)
H148 – Cracking Furnace	1	33.5	0.91 x 1.12[(a)]	16.6	187	1.568
H149 – Cracking Furnace	1	33.5	0.91 x 1.12[(a)]	16.6	187	1.568
H150 – Cracking Furnace	1	33.5	0.91 x 1.12[(a)]	16.6	187	1.568
H151 – Cracking Furnace	1	33.5	0.91 x 1.12[(a)]	16.6	187	1.568
WHB605 – Recovery Boiler	1	19.5	3.05	17.4	149	9.038
FB905 – E2 Steam Boiler	1	15.24	1.82	5.4	150	1.565
H210 – Cracking Furnace	1	61	2.6	7.6	150	2.617
H220 – Cracking Furnace	1	61	2.6	7.6	150	2.617
H230 – Cracking Furnace	1	61	2.6	7.6	150	2.617
H250 – Cracking Furnace	1	61	2.6	7.6	150	2.617
H240 – Cracking Furnace	1	61	2.6	7.6	150	2.617
H260 – Cracking Furnace	1	61	2.6	7.6	150	2.617
H270 – Cracking Furnace	1	61	2.6	7.6	150	2.617
63ME001 – PE1 Boiler	1	10.67	1.07	2	180	0.096
63ME011 – PE1 Boiler	1	10.67	1.07	2	180	0.096
CT101 – Turbine (167000 kW)	1	45.7	5.5	21	82	10.046
CT201 – Turbine (167000 kW)	1	45.7	5.5	21	82	10.046
Cogen Steam Boiler	1	19.8	1.37	14.68	149	1.806
Area Source						
INEOS Flare Pit (Area = 180.3 m^2)						0.0095

[(a)] Rectangular Opening

Concluded.

Modelling Results for JNO

The modelling results for continuous operations associated with the Agrium JNO Plant and other facilities that emit NO_x in the JNO Plant modelling domain are presented in Table 4. The maximum overall NO_x concentration is 747.07 µg/m^3 (0.396 ppm). Using the Ozone Limiting Method as per the latest AENV Model Guideline, this corresponds to an overall maximum predicted hourly average ground-level NO_2 concentration of 169.0 µg/m^3 (0.090 ppm). This concentration is predicted to occur 5758 m northwest of the steam superheater and auxiliary boiler stack (J-1) and does not exceed the allowable Alberta Ambient Air Quality Guideline (AAAQG) of 400 µg/m^3 (0.212 ppm) for NO_2. Figure 1 shows the maximum predicted NO_2 concentrations over the entire modelling domain.

The maximum predicted hourly average ground-level NH_3 concentration associated with the Agrium JNO facility is 641.35 µg/m^3 (0.916 ppm). This concentration is predicted to occur 228 m southeast of the steam superheater and auxiliary boiler stack (J-1) and does not exceed the allowable AAAQG of 1400 µg/m^3 (2.000 ppm) for NH_3. Figure 2 shows the maximum predicted NH_3 concentrations over the entire modelling domain.

Table 4. Maximum predicted hourly average concentrations during normal operations at the JNO Plant.

Substance		NO_2	NH_3
Maximum Concentration	(µg/m^3)	169.0	641.4
Direction from Steam Superheater and Auxiliary Boiler Stack (J-1)		NW	SE
Downwind Distance from Flare	(m)	5758	228

Modelling Results for Normal Operating Conditions at CDT

The modelling results for normal operating conditions at the CDT are presented in Table 5. The maximum overall NO_x concentration is 0.39 µg/m^3 (0.0002 ppm). This corresponds to an overall maximum predicted hourly average ground-level NO_2 concentration of 0.39 µg/m^3 (0.0002 ppm). This concentration is predicted to occur 190 m south-southeast of the CDT flare stack (C-1) and does not exceed the allowable AAAQG of 400 µg/m^3 (0.212 ppm) for NO_2. Figure 3 shows the maximum predicted NO_2 concentrations over the entire modelling domain.

The maximum predicted hourly average ground-level NH_3 concentration is 1240.0 µg/m^3 (1.771 ppm). This concentration is predicted to occur 269 m northwest of the CDT flare stack (C-1) and does not exceed the allowable AAAQG of 1400 µg/m^3 (2.000 ppm) for NH_3. Figure 4 shows the maximum predicted NH_3 concentrations over the entire modelling domain.

Table 5. Maximum predicted hourly average concentrations during normal operations at CDT.

Substance		NO_2	NH_3
Maximum Concentration	(µg/m^3)	0.39	1240.0
Direction from CDT Flare Stack (C-1)		SSE	NW
Downwind Distance from Flare	(m)	190	269

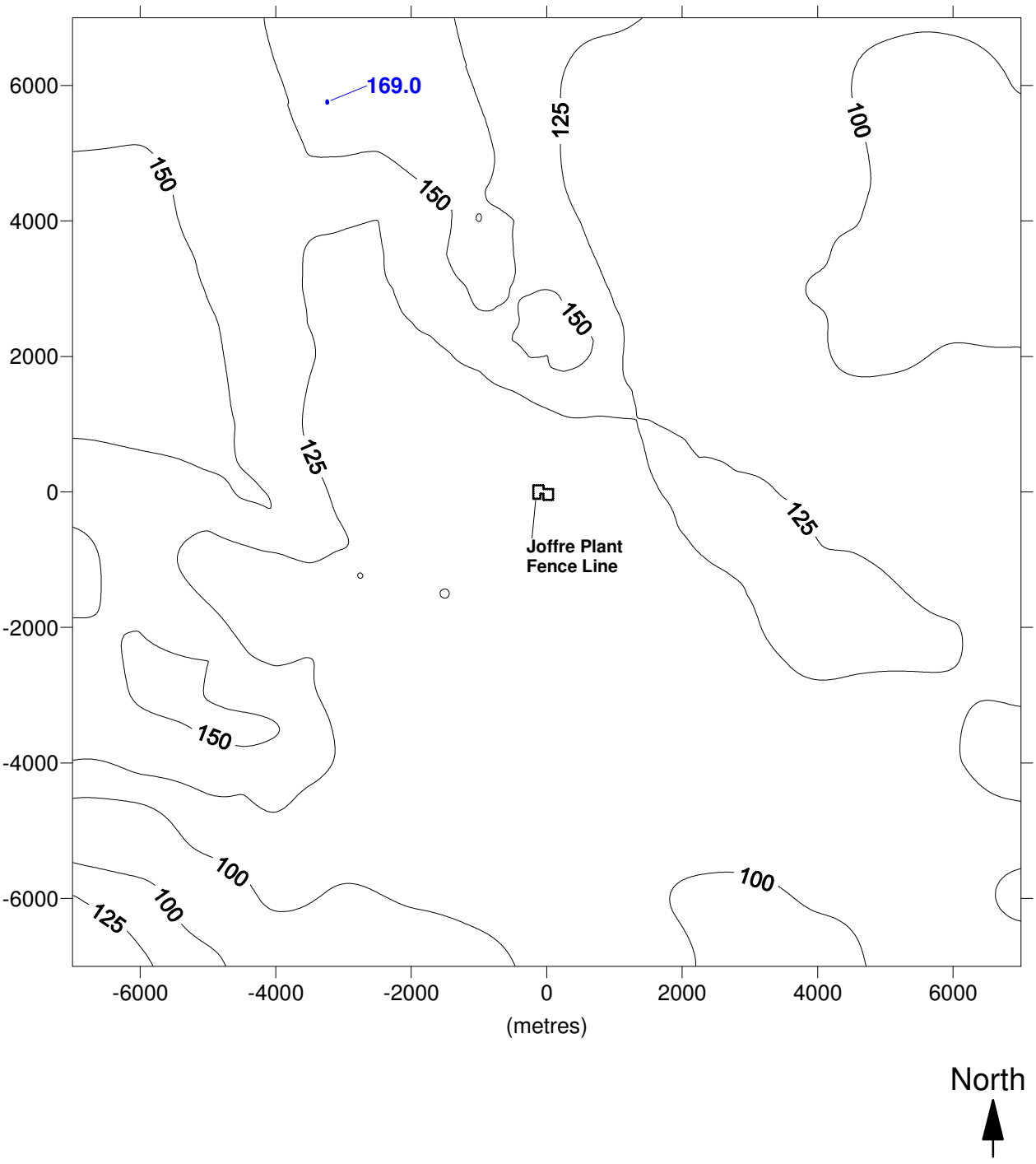

Figure 1. Maximum predicted hourly average NO_2 concentrations associated with normal operation of the sources at the Agrium JNO Plant and the existing Nova and INEOS plants located within 7 km of LSD 07-03-039-25 W4M. Isopleths shown include 100, 125 and 150 µg/m^3.

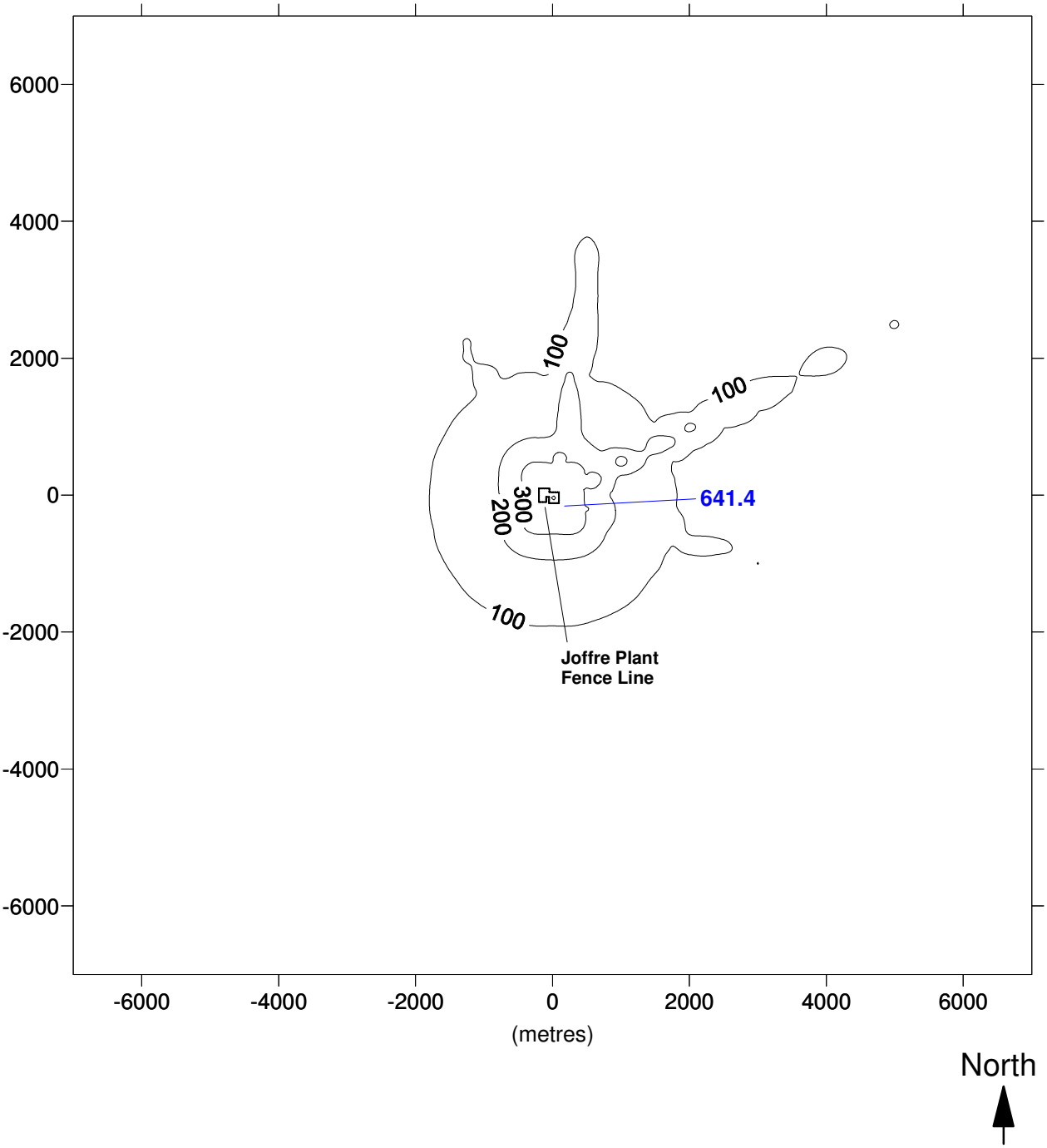

Figure 2. Maximum predicted hourly average NH_3 concentrations associated with normal operating conditions of the sources at the Agrium JNO Plant, which is located at LSD 07-03-039-25 W4M. Isopleths shown include 100, 200 and 300 µg/m^3.

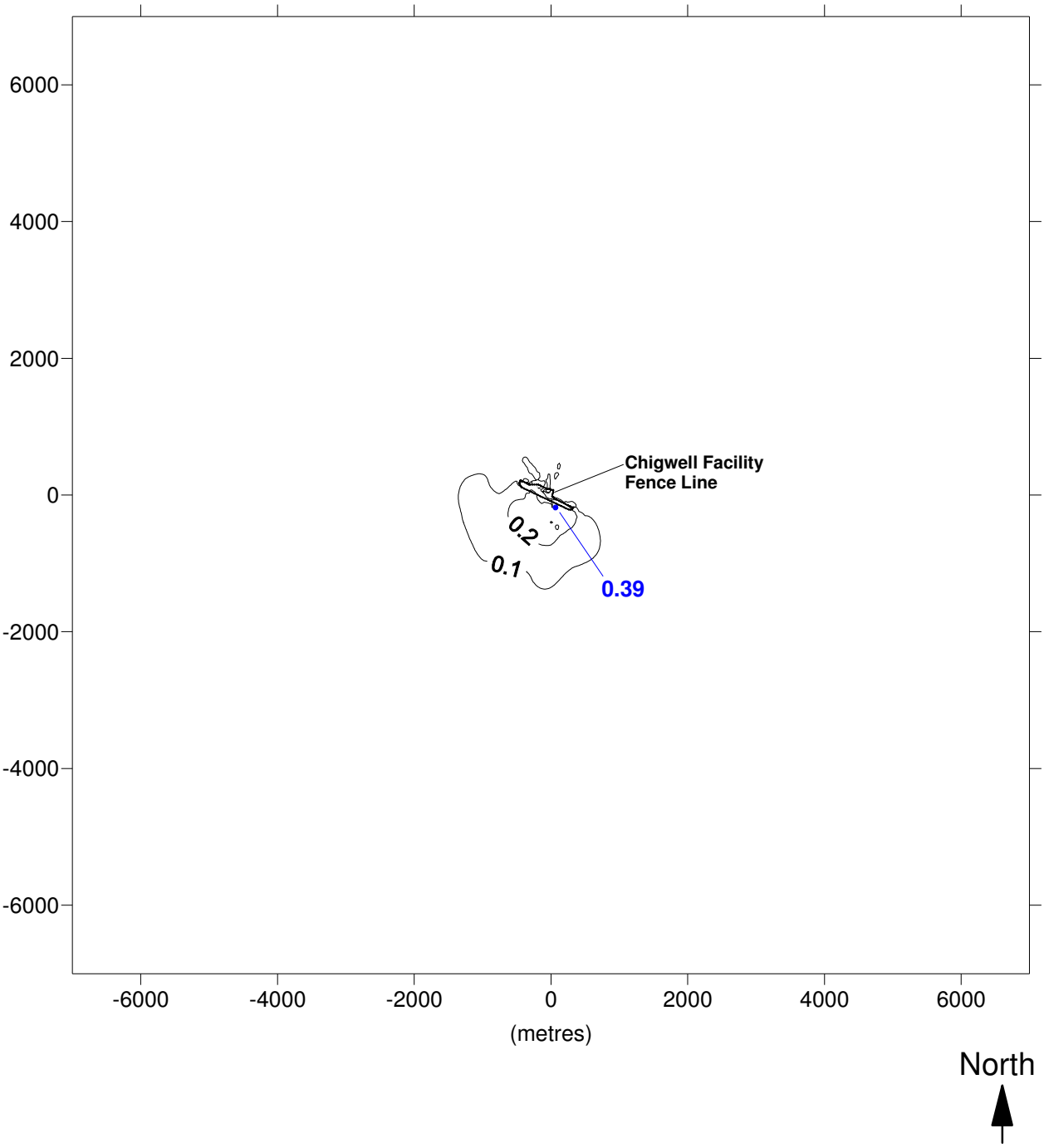

Figure 3. Maximum predicted hourly average NO_2 concentrations associated with normal operations of the sources at the Agrium CDT, which is located at LSDs 07, 08, 09 and 10-34-040-25 W4M. Isopleths shown include 0.1 and 0.2 µg/m^3.

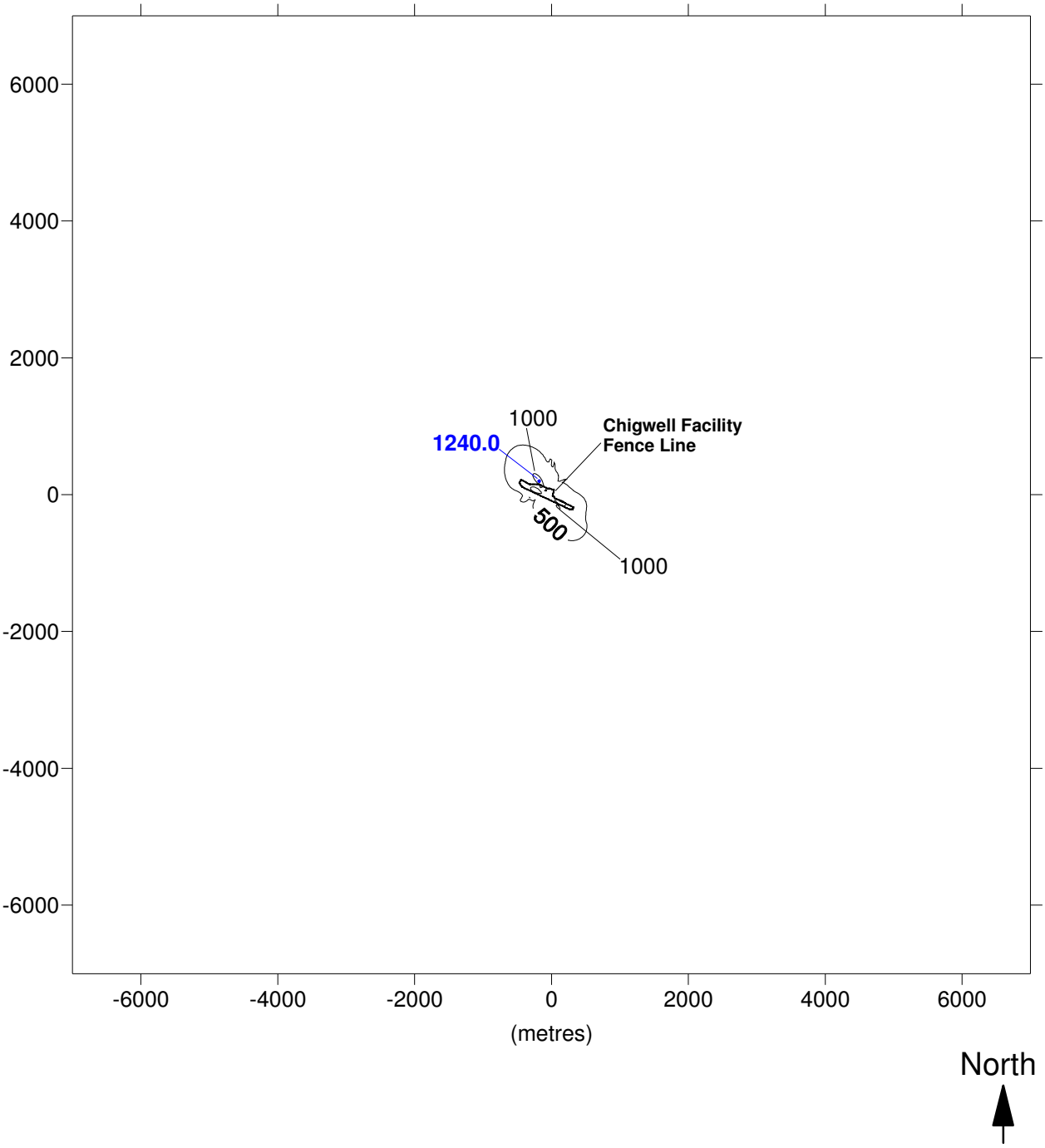

Figure 4. Maximum predicted hourly average NH_3 concentrations associated with normal operation of the sources at the Agrium CDT, which is located at LSDs 07, 08, 09 and 10-34-040-25 W4M. Isopleths shown include 500 and 1000 µg/m^3.

Modelling Results for Flaring Scenario No. 1 (Sphere Vapour Vent Flaring) at the CDT

When the ammonia pressure inside the ammonia sphere becomes too high, vapours from the sphere may be vented to the flare where they will be burned at an assumed 98% combustion efficiency before being released to the atmosphere. The flare modelling was processed with model parameters determined by the algorithms delineated by the Alberta Energy and Utilities Board (EUB) and included in the EUB spreadsheet entitled *Sour Well Test Flaring Permit Spreadsheet*. This spreadsheet enables the calculation of a flare pseudo-diameter, height and temperature for use in the model. These values are based on the heating value and flow rate of flared gas. These parameters yield the correct theoretical buoyancy for the emitted plume, which is required to create meaningful flare plume dispersion modelling.

Table 6 shows the flow rate and heating value used in this modelling scenario. The emission parameters generated by the EUB spreadsheet are based on the values shown in Table 6 and the physical stack height and diameter. The exit temperature of the flare stack is modified to reflect the increased buoyancy given to a plume containing significant concentrations of lighter than air molecules. This is the case for ammonia, whose molecular weight is 17.03 kg/kmol, compared to a molecular weight of 28.97 kg/kmol for standard dry air. This corrected temperature gives the emitted gas a more representative density and buoyancy.

Table 6. Emission pseudo-parameters used in the sphere vapour vent flaring scenario.

Flare ID	Heating Value (MJ/m^3)	Flare Pseudo-Height [(a)] (m)	Flow Rate [(b)] (10^3 m^3/ day)	Flare Exit Temperature [(c)] (K)	Flare Pseudo-Diameter [(c)] (m)	Flare Velocity (m/s)
C-1	14.0	17.86	51.32	2368.6	0.710	21.41

[(a)] Effective release height of plume for ISC-PRIME modelling.
[(b)] At 15 °C and 101.3 kPa.
[(c)] Assumed for purposes of flare modelling as per AENV guidelines.

The modelling results for the sphere vapour vent flaring scenario are presented in Table 7. The maximum predicted one-hour ground level concentrations obtained for NO_2 and NH_3 are given along with their respective locations.

Table 7. Maximum predicted hourly average concentrations associated with the sphere vapour vent flaring scenario.

Substance		NO_2	NH_3
Maximum Concentration	($\mu g/m^3$)	147.6	1291.4
Direction from CDT Flare Stack (C-1)		SSE	NW
Downwind Distance from Flare	(m)	146	456

The maximum overall NO_x concentration is 532.7 µg/m^3 (0.282 ppm). Using the Ozone Limiting Method as per the latest AENV Model Guideline, this corresponds to an overall maximum predicted hourly average ground-level NO_2 concentration of 147.6 µg/m^3 (0.078 ppm). This concentration is predicted to occur 146 m south-southeast of C-1 and does not exceed the allowable AAAQG of 400 µg/m^3 (0.212 ppm) for NO_2. Figure 5 shows the maximum predicted NO_2 concentrations over the entire modelling domain.

The maximum predicted hourly average ground-level NH_3 concentration is 1291.4 µg/m^3 (1.845 ppm). This concentration is predicted to occur 456 m northwest of C-1 and does not exceed the allowable AAAQG of 1400 µg/m^3 (2.000 ppm) for NH_3. Figure 6 shows the maximum predicted NH_3 concentrations over the entire modelling domain.

Modelling Results for Flaring Scenario No. 2 (Rail Car Venting) at the CDT.

According to the original loading design for the CDT, the rail cars should be connected by vapour lines to the ammonia sphere where the displaced vapour is then recovered by a compressor. If this compressor failed to condense all the returning ammonia vapours, the excess vapour would be sent to the flare and burned at an assumed 98% combustion efficiency before being released to the atmosphere. However, this design option has never been implemented.

As previously described, the flare modelling was processed with model parameters determined by the algorithms delineated by the EUB and included in the EUB spreadsheet entitled *Sour Well Test Flaring Permit Spreadsheet*. The emission parameters generated by the EUB spreadsheet are based on the values shown in Table 8 along with the physical stack heights and diameters. Once again, the exit temperature of the flare was modified to reflect the increased buoyancy given to a plume containing significant concentrations of lighter than air molecules.

The modelling results for the rail car venting flaring scenario are presented in Table 9. The maximum predicted one-hour ground level concentrations obtained for NO_2 and NH_3 are given along with their respective locations.

Table 8. Emission pseudo-parameters as used in the rail car venting scenario.

Flare ID	Heating Value (MJ/m^3)	Flare Pseudo-Height [(a)] (m)	Flow Rate [(b)] (10^3 m^3/ day)	Flare Exit Temperature [(c)] (K)	Flare Pseudo-Diameter [(c)] (m)	Flare Velocity (m/s)
C-1	13.6	20.22	167.94	2353.6	0.709	69.93

[(a)] Effective release height of plume for ISC-PRIME modelling.
[(b)] At 15 °C and 101.3 kPa.
[(c)] Assumed for purposes of flare modelling as per AENV guidelines.

Table 9. Maximum predicted hourly average concentrations.

Substance	NO_2	NH_3
Maximum Concentration (µg/m^3)	167.8	1417.9
Direction from the CDT Flare Stack (C-1)	SSE	SSE
Downwind Distance from Flare (m)	171	171

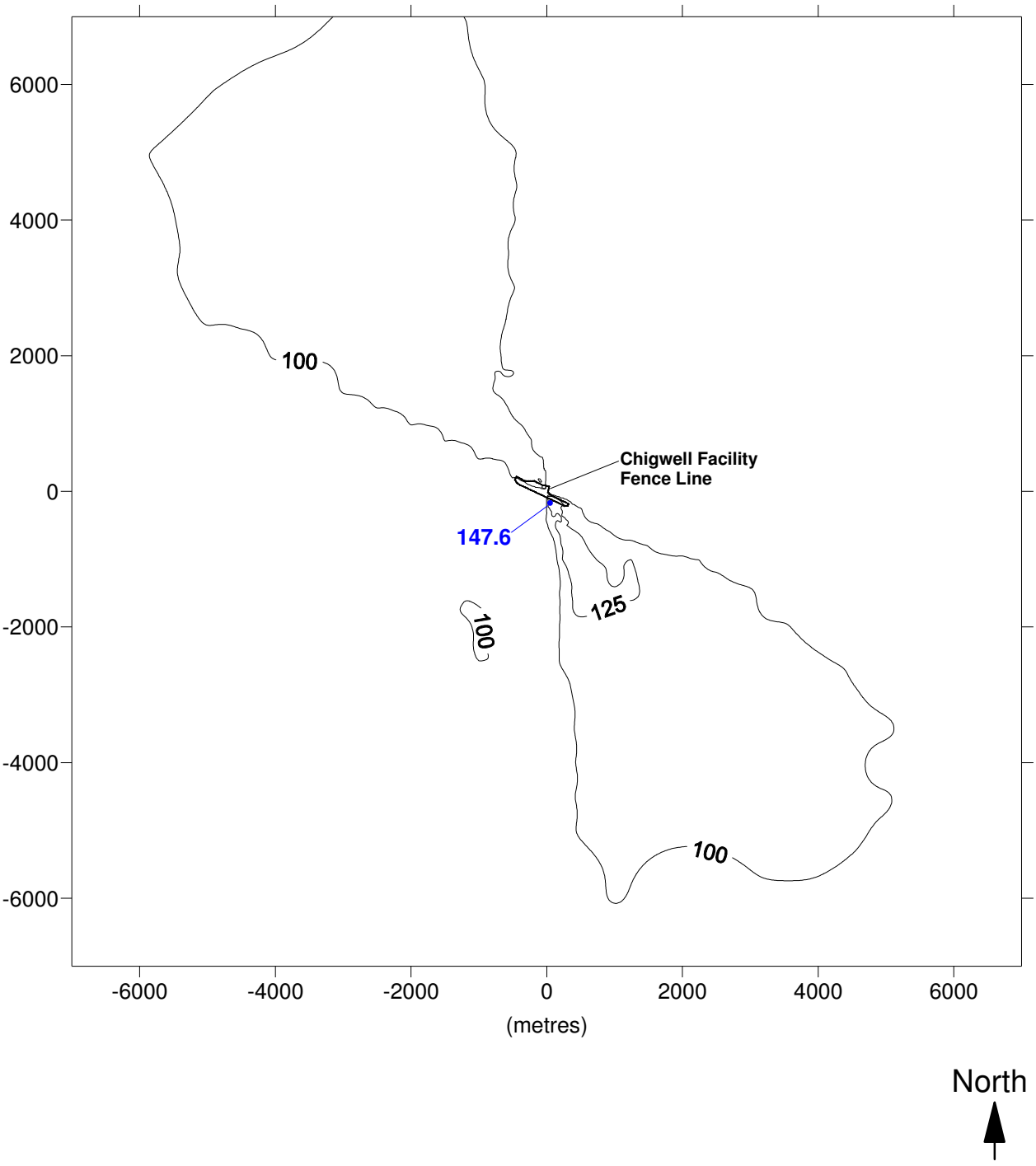

Figure 5. Maximum predicted hourly average NO_2 concentrations associated with the sphere vapour vent flaring scenario at the Agrium CDT Facility, which is located at LSDs 07, 08, 09 and 10-34-040-25 W4M. Isopleths shown include 100 and 125 µg/m^3.

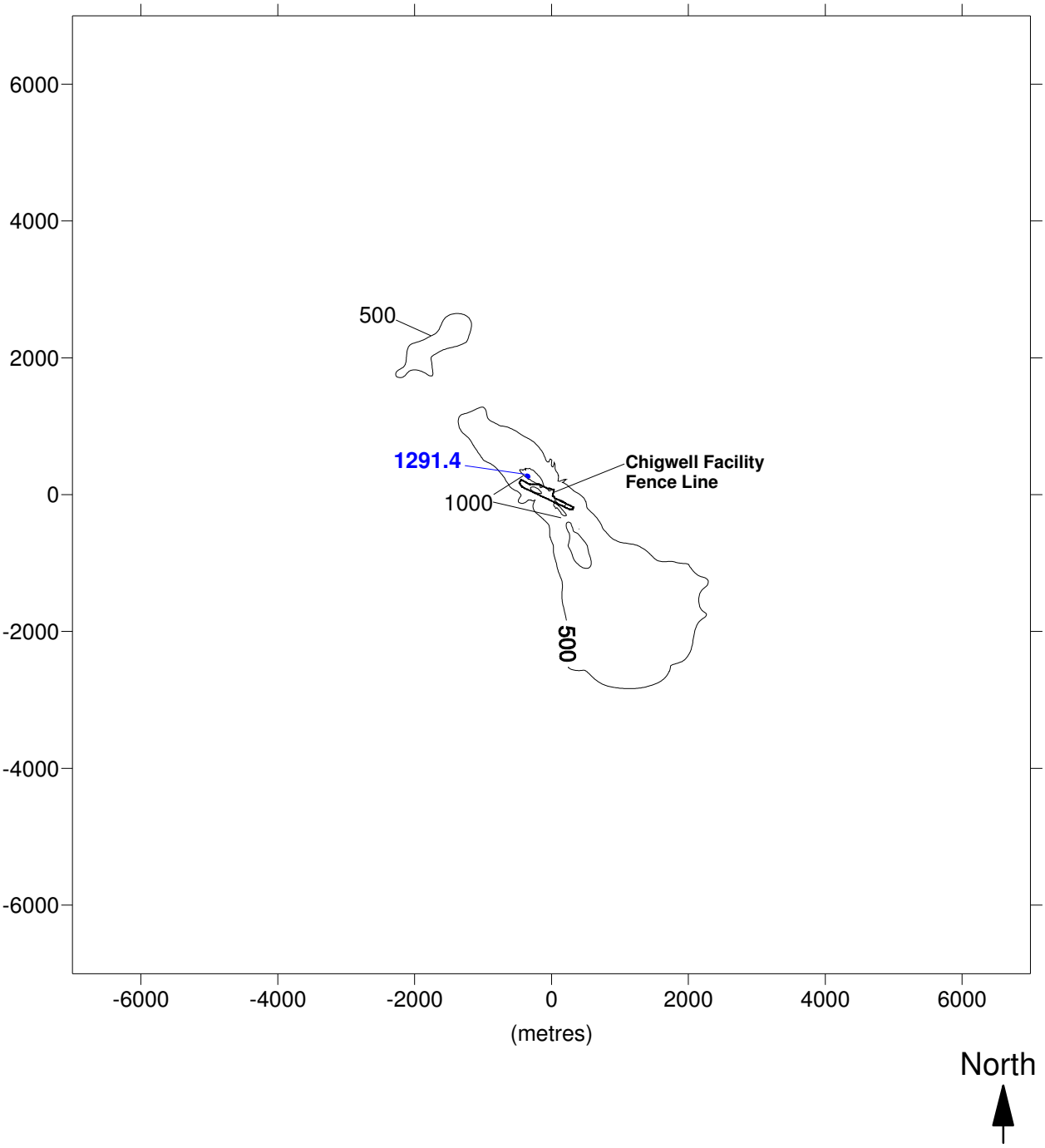

Figure 6. Maximum predicted hourly average NH_3 concentrations associated with the sphere vapour vent flaring sources at the Agrium CDT facility, which is located at LSD's 07, 08, 09 and 10-34-040-25 W4M. Isopleths shown include 500 and 1000 µg/m^3.

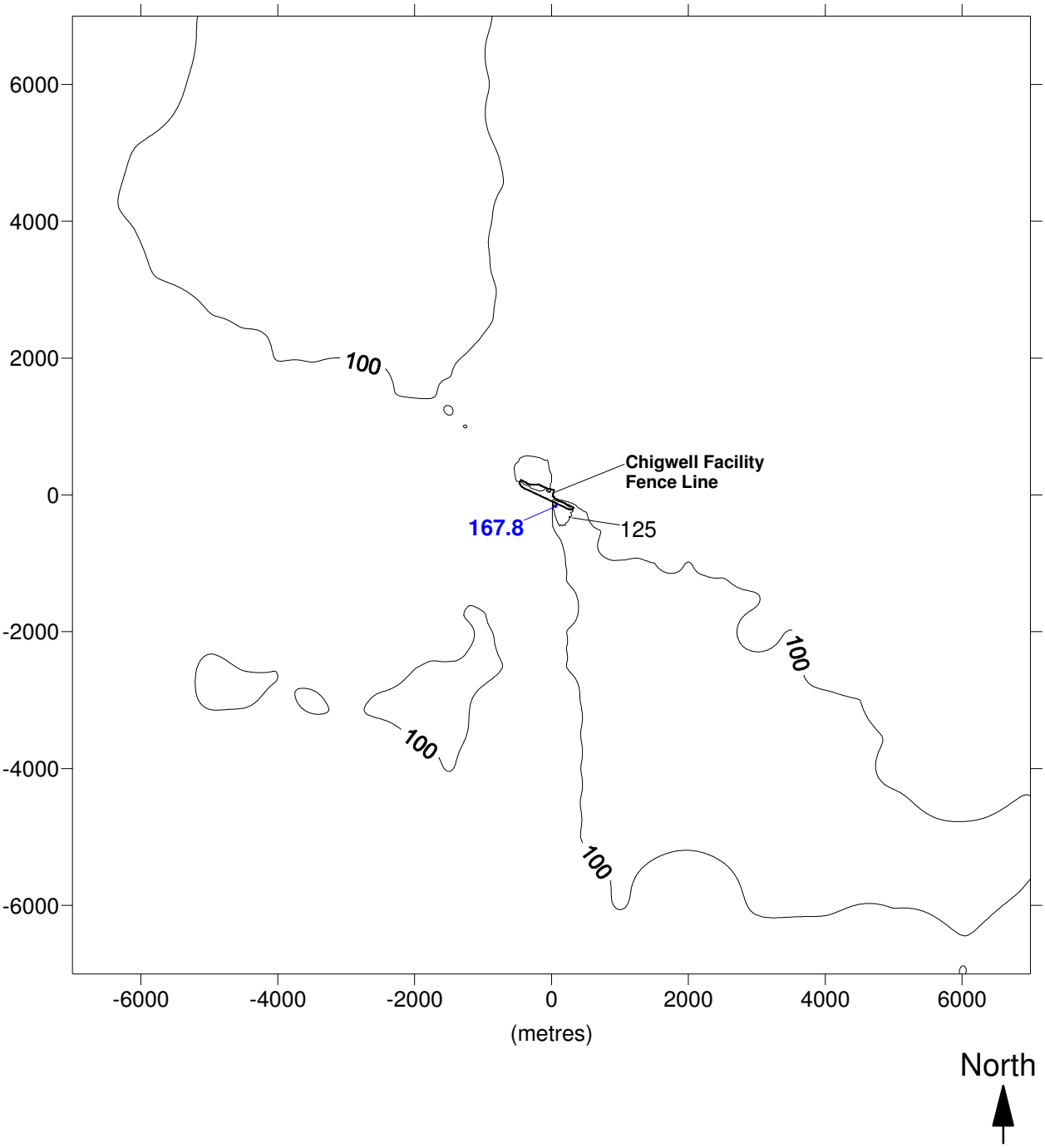

Figure 7. Maximum predicted hourly average NO_2 concentrations associated with the rail car vent flaring scenario at the Agrium CDT Facility, which is located at LSDs 07, 08, 09 and 10-34-040-25 W4M. Isopleths shown include 50 and 100 µg/m^3.

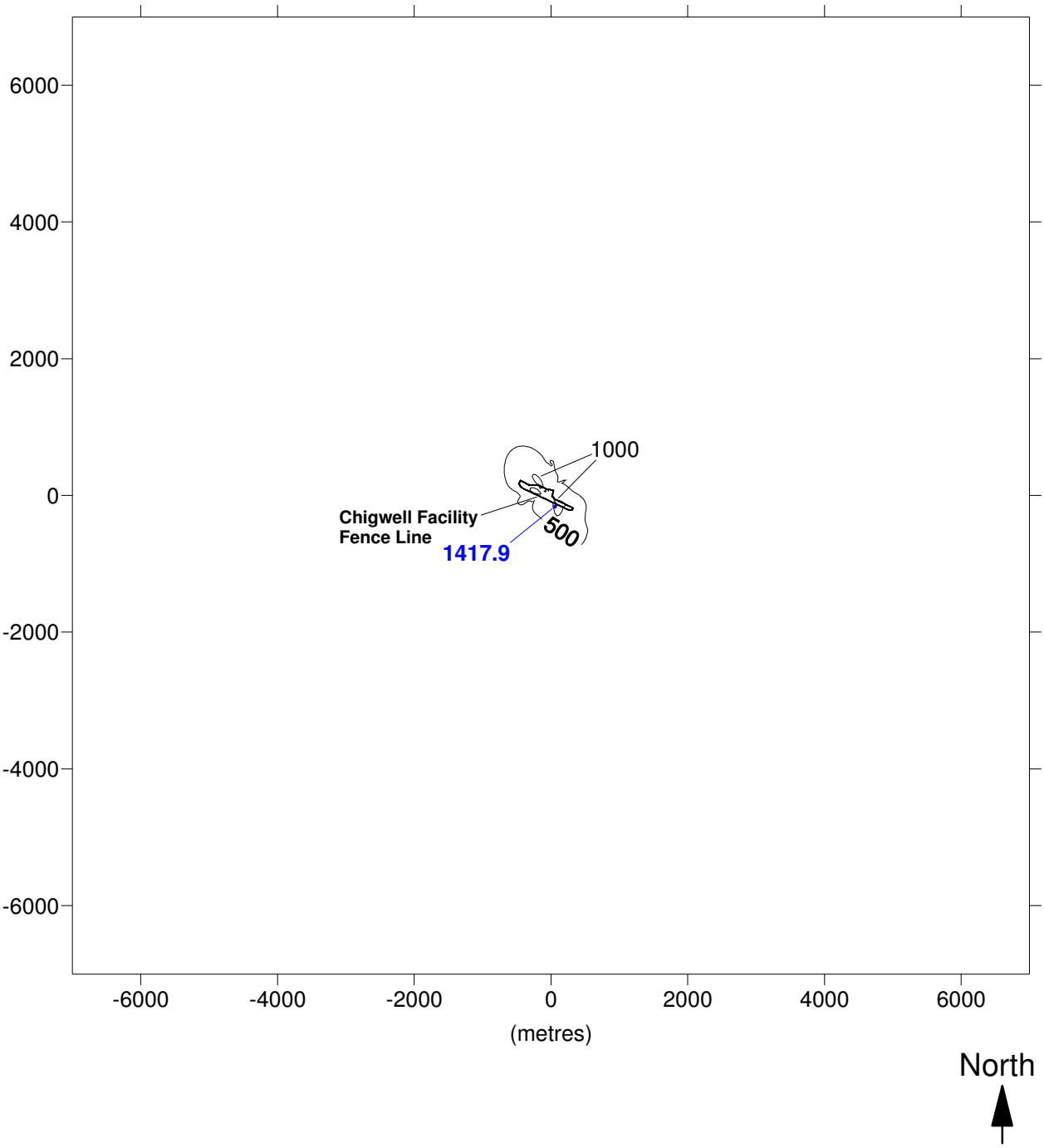

Figure 8. Maximum predicted hourly average NH_3 concentrations associated with the rail car vent flaring scenario at the Agrium CDT Facility, which is located at LSDs 07, 08, 09 and 10-34-040-25 W4M. Isopleths shown include 500 and 1000 µg/m^3.

The maximum overall NO_x concentration is 734.4 µg/m^3 (0.389 ppm). Using the Ozone Limiting Method as per the latest AENV Model Guideline, this corresponds to an overall maximum predicted hourly average ground-level NO_2 concentration of 167.8 µg/m^3 (0.089 ppm). This concentration is predicted to occur 171 m south-southeast of C-1, and does not exceed the allowable AAAQG of 400 µg/m^3 (0.212 ppm) for NO_2. Figure 7 shown on page 14 shows the maximum predicted NO_2 concentrations over the entire modelling domain.

As indicated in Figure 8 on the previous page, the maximum predicted hourly average ground-level NH_3 concentration is 1417.9 µg/m^3 (2.026 ppm). This concentration is predicted to occur 171 m south-southeast of C-1 and exceeds the allowable AAAQG of 1400 µg/m^3 (2.000 ppm) for NH_3. However, it should be noted that over the course of the five year period included in the Red Deer meteorological data, there is only one instance of such exceedence. The exceedence only occurs with 56 km/h winds from the north-northwest and neutral stability and in the five-year period, this particular meteorological condition only occurred once. As such, the probability that this specific meteorology condition would occur at the same time as this flaring scenario is only about 0.0023% of the time. Moreover, Agrium can control the timing of this flaring scenario and therefore will ensure that no flaring will occur during these worst-case meteorological conditions. Such preventative action will eliminate the possibility of exceeding the AAAQG. The second highest predicted hourly average ground-level NH_3 concentration obtained from the model was 1388.3 µg/m^3 (1.983 ppm), which is within the allowable AAAQG.

The following additional information is provided for your reference:

- **Attachment A.** ISC-PRIME input and output files giving the overall maximum predicted concentrations for these scenarios.

- **Attachment B.** Windrose for the Red Deer Airport.

Thank you for the opportunity to work on this project. If you have any comments or questions, please contact me at (403) 547-7557, ext. 106 or by email at barry.lough@calvinconsulting.ca.

Yours truly,
Calvin Consulting Group Ltd.

Barry J. Lough, Principal Meteorologist
Air Quality & Regulatory Compliance Services

ATTACHMENT A

Dispersion Modelling Input & Output Files

ISC-PRIME INPUT FILE – JOFFRE NITROGEN OPERATION PLANT

NORMAL OPERATIONS NO_x

```
CO STARTING
  TITLEONE  AGrium Joffre - Renewal March 2007
  MODELOPT  DFAULT  RURAL  CONC
  AVERTIME  1
  POLLUTID  NOx
  TERRHGTS  ELEV
  RUNORNOT  RUN
  EVENTFIL  EVENTEXP.INP
  ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING
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  LOCATION  H101    POINT   -2408.99 -1991.01   883.0
  LOCATION  H102    POINT   -2408.99 -1947.02   883.0
  LOCATION  H103    POINT   -2428.99 -1991.01   883.0
  LOCATION  H104    POINT   -2428.99 -1947.02   883.0
  LOCATION  H105    POINT   -2440.99 -1991.01   883.0
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  LOCATION  H107    POINT   -2458.99 -1991.01   883.0
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  LOCATION  H109    POINT   -2470.99 -1947.02   883.0
  LOCATION  WHB601  POINT   -2246.52 -1996.46   883.0
  LOCATION  FB901A  POINT   -2400.38 -1884.47   883.0
  LOCATION  FB901B  POINT   -2400.38 -1862.08   883.0
  LOCATION  SH902A  POINT   -2388.69 -1955.56   883.0
  LOCATION  SH902B  POINT   -2388.69 -1933.16   883.0
  LOCATION  FS745   POINT   -2680.97 -1703.04   883.0
  LOCATION  H141    POINT   -2499.98 -1693.04   883.0
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  LOCATION  H144    POINT   -2457.99 -1663.04   883.0
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  LOCATION  WHB605  POINT   -2436.41 -1667.32   883.0
  LOCATION  FB905   POINT   -2348.76 -1761.78   883.0
  LOCATION  FS734   POINT   -2621.43 -1758.85   883.0
  LOCATION  93S001  POINT   -2737.31 -1567.99   883.0
  LOCATION  FS761   POINT   -2673.04 -1341.10   883.0
  LOCATION  H210    POINT   -2479.25 -1256.38   883.0
  LOCATION  H220    POINT   -2479.25 -1274.88   883.0
  LOCATION  H230    POINT   -2479.25 -1288.51   883.0
  LOCATION  H240    POINT   -2479.25 -1306.04   883.0
  LOCATION  H250    POINT   -2479.25 -1322.60   883.0
  LOCATION  H260    POINT   -2479.25 -1338.18   883.0
  LOCATION  H270    POINT   -2479.25 -1353.76   883.0
  LOCATION  51S001  POINT   -2850.27 -1854.29   883.0
  LOCATION  63ME00  POINT   -2960.30 -1458.93   883.0
  LOCATION  63ME01  POINT   -2946.67 -1470.61   883.0
  LOCATION  105S00  POINT   -2675.96 -1021.70   883.0
  LOCATION  105FH0  POINT   -2333.18 -1090.83   883.0
  LOCATION  CT101   POINT   -2033.63 -1595.26   883.0
  LOCATION  CT201   POINT   -1998.39 -1595.26   883.0
```

```
  LOCATION  SB      POINT   -1961.82 -1613.76   883.0
  LOCATION  FS409   POINT   -1957.30 -1219.37   883.0
  LOCATION  Q5980   POINT   -1623.72 -1609.76   883.0
  LOCATION  F5901   POINT   -1579.31 -1345.43   883.0
  LOCATION  F5902   POINT   -1562.92 -1345.43   883.0
  LOCATION  F5601   POINT   -1585.76 -1345.43   883.0
  LOCATION  F5907   POINT   -1613.91 -1345.43   883.0
  LOCATION  Q5990   AREA    -1562.08 -1504.98   883.0
  LOCATION  F5903   POINT   -1570.63 -1319.52   883.0

  LOCATION  J1      POINT       0.00     0.00   880.0

** Point Source      QS     HS     TS     VS     DS
** Parameters:      ----   ----   ----   ----   ---


  SRCPARAM  FS749     0.054   77.65 1273.16    0.02    11.6
  SRCPARAM  H101       2.25    67.1  535.16    6.60     2.0
  SRCPARAM  H102       2.25    67.1  535.16    6.60     2.0
  SRCPARAM  H103       2.25    67.1  535.16    6.60     2.0
  SRCPARAM  H104       2.25    67.1  535.16    6.60     2.0
  SRCPARAM  H105       2.25    67.1  535.16    6.60     2.0
  SRCPARAM  H106       2.25    67.1  535.16    6.60     2.0
  SRCPARAM  H107      1.522    34.4  429.16    9.20     1.8
  SRCPARAM  H108      1.522    34.4  429.16    9.20     1.8
  SRCPARAM  H109      1.359    33.5  443.16   16.00     1.1
  SRCPARAM  WHB601    5.749   15.24  487.16   15.50     3.1
  SRCPARAM  FB901A    1.174   10.67  422.16    3.10     2.3
  SRCPARAM  FB901B    1.174   10.67  422.16    3.10     2.3
  SRCPARAM  SH902A    0.657   27.74  552.16    2.40     1.8
  SRCPARAM  SH902B    0.657   27.74  552.16    2.40     1.8
  SRCPARAM  FS745     0.096   77.65 1273.16    0.02    11.6
  SRCPARAM  H141      1.568    33.5  460.16   16.60     1.1
  SRCPARAM  H142      1.568    33.5  460.16   16.60     1.1
  SRCPARAM  H143      1.568    33.5  460.16   16.60     1.1
  SRCPARAM  H144      1.568    33.5  460.16   16.60     1.1
  SRCPARAM  H145      1.568    33.5  460.16   16.60     1.1
  SRCPARAM  H146      1.568    33.5  460.16   16.60     1.1
  SRCPARAM  H147      1.568    33.5  460.16   16.60     1.1
  SRCPARAM  H148      1.568    33.5  460.16   16.60     1.1
  SRCPARAM  H149      1.568    33.5  460.16   16.60     1.1
  SRCPARAM  H150      1.568    33.5  460.16   16.60     1.1
  SRCPARAM  H151      1.568    33.5  460.16   16.60     1.1
  SRCPARAM  WHB605    9.038    19.5  422.16   17.40     3.1
  SRCPARAM  FB905     1.565   15.24  423.16    5.40     1.8
  SRCPARAM  FS734    0.0716   13.72  878.16    2.40     2.1
  SRCPARAM  93S001    0.181   51.12 1273.16    0.01     8.6
  SRCPARAM  FS761     0.182   85.67 1273.16    0.06     8.6
  SRCPARAM  H210      2.617      61  423.16    7.60     2.6
  SRCPARAM  H220      2.617      61  423.16    7.60     2.6
  SRCPARAM  H230      2.617      61  423.16    7.60     2.6
  SRCPARAM  H240      2.617      61  423.16    7.60     2.6
  SRCPARAM  H250      2.617      61  423.16    7.60     2.6
  SRCPARAM  H260      2.617      61  423.16    7.60     2.6
  SRCPARAM  H270      2.617      61  423.16    7.60     2.6
  SRCPARAM  51S001    0.528    56.7 1273.16    1.27     6.6
  SRCPARAM  63ME00    0.096   10.67  453.16    2.00     1.1
  SRCPARAM  63ME01    0.096   10.67  453.16    2.00     1.1
  SRCPARAM  105S00   0.0683   51.26 1273.16    0.02     8.6
  SRCPARAM  105FH0    0.182    17.3 1124.16    7.49     2.1
  SRCPARAM  CT101    10.046    45.7  355.16   21.00     5.5
  SRCPARAM  CT201    10.046    45.7  355.16   21.00     5.5
  SRCPARAM  SB       1.8055    19.8  422.16   14.68     1.4
```

```
  SRCPARAM  FS409    0.0751   13.72  877.16    2.21     2.1
  SRCPARAM  Q5980   0.044444      61  891.16   91.40     1.0
  SRCPARAM  F5901   1.256481  42.177  583.16    5.35     2.6
  SRCPARAM  F5902   1.691898  42.177  581.16    4.28     2.6
  SRCPARAM  F5601   0.472222  42.177  620.16    7.24     1.5
  SRCPARAM  F5907   0.138889  34.747  532.16    2.73     1.0
  SRCPARAM  Q5990   0.000053     0.5   13.45   13.45     0.0
  SRCPARAM  F5903   0.041667   6.426 1143.16    0.72     1.0

  SRCPARAM  J1     1.296328    45.6  638.16    2.94     2.22


SO BUILDHGT J1        16.50    8.50    8.50    8.50    8.50    8.50
SO BUILDHGT J1         8.50    8.50    8.50   11.00   11.00   16.50
.
.
.
SO YBADJ    Q5980      0.00    0.00    0.00    0.00    0.00    0.00
SO YBADJ    Q5980      0.00    0.00    0.00    0.00    0.00    0.00

  SRCGROUP  ALL
SO FINISHED

RE STARTING
RE DISCCART    -3300.0  5700.0  942.818
RE DISCCART    -3280.0  5700.0  943.021
.
.
.
RE DISCCART    -2720.0  6300.0  948.830
RE DISCCART    -2700.0  6300.0  948.676
RE FINISHED

ME STARTING
  INPUTFIL  deer.met
  ANEMHGHT  10.
  SURFDATA  25000  1995
  UAIRDATA  23118  1995
ME FINISHED

OU STARTING
  RECTABLE  ALLAVE  FIRST
  MAXTABLE  ALLAVE  50
  PLOTFILE   1  ALL  FIRST NOxL.xyz
  MAXIFILE   1  ALL  3047. NOxL.max
OU FINISHED
```

ISC-PRIME OUTPUT FILE - JOFFRE NITROGEN OPERATION PLANT

NORMAL OPERATIONS NO_x

1 *** ISC3P - VERSION 04269 *** *** AGrium Joffre - Renewal March 2007 ***
*** ***
PAGE 44
**MODELOPTs: CONC RURAL ELEV DFAULT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	NETWORK RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	747.06842	ON 97061101: AT (-3240.00, 5760.00, 944.27, 0.00)	DC	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

ISC-PRIME INPUT FILE – JOFFRE NITROGEN OPERATION PLANT

NORMAL OPERATIONS NH_3

```
CO STARTING
  TITLEONE  AGrium Joffre - Renewal March 2007
  MODELOPT  DFAULT  RURAL  CONC
  AVERTIME  1
  POLLUTID  NH3
  TERRHGTS  ELEV
  RUNORNOT  RUN
  EVENTFIL  EVENTEXP.INP
  ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

  LOCATION  JNO1    AREA      -56.6    -121.9   880.0

  SRCPARAM  JNO1    0.00002098    3.  147.8  162.5    0.

  SRCGROUP  ALL
SO FINISHED

RE STARTING
RE DISCCART    -160.0  -480.0  876.174
RE DISCCART    -140.0  -480.0  876.405
.
.
.
RE DISCCART     420.0   120.0  882.096
RE DISCCART     440.0   120.0  882.387
RE FINISHED

ME STARTING
  INPUTFIL  deer.met
  ANEMHGHT  10.
  SURFDATA  25000  1995
  UAIRDATA  23118  1995
ME FINISHED

OU STARTING
  RECTABLE  ALLAVE  FIRST
  MAXTABLE  ALLAVE  50
  PLOTFILE   1  ALL  FIRST NH3L.xyz
  MAXIFILE   1  ALL  1400. NH3L.max
OU FINISHED
```

ISC-PRIME OUTPUT FILE - JOFFRE NITROGEN OPERATION PLANT

NORMAL OPERATIONS NH_3

**MODELOPTs: CONC RURAL ELEV DFAULT

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF NH3 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	NETWORK RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	641.35315	ON 95120422: AT (140.00, -180.00, 878.84, 0.00)	DC	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

ISC-PRIME INPUT FILE – CHIGWELL DISTRIBUTION TERMINAL

NORMAL OPERATIONS NO_x

```
STARTING CO STARTING
  TITLEONE  AGrium Chigwell - Renewal March 2007
  MODELOPT  RURAL  CONC NOSTD
  AVERTIME  1
  POLLUTID  NOx
  TERRHGTS  ELEV
  RUNORNOT  RUN
  EVENTFIL  EVENTEXP.INP
  ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

  LOCATION  c1     POINT      0.00     0.00   871.0

** Point Source      QS      HS      TS      VS      DS
** Parameters:      ----    ----    ----    ----    ---

  SRCPARAM  c1     0.000298    14.632  984.16  0.0027   4.616

SO BUILDHGT C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT C1        0.00    0.00    0.00    0.00    0.00   23.00
SO BUILDHGT C1       23.00   23.00   23.00   23.00   23.00    0.00
SO BUILDHGT C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT C1        0.00    0.00    0.00    0.00    0.00   23.00
SO BUILDHGT C1       23.00   23.00   23.00   23.00   23.00    0.00
SO BUILDWID C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID C1        0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDWID C1       29.58   29.58   28.68   26.91   24.33    0.00
SO BUILDWID C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID C1        0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDWID C1       29.58   29.58   28.68   26.91   24.33    0.00
SO BUILDLEN C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDLEN C1        0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDLEN C1       29.58   29.58   28.68   26.91   24.32    0.00
SO BUILDLEN C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDLEN C1        0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDLEN C1       29.58   29.58   28.68   26.91   24.32    0.00
SO XBADJ    C1        0.00    0.00    0.00    0.00    0.00    0.00
SO XBADJ    C1        0.00    0.00    0.00    0.00    0.00  -59.17
SO XBADJ    C1      -63.00  -64.92  -64.86  -62.83  -58.90    0.00
SO XBADJ    C1        0.00    0.00    0.00    0.00    0.00    0.00
SO XBADJ    C1        0.00    0.00    0.00    0.00    0.00   30.49
SO XBADJ    C1       33.42   35.34   36.18   35.93   34.58    0.00
SO YBADJ    C1        0.00    0.00    0.00    0.00    0.00    0.00
SO YBADJ    C1        0.00    0.00    0.00    0.00    0.00   23.39
SO YBADJ    C1       15.25    6.65   -2.16  -10.90  -19.31    0.00
SO YBADJ    C1        0.00    0.00    0.00    0.00    0.00    0.00
SO YBADJ    C1        0.00    0.00    0.00    0.00    0.00  -23.39
SO YBADJ    C1      -15.25   -6.65    2.16   10.90   19.31    0.00

  SRCGROUP  ALL
SO FINISHED
```

```
RE STARTING
RE DISCCART     -300.0  -300.0  886.357
RE DISCCART     -280.0  -300.0  886.053
.
.
.
RE DISCCART      280.0   300.0  858.173
RE DISCCART      300.0   300.0  857.452
RE FINISHED

ME STARTING
  INPUTFIL  deer.met
  ANEMHGHT  10.
  SURFDATA  25000  1995
  UAIRDATA  23118  1995
ME FINISHED

OU STARTING
  RECTABLE  ALLAVE  FIRST
  MAXTABLE  ALLAVE  50
  PLOTFILE   1  ALL  FIRST NOxE.xyz
  MAXIFILE   1  ALL  3047. NOxE.max
OU FINISHED
```

ISC-PRIME OUTPUT FILE - CHIGWELL DISTRIBUTION TERMINAL

NORMAL OPERATIONS NO_x

**MODELOPTs: CONC RURAL ELEV NOSTD

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	NETWORK RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	0.39241	ON 96030608: AT (60.00, -180.00, 876.45, 0.00)	DC	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

ISC-PRIME INPUT FILE – CHIGWELL DISTRIBUTION TERMINAL

NORMAL OPERATIONS NH_3

```
CO STARTING
  TITLEONE  AGrium Chigwell - Renewal March 2007
  MODELOPT  RURAL  CONC  NOSTD
  AVERTIME  1
  POLLUTID  NH3
  TERRHGTS  ELEV
  RUNORNOT  RUN
  EVENTFIL  EVENTEXP.INP
  ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

  LOCATION  CDT1    AREA     -131.0      2.5   874.0
  LOCATION  CDT2    AREA      -78.4     17.4   871.0
  LOCATION  CDT3    AREA     -133.1     73.3   871.0

** Area Source       QS/A       HS     Xs     Ys     Angle

  SRCPARAM  CDT1    0.00007178    4.  170.4   23.7    26.093
  SRCPARAM  CDT2    0.00007178   10.   86.1   72.9    26.093
  SRCPARAM  CDT3    0.00007178    3.   72.5   41.5    26.093

  SRCGROUP  ALL
SO FINISHED

RE STARTING
RE DISCCART     -480.0  -100.0  884.982
RE DISCCART     -460.0  -100.0  885.085
.
.
.
RE DISCCART      100.0   500.0  860.596
RE DISCCART      120.0   500.0  860.210
RE FINISHED

ME STARTING
  INPUTFIL  deer.met
  ANEMHGHT  10.
  SURFDATA  25000  1995
  UAIRDATA  23118  1995
ME FINISHED

OU STARTING
  RECTABLE  ALLAVE  FIRST
  MAXTABLE  ALLAVE  50
  PLOTFILE   1  ALL  FIRST NH3L.xyz
  MAXIFILE   1  ALL  1400. NH3L.max
OU FINISHED
```

ISC-PRIME OUTPUT FILE - CHIGWELL DISTRIBUTION TERMINAL

NORMAL OPERATIONS NH_3

1 *** ISC3P - VERSION 04269 *** *** AGrium Chigwell - Renewal March 2007 ***
*** ***
PAGE 31
**MODELOPTs: CONC RURAL ELEV NOSTD

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF NH3 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	NETWORK RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	1239.96021	ON 95121508: AT (-180.00, 200.00, 866.36, 0.00)	DC	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

ISC-PRIME INPUT FILE – CHIGWELL DISTRIBUTION TERMINAL

FLARING SCENARIO 1 – SPHERE VENT TO FLARE - NO_x

```
CO STARTING
  TITLEONE  AGrium Chigwell - Renewal March 2007
  MODELOPT  RURAL  CONC NOSTD
  AVERTIME  1
  POLLUTID  NOx
  TERRHGTS  ELEV
  RUNORNOT  RUN
  EVENTFIL  EVENTEXP.INP
  ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

  LOCATION  C1     POINT      0.00     0.00   871.0

** Point Source      QS      HS      TS      VS      DS
** Parameters:      ----    ----    ----    ----    ---

  SRCPARAM  C1     4.4082  17.856  2367.32  21.41 0.71

SO BUILDHGT C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT C1        0.00    0.00    0.00    0.00    0.00   23.00
SO BUILDHGT C1       23.00   23.00   23.00   23.00   23.00    0.00
SO BUILDHGT C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT C1        0.00    0.00    0.00    0.00    0.00   23.00
SO BUILDHGT C1       23.00   23.00   23.00   23.00   23.00    0.00
SO BUILDWID C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID C1        0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDWID C1       29.58   29.58   28.68   26.91   24.33    0.00
SO BUILDWID C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID C1        0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDWID C1       29.58   29.58   28.68   26.91   24.33    0.00
SO BUILDLEN C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDLEN C1        0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDLEN C1       29.58   29.58   28.68   26.91   24.32    0.00
SO BUILDLEN C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDLEN C1        0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDLEN C1       29.58   29.58   28.68   26.91   24.32    0.00
SO XBADJ    C1        0.00    0.00    0.00    0.00    0.00    0.00
SO XBADJ    C1        0.00    0.00    0.00    0.00    0.00  -59.17
SO XBADJ    C1      -63.00  -64.92  -64.86  -62.83  -58.90    0.00
SO XBADJ    C1        0.00    0.00    0.00    0.00    0.00    0.00
SO XBADJ    C1        0.00    0.00    0.00    0.00    0.00   30.49
SO XBADJ    C1       33.42   35.34   36.18   35.93   34.58    0.00
SO YBADJ    C1        0.00    0.00    0.00    0.00    0.00    0.00
SO YBADJ    C1        0.00    0.00    0.00    0.00    0.00   23.39
SO YBADJ    C1       15.25    6.65   -2.16  -10.90  -19.31    0.00
SO YBADJ    C1        0.00    0.00    0.00    0.00    0.00    0.00
SO YBADJ    C1        0.00    0.00    0.00    0.00    0.00  -23.39
SO YBADJ    C1      -15.25   -6.65    2.16   10.90   19.31    0.00

  SRCGROUP  ALL
SO FINISHED

RE STARTING
RE DISCCART     -300.0  -300.0  886.357
```

```
RE DISCCART     -280.0  -300.0  886.053
.
.
.
RE DISCCART      280.0   300.0  858.173
RE DISCCART      300.0   300.0  857.452
RE FINISHED

ME STARTING
  INPUTFIL  deer.met
  ANEMHGHT  10.
  SURFDATA  25000  1995
  UAIRDATA  23118  1995
ME FINISHED

OU STARTING
  RECTABLE  ALLAVE  FIRST
  MAXTABLE  ALLAVE  50
  PLOTFILE   1  ALL  FIRST NOxE.xyz
  MAXIFILE   1  ALL  3047. NOxE.max
OU FINISHED
```

ISC-PRIME OUTPUT FILE - CHIGWELL DISTRIBUTION TERMINAL

FLARING SCENARIO 1 – SPHERE VENT TO FLARE - NO_x

**MODELOPTs: CONC RURAL ELEV NOSTD

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	NETWORK RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	532.71252	ON 96102902: AT (40.00, -140.00, 875.02, 0.00)	DC	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

ISC-PRIME INPUT FILE – CHIGWELL DISTRIBUTION TERMINAL

FLARING SCENARIO 1 – SPHERE VENT TO FLARE - NH_3

```
CO STARTING
  TITLEONE  AGrium Chigwell - Renewal March 2007
  MODELOPT  RURAL  CONC  NOSTD
  AVERTIME  1
  POLLUTID  NH3
  TERRHGTS  ELEV
  RUNORNOT  RUN
  EVENTFIL  EVENTEXP.INP
  ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

  LOCATION  CDT1    AREA    -131.0      2.5   874.0
  LOCATION  CDT2    AREA     -78.4     17.4   871.0
  LOCATION  CDT3    AREA    -133.1     73.3   871.0

  LOCATION  C1      POINT     0.00     0.00   871.0

** Area Source      QS/A      HS     Xs    Ys     Angle

  SRCPARAM  CDT1    0.00007178    4.  170.4   23.7    26.093
  SRCPARAM  CDT2    0.00007178   10.   86.1   72.9    26.093
  SRCPARAM  CDT3    0.00007178    3.   72.5   41.5    26.093

** Point Source     QS      HS      TS      VS      DS
** Parameters:      ----    ----    ----    ----    ---

  SRCPARAM  C1      8.3333  17.856  2368.6  21.41  0.710

SO BUILDHGT C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT C1        0.00    0.00    0.00    0.00    0.00   23.00
SO BUILDHGT C1       23.00   23.00   23.00   23.00   23.00    0.00
SO BUILDHGT C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT C1        0.00    0.00    0.00    0.00    0.00   23.00
SO BUILDHGT C1       23.00   23.00   23.00   23.00   23.00    0.00
SO BUILDWID C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID C1        0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDWID C1       29.58   29.58   28.68   26.91   24.33    0.00
SO BUILDWID C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID C1        0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDWID C1       29.58   29.58   28.68   26.91   24.33    0.00
SO BUILDLEN C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDLEN C1        0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDLEN C1       29.58   29.58   28.68   26.91   24.32    0.00
SO BUILDLEN C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDLEN C1        0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDLEN C1       29.58   29.58   28.68   26.91   24.32    0.00
SO XBADJ    C1        0.00    0.00    0.00    0.00    0.00    0.00
SO XBADJ    C1        0.00    0.00    0.00    0.00    0.00  -59.17
SO XBADJ    C1      -63.00  -64.92  -64.86  -62.83  -58.90    0.00
SO XBADJ    C1        0.00    0.00    0.00    0.00    0.00    0.00
SO XBADJ    C1        0.00    0.00    0.00    0.00    0.00   30.49
SO XBADJ    C1       33.42   35.34   36.18   35.93   34.58    0.00
SO YBADJ    C1        0.00    0.00    0.00    0.00    0.00    0.00
SO YBADJ    C1        0.00    0.00    0.00    0.00    0.00   23.39
```

```
SO YBADJ    C1        15.25    6.65   -2.16  -10.90  -19.31    0.00
SO YBADJ    C1         0.00    0.00    0.00    0.00    0.00    0.00
SO YBADJ    C1         0.00    0.00    0.00    0.00    0.00  -23.39
SO YBADJ    C1       -15.25   -6.65    2.16   10.90   19.31    0.00

  SRCGROUP  ALL
SO FINISHED

RE STARTING
RE DISCCART     -480.0  -100.0  884.982
RE DISCCART     -460.0  -100.0  885.085
.
.
.
RE DISCCART      100.0   500.0  860.596
RE DISCCART      120.0   500.0  860.210
RE FINISHED

ME STARTING
  INPUTFIL  deer.met
  ANEMHGHT  10.
  SURFDATA  25000  1995
  UAIRDATA  23118  1995
ME FINISHED

OU STARTING
  RECTABLE  ALLAVE  FIRST
  MAXTABLE  ALLAVE  50
  PLOTFILE   1  ALL  FIRST NH3L.xyz
  MAXIFILE   1  ALL  1400. NH3L.max
OU FINISHED
```

ISC-PRIME OUTPUT FILE - CHIGWELL DISTRIBUTION TERMINAL

FLARING SCENARIO 1 – SPHERE VENT TO FLARE - NH_3

1 *** ISC3P - VERSION 04269 *** *** AGrium Chigwell - Renewal March 2007 ***
*** ***
PAGE 34

**MODELOPTs: CONC RURAL ELEV NOSTD

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF NH3 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	NETWORK RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	1291.44495	ON 97012603: AT (-360.00, 280.00, 872.86, 0.00)	DC	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

ISC-PRIME INPUT FILE – CHIGWELL DISTRIBUTION TERMINAL

FLARING SCENARIO 2 – RAIL CAR VENTING - NO_x

```
CO STARTING
  TITLEONE  AGrium Chigwell - Renewal March 2007
  MODELOPT  RURAL  CONC NOSTD
  AVERTIME  1
  POLLUTID  NOx
  TERRHGTS  ELEV
  RUNORNOT  RUN
  EVENTFIL  EVENTEXP.INP
  ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

  LOCATION  C1     POINT      0.00     0.00   871.0

** Point Source      QS      HS      TS      VS      DS
** Parameters:      ----    ----    ----    ----    ---

  SRCPARAM  C1     14.655  20.224  2352.29  69.63  0.709

SO BUILDHGT C1       0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT C1       0.00    0.00    0.00    0.00    0.00   23.00
SO BUILDHGT C1      23.00   23.00   23.00   23.00   23.00    0.00
SO BUILDHGT C1       0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT C1       0.00    0.00    0.00    0.00    0.00   23.00
SO BUILDHGT C1      23.00   23.00   23.00   23.00   23.00    0.00
SO BUILDWID C1       0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID C1       0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDWID C1      29.58   29.58   28.68   26.91   24.33    0.00
SO BUILDWID C1       0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID C1       0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDWID C1      29.58   29.58   28.68   26.91   24.33    0.00
SO BUILDLEN C1       0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDLEN C1       0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDLEN C1      29.58   29.58   28.68   26.91   24.32    0.00
SO BUILDLEN C1       0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDLEN C1       0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDLEN C1      29.58   29.58   28.68   26.91   24.32    0.00
SO XBADJ    C1       0.00    0.00    0.00    0.00    0.00    0.00
SO XBADJ    C1       0.00    0.00    0.00    0.00    0.00  -59.17
SO XBADJ    C1     -63.00  -64.92  -64.86  -62.83  -58.90    0.00
SO XBADJ    C1       0.00    0.00    0.00    0.00    0.00    0.00
SO XBADJ    C1       0.00    0.00    0.00    0.00    0.00   30.49
SO XBADJ    C1      33.42   35.34   36.18   35.93   34.58    0.00
SO YBADJ    C1       0.00    0.00    0.00    0.00    0.00    0.00
SO YBADJ    C1       0.00    0.00    0.00    0.00    0.00   23.39
SO YBADJ    C1      15.25    6.65   -2.16  -10.90  -19.31    0.00
SO YBADJ    C1       0.00    0.00    0.00    0.00    0.00    0.00
SO YBADJ    C1       0.00    0.00    0.00    0.00    0.00  -23.39
SO YBADJ    C1     -15.25   -6.65    2.16   10.90   19.31    0.00

  SRCGROUP  ALL
SO FINISHED

RE STARTING
RE DISCCART    -240.0  -460.0  886.990
```

```
RE DISCCART     -220.0  -460.0  886.656
.
.
.
RE DISCCART      340.0   140.0  858.209
RE DISCCART      360.0   140.0  858.233
RE FINISHED

ME STARTING
  INPUTFIL  deer.met
  ANEMHGHT  10.
  SURFDATA  25000  1995
  UAIRDATA  23118  1995
ME FINISHED

OU STARTING
  RECTABLE  ALLAVE  FIRST
  MAXTABLE  ALLAVE  50
  PLOTFILE   1  ALL  FIRST NOxL.xyz
  MAXIFILE   1  ALL  3047. NOxL.max
OU FINISHED
```

ISC-PRIME OUTPUT FILE - CHIGWELL DISTRIBUTION TERMINAL

FLARING SCENARIO 2 – RAIL CAR VENTING - NO_x

**MODELOPTs: CONC RURAL ELEV NOSTD

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

** CONC OF NOX IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	NETWORK RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	734.42194	ON 96031508: AT (60.00, -160.00, 875.78, 0.00)	DC	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

ISC-PRIME INPUT FILE – CHIGWELL DISTRIBUTION TERMINAL

FLARING SCENARIO 2 – RAIL CAR VENTING - NH_3

```
STARTING         CO STARTING
  TITLEONE  AGrium Chigwell - Renewal March 2007
  MODELOPT  RURAL  CONC  NOSTD
  AVERTIME  1
  POLLUTID  NH3
  TERRHGTS  ELEV
  RUNORNOT  RUN
  EVENTFIL  EVENTEXP.INP
  ERRORFIL  ERRORS.OUT
CO FINISHED

SO STARTING

  LOCATION  CDT1    AREA     -131.0      2.5   874.0
  LOCATION  CDT2    AREA      -78.4     17.4   871.0
  LOCATION  CDT3    AREA     -133.1     73.3   871.0

  LOCATION  C1      POINT      0.00     0.00   871.0

** Area Source       QS/A       HS     Xs     Ys     Angle

  SRCPARAM  CDT1    0.00007178    4.  170.4   23.7    26.093
  SRCPARAM  CDT2    0.00007178   10.   86.1   72.9    26.093
  SRCPARAM  CDT3    0.00007178    3.   72.5   41.5    26.093

** Point Source      QS      HS      TS      VS      DS
** Parameters:      ----    ----    ----    ----    ---

  SRCPARAM  C1     27.7778  20.224  2353.62  69.93  0.709

SO BUILDHGT C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT C1        0.00    0.00    0.00    0.00    0.00   23.00
SO BUILDHGT C1       23.00   23.00   23.00   23.00   23.00    0.00
SO BUILDHGT C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDHGT C1        0.00    0.00    0.00    0.00    0.00   23.00
SO BUILDHGT C1       23.00   23.00   23.00   23.00   23.00    0.00
SO BUILDWID C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID C1        0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDWID C1       29.58   29.58   28.68   26.91   24.33    0.00
SO BUILDWID C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDWID C1        0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDWID C1       29.58   29.58   28.68   26.91   24.33    0.00
SO BUILDLEN C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDLEN C1        0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDLEN C1       29.58   29.58   28.68   26.91   24.32    0.00
SO BUILDLEN C1        0.00    0.00    0.00    0.00    0.00    0.00
SO BUILDLEN C1        0.00    0.00    0.00    0.00    0.00   28.68
SO BUILDLEN C1       29.58   29.58   28.68   26.91   24.32    0.00
SO XBADJ    C1        0.00    0.00    0.00    0.00    0.00    0.00
SO XBADJ    C1        0.00    0.00    0.00    0.00    0.00  -59.17
SO XBADJ    C1      -63.00  -64.92  -64.86  -62.83  -58.90    0.00
SO XBADJ    C1        0.00    0.00    0.00    0.00    0.00    0.00
SO XBADJ    C1        0.00    0.00    0.00    0.00    0.00   30.49
SO XBADJ    C1       33.42   35.34   36.18   35.93   34.58    0.00
SO YBADJ    C1        0.00    0.00    0.00    0.00    0.00    0.00
SO YBADJ    C1        0.00    0.00    0.00    0.00    0.00   23.39
```

```
SO YBADJ    C1        15.25    6.65   -2.16  -10.90  -19.31    0.00
SO YBADJ    C1         0.00    0.00    0.00    0.00    0.00    0.00
SO YBADJ    C1         0.00    0.00    0.00    0.00    0.00  -23.39
SO YBADJ    C1       -15.25   -6.65    2.16   10.90   19.31    0.00

  SRCGROUP  ALL
SO FINISHED

RE STARTING
RE DISCCART    -240.0  -460.0  886.990
RE DISCCART    -220.0  -460.0  886.656
.
.
.
RE DISCCART     340.0   140.0  858.209
RE DISCCART     360.0   140.0  858.233
RE FINISHED

ME STARTING
  INPUTFIL  deer.met
  ANEMHGHT  10.
  SURFDATA  25000  1995
  UAIRDATA  23118  1995
ME FINISHED

OU STARTING
  RECTABLE  ALLAVE  FIRST
  MAXTABLE  ALLAVE  50
  PLOTFILE   1  ALL  FIRST NH3L.xyz
  MAXIFILE   1  ALL  1400. NH3L.max
OU FINISHED
```

ISC-PRIME OUTPUT FILE - CHIGWELL DISTRIBUTION TERMINAL

FLARING SCENARIO 2 – RAIL CAR VENTING - NH_3

1 *** ISC3P - VERSION 04269 *** *** AGrium Chigwell - Renewal March 2007 ***
*** ***
PAGE 34
**MODELOPTs: CONC RURAL ELEV NOSTD

*** THE SUMMARY OF HIGHEST 1-HR RESULTS ***

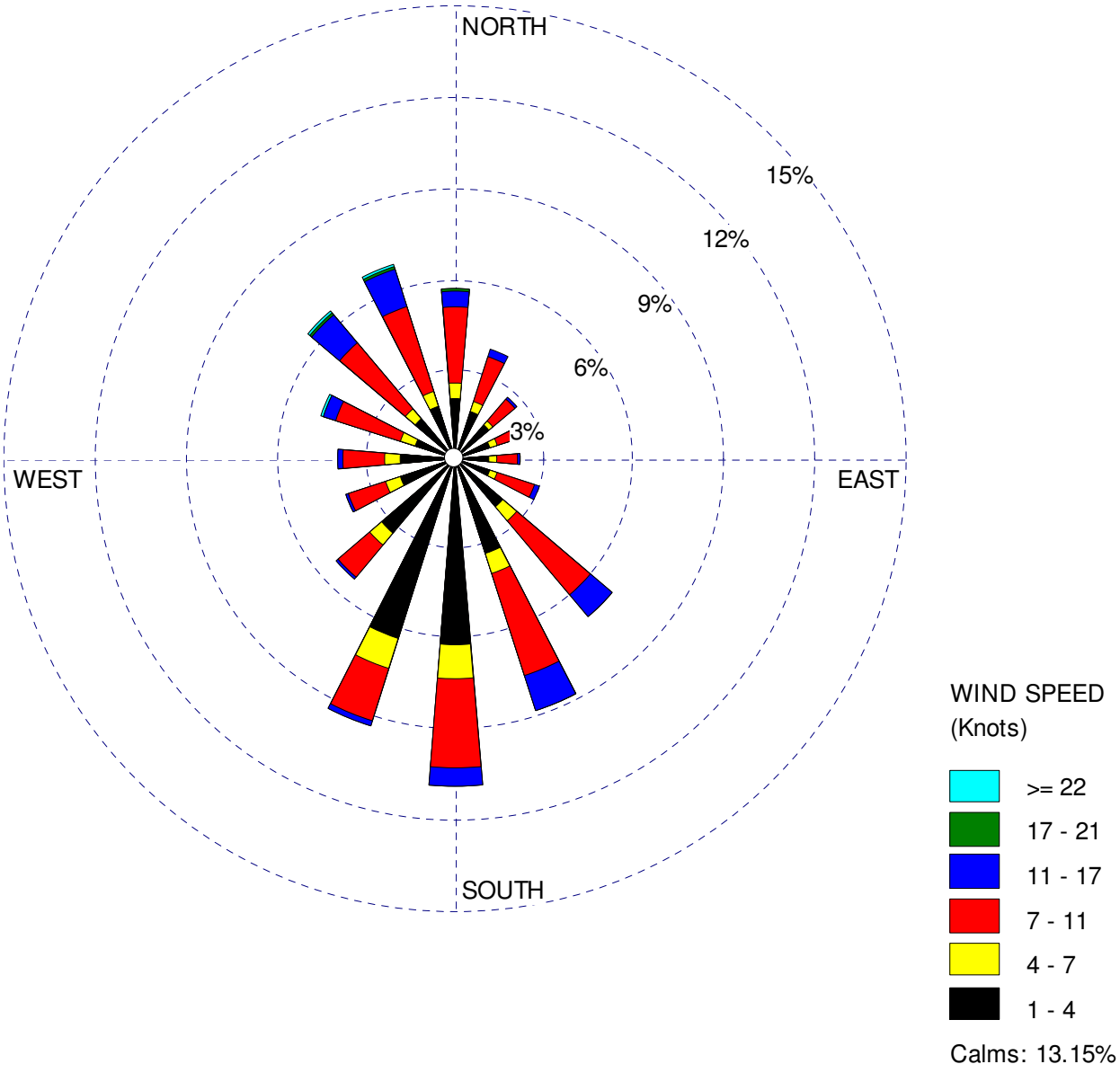
** CONC OF NH3 IN MICROGRAMS/M**3 **

GROUP ID	AVERAGE CONC	DATE (YYMMDDHH)	NETWORK RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	1417.89587	ON 96031508: AT (60.00, -160.00, 875.78, 0.00)	DC	NA

*** RECEPTOR TYPES: GC = GRIDCART
GP = GRIDPOLR
DC = DISCCART
DP = DISCPOLR
BD = BOUNDARY

ATTACHMENT B

Windrose for the Red Deer Airport



Windrose for the Red Deer Airport.