HOWSE Property Iron Mine

Air Dispersion Modelling Report

For the Environmental Impact Assessment pursuant to the Canadian Environmental Assessment Act, 2012

October 2015

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0	2015-11-02	Final	Denis Lalonde	<Original signed by>

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1 Introduction

Howse Minerals Limited (HML) is planning on developing the iron ore deposit at the Howse Property with the support of adjacent infrastructure. The Howse Property Iron Mining Project is subject to the Canadian Environmental Assessment Act, 2012. On July 14, 2014, the Canadian Environmental Assessment Agency (CEAA) issued Environmental Impact Assessment (EIS) guidelines for the project. The EIS guidelines identify the potential environment effects to be considered. One of the effects to consider is air quality.

In February 2015, a preliminary version of this report was submitted to CEAA and First Nations (FN) groups, as part of a complete draft EIS submittal. Subsequently, comments and questions from the CEAA and FN were received by HML. To ensure accurate understanding of some comments/questions versus the air dispersion modelling approach used for the Howse project, follow-up discussions were held with CEAA. Discussions were held through three conference calls from May to August 2015. Participants in the calls were: TSMC (supported by Groupe Hemispheres and AECOM) and CEAA (supported by specialists from Environment Canada (EC) and Health Canada (HC)). This Air Dispersion Modelling Report incorporates the conclusions of discussions with CEAA and also addresses the list of comments and questions from CEAA and FN.

The objective of this study is to evaluate the effects of the Howse Project emission sources on air quality. The Howse Project is located in the vicinity of the larger Direct Shipping Ore (DSO) complex operated by Tata Steel Minerals Canada Ltd (TSMC). The DSO complex comprises several mining and ore processing areas. From startup to decommissioning, the mining and operation schedules of each area vary in time and this was taken into account when establishing the air dispersion modelling approach. From an air quality effects perspective, Table 1-1 lists the key areas of the DSO and Howse projects and how they were integrated in the present air quality study for the Howse EIS, based on their respective schedule of operation and locations.

More specifically, this study evaluates the impact on air quality from activities related to these main sources from DSO-wide activities:

- mining (drilling, blasting, excavation, loading, unloading, piles, etc.);
- power generation (diesel generators);
- transportation (emissions from vehicle engines and road dust);
- operation of the main processing plant (diesel generators, crushing, screening, ore drying, stockpiles, train loading, etc.);
- operation of Plant 2 (ore crushing, drying, screening, stockpiles);
- operation of Howse Mini Plant on the east side of the rail loop (ore crushing, drying, screening, stockpiles), and
- operation of crushing and screening facility related to the FN quarry.

Detailed source descriptions and emissions can be found in the following sections. A project description with additional information on the DSO process and context of the project can be found in the main EIS report of the Howse Project.

The parameters evaluated for this air quality assessment study are:

- Total Particulate Matter (TPM);
- Particulate Matter less than 10 microns (PM_{10});
- Particulate Matter less than 10 microns ($PM_{2.5}$);
- Nitrogen dioxide (NO_2);
- Sulfur dioxide (SO_2);
- Carbon monoxide (CO);
- Dust deposition (Dustfall);
- Metals (Antimony, Arsenic, Barium, Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Silver, Thallium, Vanadium, Zinc);
- Volatile Organic Compounds or VOC (1,3-Butadiene, Acetaldehyde, Acrolein, Benzene and Formaldehyde).

The Howse property is located in the Province of Newfoundland and Labrador (NL). However, the Howse Project's air emissions may have an effect on receptors located in the Province of Quebec due to its proximity to the QC-NL border (2-3 km approximately). Consequently, the selected study area covers both provinces.

To predict the effects of the Project's emissions sources on air quality, the air dispersion model used in this study is CALPUFF, an air modelling program available from the United States Environmental Protection Agency (USEPA) and the preferred model[1] for dispersion modelling studies in NL. It is also an approved model in the province of QC. It is important to note that for different previous DSO phases, air dispersion modelling has been conducted for compliance demonstration or for environmental impact statement (EIS) purposes. For example, the EIS for the Elross Lake Area Iron Ore Mine (ELAIOM) submitted to the Government of Newfoundland and Labrador in 2009[2] and the Direct-Shipping Ore Project 2A (Goodwood, Leroy1, Sunny1 and Kivivik 3S deposits) submitted to the Government of Quebec in 2009[3] both contained a dispersion modelling study. More recently (late 2014), a compliance air dispersion modelling study for the DSO3 complex was submitted to the government of Newfoundland and Labrador to obtain an operating license. When applicable, data and methodologies from these previous air modelling efforts were incorporated in the current Howse project air quality assessments. To ensure consistency, some key aspects and/or methodologies of previous studies were used for the Howse project EIS, including the following:

- Dispersion modelling software is CALPUFF;
- Meteorological data;
- Topographical data;
- Terrain usage (land use); and
- Emission factors for emissions sources such as roads, vehicle engines, diesel generators, drills, truck loading and unloading, etc.

The highest air quality impact will be observed during the Operations phase due to the operation of the processing plants and full scale production (eg. mining and ore hauling). The other two phases of the project consist of:

a) *Site Preparation and Construction (SPC) Phase*: This phase consists mostly of construction of the access/haul road and bypass road, pit development, installation of the Howse Mini-Plant and transportation/traffic.
b) *Decommissioning and Reclamation (DR) Phase*: This phase consists mostly of transportation and traffic and final site restoration.

The types of air contaminants and the areas from which air emissions will occur during the SPC and DR phases will be similar to those encountered during the operation phase. During all three phases, air emissions from diesel powered engines, dust emissions due to vehicle movements on unpaved roads and blasting will occur, but rates of air emissions during the operation phase will be continuous and of a higher intensity. One important reason why the nature of the air contaminants remains the same during the three phases is the fact that all the power used at the site is generated by diesel equipment; the site is not connected to the power grid. Air emissions intensity during the operation phase will be higher than during the SPC and DR phases due to continuous intensive mining and processing at the Howse Mini-Plant. Consequently, the air quality impact study was conducted for the operations phase only.

This report is divided into two sections: 1) description of the air dispersion modelling methodology and 2) presentation of results.

1 *Guideline for Plume Dispersion Modelling* of the Department of Environment and Conservation of the Government of Newfoundland and Labrador (GD-PPD-019.2, 2nd revision, Sept. 2012).
2 http://www.env.gov.nl.ca/env/env_assessment/projects/Y2010/1380/index.html
3 http://www.mddelcc.gouv.qc.ca/evaluations/projet-nord.htm

Table 1-1 DSO and Howse Projects - Schedules and Inclusion in the Air Quality Study

Project Area	Main Air Emission Sources	Expected Operation Schedule	Inclusion in this Air Quality Study
DSO3	Mining activities at Fleming 7N and Timmins 3N deposits Ore processing at the Main Processing Plant Ore processing at Plant 2 Road transportation and ore hauling Ore loading to rail cars Workers' Camp	DSO3 operations started in 2015 (currently in commissioning stages). DSO3 and Howse will operate simultaneously after Howse starts up in 2017.	The DSO3 complex is located within the Air Quality LSA. DSO3 air emission sources are included in this study and considered as part of the baseline (pre-Howse) condition.
DSO4	Mining activities at Kivivic and Goodwood/Sunny deposits Road transportation and ore hauling (on Goodwood Road)	DSO4 operations started in 2015 (currently in commissioning stages). DSO4 and Howse will operate simultaneously after Howse starts up in 2017.	The DSO4 deposits are located approximately 22 km from Howse, are outside the LSA, and emissions associated to DSO4 mining activities are not included in air quality study. However, the ore mined at DSO4 will be hauled to the DSO3 Main processing plant. Air emissions from ore hauling on the 9.6 km portion of the Goodwood road located within the LSA are included in this air quality study and considered as part of the baseline (pre-Howse) condition.
HOWSE	Mining activities at Howse deposit Road transportation and ore hauling Ore processing at the Howse Mini-Plant FN crushing/Screening facility	2017	Included in this air quality study.

2 Air Dispersion Modelling Methodology

The effects on air quality were estimated by means of atmospheric pollution dispersion modelling of the emissions from the Project's sources using the California Puff Model or CALPUFF program of the United States Environmental Protection Agency (USEPA). The methodology used for modelling is presented in this section and comprises the following four elements:

- description of the dispersion model used;
- description of the study areas;
- context and modelling approach; and,
- modelling parameters and inputs.

2.1 Description of the Dispersion Model Used

The CALPUFF model is the atmospheric pollution dispersion model recommended in the *Guideline for Plume Dispersion Modelling* of the Department of Environment and Conservation of the Government of Newfoundland and Labrador (GD-PPD-019.2, 2nd revision, Sept. 2012). The CALPUFF model is also approved by the Ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques (MDDELCC) of the province of Quebec in the Guide de la modélisation de la dispersion atmosphérique (April 2005).

CALPUFF is a Lagrangian puff modelling system for the simulation of variable spatial and temporal conditions. Atmospheric emissions are modelled as a series of puffs which disperse according to wind direction over a given period. These puffs disperse vertically and horizontally in the atmosphere. They are influenced by the topography. Thus, a change in wind direction will influence the results of the modelling. The CALPUFF model adapts to various modelling situations. The flexibility of the model allows for the various characteristics associated with the local context to be taken into account. CALPUFF is especially useful in situations in which particulate matter is transported over long distances, with light and calm wind conditions (speed less than 0.5 m/s), wind inversions, such as land breezes and sea breezes, and complex wind configurations associated with very rugged terrains. In addition, parameters such as dry deposition, wet deposition and particulate matter sizing have been incorporated into the CALPUFF input files as described in the *Guideline for Plume Dispersion Modelling*. Dustfall rates presented in the results of this study are equivalent to TPM deposition calculated by the model.

The system is made up of three programs: CALMET, CALPUFF and CALPOST. CALMET allows for the processing of meteorological data and the obtaining of hourly tridimensional meteorological data specific to the study area. Once processed, the meteorological data obtained with CALMET are used by CALPUFF, the atmospheric dispersion modelling program. Lastly, CALPOST allows for the processing and analysis of the modelling results. The V6.334, V6.42 and V6.292 versions of CALMET, CALPUFF and CALPOST were used within the framework of this study.

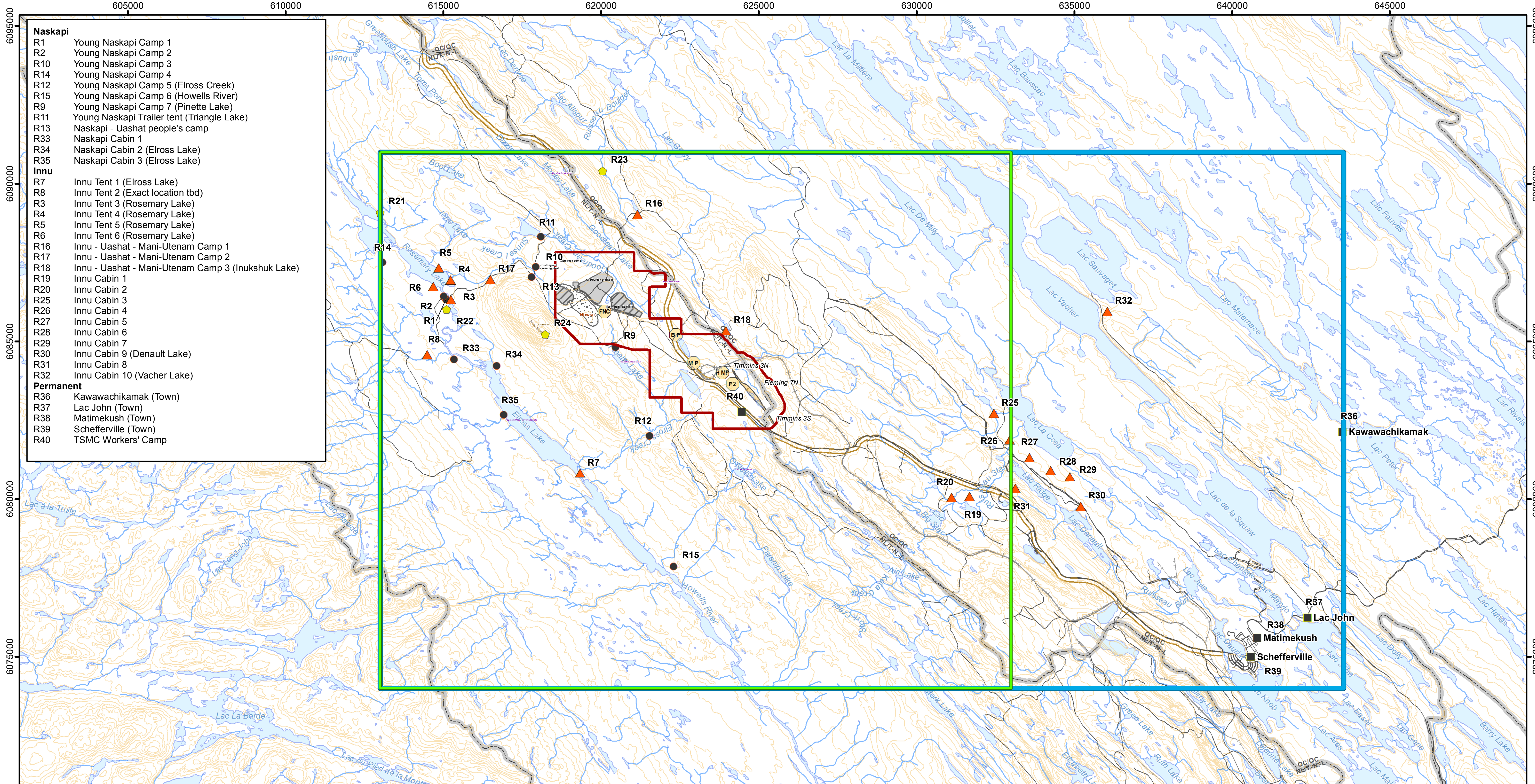
2.2 Description of Study Area

The Local Study Area (LSA) is selected based on the requirements of the air dispersion modelling software used for effects assessments and provincial regulatory requirements on dispersion modelling methodology. LSA for the purposes of modelling the dispersion of pollutants covers an area of 340 km^2. Centered at the UTM coordinates East – 623 000 m, North – 6 082 500 m, located at the center of DSO3, this area extends 17 km north to south and 20 km east to west (see Figure 2.1). The LSA is characterized by rugged relief, with drops of up to 300 metres. It is covered in large part by coniferous forests and tundra. A list of sensitive receptors in the study area was provided to AECOM; these sensitive receptors are described in Section 2.4.5 and include several sites used by the Innus and Naskapis. The LSA includes areas likely to be directly impacted by the mine development.

The regional study area (RSA) is a larger area extending east to include the towns of Schefferville and Kawawachikamach, and the Matimekush-Lac John community, located approximately 20 km east of the project. These four towns/communities were also considered sensitive receptors and were included in this study. The RSA covers an area of 520 km^2. Centered at the UTM coordinates East – 628 200 m, North – 6 082 130 m, located half way between DSO2 and DSO3, this area extends 17 km north to south and 40.5 km east to west (see Figure 2.1).

Figure 2.1 presents the study areas selected for modelling and shows the following site features:

- location of sensitive receptors, including the workers' camp;
- Howse mining area; and
- processing plants: Main Processing Plant and Plant 2 (under the DSO3 project) and Howse Mini Plant and the FN crusher/screener (under the Howse Project).



LEGEND

Sensitive Receptors
- Naskapi
- Innu
- Permanent
- Other

Study Areas
- Local Study Area (LSA)
- Regional Study Area (RSA)
- Air Quality Modelling Perimeter

Infrastructure and Mining Components
- P2 Plant 2
- MP Main processing Plant
- HMP Howse Mini-Plant
- BP Batch Plant
- FNC First Nations crusher/screener
- Road to DSO Area 4
- Existing Railroad
- Deposit
- Proposed Howse Pit
- Proposed Topsoil/ Overburden Stockpile
- Proposed Waste Dump/ In-Pit Dump
- Proposed Mine Haul Road

Basemap
- Existing road
- Contour Line (50 ft)
- Provincial Border
- Watercourse
- Water Body

*Hydronyms are oriented along the direction of water flow

FILE, PROJECT, DATE, AUTHOR:
GH-0672 , PR185-19-14, 2015-11-02, edickoum

N

0 2 4
Kilometers
SCALE: 1:120 000

UTM 19N NAD 83

SOURCES:

Basemap and Land Use Components
Government of Canada, NTDB, 1:50,000, 1979
Government of NL and government of Quebec,

Mining Components
Howse Minerals Limited/
MET-CHEM Howse Deposit Design
for General Layout., 2015
Groupe Hémisphères, Hydrology and update, 2013

AECOM

ENVIRONMENTAL IMPACT ASSESSMENT
HOWSE PROPERTY PROJECT

Study Area for Purposes of Air Quality Modelling Sensitive Receptors

Howse Minerals Limited

GroupeHemispheres
5731, rue Saint-Louis, Bureau 201, Lévis (QC) Canada, G6V 4E2
1453, rue Beaubien est, Bureau 301, Montréal (QC) Canada, H2G 3C6

Figure 2.1

2.3 Context and modelling approach

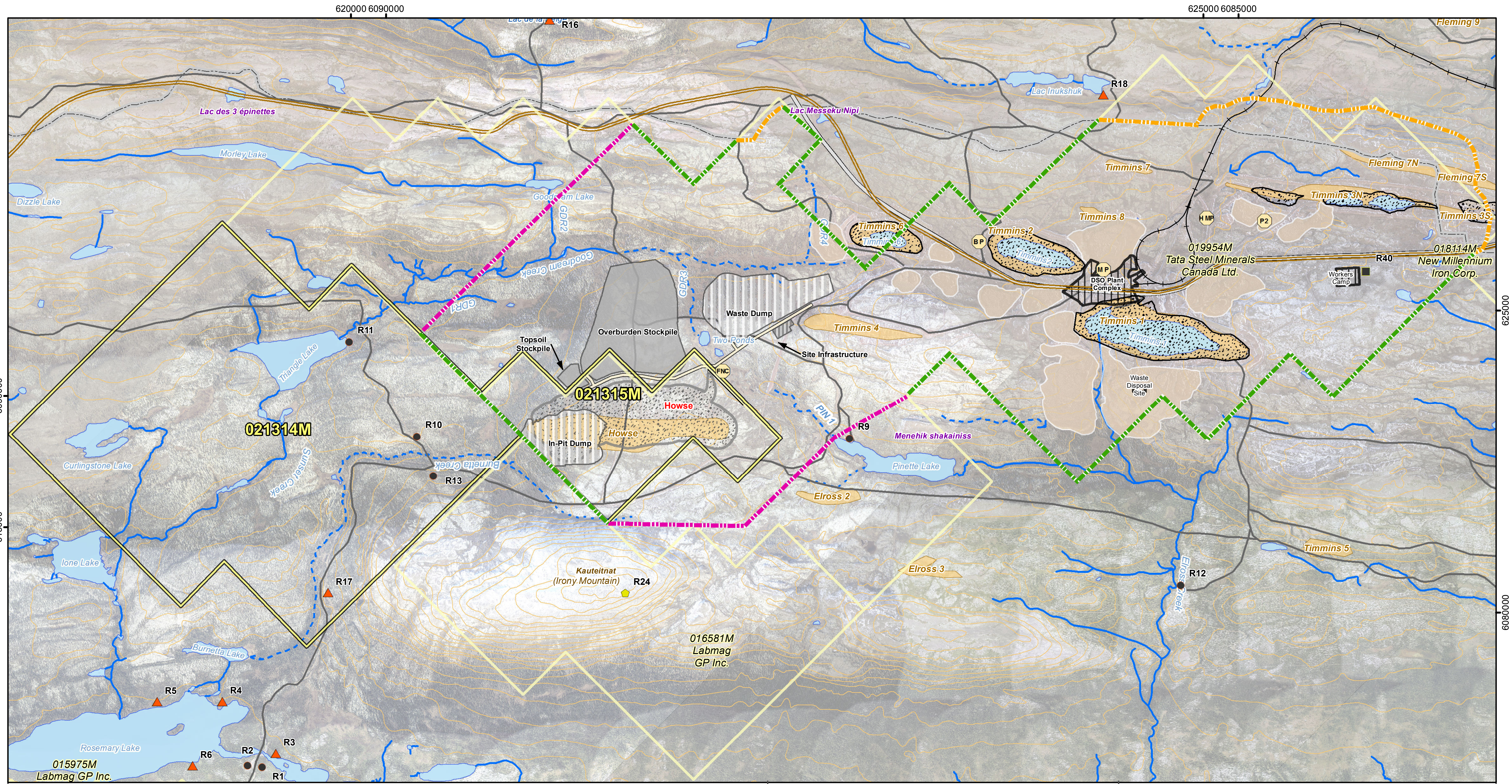
2.3.1 Air Dispersion Modelling Perimeter

As mentioned in the introduction of this report, the Howse Project is located in the vicinity of the larger Direct Shipping Ore (DSO) complex operated by TSMC. The DSO complex comprises several mining areas. The DSO3 area is located approximately 4 km from the Howse mining area and is considered the heart of the complex; that is where the ore is processed and loaded on rail cars for shipment. The DSO3 area main infrastructures already in place (or currently in advanced construction phase) are: Main Processing Plant (eg. Dome), Plant 2, rail loop, batch plant, workers' camp and maintenance buildings / garages. All these will be operational prior to the startup of the Howse project. The Howse project itself will add the following infrastructures: the Howse Mini Plant located besides the rail loop (east side) and a crusher/screener for the FN quarry.

To include emission sources from the Howse activities only (eg. ore mining, Howse Mini Plant processing activities, crusher/screener at FN quarry and hauling) in the air quality assessment would underestimate the resulting air quality exposure at local receptors and would not be representative of the overall impact of the mining/processing activities in the study area. Consequently, it was decided that the air quality effects assessment for the Howse Project would be evaluated as an add-on to other activities from the DSO complex and the air modelling approach would be as follows:

- A modelling perimeter including activities of DSO3 and Howse was established, see Figure 2.2.
- The modelling perimeter encompasses air emissions associated to:
    - Howse project (mining operations and infrastructures);
    - DSO3 area mining operations and infrastructures;
    - Ore hauling from the DSO4 area.
- Emission sources from within the modelling perimeter are considered and are included as inputs to the dispersion modelling software.
- The area within the air quality modelling perimeter was excluded for assessment purposes as this area is restricted to the general public because of safety and security concerns and subject to work-place safety standards rather than ambient air quality thresholds. The air model grid receptors located within the modelling perimeter are excluded from the study. The only sensitive receptor located within the perimeter is the workers' camp and air quality at this receptor has been assessed.
- The perimeter lines were established based on locations of:
    - claim lines;
    - sensitive receptors such as camps, hunting and picking sites, and natural elements (lakes);
    - the QC/NL border; and,
    - compatibility with previous modelling efforts performed for other TSMC DSO sites in this region.
- The air modelling approach for establishing the modelling perimeter combines regulatory requirements from both NL and QC jurisdictions. AECOM has been involved in several air modelling projects on each side of the border for the DSO project and used these past modelling experiences to establish the modelling approach. Each province has its own set of requirements for determining a modelling perimeter, but the perimeter typically stops at the border where a province has jurisdiction. For this study, a combination of each provincial guidance applied for air modelling of previous phases of TSMC DSO Project was used, as explained below and shown on Figure 2.2 Air Dispersion Modelling Perimeter – Howse Project EIS
-

- NL Guidance: Include a line of receptors on the NL/QC border and remove border receptors that would be located inside a claim area.
- QC requirements: No receptors within 300 meters of any industrial activity.



LEGEND

Infrastructure and Mining Components

Proposed Infrastructures
- Proposed Howse Pit
- Proposed Topsoil/Overburden Stockpile
- Proposed Waste Dump/In-Pit Dump
- Proposed Site Infrastructure
- Proposed Mine Haul Road

Existing Components
- Existing Railroad
- Road to DSO Area 4
- Existing Sedimentation Pond
- DSO Howse - Claim Labrador Iron Mines Limited(49%)/ Howse Minerals Ltd.(51%)
- Other Claim
- Elross Lake Area Iron Ore Mine (ELAIOM) Plant Infrastructure Footprint
- Existing Dump
- Existing Pit
- Deposit
- P2 Plant 2
- MP Main processing Plant
- HMP Howse Mini-Plant
- BP Batch Plant
- FNC First Nations crusher/screener

Sensitives Receptors
- Naskapi
- Innu
- Permanent
- Other/Autre

Air Dispersion Modelling Perimeter
- Administrative Boundaries using Newfoundland Methodology with Receptors on Claim Lines
- Alternative Boundary Limits within Newfoundland to Include Possible sensitive Areas into the Receptors grid
- Administrative Boundaries using a Methodology used by Quebec in a previous Impact Study

Basemap
- Permanent Watercourse
- Intermittent Watercourse
- Storm Runoff
- Disappearing Stream
- Artesian Spring
- Water body
- Contour Line (50 ft)
- Provincial Border
- Existing Road
- Main Access

*Hydronyms are oriented along the direction of water flow

FILE, PROJECT, DATE, AUTHOR:
GH-0673 , PR185-19-14, 2015-11-02, edickoum

N

0 500 1 000 1 500 2 000

Meters

UTM 19N NAD 83

SCALE: 1:31 000

SOURCES:
Basemap
Government of Canada, NTDB, 1:50,000, 1979 Government of NL and government of Quebec, Boundary used for claims
SNC Lavalin, Groupe Hémisphères, Hydrology update, 2013

Infrastructure and Mining Components
New Millennium Capital Corp., Mining sites and roads
Howse Minerals Limited/ MET-CHEM Howse Deposit Design for General Layout, 2013

ENVIRONMENTAL IMPACT ASSESSMENT
HOWSE PROPERTY PROJECT

Air Dispersion Modelling Perimeter
Howse Minerals Limited

GroupeHemispheres
5731, rue Saint-Louis, Bureau 201, Lévis (QC) Canada, G6V 4E2
1453, rue Beaubien est, Bureau 301, Montréal (QC) Canada, H2G 3C6

Figure 2.2

2.3.2 Definition of contributors to Air Quality Effects

The Howse project will be integrated in the larger TSMC DSO complex. As shown in Table 1-1, mining and processing activities at DSO3 and DSO4 areas will start before Howse starts. To evaluate the cumulative effects on air quality and meet the CEAA guidelines for this project, Howse, DSO3 and DSO4 must all be considered in the air modelling study.

To compartmentalize the air modelling inputs and to facilitate results interpretation, the resulting concentrations at each receptor will consist of five (5) contributors from the DSO complex as described in Table 2-1.

Table 2-1 Five (5) Contributors to the Cumulative Effect on Air Quality

Contrib. #	Contribution from	Description
(1)	*Background concentrations*	Corresponds to pre-DSO3 air quality level. Background concentrations values based on evaluation of previous on-site monitoring data and province provided background concentrations. Appendix G contains copy of a memo discussed and approved by CEAA regarding background concentrations and ambient air monitoring.
(2)	*Concentrations due to emissions from DSO3 operations (see list of sources in Section 2.4.1 and Appendix A)*	DSO3 sources are located with the air quality modelling perimeter and therefore included in the air quality study. *DSO3 Deposits*: Fleming 7N (2016-2021) and Fleming 3N (2022-2026). Very close to each other. In addition to ore hauling trucks, smaller vehicle movements within the air quality modelling perimeter were included. One sensitive receptor located within property limit = Workers' camp.
(3)	*Concentrations due to emissions from ore hauling from the DSO4*	DSO4 deposits are located approximately about 20 km to the North-West of the Howse Property. Mining activities at these deposits are far and have an insignificant impact in the LSA. *However, ore hauling from the DSO4 pits to the Main processing plant and rail loop does fall within the LSA and the air quality modelling perimeter. Contribution of DSO4 ore hauling on a 9.6 km road section is included in the air quality study.* From a practical air model input standpoint, Contributor (3) is included in Contributor (2) and is not reported separately.
(4)	*Concentrations due to emissions from Other Projects in the RSA*	TSMC DSO3 and DSO4 are actual and active projects, and are included in the air quality study as explained above. Due to the plunging iron ore prices (from $150/tonne in early 2013 to $50/tonne currently), it is anticipated that other iron ore projects in the region such as Taconite, Block 103 and Lac Otelnuk projects will be delayed or cancelled. Therefore, these projects are still hypothetical and information on the location of mining and processing activities is not available. Consequently, future potential air emissions effects from these projects are considered as being zero for the air dispersion modeling study.
(5)	*Concentrations due to emissions from Howse operations*	Howse sources are located with the air quality modelling perimeter and therefore included in the air quality study.

2.3.3 Project Air Quality Criteria - Criteria Air Contaminants (CAC)

This modelling study is performed in the context of an environmental impact assessment under the Canadian Environmental Assessment Agency (CEAA). The Howse Property and the DSO3 complex and its mining areas are located in the Province of Newfoundland and Labrador (NL), in close proximity to the Quebec (QC) border. Effects on air quality may be observed on both sides of the border.

Table 2-2 presents ambient air quality standards and objectives for the three jurisdictions (Canada, QC and NL) for the six Criteria Air Contaminants (CAC) evaluated in this study. The most stringent air quality standards were selected as assessment criteria for this study. Each jurisdiction has its own procedure for comparing air modelling results to air quality standards. For example, compliance with the Canada $PM_{2.5}$ standard is based on the 98th percentile ambient annual measurement, averaged over 3 consecutive years[4]. Another example is in NL[5], compliance for modelled impacts for any given year is to be based on the:

- 9th highest level at any given receptor for 1-hour averaging period;
- 6th highest level at any given receptor for 3-hour averaging period;
- 3rd highest level at any given receptor for 8-hour averaging period; and
- 2nd highest level at any given receptor for 24-hour averaging period.

Finally, the Province of Quebec also has its own procedure for demonstrating compliance with air quality standards[6].

In this study, maximum modelled results are compared to the selected assessment criteria (see last column in Table 2-2), regardless of their percentile or ranked levels. A discussion of ranks and levels, by way of an exceedance frequency analysis is provided in Section 0.

4 http://www.ccme.ca/files/Resources/air/pm_ozone/pmozone_standard_e.pdf
5 http://www.env.gov.nl.ca/env/env_protection/science/gd_ppd_009_4.pdf
6 http://www.mddelcc.gouv.qc.ca/air/criteres/

Table 2-2 Air Quality Standards/Objectives & Selected Assessment Criteria - CAC

Pollutant	Averaging Period	NL Air quality standards (1) (µg/m³)	QC Air quality standards (2) (µg/m³)	Canada Air quality standards/objectives(3) (µg/m³)	Selected Assessment Criteria (µg/m³)
TPM	1-yr	60	70	70	**60**
	24-hr	120	120	120	**120**
	1-hr	--	--	--	**--**
PM_{10}	1-yr	--	--	--	**--**
	24-hr	50	--	--	**50**
	1-hr	--	--	--	**--**
$PM_{2.5}$	1-yr	--	--	10 (8.8 after 2020)	**8.8**
	24-hr	25	30	28 (27 after 2020)	**25**
	1-hr	--	--	--	**--**
SO_2	1-yr	60	52	60	**52**
	24-hr	300	288	300	**288**
	3-hr	600	--	--	**600**
	1-hr	900	--	900	**900**
NO_2	1-yr	100	103	100	**100**
	24-hr	200	207	200	**200**
	1-hr	400	414	400	**400**
CO	8-hr	15 000	12 700	15 000	**12 700**
	1-hr	35 000	34 000	35 000	**34 000**

(1) Reference: Air Pollution Control Regulations, 2004 Newfoundland and Labrador Regulations 39/04, Schedule A – Table I: Ambient Air Quality Standards at Reference Conditions.
(2) Reference: Atmospheric quality standards, Sections 197 and 198 and Schedule K of the Clean Air Regulation, Q-2, r. 4.1.
(3) Federal $PM_{2.5}$ standards published on May 25, 2013: Sections 54 and 55 of the Canadian Environmental Protection Act, 1999. For other pollutants, in 2004, the federal government sets national ambient air quality objectives (NAAQOs) on the basis of recommendations from the Federal–Provincial Working Group on Air Quality Objectives and Guidelines consisting of representatives from both the health and environment departments. NAAQOs are structured in three-tiered: maximum desirable levels, maximum acceptable levels and maximum tolerable levels. Maximum acceptable levels are listed in the table.

2.3.4 Project Air Quality Criteria – Non-Criteria Air Contaminants (non-CAC)

Table 2-3 presents NL and QC ambient air quality standards for non-Criteria Air Contaminants (non-CAC) evaluated in this study.

All metals listed in either the NL or the QC air quality standards regulations have been included in Table 2-3. In addition, Ontario air quality standards for metals and averaging periods listed in NL/QC regulations have been added to Table 2-3. Ontario air quality standards are not applicable in NL or QC, but their inclusion for non-CAC of the present study is particularly useful for VOCs, since there are no air quality standards in QC and NL for acetaldehyde and acrolein. Volatile Organic Compounds (VOC) can be emitted from diesel-fired engines at the site. Principal VOCs from diesel combustion are listed in the table with respective NL, QC and ON air quality standards. For each air contaminant, the most stringent metal air quality standards were selected as assessment criteria for this study.

As for CAC, each jurisdiction has its own procedure for comparing air modelling results to air quality standards.

Table 2-3 Air Quality Standards/Objectives & Selected Assessment Criteria – Non-CAC

Pollutant		Averaging Period	NL Air quality standards (1) (µg/m³)	QC Air quality standards (2) (µg/m³)	ON Air quality standards (3) (µg/m³)	Selected Assessment Criteria (µg/m³)
Metals	Antimony (Sb)	1-yr	--	0.17	--	**0.17**
	Arsenic (As)	1-yr	--	0.003	--	**0.003**
		24-hr	0.3	--	0.3	**0.3**
	Barium (Ba)	1-yr	--	0.05	--	**0.05**
	Beryllium (Be)	1-yr	--	0.0004	--	**0.0004**
	Cadmium (Cd)	1-yr	--	0.0036	0.005	**0.0036**
		24-hr	2	--	0.025	**0.025**
	Chromium (Cr)	1-yr	--	0.004	--	**0.004**
	Copper (Cu)	24-hr	50	2.5	50	**2.5**
	Lead (Pb)	1-yr	--	0.1	--	**0.1**
		30 days	0.7	--	0.2	**0.2**
		24-hr	2	--	0.5	**0.5**
	Mercury (Hg)	1-yr	--	0.005	--	**0.005**
		24-hr	2	--	2	**2**
	Nickel (Ni)	24-hr	2	0.014	0.2	**0.014**
	Silver (Ag)	1-yr	--	0.23	--	**0.23**
	Thallium (Tl)	1-yr	--	0.25	--	**0.25**
	Vanadium (V)	1-yr	--	1	--	**1**
		24-hr	2	--	2	**2**
	Zinc	24-hr	120	2.5	120	**2.5**
Volatile Organic Compounds (VOC)	Benzene	24-hr	--	10	2.3	**2.3**
	1,3-Butadiene	1-yr	--	0.3	2	**0.3**
		24-hr	--	--	10	**10**
	Formaldehyde	24-hr	--	6.5	65	**6.5**
	Acetaldehyde	24-hr	--	--	500	**500**
	Acrolein	24-hr	--	--	0.4	**0.4**
Other	Dustfall	30 days	7.0 g/m² per 30 days	--	7.0 g/m² per 30 days	**7.0 g/m² per 30 days**
		1 year	4.6 g/m² per 30 day avg.	--	4.6 g/m² per 30 day avg.	**4.6 g/m² per 30 day avg.**

(1) Air Pollution Control Regulations, 2004 Newfoundland and Labrador Regulations 39/04, Schedule A – Table I: Ambient Air Quality Standards at Reference Conditions.
(2) Atmospheric quality standards, Sections 197 and 198 and Schedule K of the Clean Air Regulation, Q-2, r. 4.1. When necessary, averaging time conversion was made.
(3) Ontario's Ambient Air Quality Criteria, Standards Development Branch Ontario Ministry of The Environment, April 2012.

2.3.5 Background Ambient Air Concentrations

Background concentrations represent concentrations present before the Howse project starts. As shown in Table 1-1, between now and the start of the Howse project, other parts of TSMC's DSO Complex will start operating at production capacity. Note that the main processing plant located in the DSO3 area has been under intensive construction for most of 2015 and is currently in the commissioning phase.

Typically, there are three methods of obtaining background concentrations:

a) In-situ air monitoring: In-situ air monitoring was conducted in 2006. The objective of this monitoring was to establish existing air concentrations prior to the beginning industrial activities.

b) Background concentrations provided by the regulator: The Provinces of NL and QC both provide background concentrations to be used when representative monitoring data is unavailable.

c) Air monitoring data from projects in the region: When available, air monitoring data from projects in the region could be used to define background air concentrations.

On June 10, 2015, a memo pertaining to background concentrations for the Howse project was submitted to CEAA. A copy of the memo is available in Appendix G of this report. The memo provides a review of the three methods listed above and concludes that for the Howse project, background concentrations provided by the regulators are the most conservative and appropriate representation of the pre-DSO air quality. The memo was discussed with CEAA on June 11, 2015 and its conclusions are implemented in this air quality study. Table 2-4 shows the background ambient air concentrations used in this study. Background concentrations for specific VOCs and dustfall were not covered in the memo to CEAA. The sources of information used to establish background concentrations for specific VOCs and dustfall are indicated in Table 2-4.

As explained in Section 2.3.2, five (5) contributors to the air quality effects are included in this study. Pre-Howse air quality is represented by the summation of four (4) contributors:

	(1)	Background concentrations
+	(2)*	Concentrations due to emissions from DSO3 operations
+	(3)*	Concentrations due to emissions from ore hauling from the DSO4
+	(4)*	Concentrations due to emissions from other Projects in the RSA
=	Pre-Howse Air Quality ("Baseline Condition")	
+	(5)	*Concentrations due to emissions from Howse operations*
=	Cumulative Air Quality Effect	

* *From a technical modelling standpoint, resulting ambient air concentrations from contributors (2), (3) and (4) are presented together.*

Table 2-4 Background ambient air concentrations used in the Howse Project Air Quality Study

Pollutant	Averaging Period	Selected Assessment Criteria (µg/m³)	Background Concentrations	
			µg/m³	Source
Criteria Air Contaminants				
TPM	1-yr	60	8	(b)
	24-hr	120	40	(a)
	1-hr	--	97	(b)
PM_{10}	1-yr	--	4	(b)
	24-hr	50	20	(c)
	1-hr	--	49	(b)
$PM_{2.5}$	1-yr	8.8	3	(b)
	24-hr	25	15	(a)
	1-hr	--	37	(b)
SO_2	1-yr	52	2	(a)
	24-hr	288	10	(a)
	3-hr	600	18	(b)
	1-hr	900	24	(b)
NO_2	1-yr	100	10	(a)
	24-hr	200	30	(a)
	1-hr	400	50	(a)
CO	8-hr	12 700	400	(a)
	1-hr	34 000	600	(a)
Metals				
Antimony (Sb)	1-yr	0.17	0.001	(a)
Arsenic (As)	1-yr	0.003	0.002	(a)
	24-hr	0.3	0.01	(b)
Barium (Ba)	1-yr	0.05	0.02	(a)
Beryllium (Be)	1-yr	0.0004	0	(a)
Cadmium (Cd)	1-yr	0.0036	0.0005	(a)
	24-hr	0.025	0.0025	(b)
Chromium (Cr)	1-yr	0.004	0.002	(a)
Copper (Cu)	24-hr	2.5	0.2	(a)
Lead (Pb)	1-yr	0.1	0.004	(a)
	30 days	0.2	0.0081	(b)
	24-hr	0.5	0.02	(b)
Mercury (Hg)	1-yr	0.005	0.002	(a)
	24-hr	2	0.01	(b)
Nickel (Ni)	24-hr	0.014	0.002	(a)
Silver (Ag)	1-yr	0.23	0.005	(a)
Thallium (Tl)	1-yr	0.25	0.005	(a)
Vanadium (V)	1-yr	1	0.01	(a)
	24-hr	2	0.05	(b)
Zinc (Zn)	24-hr	2.5	0.1	(a)

Pollutant	Averaging Period	Selected Assessment Criteria (µg/m³)	Background Concentrations	
			µg/m³	Source
Volatile Organic Compounds (VOC)				
Benzene	24-hr	2.3	0	(d)
1,3-Butadiene	1-yr	0.3	0.27	(e)
	24-hr	10	1.4	(d),(b)
Formaldehyde	24-hr	6.5	0.5	(e)
Acetaldehyde	24-hr	500	0	(d)
Acrolein	24-hr	0.4	0	(d)
Dustfall				
Dustfall	30 days	7.0 g/m²/30 days	2.6	(f)
	1 year	4.6 g/m²/30 days, arithmetic average	1.7	(f)

(a) Quebec Background Concentrations for Mining Projects in Northern Regions: http://www.mddelcc.gouv.qc.ca/air/criteres/instructions-secteur-minier.pdf

(b) Conversion to other averaging times based on Ontario MOE formula: $C1 = C2 \times (t2/t1)^p$, where p = 0.28. Examples: $C_{1yr} = C_{24hr} \times 0.2$; $C_{1hr} = C_{24hr} \times 2.43$; $C_{3hrs} = C_{24hr} \times 1.79$; etc…

(c) Calculated based on background concentrations for TPM and $PM_{2.5}$. Corresponds to more than twice the weighted average (7.0 ug/m³) in-situ monitoring of PM_{10} in the Labrador region (see Table 4 of Appendix G).

(d) No background concentration provided by Ontario.

(e) Atmospheric quality standards, Sections 197 and 198 and Schedule K of the Clean Air Regulation, Q-2, r. 4.1. When necessary, averaging time conversion was made.

(f) Background dustfall data was taken from the Voisey's Bay mining site in Labrador: http://www.vbnc.com/eis/chap8/chap81.htm. 1 year dustfall was calculated by multiplying the average 30 days dustfall by 8/12, assuming dustfall is nil during 4 winter months.

2.4 Modelling parameters and inputs

This section presents the data used for modelling. Modelling parameters are divided into four categories: data related to emission sources including emissions inventories, meteorological data, data related to receptors, and project specific modelling scenarios.

2.4.1 Data Related to Emission Sources

The following sub-sections describe the sources of emissions, the methodology used to estimate emission rates and how this information was used in the dispersion model. The data related to emission sources include the physical characteristics of the sources, the emission rates of pollutants and their duration. Detailed calculations to establish emission rates for each source are presented in Appendix A and a summary table of data used for modelling is included in Appendix B.

General layouts of the sites (Howse and DSO3) are presented in Appendix C. These layouts were used to determine the coordinates of emission sources (i.e. stack, stockpiles, conveyors' transfer points, etc.).

To provide a conservative assessment of air quality and to meet the modelling approach criteria set out in Section 2.3, air emission rates and intensities were estimated on the basis of the maximum operation scenario projected for years 2016 to 2027. Table 2-5 presents the mining plan summary for Howse, DSO3 and DSO4 for years 2016 to 2027 as provided by TSMC. As shown in Table 2-5, the maximum production rates from each area were selected as calculation basis:

Howse:

> Maximum mined materials will occur in year 2022. For calculations of the air model inputs, these values from year 2022 were used and conservatively assumed to be applicable every year.

DSO3:

> Over the period 2016 to 2026, two deposits will be mined in the DSO3 area: Fleming 7N (from 2016 to 2021) and Timmins 3N (from 2022 to 2026). As can be seen in Figure 2.2, Fleming 7N and Timmins 3N are located very close to each other, in the Northeast section of the air quality modelling perimeter. Fleming 7N is located the closest to the perimeter and its mining intensity will be higher than Timmins 3N. Consequently, the maximum Fleming 7N mining rate (Year 2017) was selected and used in calculations for the air model inputs. These values from Fleming 7N Year 2017 were conservatively assumed to be applicable every year.

DSO4:

> A portion of the road on which hauling trucks for DSO4 are moving is included in the air model. The DSO4 area includes several deposits (Goodwood, Sunny, Kivivic 1C, 2, 3N, etc.). Annual production rates associated to DSO4 deposits are shown in Table 2-5. For calculations of the air model inputs, the maximum mining year (Year 2022) was used and conservatively assumed to be applicable every year.

A more detailed mining plan covering years 2016 to 2027 is provided in Appendix A.

Table 2-5 Mining Plan and Maximum Production Rates Used in Air Modelling Study

MINE PLAN SUMMARY (Highlighted data indicate maximum year selected for air modeling)														Max applied in air modelling study
Mining Area and Production	**Unit**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	
HOWSE														**HOWSE**
Ore to Main Plant	kt	--	--	--	--	--	--	--	--	--	--	--	--	**--**
Ore to Howse Mini-Plant	kt	--	1319	3077	3077	3077	3246	3077	3077	3077	3077	3077	3077	**3077**
Ore to Plant 2	kt	--	--	--	--	--	--	--	--	--	--	--	--	**--**
Overburden	kt	6346	5095	6295	--	--	6687	6778	6778	6778	3388	3388	3388	**6778**
Waste	kt	--	112	332	2866	2879	2242	3968	3968	3968	6916	6916	6916	**3968**
Total mined	*kt*	*6346*	*6525*	*9703*	*5943*	*5956*	*12175*	*13823*	*13823*	*13823*	*13381*	*13381*	*13381*	***13823***
DSO3 - Fleming 7N														**DSO3 - Fleming 7N**
Ore to Main Plant	kt	--	--	--	--	--	--	--	--	--	--	--	--	**--**
Ore to Howse Mini-Plant	kt	--	--	--	--	--	--	--	--	--	--	--	--	**--**
Ore to Plant 2	kt	485	1109	1103	1105	1123	977	--	--	--	--	--	--	**1109**
Overburden	kt	452	46	--	--	--	--	--	--	--	--	--	--	**46**
Waste	kt	1533	2228	1628	1622	1550	1367	--	--	--	--	--	--	**2228**
Total mined	*kt*	*2471*	*3383*	*2730*	*2726*	*2673*	*2344*	--	--	--	--	--	--	***3383***
DSO3 - Timmins 3N														**DSO3 - Timmins 3N**
Ore to Main Plant	kt	--	--	--	--	--	--	--	--	--	--	--	--	**(1)**
Ore to Howse Mini-Plant	kt	--	--	--	--	--	--	--	--	--	--	--	--	
Ore to Plant 2	kt	--	--	--	--	--	--	47	384	521	662	420	--	
Overburden	kt	--	--	--	--	--	--	1193	211	--	--	--	--	
Waste	kt	--	--	--	--	--	--	1240	2578	1715	1247	313	--	
Total mined	*kt*	--	--	--	--	--	--	*2479*	*3173*	*2236*	*1909*	*733*	--	
DSO3 - Timmins 7, 4N, 4S														**DSO3 - Timmins 7, 4N, 4S**
No production at these deposits	kt	--	--	--	--	--	--	--	--	--	--	--	--	**--**
DSO4 to Main Plant														**DSO4 to Main Plant**
Ore hauled from DSO4 to Main Plant	kt	2377	6409	6308	6375	6298	6455	7384	7085	6931	6763	6961	4194	**7384**

(1) Fleming 7N and Timmins 3N are located very close to each other, in the Northeast section of the air quality modelling perimeter. Fleming 7N is located the closest to the perimeter and its mining intensity will be higher than Timmins 3N. Consequently, the maximum Fleming 7N mining rate (Year 2017) was selected and used in calculations for the air model inputs.

The following emissions sources are located inside the air modelling perimeter and are included in the Howse Project air dispersion modelling:

- A total of fourteen (14) diesel generators (see Table 2-6).
- Mining operations for the Howse and Fleming 7N mining sites which are located within the air modelling perimeter. Mining operations include drilling, excavating, loading/unloading and blasting.
- Ore/waste/overburden transportation to/from all mining sites listed in Table 2-5 (dust from unpaved roads and emissions from engines).
- Sand and gravel transportation by dump trucks (10-wheelers) to/from the First Nations quarry. The FN Quarry is to be located in close proximity to the Howse deposit.
- Small Equipment and personnel vehicles.
- Main Plant operations (crushers, conveyors, process exhaust from main stack, load/unload, train loading).
- Plant 2 operations (crushers, dryer, mixer, conveyors).
- Howse Mini plant operations (crusher, dryers, conveyors).
- FN Quarry (crushers, screener, conveyors).
- Wind erosion from ore, waste and overburden piles.

Sub-sections below provide more information on each type of emission sources.

2.4.1.1 Mining Operations

Iron ore will be extracted by conventional open-pit mining techniques. Mining operations considered for modelling include the four activities below:

- drilling (diesel-driven drills will drill 160 mm diameter holes for blasting);
- blasting (using a bulk emulsion of ammonium nitrate);
- excavating (hydraulic excavator); and,
- loading and unloading of ore, overburden and waste rock.

Mining operations at Fleming 7N (F7N) and Howse sites were included in the assessment because they are located within the air modelling perimeter (see Section 2.4.1).

For the F7N deposit site, ore will be transported to Plant 2 or to a low grade ore stockpile located close to the deposit and waste rock will be transported by truck and dumped at piles located close to the deposit. For modelling, all ore extracted from pit F7N to be hauled by truck to Plant 2. This is a conservative assumption regarding ore transportation for calculating the number of trips per year. It is assumed that 100% of the material at the F7N deposit will be blasted and that one blast per week in summer time (typically April to October) and one blast per month in winter time (typically November to March) will be conducted.

For the Howse deposit site, the material will be transported to the Howse Mini plant to be located to the east of the railing loop. Following the treatment process (including primary crushing/screening and drying), the ore will be hauled to the rail loop for shipment. Given the softness of the ore found at the Howse property, it is estimated that only 50% of the material will require blasting. Explosive consumption is estimated at 18 143 kg per week.

The emission of pollutants generated by these activities were estimated on the basis of the most recent version of Publication AP-42 of the USEPA, Sections 11.9 (Dust emissions from drilling and blasting), 13.2.4 (dust emissions for loading/unloading and excavation), 13.3 (combustion products emissions from explosive detonation during blasting) and based on technical specifications provided by the potential suppliers of mining equipment.

To consistently represent mining activities, a single area (7500 m^2) located in the center of each active pit was modelled. This area corresponds to the area affected by each blast (e.g. 144 holes per blast, with each hole affecting a 7.2m x 7.2m area). All emissions associated with drilling, blasting, excavating and loading activities were considered to be located within this area source.

At the F7N deposit, blasting, excavating and loading activities of the three types of materials (ore, waste, overburden) were considered to be evenly distributed throughout the months of operation e.g., 365 days/year, 24h/day. At the Howse deposit, blasting, excavating and loading activities of ore and waste material were considered to be evenly distributed throughout the 7 months of operation (April to October), while overburden clearing activities were considered to be evenly distributed throughout 5 winter months (November to March). The emission rates of pollutants generated by excavation and truck loading vary according to the water content of the material (i.e., ore, overburden and waste rock) and to the average wind speed.

Drilling operations were considered to be distributed the same way as excavating and loading activities. As a conservative assumption, it was considered that one drill would be in operation at each pit all year long. The number of holes drilled per year was established by using the ratio of tonnes of material per hole drilled, based on the Mining Plan. Particulate matter emissions from drilling activities were then estimated using equations from USEPA AP-42, Section 11.9.

2.4.1.2 Diesel Generators

A total of fourteen (14) diesel generators will be in operation within the air dispersion modelling perimeter. The generators and operating scenarios are listed in Table 2-6.

Table 2-6 Diesel Generators

Area	Location	Qty	Power Rating (each)	Manufact.	Model	Operating scenarios used in modelling
DSO3	Concrete Batch Plant	1	157.5 kW	Caterpillar	157.5 ekW	100% load – 24 hrs/day, 12 months/year
DSO3	Main Plant	5	2825 kW	Caterpillar	C175-16	_Winter operations_ 5 units at 75% load – 24 hrs/day, 7 months/year _Summer operations_ 3 units at 75% load – 24 hrs/day, 5 months/year
DSO3	Plant 2	1	1935 kW	MTU	DP1935D6SRW	Operating at 1710 ekW – 24 hrs/day, 12 months/year
DSO3	Mixer at Plant 2	1	182 kW	FPT	N67-TE2X	80% load – 24 hrs/day, 12 months/year
DSO3	Howse Mini Plant	1	1935 kW	MTU	DP1935D6SRW	75% load – 24 hrs/day, 7 months/year
Howse	FN Quarry Crusher/Screener	1	275 kW	Caterpillar	275 ekW	100% load- 24 hrs/day, 7 months/year
DSO3	Worker's Camp	3	275 kW	Caterpillar	275 ekW	100% load- 24 hrs/day, 12 months/year
DSO3	Worker's Camp	1	1000 kW	Caterpillar	1000 ekW	100% load- 24 hrs/day, 12 months/year

The emission rates of the generators were established based on information provided by the generators' supplier. For particulate matter, the emission rates for TPM (Total Particulate Matter), PM_{10} (particulates with a diameter less than 10 microns) and $PM_{2.5}$ (particulates with a diameter less than 2.5 microns) are equivalent, since it is considered that all particulate matter from the generators have a diameter less than 1 micron. The emission rates of sulphur dioxide (SO_2) were estimated based on the fuel consumption rates and the average sulphur content in fuel oil of 0.0015% (Arctic diesel specifications).

NOx, CO and VOC emission data were obtained from the diesel generators manufacturers or EPA emissions factors. Emissions calculations, methodology and source of data are presented in Appendix A.

2.4.1.3 Transportation

Figure 2.2 shows the roads included in the air modelling study. All roads are unpaved. In summary, five main transportation groups were included in the study:

- Hauling trucks for material transport (ore, waste and overburden) from the Howse pit;
- Hauling trucks for material transport (ore, waste and overburden) from the F7N pit;
- Hauling trucks for material transport (ore, waste and overburden) from the DSO4 pits;
- Personnel vehicles on all roads (pickup trucks);
- Sand and gravel transport from the FN Quarry with dump-trucks (10-wheelers).

Transporting materials or personnel by trucks on unpaved roads constitutes a source of dust. Roads within the air modelling perimeter were included in this study and calculations of hauling rates and frequency to/from mining areas are available in Appendix A. For the purpose of inputting road emissions data in the Calpuff model, roads were divided in several segments representative of expected transport volumes. Emission rates (g/s) and annual emissions (tonnes per year) from each segment are included in the Emissions Inventory presented in Section 2.4.2. It is anticipated that roads will be sprayed with water during dry weather to reduce dust emissions. In evaluating the emission rates of particulates, it was estimated that spraying the roads with water regularly would reduce the production of dust emissions by 70%. Roads are covered with snow and ice seven months per year (from mid-October to mid-May), dust emissions from road sources are greatly reduced during this period. The mitigating effects of precipitation and snow cover have been taken into account by applying a monthly Precipitation factor (P). The monthly P factor values were evaluated based on Environment Canada climate normal data for the period of 1971 to 2000 for the meteorological station at Schefferville airport. Although P values are applied based on particulate matter emissions coming from unpaved roads, the portion of the overall emissions coming from truck engines is kept intact. The resulting P value attenuation is shown in Appendix A.

The evaluation of the emission rates of particulates from unpaved roads was based on the equation taken from Publication AP-42 of the USEPA, Section 13.2.2 (USEPA 2006b). This equation evaluates the emission rate per kilometer travelled on the basis of the silt content of the road surface and the average weight of the vehicle. Since the roads will be built with waste rock, the silt content was determined using granulometric data of waste rock.

An on-site metal sampling program was conducted in the Howse pit area on multiple types of soil and the ore itself. Analysis results for the list of metals assessed in this study (see Table 2-3) were used for estimating the metal concentrations in the particulate. As a conservative assumption, the maximum of the sum of the mean load of all samples plus one standard deviation for each metal was considered as the metal fraction in the dust. This metal fraction was applied to the modelled concentrations of TPM and dust deposition (eg. dustfall) at the receptors and compared to the assessment criteria. Appendix H shows the metal analytical results and calculations.

The emissions of particulates, NO_x, SO_2, CO and VOC produced by truck engines were also considered in the air dispersion modelling. Particulates (PM, PM_{10} and $PM_{2.5}$), SO_2, NO_x and CO emissions, generated by diesel engine vehicles, were based on the technical specifications of the vehicle suppliers. The emission rate of sulphur dioxide (SO_2) was estimated based on the fuel consumption rate, with an average sulphur content in fuel oil of 0.0015% (Arctic diesel specifications) for hauling trucks and dump trucks (10-wheelers) and of 0.003% for personnel transport vehicles.

The VOCs are a class of Hydrocarbons (HC) and are equivalent to Non Methane Hydrocarbons (NMHC). The NMHC emissions from all sources are either found in the equipment specification sheets or are calculated based on the USEPA "Exhaust and Crankcase Emission Factors for Nonroad Engine Modelling - Compression-Ignition" document for the Nonroad Diesel Engine based on the device engines power).

1,3-Butadiene, Acetaldehyde, Acrolein, Benzene and Formaldehyde were determined to be the main toxic components of NMHC and their fraction in NMHC, total HC, VOC and NMHC+NOx are calculated using MOVES2014 (Motor Vehicle Emission Simulator-v. 2014) model for Heavy-Duty diesel trucks (see Appendix I). The highest fractions for each specific VOC listed above were applied to the concentrations of HC predicted by the air model.

The transportation activities were modelled as area sources. Due to limitations of the model, roads were segmented into several area sources, each of them measuring 20 m wide and a maximum length of approximately 200 m.

2.4.1.4 Main Plant Operations

The Main Processing Plant is located in the DSO3 area. The Main Plant is currently in the commissioning period and is described in further details in the EIS text. Emissions related to the operation of the Main Plant are considered for modelling purposes as a three steps process: activities before entering the Main Plant, activities occurring inside the dome converging to the main stack exhaust, and activities after the Main Plant when the processed product is leaving the enclosure of the dome.

Activities before the Main Plant:

The activities before the Main Plant were modelled as two volume sources:

- Unloading trucks, chute into crusher, primary crusher, chute on conveyor;
- Chute from conveyor into crusher, secondary crusher, chute on conveyor.

An assumption was made that all product material will be processed through primary and secondary crushers, at their nominal capacity of 700 tonnes per hour, modelled for 24 hour days during year round operations, regardless of which pit the material comes from. As mentioned previously, ore from the Howse pit will be transported to and processed at the Howse Mini Plant, located at the Eastern corner of the railing loop.

The emission factors taken from AP-42 of the USEPA, Section 11.19.2, were used to estimate emissions for truck unloading, chute, primary and secondary crushers and conveyor transfer points.

Process activities inside the dome:

In summary, the main unit operations and equipment of the Main Plant are:

- Surge bins;
- Scrubbers;
- Crushers;
- Screens;
- Conveyors;
- Rod and ball mills;
- Gravity separation mainly jigs, spirals and hydroclassifier;
- Wet magnetic separation equipment;
- Hydrocyclones;
- Thickeners;
- Filters;
- Power/heat generation through the operation of five (5) diesel generators (Gen Set);
- Rotary dryer (with stand-alone diesel burner);
- Flash dryer (with backup diesel burner);
- Electrostatic precipitator;
- Heat recovery / gas scrubber;
- Main stack.

A review of air emissions points from the Main Plant dome has been conducted. Table 2-7 summarizes the dome emission points and how they have been integrated in the air modelling study. Detailed emissions calculations and emission point characteristics are provided in Appendix A.

Table 2-7 Main Plant Dome Emission Points

Emission Source(s)	Emissions point(s)	Integration in air model
Five (5) diesel generators (Gen Set) Rotary dryer (with stand-alone diesel burner) Flash dryer (with backup diesel burner) Electrostatic precipitator Heat recovery / gas scrubber	Main Stack	One point source (vertical) Two operating modes: Drying Mode, 5 generators @ 75% load + 1 flash dryer + 1 rotary dryer No Drying Mode, 3 generators @ 75% load
Inside Air – Dome Ventilation	10 South Wall Vents	One point source (horizontal) Exhaust flow rates different Winter vs Summer
	4 North Wall Vents	One point source (horizontal) Exhaust flow rates different Winter vs Summer
	4 roof exhaust	One point source (vertical) Exhaust flow rates different Winter vs Summer
2 drum filter vacuum pumps vents and one pan filter suction blower vent	3 exhaust pipes	One point source (horizontal) 24h/24h - 12 months per year

Activities after the Main Plant:

Activities after the Main Plant were modelled as five volume sources and one point source as indicated below:

Volume sources:

- Telescopic chute from the Sinterfines conveyor to the Sinterfines stockpile;
- Telescopic chute from the Superfines conveyor to the Superfines stockpiles;
- Loaders extracting product from stockpiles and dropping it on the reclaim conveyor during rail loading;
- Uni-load loading system (chute from conveyor directly into rail cars);
- Plant 2 product being unloaded from truck and loaded on the reclaim conveyor during rail loading.

Point source:

- Bin vent dust collector at the train Load-out tower.

Emission factors taken from AP-42 of the USEPA, Sections 11.9.2 and 13.2.4 were used to estimate dust emissions for conveyor transfer points, truck unloading, as well as material handling by loaders. With respect to transport of the processed ore on conveyors, the emission factor for controlled emissions was used to take into account the ore moisture content (Canada's NPRI guidelines recommends to use the *controlled* emission factors with material of moisture higher than 1.5%). As a conservative assumption, it was modelled that all processed material coming from Main Plant had a moisture level of 2%. The bin vent dust collector manufacturer was contacted to obtain the particulate emission rate from this equipment. Details of assumptions used for modelling and calculations are included in Appendix A.

2.4.1.5 Plant 2 Operations

Plant 2 is located in the DSO3 area and is currently operational. For this modelling study, the ore from Fleming 7N and Timmins 3N pits will be processed at Plant 2. Plant 2 operations aim to prepare a product with moisture below transportable moisture level through a crushing and drying process. Particulate matter will be emitted from ore handling and crushing operations at Plant 2. The particulate emission sources considered at Plant 2 include:

- Truck Unloading;
- Jaw Crusher;
- Feed Conveyor #1;
- Feed Conveyor #2;

- 1 Dryer (NOx, SO_2, CO, VOC emissions in addition to particulate emissions);
- Diesel generator (NOx, SO_2, CO, VOC emissions in addition to particulate emissions);
- Transfer Conveyor #3;
- Screen;
- Lump Stacker Conveyor;
- Transfer Conveyor #4;
- Fines Stacker Conveyor;
- Transfer Conveyor #5;
- Transfer Conveyor #6;
- Cone Crusher;
- Truck Loading.

The emission factors taken from Publication AP-42, Section 11.9.2 (USEPA 2004) for conveyor transfer points were used to estimate those emissions. With respect to the handling of the crushed ore, the emission factor for controlled emissions was used to take into account the ore moisture content. Ore unloading and loading as well as crushing and screening systems will produce particulate emissions. They were estimated using the emission factors taken from Publication AP-42, Section 13.2.4 (USEPA 1982).

In addition to these operations, the generator providing power to the mixer located at Plant 2 has been modelled as 24 hours/day, all year operations as a conservative assumption. The mixer's purpose is to make the iron ore less friable at very low temperatures by treating the ore coming out of the dryer with a polymer that is water absorbent.

All activities at Plant 2 were modelled as two volume sources: activities before the dryer and activities after the dryer. The exceptions to this grouping exercise are the dryer itself, and the two generators on site (for mixer and power generation of Plant 2), which were modelled using a point source for each of them.

At Plant 2, a dryer is installed on the crusher pad for drying iron ore to reduce its water content down to 6%, ensuring shipping below the transportable moisture limit. The 9' x 52' rotary dryer equipped with a bag house. The dryer/bag house stack height is 15 meters above ground, exiting vertically *without* rain cap. The fuel used at the dryer is arctic diesel (sulphur content of 0.0015%). The related emission factors were provided by the equipment supplier for particulates, NO_x, SO_2, CO and VOC for a 450 tonnes/hour throughput. As a conservative assumption, drying activities at Plant 2 were modelled as 24 hours/day, all year operations.

Detailed emissions calculations used for modelling are available in Appendix A.

2.4.1.6 Howse Mini Plant

The Howse Mini-Plant will be constructed in the DSO3 area at the east of the railing loop (see location on Figure 2.2 and will be used to process the ore from the Howse pit. The ore from Howse will be transported by hauling trucks to the Howse Mini Plant. This plant has the same engineering design to Plant 2, except that there will be no mixer and there will be two dryers instead of one. Consequently, particulate emission sources from the Howse Mini Plant include:

- Truck Unloading;
- Jaw Crusher;
- Feed Conveyor #1;
- Feed Conveyor #2;
- 2 Dryers (NOx, SO_2, CO, VOC emissions in addition to particulate emissions);
- Diesel generator (NOx, SO_2, CO, VOC emissions in addition to particulate emissions);
- Transfer Conveyor #3;
- Screen;
- Lump Stacker Conveyor;
- Transfer Conveyor #4;
- Fines Stacker Conveyor;
- Transfer Conveyor #5;

- Transfer Conveyor #6;
- Cone Crusher;
- Truck Loading.

The emission factors taken from Publication AP-42, Section 11.9.2 (USEPA 2004) for conveyor transfer points were used to estimate those emissions. With respect to the handling of the crushed ore, the emission factor for controlled emissions was used to take into account the ore moisture content. Ore unloading and loading as well as crushing and screening systems will produce particulate emissions. They were estimated using the emission factors taken from Publication AP-42, Section 13.2.4 (USEPA 1982). Emissions were modelled as 24 hours/day, 7 months per year.

Activities at the Howse were modelled as two volume sources (before and after drying). The two dryers and the Howse generator were modelled as point sources.

At the Howse Mini Plant, two dryers will be installed for drying iron ore to reduce its water content down to 6%, ensuring shipping below the transportable moisture limit. The 9' x 52' rotary dryers are equipped with a baghouse each. The dryer/baghouse stacks' height are 15 meters above ground, exiting vertically. The fuel used at the dryers is arctic diesel (sulphur content of 0.0015%). The related emission factors were provided by the equipment supplier for particulates, NO_x, SO_2, CO and VOC for a 450 tonnes/hour; these emission factors are scaled down to 320 tonnes/hour to represent the emissions from each of the two dryers. The drying activities at Howse Mini Plant were modelled as 24 hours/day, 7 months/year operation.

Detailed emissions calculations used for modelling are available in Appendix A.

2.4.1.7 First Nation Quarry

The Howse project is considering the development of a quarry (referred to as FN Quarry in this report) to produce sand and gravel for sale to the local community as construction material. Production from the FN Quarry is targeted at 100 000 tonnes per year. Definitive location and engineering plans were not available at the time of writing this report, but it was requested that emissions related to this activity be included in the air modelling study. It was assumed that the sand and gravel from the FN Quarry will be processed at a crushing/screening plant (referred to as FN Crusher/Screener). The sand and gravel will then be transported by dump trucks (10-wheelers) principally to communities located in the Schefferville area. The anticipated location of the FN Crusher/Screener is indicated on Figure 2.1. Unit operations of the FN Crusher/Screener were assumed to be similar to those present at Plant 2, but without mixing and drying activities, and include the following:

- Dump trucks (10-wheelers) unloading;
- Crusher;
- Feed Conveyor #1;
- Feed Conveyor #2;
- Diesel generator (NOx, SO_2, CO, VOC emissions in addition to particulate emissions);
- Screen;
- Transfer Conveyor #4;
- Fines Stacker Conveyor;
- Transfer Conveyor #5;
- Transfer Conveyor #6;
- Dump trucks (10-wheelers) loading.

The emission factors taken from Publication AP-42, Section 11.9.2 (USEPA 2004) for conveyor transfer points were used to estimate those emissions. With respect to the handling of the quarry materials, the emission factor for controlled emissions was used to take into account the ore moisture content. Sand and gravel unloading and loading as well as crushing and screening systems will generate particulate emissions. They were estimated using the emission factors taken from Publication AP-42, Section 13.2.4 (USEPA 1982). Emissions were modelled as 24 hours/day, 7 months per year.

Activities at the FN Crusher/Screener were modelled as a volume sources and the generator was modelled as a point source. Detailed emissions calculations used for modelling are available in Appendix A.

2.4.1.8 Stockpiles

The "More Complex" equation from "*Mojave Desert Air Quality Management District, Antelope Valley Air Pollution Control District, Emissions Inventory Guidance, Mineral Handling Handbook and Processing Industries, April 10, 2000*" was used to calculate particulate emissions from wind erosion. The latest document "*Proposed Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors, 2006*" has been used to revise the $PM_{2.5}/PM_{10}$ ratio from 0.40 to 0.15 for *Industrial Wind Erosion* which is applicable to storage piles of crushed aggregate materials, such as coal or metallic ore piles. For active piles, it should be noted that since the piled material is spread over the entire pile surface all year long, the piles (stockpiles and dump piles) are considered as 100% active as a conservative assumption for the calculations.

A complete layout of the multiple stockpiles in place at the mining site is included in Appendix C. The following data was used to model stockpiles as area sources:

- Average density of stockpiled material is 3 tonnes per cubic meter;
- Silt content of stockpiled material was determined to be 1.5%[7] (except for final product stockpiles);
- Silt content of stockpiled final products were determined to be 11.2% for the Sinterfines stockpile and 84.5% for the two Superfines stockpiles, all of which are located east of the Main Plant near the rail loop;
- Using the same methodology as described in the previous section addressing transportation, P values were applied on particulate matter emissions to take into account the mitigating effect of precipitation and snow;
- Days with unobstructed winds higher than 12 mph occurred 35% of the time.

Table 2-8 shows the list of piles included in this study.

Table 2-8 Piles included in air quality modelling study

Type of pile	Location / Pit
Overburden & Waste	Fleming 7N
Overburden & Waste	Timmins 7
Overburden & Waste	Howse
Stockpiles	Near Timmins 4
Stockpiles	North of Main Plant
Stockpiles	Near Plant 2
Stockpiles	Near Fleming 7N
Stockpiles	Near and to the east of Fleming 7N
Stockpiles	At Main Plant
Stockpile	Sinterfines at Main Plant
Stockpile	Superfines at Main Plant
Stockpiles	Near Howse Mini Plant

[7] Phone conversation with Loic Didillon (Tata Steel Minerals Canada). April 1, 2014.

2.4.2 Air Emissions Inventory

Table 2-9 presents the annual emissions inventory for the Howse Project's main air pollutants.

Table 2-10 presents the annual emissions inventory for the DSO3 and DSO4 areas' main air pollutants.

The basis for the calculations is presented in section 2.4.1. Detailed inventory calculation tables are available in Appendix J.

Table 2-9 Annual Emissions Inventory – Howse Project

Project Area	ANNUAL EMISSIONS INVENTORY (1)						
	TPM	PM_{10}	$PM_{2.5}$	NOx	CO	SO_2	HC (2)
HOWSE	231.4	121.9	64.2	283.2	146.3	2.2	13.1

(1) Based on maximum production year (see Section 2.4.1).
(2) HC = Hydrocarbons. HC = VOC in this air quality study.

Table 2-10 Annual Emissions Inventory – DSO3 and DSO4 Areas

Project Area	ANNUAL EMISSIONS INVENTORY (1)						
	TPM	PM_{10}	$PM_{2.5}$	NOx	CO	SO_2	HC (3)
DSO3	301.9	99.1	22.8	1550.7	200.1	3.2	41.9
DSO4 (2)	259.2	73.9	8.4	124.6	68.7	0.1	7.8

(1) Based on maximum production year (see Section 2.4.1).
(2) Includes a 9.6 km section of the Goodwood Road where Hauling trucks transport ore from the DSO4 area. DSO4 mining activities not included.
(3) HC = Hydrocarbons. HC = VOC in this air quality study.

2.4.3 Fuel Usage Inventory

As indicated in previous sections, equipment on-site (mobile and stationary) will be using diesel fuel.

Table 2-11 presents the annual fuel usage inventory for the Howse Project's. For this fuel inventory, the FN Quarry related fuel usage (one diesel generator for the FN Crusher/screener and hauling by dump trucks) was put separately in Table 2-13. However, for the air dispersion modelling study, the FN Quarry activities were included as an integral part of the Howse Project.

Table 2-12 and Table 2-13 present the annual fuel usage inventory for the DSO3 and DSO4 Areas respectively.

Detailed fuel usage inventory tables and calculations are available in Appendix K.

Table 2-11 Annual Fuel Usage – Howse Project

Source	Diesel Fuel Usage *
	Liters / year
Howse Mini Plant	21 033 917
Hauling Trucks	3 261 224
Howse Pit Mining Activities	1 151 064
Total	**25 446 205**

* Fuel usage for the FN crusher/screener to be installed on the Howse Project Property is included in Table 2-13 below.

Table 2-12 Annual Fuel Usage – DSO3 Area

Source	Diesel Fuel Usage
	Liters / year
Main Processing Plant	26 072 640
Workers' Camp Generators	4 493 880
Plant 2	25 973 172
DSO3 Hauling trucks and TSMC personnel vehicles	585 143
Batch Plant Generator	439 752
Fleming 7N Pit Mining Activities	920 851
Total	**58 485 438**

Table 2-13 Annual Fuel Usage – DSO4 Area and FN Quarry

Source	Diesel Fuel Usage *
	Liters / year
Goodwood Road from DSO4*	5 012 539
Diesel Generator at FN Crusher / screener	703 428
FN Quarry Hauling (Dump Trucks - 10 wheelers)	794 128
Total	**6 510 095**

* Considers transport on the section of the Goodwood Road located within the air quality modelling perimeter only, which corresponds to a length of 9.6 km.

2.4.4 Meteorological Data

The CALMET program was used to generate meteorological data files. The program used the following elements to generate wind fields:

- Meteorological data obtained by a non-hydrostatic mesoscale assessment technique using Mesoscale Model (MM 5) (operated by the Canadian company Lakes Environmental) for years 2004 to 2008 were used as baseline data. This set of years was retained because they were used for all previous air modelling studies for other TSMC DSO Projects, they are considered representative of the current conditions and, meet the objectives of this air modelling study. The data grid provided by Lakes Environmental had a resolution of 12 km and covered a surface area of 30 km by 20 km. The UTM coordinates of the central point were: East – 628 000 m, North 6 081 000 m (zone 19). An explanatory document is provided in Appendix D.
- The domain of the meteorological grid generated by the program had a surface area of 600 km^2, which extends 10 km north and 10 km south, and 15 km east and 15 km west, in relation to the central point (UTM East – 628 000 m, North 6 081 000 m). The resolution of the meteorological grid was of 500 m by 500 m.
- The vertical levels of the meteorological grid data were 20 m, 50 m, 100 m, 200 m, 500 m, 1000 m, 2000 m and 3300 m.
- The CALMET land use grid is shown in Appendix E. Land use data were obtained directly from the Government of Newfoundland and Labrador and processed with CTGPROC so they could be processed by CALMET. The land use data in the study area were used by CALMET to calculate parameters such as surface roughness. Even though land use varies within the study area, the capabilities of CALMET are such that a given land use can be associated with each section of the meteorological grid.
- In accordance with *Guideline for Plume Dispersion Modelling* (GNL, 2012), parameterization of land use data regarding Albedo, z0, Bowen and other parameters was defined for three different GEO.dat files to better represent seasonal land use for the area of study "Western and Central Labrador".

- Terrain elevation data were obtained from digital databases with greater than 5 m precision.
- All other CALMET default options and factors were selected.

2.4.5 General Receptor Grid and Specific Sensitive Receptors

General Receptor Grid

To meet the requirements of the *Guideline for Plume Dispersion Modelling* of the Department of Environment and Conservation of the Government of Newfoundland and Labrador (GNL 2002), two Cartesian grids of receptors as well as discrete receptors were defined. The terrain elevation data used in the grids was obtained from the digital database having greater than 5 m precision.

The larger Cartesian grid covers a surface area of 340 km^2. It covers the DSO2 and DSO3 sites and is centered by Main Plant. The North-west corner start close to Howells Rover and the South-eastern corner extends close to Stork Lake. This grid resolution is 500 m by 500 m.

The second Cartesian grid covers a surface area of 16 km^2. It extends along the DSO3 facilities for a distance of 4 km and covers a strip of land of 4 km in width. Its resolution is 200 m by 200 m. It was not necessary to use a grid of 50 m resolution (as required in the *Guideline for Plume Dispersion Modelling*) because the zone for which such a grid is required falls within the boundaries of the air quality perimeter. In addition to this general receptors grid, refer to Section 2.3.1 for explanation on how the modelling perimeter was established.

The receptors were positioned at ground level. General grid receptors located within the air quality modelling perimeter were removed from the modelling file in order to evaluate the ambient concentrations outside this boundary. General grid receptors located at less than 100 m from roads were also removed.

This removal process only excludes grid receptors, which are not specifically designated as sensitive receptors where humans live, hunt or do other activities. None of the sensitive receptors discussed in the next paragraph were removed from the model.

Sensitive Receptors

As part of the Howse Project EIS study, a list of discrete sensitive receptors was established and provided to AECOM for the air dispersion modelling study. Table 2-14 show the list of receptors. The location of these receptors is presented on Figure 2.1.

Table 2-14 Discrete Sensitive Receptors

ID	FINAL Description	Province	X Easting (km)	Y Northing (km)	Z Elevation (m)	Distance and direction relative to Howse Deposit
R1	Young Naskapi Camp 1	NL	615.0828	6086.3313	498	4.21 km, W
R2	Young Naskapi Camp 2	NL	615.0068	6086.4258	498	4.29 km, W
R3	Innu Tent 3 (Rosemary Lake)	NL	615.2457	6086.3324	499	4.05 km, W
R4	Innu Tent 4 (Rosemary Lake)	NL	615.2376	6086.9500	499	4.11 km, W
R5	Innu Tent 5 (Rosemary Lake)	NL	614.8537	6087.3314	500	4.56 km, WNW
R6	Innu Tent 6 (Rosemary Lake)	NL	614.6857	6086.7490	498	4.63 km, W
R7	Innu Tent 1 (Elross Lake)	NL	619.3356	6080.8277	500	5.44 km, S
R8	Innu Tent 2 (Exact location tbd)	NL	614.4960	6084.5808	505	5.08 km, WSW
R9	Young Naskapi Camp 7 (Pinette Lake)	NL	620.4557	6084.8152	636	1.86 km, SE

ID	FINAL Description	Province	X Easting (km)	Y Northing (km)	Z Elevation (m)	Distance and direction relative to Howse Deposit
R10	Young Naskapi Camp 3	NL	617.9290	6087.3644	606	1.75 km, NW
R11	Young Naskapi Trailer tent (Triangle Lake)	NL	618.0872	6088.3173	580	2.38 km, NNW
R12	Young Naskapi Camp 5 (Elross Creek)	NL	621.5380	6082.0124	579	4.81 km, SSE
R13	Naskapi - Uashat people's camp	NL	617.7971	6087.0367	619	1.68 km, WNW
R14	Young Naskapi Camp 4	NL	613.0674	6087.5092	514	6.35 km, WNW
R15	Young Naskapi Camp 6 (Howells River)	NL	622.2957	6077.8614	515	8.92 km, SSE
R16	Innu - Uashat - Mani-Utenam Camp 1	QC	621.1566	6089.0311	624	3.34 km, NE
R17	Innu - Uashat - Mani-Utenam Camp 2	NL	616.4962	6086.9704	556	2.88 km, WNW
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	QC	623.9650	6085.3445	718	4.76 km, E
R19	Innu Cabin 1	QC	631.6822	6080.0850	551	13.85 km, ESE
R20	Innu Cabin 2	QC	631.1136	6080.0592	558	13.35 km, ESE
R21	Bustard - Observation and hunting site 1	NL	612.9988	6089.0819	521	6.89 km, WNW
R22	Bustard - Observation and hunting site 2	NL	615.1038	6086.0116	514	4.19 km, W
R23	Picking site (berries / tea)	QC	620.0463	6090.4069	606	4.21 km, N
R24	Irony Mountain	NL	618.2357	6085.2228	835	1.48 km, SW
R25	Innu Cabin 3	QC	632.4583	6082.717	496	13.64 km, ESE
R26	Innu Cabin 4	QC	632.9582	6081.877	491	14.35 km, ESE
R27	Innu Cabin 5	QC	633.5804	6081.318	502	15.12 km, ESE
R28	Innu Cabin 6	QC	634.2557	6080.909	487	15.89 km, ESE
R29	Innu Cabin 7	QC	634.862	6080.707	493	16.53 km, ESE
R30	Innu Cabin 9 (Denault Lake)	QC	635.213	6079.776	504	17.19 km, ESE
R31	Innu Cabin 8	QC	633.1337	6080.34	539	15.06 km, ESE
R32	Innu Cabin 10 (Vacher Lake)	QC	636.0547	6085.953	492	16.77 km, E
R33	Naskapi Cabin 1	NL	615.3395	6084.424	502	4.36 km, WSW
R34	Naskapi Cabin 2 (Elross Lake)	NL	616.6907	6084.223	502	3.3 km, SW
R35	Naskapi Cabin 3 (Elross Lake)	NL	616.9098	6082.671	498	4.31 km, SSW
R36	Kawawachikamak (Town)	QC	643.5	6082.132	474	24.56 km, E
R37	Lac John (Town)	QC	642.39	6076.24	505	25.18 km, ESE
R38	Matimekush (Town)	QC	640.8	6075.6	516	24.01 km, ESE
R39	Schefferville (Town)	QC	640.6	6075	511	24.1 km, ESE
R40	TSMC Workers' Camp	NL	624.465	6082.765	742	6.25 km, SE

2.4.6 Chemical transformation methods

To meet the requirements of the *Guideline for Plume Dispersion Modelling* of the Department of Environment and Conservation (GD-PPD-019.2), the RIVAD/ISORROPIA chemical transformation module was activated in CALPUFF.

One of the requirements of activating this module was the need to input specific NO and NO_2 emission rates separately, instead of modelling NO_x emissions directly and treating the results as a post-process step to obtain NO_2 concentrations.

Table A.1 in Appendix A of the GD-PPD-019.2, lists default in-stack NO_2/NO_x ratios to be used where in-stack emissions of NO and NO_2 are not available. As all NO_x emitting sources on-site are diesel powered, a NO_2/NO_x in-stack ratio of 0.2 was used for modelling (exception to this rule, blasting emissions were modelled using a NO_2/NO_x ratio of 0.5 as a conservative assumption). Additionally, calculations related to the conversion of volume-based NO_2/NO_x ratios to mass-based ratios are included in Appendix A.

2.4.7 Air modelling of blasting events

As indicated in Section 2.3.2, activities from two (2) mining sites Fleming 7N and Howse are included in the study. The Fleming 7N activities are part of the DSO3 area operations and are considered in the baseline air quality evaluation. Most of the activities at these two sites consist of semi-continuous material hauling, moving and drilling. Before these activities can take place, blasting of material (waste, overburden and ore) is required. Blasting events are short in duration and occur infrequently (estimated at one time per week during summer and once per month during winter). Emissions factors (EF) for blasting, including the detonation of explosive are available for these pollutants: TSP, PM_{10}, $PM_{2.5}$, CO, NOx and SO_2 (USEPA AP-42, Sections 11.9 and 13.3); emissions for other air pollutants such as VOC and other could not be found. Table 2-15 provides the assumptions used to capture blasting events in this dispersion modelling study and the limitations and impacts on the results.

It is considered as the main outcome of these modelling assumptions that short-term results (eg. Modeled concentrations over 1-hour and 24-hours) are conservative.

Consequently, for results presentation in Section 3, it was decided to presents results for both “With Blasting” and “No Blasting” modelling scenarios.

Table 2-15 Modelling of Blasting Events – Assumptions and Limitations

Project Description	Assumption	Impact on modelling results
Blasting events are short in duration (typically less than 2 minutes)	For dust emissions caused by the blast, AP-42 EF were used and total emissions are calculated in kg/blast. kg/blast are then averaged to g/s over a one hour period (see calculations below). This g/s value is used in the dispersion model.	Overestimation
Blasting events occur only sporadically (estimated at one time per week during summer and once per month during winter)	The blasting schedule is not fixed in time. To capture worst-case meteorological conditions in the model, one blast per day was assumed. At the Fleming 7N (F7N) pit, the blast was assumed to occur between 11AM-12PM. At the Howse pit, the blast was assumed to occur between 1PM-2PM.	Overestimation
Explosive detonation	Conservative emission factors from USEPA AP-42 were used. These EF are rated “D” on a scale of A to E.	Overestimation
Mining pit location	As can be seen on Figure 2.1, the F7N pit is located right at the border between QC and NL (East of the F7N mining area) and right on the air quality modelling perimeter. Grid receptors located on this artificial boundary, being in so close proximity (300 meters) to the pit, will show high concentrations of pollutants during the one hour during which blasting is modelled.	Expect high short-term pollutant concentrations on grid receptors located immediately East of F7N pit

Estimation of dust emissions from blasting

Emissions from blasting were estimated using the emission factors in US EPA AP-42, Chapter 11.9 – Western Surface Coal Mining (US EPA 1998):

$TSP = 0.00022(A)^{1.5}$ kg/blast

$PM_{2.5} = 0.3 \times 0.00022(A)^{1.5}$ kg/blast

$PM_{10} = 0.52 \times 0.00022(A)^{1.5}$ kg/blast

Where, A = area of the blast face (m^2)

This method requires an estimate of the horizontal area displaced by blasting as well as the frequency of blasting. Detailed calculations are available in Appendix A.

Estimation of combustion products emissions from Explosives Detonation

For AP-42 Chapter 13.3 – Explosives Detonation EF selection, it is assumed that blasting will use a bulk emulsion explosive, with ammonium nitrate and fuel oil mixture (ANFO):

CO = 34 kg/tonne explosive

NOx = 8 kg/tonne explosive[8]

SO_2 = 1 kg/tonne explosive

This method requires an estimate of the amount of explosive required for blasting. Detailed calculations are available in Appendix A.

[8] Section 2.4.6 of this report describes chemical transformation procedures for NO and NO_2 emission rates. For explosive detonation, a ratio of 0.5 was used in the calculations

3 Modelling Results and Discussion

3.1 Results Presentation Structure

To optimize air dispersion modelling and computing time, project sources have been divided into several CALPUFF modelling input files. Concentration results obtained for each modelling have been compiled with CALSUM and then post processed with CALPOST. CALPUFF and CALPOST input files are referenced in Appendix E and Appendix F, but due to their number and volume, they are available electronically on request.

Section 2.3.5 explains how background concentrations and baseline concentrations due to other projects (eg. DSO3 and DSO4) are incorporated in the results. Resulting concentrations are compared to the project's assessment criteria presented in Sections 2.3.3 and 2.3.4.

The results from the air dispersion modelling for all air pollutants assessed in this study are presented in this report in tabular format at the sensitive receptor locations, and also at grid receptors having the highest impacts. For air pollutants having predicted maximum concentrations that exceed the applicable Project Air Quality Assessment Criteria beyond the Air Quality Modelling Perimeter, concentrations have also been presented in graphical format in Section 3.6. Tables of results and contour plots have been generated for the "With Blast" and "No Blasts" scenarios.

Due to the large amount of results for CAC and non-CAC (for both the "With Blasts" and "Without Blasts" scenarios) and the number of sensitive and grid receptors, the tables of results in Section 3.5 include a list of 13 selected sensitive receptors reflecting highest impacts or cluster of representative receptors. Complete tables of results with all 40 sensitive receptors are available in Appendix L for the "With Blasts" scenario and Appendix M for the "No Blasts" scenario. Figure 3.1 shows the location of the 13 selected sensitive receptors.

It is important to note that the maximum predicted concentrations shown on the contour plots represent the single highest concentration predicted to occur at each location, at any time during the 5-year assessment period and include background concentrations. Therefore, the contours shown do not represent a snapshot in time as these maxima may occur on different days, under different meteorological conditions. It should also be emphasized that the model results are based on the conservative emissions scenario described in Section 2.3.2 which assumes that all sites within the LSA (DSO3, DSO4 and Howse) operate at their maximum capacities over the entire 5 year meteorological assessment period. Therefore, the results presented below are expected to be lower than those predicted by the model.

3.2 Frequency of Exceedances of Air Quality Assessment Criteria

The air model predicts that air quality assessment criteria could be exceeded for the averaging periods and air pollutants shown in Table 3-1.

Table 3-1 Sensitive Receptors with predicted exceedances of assessment criteria (With Blast and No Blasts scenarios)

<table>
<tr><th rowspan="2">Pollutant</th><th rowspan="2">Averaging Period</th><th rowspan="2">Assessment Criteria (µg/m³)</th><th colspan="2">Receptors with predicted exceedance</th><th colspan="2">Predicted Exceedance?</th></tr>
<tr><th>ID</th><th>Name</th><th>WITH BLASTS</th><th>NO BLASTS</th></tr>
<tr><td>TPM</td><td>24-hr</td><td>120</td><td>R40</td><td>TSMC Workers' Camp</td><td>Yes</td><td>No</td></tr>
<tr><td rowspan="2">PM_{10}</td><td rowspan="2">24-hr</td><td rowspan="2">50</td><td>R13</td><td>Naskapi - Uashat people's camp</td><td>Yes</td><td>No</td></tr>
<tr><td>R40</td><td>TSMC Workers' Camp</td><td>Yes</td><td>No</td></tr>
<tr><td>NO_2</td><td>24-hr</td><td>200</td><td>R40</td><td>TSMC Workers' Camp</td><td>Yes</td><td>Yes</td></tr>
<tr><td rowspan="9">NO_2</td><td rowspan="9">1-hr</td><td rowspan="9">400</td><td>R9</td><td>Young Naskapi Camp 7 (Pinette Lake)</td><td>Yes</td><td>No</td></tr>
<tr><td>R10</td><td>Young Naskapi Camp 3</td><td>Yes</td><td>No</td></tr>
<tr><td>R11</td><td>Young Naskapi Trailer tent (Triangle Lake)</td><td>Yes</td><td>No</td></tr>
<tr><td>R13</td><td>Naskapi - Uashat people's camp</td><td>Yes</td><td>No</td></tr>
<tr><td>R16</td><td>Innu - Uashat - Mani-Utenam Camp 1</td><td>Yes</td><td>No</td></tr>
<tr><td>R17</td><td>Innu - Uashat - Mani-Utenam Camp 2</td><td>Yes</td><td>No</td></tr>
<tr><td>R18</td><td>Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)</td><td>Yes</td><td>No</td></tr>
<tr><td>R24</td><td>Irony Mountain</td><td>Yes</td><td>No</td></tr>
<tr><td>R40</td><td>TSMC Workers' Camp</td><td>Yes</td><td>Yes</td></tr>
</table>

At some grid receptors, the following averaging periods and air pollutants could exceed air quality assessment criteria:

"With Blasts" Scenario: 24-hr (TPM, PM_{10}, $PM_{2.5}$, NO_2), 1-hr (NO_2, SO_2, CO)

"No Blasts" Scenario: 24-hr (TPM, PM_{10}, $PM_{2.5}$, NO_2), 1-hr (NO_2)

To assist in results interpretation, a useful tool is to examine the frequency of the predicted exceedances of the project's air quality effects criteria. A frequency analysis was completed to determine the total number of exceedances, including background concentrations, for the whole site (eg. DSO3 + DSO4 + Howse), over 5 years of meteorological data.

Table 3-2 and Table 3-3 present the exceedances frequency analysis for sensitive receptors and "off-property" grid receptors respectively. "With Blasts" and "No Blasts" scenarios are presented separately in each table. The tables include only pollutants for which exceedances of the assessment criteria are predicted, since no exceedances are predicted for non-CAC (eg. dustfall, metals and VOCs), they cannot be included in the frequency of exceedances analysis.

A discussion of the significance of this analysis is provided in Section 3.3.

Table 3-2 Frequency of Exceedances at Sensitive Receptors

Pollutant	Averaging Period	Assessment Criteria (µg/m³)	Receptors with predicted exceedance		Maximum Concentration* (Exceedance count / % of time)**					
			ID	Name	WITH BLASTS			NO BLASTS		
					Max	Count	% of time	Max	Count	% of time
TPM	24-hr	120	R40	TSMC Workers' Camp	**137.1**	2	0.11%	**Meets Criteria**	--	--
PM_{10}	24-hr	50	R13	Naskapi - Uashat people's camp	**57.5**	1	0.05%	**Meets Criteria**	--	--
			R40	TSMC Workers' Camp	**90.6**	6	0.33%	**Meets Criteria**	--	--
NO_2	24-hr	200	R40	TSMC Workers' Camp	**315.8**	7	0.38%	**315.0**	7	0.38%
NO_2	1-hr	400	R9	Young Naskapi Camp 7 (Pinette Lake)	**1636.9**	13	0.71%	**Meets Criteria**	--	--
			R10	Young Naskapi Camp 3	**1391.3**	10	0.55%	**Meets Criteria**	--	--
			R11	Young Naskapi Trailer tent (Triangle Lake)	**658.7**	8	0.44%	**Meets Criteria**	--	--
			R13	Naskapi - Uashat people's camp	**1637.7**	8	0.44%	**Meets Criteria**	--	--
			R16	Innu - Uashat - Mani-Utenam Camp 1	**687.9**	6	0.33%	**Meets Criteria**	--	--
			R17	Innu - Uashat - Mani-Utenam Camp 2	**693.9**	1	0.05%	**Meets Criteria**	--	--
			R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	**1478.5**	9	0.49%	**Meets Criteria**	--	--
			R24	Irony Mountain	**1232.0**	6	0.33%	**Meets Criteria**	--	--
			R40	TSMC Workers' Camp	**3011.1**	128	0.93%	**487.3**	99	0.23%

* Maximum modelled concentration over 5 years meteorological data.

** Exceedance count = Number of times concentration above the standard in the 5 year period. The exceedance count is for the cumulative air quality effect eg. Background + DSO3 + DSO4 + HOWSE.

% of time = Count ÷ Number of averaging period in 5 years. For hourly averaging period With Blasts, a day corresponds to the averaging period, due to the way blasting is modelled. At the R40 receptor, for the "With Blasts" scenario the % of time exceedance was calculated based on the number hours in 5 years (5 yrs x 8760 hrs/yr = 43 800 hrs/5 yrs) and the 29 exceedances due to blasting, while the "No Blasts" % of time exceedance was calculated based on the number of hours in 5 years (5 yrs x 8760 hrs/yr = 43 800 hrs/5 yrs).

Table 3-3 Frequency of Exceedances at Maximum "Off-Property" Grid Receptors

Pollutant	Averaging Period	Assessment Criteria (µg/m³)	Receptors with predicted exceedance		Maximum Concentration* (Exceedance count / % of time)**			
			Prov.	Name	WITH BLASTS		NO BLASTS	
TPM	24-hr	120	QC	"Off-Property Limit" Maximum - QC	**251.4**		**127.8**	
					26	1.42%	4	0.22%
			NL	"Off-Property Limit" Maximum - NL	**184.9**		**184.1**	
					8	0.44%	8	0.44%
PM_{10}	24-hr	50	QC	"Off-Property Limit" Maximum - QC	**157.2**		**64.5**	
					52	2.85%	7	0.38%
			NL	"Off-Property Limit" Maximum - NL	**103.7**		**77.1**	
					17	0.93%	15	0.82%
$PM_{2.5}$	24-hr	25	QC	"Off-Property Limit" Maximum - QC	**29.2**		**Meets Criteria**	
					5	0.27%	--	--
			NL	"Off-Property Limit" Maximum - NL	**26.0**		**25.8**	
					1	0.05%	1	0.05%
NO_2	24-hr	200	QC	"Off-Property Limit" Maximum - QC	**364.2**		**201.5**	
					9	0.49%	1	0.05%
			NL	"Off-Property Limit" Maximum - NL	**232.1**		**205.9**	
					3	0.16%	1	0.05%
NO_2	1-hr	400	QC	"Off-Property Limit" Maximum - QC	**5391.0**		**Meets Criteria**	
					358	< 1.19%	--	--
			NL	"Off-Property Limit" Maximum - NL	**3577.3**		**431.9**	
					46	2.52%	3	0.00002%
SO_2	1-hr	900	QC	"Off-Property Limit" Maximum - QC	**1230.3**		**Meets Criteria**	
					6	< 1.19%	--	--
			NL	"Off-Property Limit" Maximum - NL	**Meets Criteria**		**Meets Criteria**	
					--	--	--	--
CO	1-hr	34 000	QC	"Off-Property Limit" Maximum - QC	**42942**		**Meets Criteria**	
					4	< 1.19%	--	--
			NL	"Off-Property Limit" Maximum - NL	**Meets Criteria**		**Meets Criteria**	
					--	--	--	--

* Maximum modelled concentration over 5 years meteorological data.

** Exceedance count = Number of times with concentration above the standard during the 5 year modelling period. The exceedance count is for the cumulative air quality effect eg. Background + DSO3 + DSO4 + HOWSE.

% of time = Count ÷ Number of averaging period in 5 years. For NO_2 1-hr, SO_2 1-hr and CO 1-hr averaging periods, the No Blasts result is "Meets Criteria", which means that results for the With Blast scenario are all caused by blasting events. Blasting events will occur once per week at most. Conservatively assuming that each blast at Howse and Fleming 7N causes a 1-hr air quality exceedance, this would translate to: 52 blasts/yr x 2 pits x 5 years = 520 blasts per 5 year. There are 5 yrs x 8760 hrs/yr = 43 800 hrs/5 yrs. Resulting in 520 ÷ 43 800 x 100 = 1.19% of time exceedance. In reality, the annual number of blasts per year is expected to be less at 30 and 33 for Fleming 7N and Howse, respectively.

*** Figure 3.16 and Figure 3.17 show the locations of grid receptors with maximum predicted concentration for the "With Blasts" and "No Blasts" scenarios respectively.

3.3 Discussion of Results

3.3.1 Non-CAC Results

As shown in Table 3-7 to Table 3-12, air modelling results indicate that no exceedances of assessment criteria are predicted for dustfall, metals and VOCs reviewed in this study. Consequently, these results will not be discussed further.

Note: Table 3-12 presents results for non-CAC (VOCs). Results for “With Blasts” and “No Blasts” scenarios are identical since blasting events do not emit VOCs (eg. there are no VOC emission factors available). For all other pollutants, emission factors for blasting events are available and therefore, results for “With Blasts” and “No Blasts” scenarios are presented separately.

3.3.2 CAC (TPM, PM_{10}, $PM_{2.5}$, CO, NO_2 and SO_2) Results

3.3.2.1 CAC Results – Annual Averaging Period – All Receptor Types

Table 3-4 shows that for annual averaging periods, for both the “With Blasts” and the “No Blasts” scenarios, no exceedances of assessment criteria are predicted for all CAC and for all receptors types (eg. Sensitive and Grid). Consequently, these results will not be discussed further. However, it is interesting to note that annual results for “With Blasts” and “No Blasts” scenarios are very similar; “With Blasts” results are slightly higher than “No Blasts” results. *This is evidence that the hourly blasts at Howse and Fleming 7N mostly have a short term impact on air quality*.

3.3.2.2 CAC Results - Short-Term Averaging Periods – at Sensitive Receptors

Table 3-5 and Table 3-6 present CAC results for short-term averaging periods (24-hr, 8-hr, 3-hr, 1-hr). For all sensitive receptors at which the project’s air quality assessment criteria are exceeded and for both scenarios (“With Blasts” and “No Blasts”), an exceedance frequency analysis has been conducted. Results of the frequency analysis are presented in Table 3-2. A discussion of Table 3-2 results is presented below:

- For TPM (24-hr), no exceedances are predicted under the “No Blasts” scenario, while 2 exceedances are predicted to occur under the “With Blasts” scenario at Receptor R40 (Workers’ Camp), over the 5 years of meteorological data studied. These 2 exceedances are equivalent to 0.11% of the time during which a maximum of 137.1 $\mu g/m^3$ (vs criteria of 120 $\mu g/m^3$) is predicted to occur.

- For PM_{10} (24-hr), no exceedances are predicted under the “No Blasts” scenario, while under the “With Blasts” scenario, 1 exceedance (0.05% of the time) is predicted to occur at Receptor R13 (Naskapi - Uashat people's camp) and 6 exceedances (0.33% of the time) at Receptor R40 (Workers’ Camp), over the 5 years of meteorological data studied.

- For NO_2 (24-hr), 7 exceedances (0.38% of the time) are predicted to occur under both “With Blasts” and “No Blasts” at 315.8 $\mu g/m^3$ and 315.0 $\mu g/m^3$, respectively. The occurrence of the same number of exceedances both scenarios indicates that the cause of higher NOx during that time period and specific meteorological conditions is not due to blasting events. In addition, in Table 3-5 for Receptor R40, for Howse only, No Blasts, the predicted contribution is 43.2 $\mu g/m^3$, which in itself does not exceed the criterion. In the same table, the contribution of DSO3 + DSO4 at R40 is 285.0 $\mu g/m^3$. This explains that the Howse Project itself does not create the exceedance, but the cumulative effect of all projects is above the assessment criteria.

- For NO_2 (1-hr), exceedances are predicted at 8 sensitive receptors (R9, R10, R11, R13, R16, R17 and R24) in the “With Blasts” scenario, while no exceedances would occur at these same receptors in the “No Blasts” scenario. Note that the 8 receptors are located in the vicinity of the Howse deposit. The maximum number of exceedances is 13 (0.71% of the time) at R9 – Young Naskapi Camp 7 (Pinette Lake). A more detailed review indicated that all exceedances at these 8 receptors occur during winter (November to March period) and are due to blasting events at the Howse pit. By minimizing bastings at the Howse pit during the winter period, exceedances would also be minimized.

- For NO_2 (1-hr), 9 exceedances (0.49% of the time) are predicted at sensitive receptor R18 - Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake) in the "With Blasts" scenario, while no exceedances would occur in the "No Blasts" scenario.

- For NO_2 (1-hr), exceedances at Receptor R40 (Workers' Camp) occur less than 1% of the time for both "With Blasts" and "No Blasts" scenarios. Looking at the "No Blasts" scenario in Table 3-6 for Receptor R40, for Howse only, No Blasts, the predicted contribution is 199.5 µg/m^3, which in itself does not exceed the criterion. In the same table, the contribution of DSO3 + DSO4 at R40 is 423.0 µg/m^3. This explains that the Howse Project itself does not create the exceedance, but the cumulative effect of all projects is above the assessment criteria at this receptor. Furthermore, it was determined that the principal cause of the 99 exceedances at the Workers' Camp is the continuous operation of diesel generators located on the premises of the camp to produce electricity used at the camp. By removing these generators, the number of exceedances would fall to 2, under the "No Blasts" scenario.

- Sensitive receptors R36 to R39 are the nearest towns (Kawawachikamak, Lac John, Matimekush and Schefferville). The impact of the modelled Howse Project activities on these four receptors' air quality is minimal and meet the project's air quality assessment criteria. For example, the NO_2 1-hr concentration in Schefferville and due to the Howse project is 20.0 µg/m^3 vs an assessment criteria of 400 µg/m^3. When considering the cumulative effects of all mining activities included in the air quality sudy (eg. DSO3 + DSO4 + Howse + Background), the cumulatiove NO_2 1-hr concentration in Schefferville is 74.3 µg/m^3 vs an assessment criteria of 400 µg/m^3. The impact at sensitive receptors R36, R37 and, R38 is lower than at Schefferville.

3.3.2.3 CAC Results - Short-Term Averaging Periods – at "Off-Property Limit" Grid Receptors

As mentioned previously, "Off-Property Limit" grid receptors are not sensitive receptors. They are programmed geographical coordinates, entered in the air model as per provincial guidelines. They are referred to as grid receptors.

Table 3-5 and Table 3-6 present CAC results for short-term averaging periods (24-hr, 8-hr, 3-hr, 1-hr). For all grid receptors at which the project's air quality assessment criteria are exceeded and for both scenarios ("With Blasts" and "No Blasts"), an exceedance frequency analysis has been conducted. Results of the frequency analysis are presented in Table 3-3. A discussion of Table 3-3 results is presented below:

- For the "No Blasts" scenario results, exceedances are predicted for the following averaging periods and pollutants: 24-hr (TPM, PM_{10}, $PM_{2.5}$, NO_2), 1-hr (NO_2). The maximum number of predicted exceedances is 15 (0.82% of the time) for PM_{10} (24-hr) at "Off-Property Limit" grid receptor UTM coordinates 622.2434, 6085.7298 in NL. Figure 3.17 shows the points at which maximum concentrations are predicted to occur; these points are located right on the air quality modelling perimeter.

- For the "With Blasts" scenario results, exceedances are predicted for the following averaging periods and pollutants: 24-hr (TPM, PM_{10}, $PM_{2.5}$, NO_2), 1-hr (NO_2, SO_2, CO). The maximum number of predicted exceedances is 2.85% of the time for PM_{10} (24-hr) at "Off-Property Limit" grid receptor UTM coordinate 625.6801, 6083.313 in QC. Figure 3.16 shows the points at which maximum concentrations are predicted to occur; these points are located right on the air quality modelling perimeter.

- As can be seen in the figures, zones of air quality effects exceeding assessment criteria on "Off-Property Limit" grid receptors are:

  - restricted to small areas along perimeter limits;
  - pollutants concentrations drop-off quickly by distance;
  - zones where no people live, not sensitive receptors.

3.4 General Conclusions

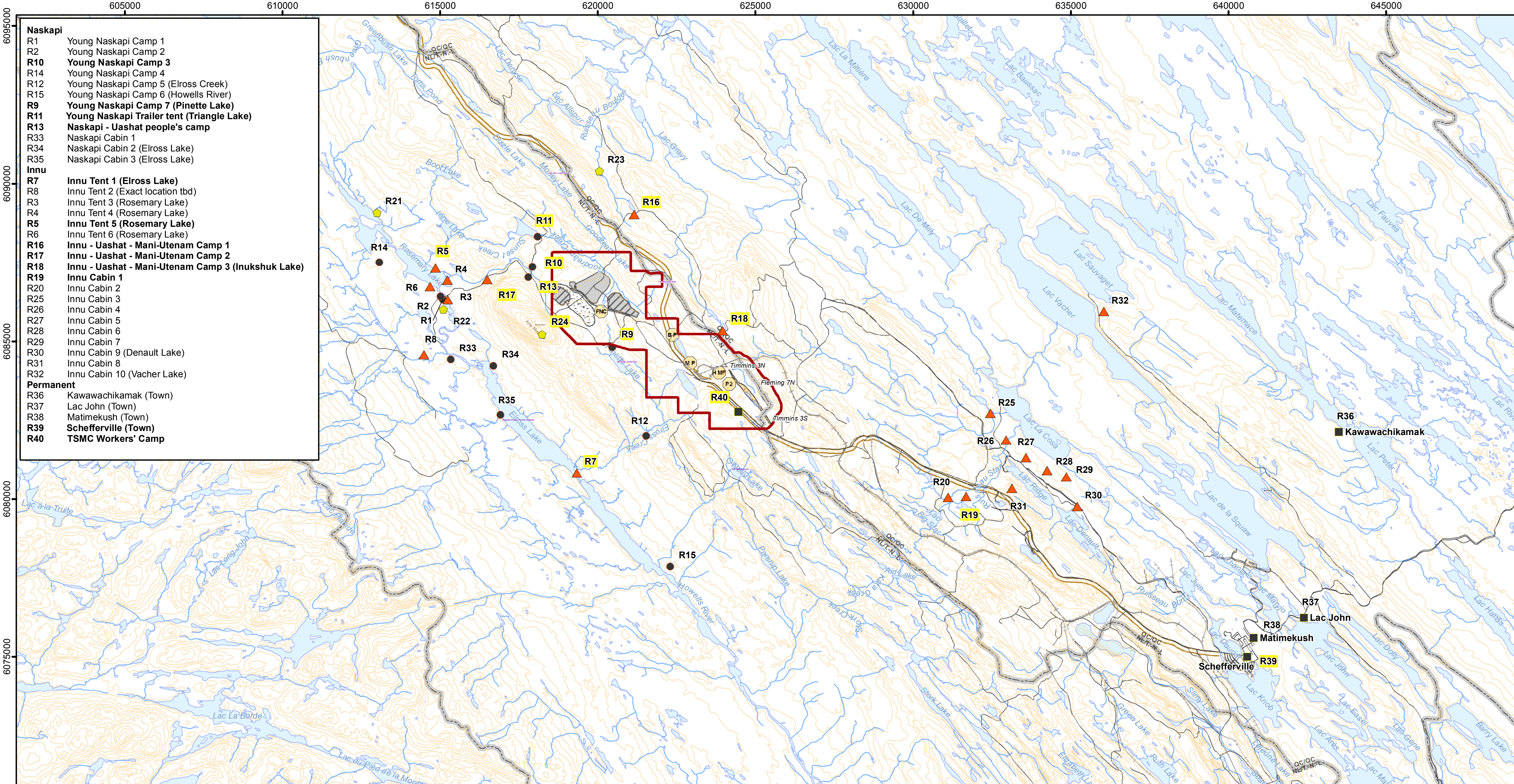
As can be seen in the preceding sections, there were some predicted exceedances of Project Air Quality Assessment Criteria for selected CAC. As would be expected, exceedances are occurring for the most part, when blasting events (short-term by nature) are included in the model. Even then, when blasting events are considered, exceedances are predicted to occur less than 1% of the time at sensitive receptors. The receptor with the highest number of exceedances is the R40 - Worker's camp located on TSMC's premises. An important reduction of exceedances at sensitive receptors can be achieved by minimizing blasting at the Howse pit during the winter period (November to March) and by finding an alternative to the presence of diesel generators at the Workers' camp. When considering all "off-property limit" grid receptors, effects to air quality are limited, and generally only occur at locations in close proximity to the boundary of the Project Footprint. The maximum amount of time the project's air quality assessment criteria are exceeded is 2.85% of the time under the "With Blasting" scenario and 0.44% of time under the "No Blasts" scenario.

3.5 Tables of Results

In this section, results from the air dispersion modelling study for all air pollutants for which assessment criteria were determined (see Section 2.3.3 for CAC and Section 2.3.4 for non-CAC) are presented in tabular format.

Each table has a similar format and contains:

- Identification of averaging period and pollutants
- Assessment criteria
- Background concentrations
- "With Blasts" and "No Blast" scenarios. When possible, both scenarios are presented in one single table to facilitate comparison
- Separate resulting concentrations for each DSO Areas included in the air modelling study:
  - DSO3 and DSO4 only;
  - Howse Only;
  - Combined DSO3, DSO4 and Howse;
  - All: Background + DSO3, DSO4 and Howse.
- Selected Sensitive Receptors. Section 2.4.5 describes the 40 sensitive receptors included in this study. For presentation and discussion purposes, among these 40 receptors, 13 were selected and reflect highest impacts or cluster of representative receptors. Figure 3.1 shows the location of the 13 selected sensitive receptors. Note that complete detailed results for all 40 sensitive receptors are available in Appendix L and Appendix M.
- Grid Receptors with highest impacts. The maximum modelled concentrations at grid receptors located on or outside the air quality modelling perimeter (eg. typically referred to as "Off-Property Limits" concentrations). Maximum concentrations in QC and in NL are reported. These grid receptors are NOT sensitive receptors; they are just equally spaced geographical points entered in the Calpuff model as per air modelling guidelines.



LEGEND

Sensitive Receptors
- Naskapi
- Innu
- Permanent
- Other
- Air Quality Modelling Perimeter

Infrastructure and Mining Components
- P2 Plant 2
- MP Main processing Plant
- HMP Howse Mini-Plant
- BP Batch Plant
- FNC First Nations crusher/screener
- Road to DSO Area 4
- Existing Railroad
- Deposit
- Proposed Howse Pit
- Proposed Topsoil/ Overburden Stockpile
- Proposed Waste Dump/ In-Pit Dump
- Proposed Mine Haul Road

Basemap
- Existing road
- Contour Line (50 ft)
- Provincial Border
- Watercourse
- Water Body

*Hydronyms are oriented along the direction of water flow

FILE, PROJECT, DATE, AUTHOR:
GH-0680 , PR185-19-14, 2015-11-02, edickoum

N

0 2 4
Kilometers
SCALE: 1:120 000

UTM 19N NAD 83

SOURCES:

Basemap and Land Use Components
Government of Canada, NTDB, 1:50,000, 1979
Government of NL and government of Quebec,

Mining Components
Howse Minerals Limited/
MET-CHEM Howse Deposit Design
for General Layout., 2015
Groupe Hémisphères, Hydrology and update, 2013

AECOM

ENVIRONMENTAL IMPACT ASSESSMENT
HOWSE PROPERTY PROJECT

Location of Selected Sensitive Receptors (13) - Included in Summary Tables of Results

Howse Minerals Limited

GroupeHemispheres

5731, rue Saint-Louis,
Bureau 201, Lévis (QC)
Canada, G6V 4E2

1453, rue Beaubien est,
Bureau 301, Montréal (QC)
Canada, H2G 3C6

Figure 3.1

Table 3-4 Summary Results – CAC – Maximum Annual Concentrations – With Blasts and No Blasts

			WITH BLASTS					NO BLASTS				
		Pollutant	TPM	PM10	PM2.5	SO2	NO2	TPM	PM10	PM2.5	SO2	NO2
		Averaging Period	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr
		Selected Air Quality Assessement Criteria for Howse	**60**	**--**	**8.8**	**52**	**100**	**60**	**--**	**8.8**	**52**	**100**
		BACKGROUND CONCENTRATIONS - PRE-DSO3	**8**	**4**	**3**	**2**	**10**	**8**	**4**	**3**	**2**	**10**
DSO3 + DSO4 ONLY	**ID**	**Description**	TPM	PM10	PM2.5	SO2	NO2	TPM	PM10	PM2.5	SO2	NO2
	R5	Innu Tent 5 (Rosemary Lake)	0.1	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.2
	R7	Innu Tent 1 (Elross Lake)	0.1	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.3
	R9	Young Naskapi Camp 7 (Pinette Lake)	0.4	0.2	0.1	0.0	1.5	0.4	0.2	0.1	0.0	1.5
	R10	Young Naskapi Camp 3	0.3	0.1	0.0	0.0	0.7	0.3	0.1	0.0	0.0	0.6
	R11	Young Naskapi Trailer tent (Triangle Lake)	0.2	0.1	0.0	0.0	0.6	0.2	0.1	0.0	0.0	0.6
	R13	Naskapi - Uashat people's camp	0.3	0.1	0.0	0.0	0.7	0.3	0.1	0.0	0.0	0.7
	R16	Innu - Uashat - Mani-Utenam Camp 1	0.9	0.4	0.1	0.0	1.7	0.9	0.4	0.1	0.0	1.6
	R17	Innu - Uashat - Mani-Utenam Camp 2	0.1	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.3
	R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	1.7	1.1	0.4	0.1	8.8	1.5	0.9	0.4	0.0	8.5
	R20	Innu Cabin 2	0.1	0.1	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.3
	R24	Irony Mountain	0.4	0.2	0.1	0.0	1.5	0.4	0.2	0.1	0.0	1.5
	R39	Schefferville (Town)	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1
	R40	TSMC Workers' Camp	3.7	2.1	0.7	0.4	19.3	2.5	1.3	0.7	0.1	18.5
	--	"Off-Property Limit" Maximum - Quebec	11.0	6.4	1.1	2.3	21.3	8.4	3.1	0.8	0.0	11.0
	--	"Off-Property Limit" Maximum - Newfoundland/Labrador	9.8	3.6	0.9	0.3	14.2	9.8	3.6	0.9	0.0	13.8
HOWSE ONLY	**ID**	**Name**	TPM	PM10	PM2.5	SO2	NO2	TPM	PM10	PM2.5	SO2	NO2
	R5	Innu Tent 5 (Rosemary Lake)	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1
	R7	Innu Tent 1 (Elross Lake)	0.1	0.1	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.1
	R9	Young Naskapi Camp 7 (Pinette Lake)	1.4	0.8	0.1	0.2	2.2	1.0	0.5	0.1	0.0	1.2
	R10	Young Naskapi Camp 3	0.9	0.5	0.1	0.1	1.5	0.6	0.3	0.1	0.0	0.8
	R11	Young Naskapi Trailer tent (Triangle Lake)	0.7	0.4	0.1	0.1	1.2	0.4	0.2	0.0	0.0	0.5
	R13	Naskapi - Uashat people's camp	0.8	0.5	0.1	0.1	1.6	0.6	0.3	0.1	0.0	1.0
	R16	Innu - Uashat - Mani-Utenam Camp 1	0.5	0.3	0.1	0.1	0.9	0.4	0.2	0.0	0.0	0.5
	R17	Innu - Uashat - Mani-Utenam Camp 2	0.2	0.1	0.0	0.0	0.4	0.1	0.1	0.0	0.0	0.2
	R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	1.4	0.7	0.2	0.0	2.2	1.3	0.6	0.2	0.0	2.0
	R20	Innu Cabin 2	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1
	R24	Irony Mountain	1.0	0.6	0.1	0.1	1.8	0.8	0.4	0.1	0.0	1.2
	R39	Schefferville (Town)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	R40	TSMC Workers' Camp	1.7	0.8	0.2	0.0	2.3	1.7	0.7	0.2	0.0	2.1
	--	"Off-Property Limit" Maximum - Quebec	3.3	1.5	0.3	0.1	4.3	3.2	1.4	0.3	0.0	4.0
	--	"Off-Property Limit" Maximum - Newfoundland/Labrador	5.3	2.8	0.5	0.7	7.6	4.7	2.1	0.5	0.0	5.4

- all values in μg/m^3. Red cell indicates above criteria.

Note to reader: Complete table of results for all sensitive receptors and averaging periods are available in Appendix L and Appendix M

Table 3-4 Summary Results – CAC – Maximum Annual Concentrations – With Blasts and No Blasts (Continued)

			WITH BLASTS					NO BLASTS				
		Pollutant	TPM	PM10	PM2.5	SO2	NO2	TPM	PM10	PM2.5	SO2	NO2
		Averaging Period	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr
		Selected Air Quality Assessement Criteria for Howse	**60**	**--**	**8.8**	**52**	**100**	**60**	**--**	**8.8**	**52**	**100**
		BACKGROUND CONCENTRATIONS - PRE-DSO3	**8**	**4**	**3**	**2**	**10**	**8**	**4**	**3**	**2**	**10**
DSO3 + DSO4 + HOWSE	**ID**	**Name**	TPM	PM10	PM2.5	SO2	NO2	TPM	PM10	PM2.5	SO2	NO2
	R5	Innu Tent 5 (Rosemary Lake)	0.1	0.1	0.0	0.0	0.4	0.1	0.1	0.0	0.0	0.3
	R7	Innu Tent 1 (Elross Lake)	0.2	0.1	0.0	0.0	0.5	0.1	0.1	0.0	0.0	0.4
	R9	Young Naskapi Camp 7 (Pinette Lake)	1.8	1.0	0.2	0.2	3.7	1.4	0.7	0.2	0.0	2.7
	R10	Young Naskapi Camp 3	1.1	0.6	0.1	0.1	2.2	0.8	0.4	0.1	0.0	1.4
	R11	Young Naskapi Trailer tent (Triangle Lake)	1.0	0.5	0.1	0.1	1.8	0.6	0.3	0.1	0.0	1.1
	R13	Naskapi - Uashat people's camp	1.1	0.6	0.1	0.1	2.3	0.9	0.5	0.1	0.0	1.6
	R16	Innu - Uashat - Mani-Utenam Camp 1	1.5	0.7	0.1	0.1	2.5	1.3	0.6	0.1	0.0	2.1
	R17	Innu - Uashat - Mani-Utenam Camp 2	0.3	0.2	0.0	0.0	0.7	0.2	0.1	0.0	0.0	0.5
	R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	3.1	1.7	0.6	0.1	10.9	2.8	1.5	0.6	0.0	10.5
	R20	Innu Cabin 2	0.2	0.1	0.0	0.0	0.5	0.1	0.1	0.0	0.0	0.4
	R24	Irony Mountain	1.3	0.8	0.2	0.1	3.2	1.1	0.6	0.2	0.0	2.6
	R39	Schefferville (Town)	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.2
	R40	TSMC Workers' Camp	5.1	2.7	0.8	0.4	20.7	4.2	2.1	0.8	0.1	19.7
	--	"Off-Property Limit" Maximum - Quebec	11.5	6.6	1.2	2.3	22.1	9.6	3.7	0.9	0.0	13.3
	--	"Off-Property Limit" Maximum - Newfoundland/Labrador	13.0	5.1	1.1	0.7	17.2	12.8	4.9	1.1	0.0	16.4
ALL: Background + DSO3 + DSO4 + HOWSE	**ID**	**Name**	TPM	PM10	PM2.5	SO2	NO2	TPM	PM10	PM2.5	SO2	NO2
	R5	Innu Tent 5 (Rosemary Lake)	8.1	4.1	3.0	2.0	10.4	8.1	4.1	3.0	2.0	10.3
	R7	Innu Tent 1 (Elross Lake)	8.2	4.1	3.0	2.0	10.5	8.1	4.1	3.0	2.0	10.4
	R9	Young Naskapi Camp 7 (Pinette Lake)	9.8	5.0	3.2	2.2	13.7	9.4	4.7	3.2	2.0	12.7
	R10	Young Naskapi Camp 3	9.1	4.6	3.1	2.1	12.2	8.8	4.4	3.1	2.0	11.4
	R11	Young Naskapi Trailer tent (Triangle Lake)	9.0	4.5	3.1	2.1	11.8	8.6	4.3	3.1	2.0	11.1
	R13	Naskapi - Uashat people's camp	9.1	4.6	3.1	2.1	12.3	8.9	4.5	3.1	2.0	11.6
	R16	Innu - Uashat - Mani-Utenam Camp 1	9.5	4.7	3.1	2.1	12.5	9.3	4.6	3.1	2.0	12.1
	R17	Innu - Uashat - Mani-Utenam Camp 2	8.3	4.2	3.0	2.0	10.7	8.2	4.1	3.0	2.0	10.5
	R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	11.1	5.7	3.6	2.1	20.9	10.8	5.5	3.6	2.0	20.5
	R20	Innu Cabin 2	8.2	4.1	3.0	2.0	10.5	8.1	4.1	3.0	2.0	10.4
	R24	Irony Mountain	9.3	4.8	3.2	2.1	13.2	9.1	4.6	3.2	2.0	12.6
	R39	Schefferville (Town)	8.0	4.0	3.0	2.0	10.2	8.0	4.0	3.0	2.0	10.2
	R40	TSMC Workers' Camp	13.1	6.7	3.8	2.4	30.7	12.2	6.1	3.8	2.1	29.7
	--	"Off-Property Limit" Maximum - Quebec	19.5	10.6	4.2	4.3	32.1	17.6	7.7	3.9	2.0	23.3
	--	"Off-Property Limit" Maximum - Newfoundland/Labrador	21.0	9.1	4.1	2.7	27.2	20.8	8.9	4.1	2.0	26.4

- all values in µg/m^3. Red cell indicates above criteria.

Note to reader: Complete table of results for all sensitive receptors and averaging periods are available in Appendix L and Appendix M

Table 3-5 Summary Results – CAC – Maximum Daily Concentrations – With Blasts and No Blasts

		WITH BLASTS					NO BLASTS				
	Pollutant	TPM	PM10	PM2.5	SO2	NO2	TPM	PM10	PM2.5	SO2	NO2
	Averaging Period	24-hr	24-hr	24-hr	24-hr	24-hr	24-hr	24-hr	24-hr	24-hr	24-hr
	Selected Air Quality Assessement Criteria for Howse	**120**	**50**	**25**	**288**	**200**	**120**	**50**	**25**	**288**	**200**
	BACKGROUND CONCENTRATIONS - PRE-DSO3	**40**	**20**	**15**	**10**	**30**	**40**	**20**	**15**	**10**	**30**

DSO3 + DSO4 ONLY

ID	Description	TPM	PM10	PM2.5	SO2	NO2	TPM	PM10	PM2.5	SO2	NO2
R5	Innu Tent 5 (Rosemary Lake)	1.5	0.5	0.3	0.1	7.9	1.5	0.5	0.3	0.0	7.7
R7	Innu Tent 1 (Elross Lake)	1.4	0.9	0.5	0.3	10.6	1.0	0.6	0.5	0.0	10.6
R9	Young Naskapi Camp 7 (Pinette Lake)	6.2	4.1	2.6	1.7	63.2	6.2	3.1	2.6	0.1	59.6
R10	Young Naskapi Camp 3	3.6	1.4	0.9	0.6	20.0	3.6	1.3	0.9	0.0	19.9
R11	Young Naskapi Trailer tent (Triangle Lake)	2.5	1.6	0.9	0.7	20.0	2.5	1.3	0.9	0.0	19.4
R13	Naskapi - Uashat people's camp	5.1	1.9	0.8	0.5	19.8	5.1	1.9	0.8	0.0	19.7
R16	Innu - Uashat - Mani-Utenam Camp 1	7.1	2.6	1.1	0.6	24.5	7.1	2.6	1.1	0.0	24.5
R17	Innu - Uashat - Mani-Utenam Camp 2	1.4	1.0	0.3	0.4	7.2	1.4	0.6	0.3	0.0	6.9
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	36.6	26.3	5.5	11.6	119.0	11.7	7.3	5.5	0.1	119.0
R20	Innu Cabin 2	1.8	1.5	0.4	0.6	9.9	1.1	0.6	0.3	0.0	9.3
R24	Irony Mountain	4.7	2.6	1.5	0.7	39.5	4.7	2.6	1.4	0.0	35.8
R39	Schefferville (Town)	0.6	0.4	0.2	0.1	4.6	0.5	0.3	0.2	0.0	4.5
R40	TSMC Workers' Camp	97.1	70.6	7.7	31.3	283.3	20.2	10.7	7.7	0.6	283.3
--	"Off-Property Limit" Maximum - Quebec	211.3	137.1	14.2	58.1	333.7	82.1	35.2	10.0	0.2	171.5
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	105.8	44.9	8.2	19.5	175.9	105.8	35.8	8.2	0.2	175.9

HOWSE ONLY

ID	Name	TPM	PM10	PM2.5	SO2	NO2	TPM	PM10	PM2.5	SO2	NO2
R5	Innu Tent 5 (Rosemary Lake)	3.6	3.3	0.2	1.4	11.1	1.9	1.0	0.2	0.0	3.2
R7	Innu Tent 1 (Elross Lake)	2.6	2.4	0.2	1.0	8.4	1.2	0.6	0.1	0.0	1.5
R9	Young Naskapi Camp 7 (Pinette Lake)	41.0	29.2	1.9	13.1	90.7	9.2	4.4	1.3	0.0	11.9
R10	Young Naskapi Camp 3	33.4	25.9	1.8	11.2	72.2	10.7	5.1	1.2	0.0	12.9
R11	Young Naskapi Trailer tent (Triangle Lake)	17.7	14.2	1.0	6.2	44.1	5.9	2.7	0.8	0.0	9.5
R13	Naskapi - Uashat people's camp	45.6	36.1	2.6	15.5	101.3	14.9	7.5	1.8	0.0	18.2
R16	Innu - Uashat - Mani-Utenam Camp 1	14.7	10.3	0.6	4.6	35.5	4.3	2.0	0.5	0.0	5.7
R17	Innu - Uashat - Mani-Utenam Camp 2	13.8	12.1	0.8	5.2	37.6	3.4	1.6	0.6	0.0	5.9
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	12.1	10.5	3.4	4.4	52.2	11.8	6.5	3.4	0.2	52.2
R20	Innu Cabin 2	1.7	1.0	0.2	0.4	3.3	1.7	1.0	0.2	0.0	2.0
R24	Irony Mountain	33.8	20.3	1.8	8.9	56.6	12.5	7.8	1.7	0.0	18.0
R39	Schefferville (Town)	0.6	0.4	0.1	0.1	1.2	0.6	0.4	0.1	0.0	0.9
R40	TSMC Workers' Camp	17.9	8.4	2.7	3.3	43.2	17.7	8.3	2.7	0.2	43.2
--	"Off-Property Limit" Maximum - Quebec	54.8	27.0	5.8	10.4	83.8	54.5	26.8	5.8	0.4	80.1
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	123.6	83.4	10.7	37.0	196.3	82.7	42.7	10.6	0.4	89.6

- all values in μg/m^3. Red cell indicates above criteria.

Note to reader: Complete table of results for all sensitive receptors and averaging periods are available in Appendix L and Appendix M

Table 3-5 Summary Results – CAC – Maximum Daily Concentrations – With Blasts and No Blasts (Continued)

			WITH BLASTS					NO BLASTS				
		Pollutant	TPM	PM10	PM2.5	SO2	NO2	TPM	PM10	PM2.5	SO2	NO2
		Averaging Period	24-hr	24-hr	24-hr	24-hr	24-hr	24-hr	24-hr	24-hr	24-hr	24-hr
		Selected Air Quality Assessement Criteria for Howse	**120**	**50**	**25**	**288**	**200**	**120**	**50**	**25**	**288**	**200**
		BACKGROUND CONCENTRATIONS - PRE-DSO3	**40**	**20**	**15**	**10**	**30**	**40**	**20**	**15**	**10**	**30**
DSO3 + DSO4 + HOWSE	**ID**	**Name**	TPM	PM10	PM2.5	SO2	NO2	TPM	PM10	PM2.5	SO2	NO2
	R5	Innu Tent 5 (Rosemary Lake)	4.1	3.8	0.5	1.5	13.6	2.5	1.3	0.5	0.0	10.9
	R7	Innu Tent 1 (Elross Lake)	2.6	2.4	0.5	1.0	10.6	2.1	1.0	0.5	0.0	10.6
	R9	Young Naskapi Camp 7 (Pinette Lake)	41.0	29.2	2.6	13.1	91.0	12.4	5.7	2.6	0.1	59.6
	R10	Young Naskapi Camp 3	34.8	27.2	1.9	11.7	77.6	12.2	5.8	1.7	0.0	31.8
	R11	Young Naskapi Trailer tent (Triangle Lake)	18.2	14.6	1.2	6.3	48.3	7.5	3.5	1.2	0.0	23.5
	R13	Naskapi - Uashat people's camp	47.3	37.5	2.8	16.0	106.9	16.2	8.1	1.9	0.0	27.6
	R16	Innu - Uashat - Mani-Utenam Camp 1	14.8	10.4	1.1	4.6	39.6	8.9	3.6	1.1	0.0	24.5
	R17	Innu - Uashat - Mani-Utenam Camp 2	14.8	13.1	0.9	5.6	41.2	4.1	2.1	0.7	0.0	12.6
	R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	36.8	26.5	5.5	11.6	119.1	22.2	13.8	5.5	0.2	119.1
	R20	Innu Cabin 2	3.0	2.0	0.4	0.8	10.0	2.7	1.6	0.4	0.0	9.3
	R24	Irony Mountain	33.8	20.4	2.6	8.9	57.4	16.3	9.7	2.5	0.1	45.8
	R39	Schefferville (Town)	1.2	0.7	0.2	0.2	4.7	1.1	0.7	0.2	0.0	4.6
	R40	TSMC Workers' Camp	97.1	70.6	7.7	31.3	285.8	33.9	16.3	7.7	0.7	285.0
	--	"Off-Property Limit" Maximum - Quebec	211.4	137.2	14.2	58.2	334.2	87.8	44.5	10.0	0.4	171.5
	--	"Off-Property Limit" Maximum - Newfoundland/Labrador	144.9	83.7	11.0	37.0	202.1	144.1	57.1	10.8	0.4	175.9
ALL: Background + DSO3 + DSO4 + HOWSE	**ID**	**Name**	TPM	PM10	PM2.5	SO2	NO2	TPM	PM10	PM2.5	SO2	NO2
	R5	Innu Tent 5 (Rosemary Lake)	44.1	23.8	15.5	11.5	43.6	42.5	21.3	15.5	10.0	40.9
	R7	Innu Tent 1 (Elross Lake)	42.6	22.4	15.5	11.0	40.6	42.1	21.0	15.5	10.0	40.6
	R9	Young Naskapi Camp 7 (Pinette Lake)	81.0	49.2	17.6	23.1	121.0	52.4	25.7	17.6	10.1	89.6
	R10	Young Naskapi Camp 3	74.8	47.2	16.9	21.7	107.6	52.2	25.8	16.7	10.0	61.8
	R11	Young Naskapi Trailer tent (Triangle Lake)	58.2	34.6	16.2	16.3	78.3	47.5	23.5	16.2	10.0	53.5
	R13	Naskapi - Uashat people's camp	87.3	57.5	17.8	26.0	136.9	56.2	28.1	16.9	10.0	57.6
	R16	Innu - Uashat - Mani-Utenam Camp 1	54.8	30.4	16.1	14.6	69.6	48.9	23.6	16.1	10.0	54.5
	R17	Innu - Uashat - Mani-Utenam Camp 2	54.8	33.1	15.9	15.6	71.2	44.1	22.1	15.7	10.0	42.6
	R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	76.8	46.5	20.5	21.6	149.1	62.2	33.8	20.5	10.2	149.1
	R20	Innu Cabin 2	43.0	22.0	15.4	10.8	40.0	42.7	21.6	15.4	10.0	39.3
	R24	Irony Mountain	73.8	40.4	17.6	18.9	87.4	56.3	29.7	17.5	10.1	75.8
	R39	Schefferville (Town)	41.2	20.7	15.2	10.2	34.7	41.1	20.7	15.2	10.0	34.6
	R40	TSMC Workers' Camp	137.1	90.6	22.7	41.3	315.8	73.9	36.3	22.7	10.7	315.0
	--	"Off-Property Limit" Maximum - Quebec	251.4	157.2	29.2	68.2	364.2	127.8	64.5	25.0	10.4	201.5
	--	"Off-Property Limit" Maximum - Newfoundland/Labrador	184.9	103.7	26.0	47.0	232.1	184.1	77.1	25.8	10.4	205.9

- all values in $\mu g/m^3$. Red cell indicates above criteria.

Note to reader: Complete table of results for all sensitive receptors and averaging periods are available in Appendix L and Appendix M

Table 3-6 Summary Results – CAC – Maximum 1-hr, 3-hr and 8-hr Concentrations – With Blasts and No Blasts

			WITH BLASTS					NO BLASTS				
		Pollutant	SO2	SO2	NO2	CO	CO	SO2	SO2	NO2	CO	CO
		Averaging Period	3-hr	1-hr	1-hr	8-hr	1-hr	3-hr	1-hr	1-hr	8-hr	1-hr
		Selected Air Quality Assessement Criteria for Howse	**600**	**900**	**400**	**12700**	**34000**	**600**	**900**	**400**	**12700**	**34000**
		BACKGROUND CONCENTRATIONS - PRE-DSO3	**18**	**24**	**50**	**400**	**600**	**18**	**24**	**50**	**400**	**600**
DSO3 + DSO4 ONLY	**ID**	**Description**	SO2	SO2	NO2	CO	CO	SO2	SO2	NO2	CO	CO
	R5	Innu Tent 5 (Rosemary Lake)	1.1	1.8	31.8	33.3	138.7	0.0	0.0	31.8	1.9	4.2
	R7	Innu Tent 1 (Elross Lake)	2.3	6.0	56.0	43.6	259.6	0.0	0.1	56.0	1.8	5.0
	R9	Young Naskapi Camp 7 (Pinette Lake)	12.8	28.5	191.9	207.7	1138.9	0.1	0.2	180.3	8.7	13.4
	R10	Young Naskapi Camp 3	4.6	7.9	61.4	72.0	350.1	0.0	0.1	49.0	4.1	5.7
	R11	Young Naskapi Trailer tent (Triangle Lake)	5.2	9.9	74.8	83.7	517.7	0.0	0.0	39.4	3.1	9.5
	R13	Naskapi - Uashat people's camp	4.1	8.2	64.1	74.6	364.9	0.0	0.1	50.1	3.9	6.4
	R16	Innu - Uashat - Mani-Utenam Camp 1	3.9	8.2	83.7	81.0	293.2	0.1	0.1	83.7	6.2	11.3
	R17	Innu - Uashat - Mani-Utenam Camp 2	3.0	6.0	46.8	62.6	285.4	0.0	0.0	34.4	1.8	3.7
	R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	68.3	205.0	1428.5	1260.4	7378.7	0.2	0.3	269.2	31.9	54.9
	R20	Innu Cabin 2	4.2	11.6	86.8	76.9	457.4	0.0	0.0	25.8	2.1	3.7
	R24	Irony Mountain	5.1	9.4	183.6	88.9	413.3	0.1	0.2	183.6	10.5	16.9
	R39	Schefferville (Town)	1.1	2.6	22.0	28.7	112.8	0.0	0.0	9.4	0.7	1.6
	R40	TSMC Workers' Camp	202.9	608.5	2961.1	3422.5	21957.0	0.8	0.8	423.0	78.8	120.8
	--	"Off-Property Limit" Maximum - Quebec	402.0	1206.0	5339.8	6291.5	42341.0	0.3	0.4	327.3	193.7	319.0
	--	"Off-Property Limit" Maximum - Newfoundland/Labrador	139.1	417.1	2161.0	2101.6	14721.0	0.4	0.5	373.8	82.0	104.7
HOWSE ONLY	**ID**	**Name**	SO2	SO2	NO2	CO	CO	SO2	SO2	NO2	CO	CO
	R5	Innu Tent 5 (Rosemary Lake)	10.6	30.4	240.1	182.8	1335.4	0.0	0.0	11.3	3.3	8.7
	R7	Innu Tent 1 (Elross Lake)	7.5	21.9	173.6	161.1	990.7	0.0	0.0	9.4	2.4	4.5
	R9	Young Naskapi Camp 7 (Pinette Lake)	104.4	237.4	1586.9	1419.2	8569.9	0.1	0.2	67.7	35.5	63.0
	R10	Young Naskapi Camp 3	89.7	197.1	1293.3	1285.2	7386.2	0.0	0.1	75.1	27.7	77.2
	R11	Young Naskapi Trailer tent (Triangle Lake)	49.5	81.8	608.4	713.4	3139.3	0.0	0.0	47.2	22.4	48.0
	R13	Naskapi - Uashat people's camp	124.0	247.6	1523.6	1774.0	9409.3	0.1	0.1	93.7	48.5	92.0
	R16	Innu - Uashat - Mani-Utenam Camp 1	36.5	82.6	635.8	496.9	3000.1	0.1	0.1	35.2	13.9	32.4
	R17	Innu - Uashat - Mani-Utenam Camp 2	41.6	87.5	625.6	631.1	3539.2	0.0	0.0	26.8	13.4	27.5
	R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	35.3	78.7	609.2	522.6	3092.7	0.7	0.9	160.2	20.2	38.2
	R20	Innu Cabin 2	3.0	7.9	63.6	59.2	323.9	0.0	0.0	7.7	2.1	4.5
	R24	Irony Mountain	71.4	188.1	1181.2	939.4	6599.8	0.2	0.3	91.8	37.7	78.2
	R39	Schefferville (Town)	0.8	2.5	20.0	14.9	94.6	0.0	0.0	3.0	0.9	1.8
	R40	TSMC Workers' Camp	26.3	52.6	413.9	388.4	2068.5	1.0	1.1	199.5	20.1	41.1
	--	"Off-Property Limit" Maximum - Quebec	83.2	191.9	1459.8	1135.8	6955.0	1.7	1.8	269.6	37.0	67.0
	--	"Off-Property Limit" Maximum - Newfoundland/Labrador	295.5	769.4	3525.5	3975.8	27484.0	1.7	1.8	269.6	162.7	227.9

- all values in $\mu g/m^3$. Red cell indicates above criteria.

Note to reader: Complete table of results for all sensitive receptors and averaging periods are available in Appendix L and Appendix M

Table 3-6 Summary Results – CAC – Maximum 1-hr, 3-hr and 8-hr Concentrations – With Blasts and No Blasts (Continued)

	WITH BLASTS					NO BLASTS				
Pollutant	SO2	SO2	NO2	CO	CO	SO2	SO2	NO2	CO	CO
Averaging Period	3-hr	1-hr	1-hr	8-hr	1-hr	3-hr	1-hr	1-hr	8-hr	1-hr
Selected Air Quality Assessement Criteria for Howse	**600**	**900**	**400**	**12700**	**34000**	**600**	**900**	**400**	**12700**	**34000**
BACKGROUND CONCENTRATIONS - PRE-DSO3	**18**	**24**	**50**	**400**	**600**	**18**	**24**	**50**	**400**	**600**

DSO3 + DSO4 + HOWSE

ID	Name	SO2	SO2	NO2	CO	CO	SO2	SO2	NO2	CO	CO
R5	Innu Tent 5 (Rosemary Lake)	11.7	31.9	253.5	216.2	1474.1	0.0	0.0	34.5	5.1	10.4
R7	Innu Tent 1 (Elross Lake)	7.5	21.9	174.0	161.5	991.9	0.0	0.1	56.3	3.4	6.8
R9	Young Naskapi Camp 7 (Pinette Lake)	104.4	237.4	1586.9	1419.2	8569.9	0.2	0.3	181.7	37.3	67.7
R10	Young Naskapi Camp 3	93.7	203.0	1341.3	1356.9	7700.6	0.1	0.1	81.9	28.4	78.9
R11	Young Naskapi Trailer tent (Triangle Lake)	50.3	82.8	608.7	730.1	3191.8	0.1	0.1	48.6	23.1	48.8
R13	Naskapi - Uashat people's camp	128.1	255.7	1587.7	1848.6	9774.2	0.1	0.1	96.1	49.4	93.8
R16	Innu - Uashat - Mani-Utenam Camp 1	36.5	82.6	637.9	499.4	3001.4	0.1	0.1	86.2	16.2	33.0
R17	Innu - Uashat - Mani-Utenam Camp 2	44.6	89.5	643.9	693.7	3693.1	0.0	0.1	43.5	14.8	30.5
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	68.3	205.0	1428.5	1260.4	7378.7	0.7	0.9	279.3	32.2	54.9
R20	Innu Cabin 2	4.4	11.6	87.5	115.4	458.0	0.0	0.1	27.7	4.0	7.2
R24	Irony Mountain	71.4	188.1	1182.0	940.0	6600.3	0.3	0.3	184.3	38.8	80.2
R39	Schefferville (Town)	1.1	2.6	24.3	31.3	113.0	0.0	0.0	11.5	1.5	3.4
R40	TSMC Workers' Camp	202.9	608.5	2961.1	3422.5	21957.0	1.2	1.3	437.3	79.1	121.0
--	"Off-Property Limit" Maximum - Quebec	402.0	1206.0	5341.0	6296.3	42342.0	1.7	1.8	338.3	193.7	326.8
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	295.5	769.4	3527.3	3976.7	27485.0	1.7	1.8	381.9	165.0	230.1

ALL: Background + DSO3 + DSO4 + HOWSE

ID	Name	SO2	SO2	NO2	CO	CO	SO2	SO2	NO2	CO	CO
R5	Innu Tent 5 (Rosemary Lake)	29.6	56.2	303.5	616.2	2074.1	17.9	24.4	84.5	405.1	610.4
R7	Innu Tent 1 (Elross Lake)	25.4	46.2	224.0	561.5	1591.9	17.9	24.4	106.3	403.4	606.8
R9	Young Naskapi Camp 7 (Pinette Lake)	122.3	261.7	1636.9	1819.2	9169.9	18.1	24.6	231.7	437.3	667.7
R10	Young Naskapi Camp 3	111.6	227.4	1391.3	1756.9	8300.6	18.0	24.4	131.9	428.4	678.9
R11	Young Naskapi Trailer tent (Triangle Lake)	68.2	107.2	658.7	1130.1	3791.8	18.0	24.4	98.6	423.1	648.8
R13	Naskapi - Uashat people's camp	146.0	280.1	1637.7	2248.6	10374.2	18.0	24.4	146.1	449.4	693.8
R16	Innu - Uashat - Mani-Utenam Camp 1	54.4	107.0	687.9	899.4	3601.4	18.0	24.5	136.2	416.2	633.0
R17	Innu - Uashat - Mani-Utenam Camp 2	62.5	113.9	693.9	1093.7	4293.1	17.9	24.4	93.5	414.8	630.5
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	86.2	229.4	1478.5	1660.4	7978.7	18.6	25.2	329.3	432.2	654.9
R20	Innu Cabin 2	22.3	35.9	137.5	515.4	1058.0	17.9	24.4	77.7	404.0	607.2
R24	Irony Mountain	89.3	212.4	1232.0	1340.0	7200.3	18.2	24.7	234.3	438.8	680.2
R39	Schefferville (Town)	19.0	26.9	74.3	431.3	713.0	17.9	24.4	61.5	401.5	603.4
R40	TSMC Workers' Camp	220.8	632.9	3011.1	3822.5	22557.0	19.1	25.6	487.3	479.1	721.0
--	"Off-Property Limit" Maximum - Quebec	419.9	1230.3	5391.0	6696.3	42942.0	19.6	26.1	388.3	593.7	926.8
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	313.4	793.8	3577.3	4376.7	28085.0	19.6	26.1	431.9	565.0	830.1

- all values in µg/m^3. Red cell indicates above criteria.

Note to reader: Complete table of results for all sensitive receptors and averaging periods are available in Appendix L and Appendix M

Table 3-7 Summary Results – Dustfall – Maximum Annual and Monthly Deposition – With Blasts and No Blasts

		WITH BLASTS		NO BLASTS	
	Pollutant	DEPO-TPM	DEPO-TPM	DEPO-TPM	DEPO-TPM
	Averaging Period	1-yr	30-day	1-yr	30-day
	Selected Air Quality Assessement Criteria for Howse	**4.6**	**7**	**4.6**	**7**
	BACKGROUND CONCENTRATIONS - PRE-DSO3	**1.7**	**2.6**	**1.7**	**2.6**

DSO3 + DSO4 ONLY

ID	Description	DEPO-TPM (With Blasts)	DEPO-TPM (With Blasts)	DEPO-TPM (No Blasts)	DEPO-TPM (No Blasts)
R5	Innu Tent 5 (Rosemary Lake)	0.00	0.02	0.00	0.02
R7	Innu Tent 1 (Elross Lake)	0.01	0.02	0.01	0.03
R9	Young Naskapi Camp 7 (Pinette Lake)	0.02	0.08	0.06	0.17
R10	Young Naskapi Camp 3	0.02	0.06	0.04	0.13
R11	Young Naskapi Trailer tent (Triangle Lake)	0.02	0.06	0.03	0.13
R13	Naskapi - Uashat people's camp	0.02	0.05	0.03	0.13
R16	Innu - Uashat - Mani-Utenam Camp 1	0.07	0.23	0.02	0.07
R17	Innu - Uashat - Mani-Utenam Camp 2	0.01	0.03	0.01	0.06
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	0.06	0.15	0.05	0.15
R20	Innu Cabin 2	0.01	0.02	0.00	0.01
R24	Irony Mountain	0.01	0.04	0.03	0.09
R39	Schefferville (Town)	0.00	0.00	0.00	0.00
R40	TSMC Workers' Camp	0.11	0.27	0.08	0.21
--	"Off-Property Limit" Maximum - Quebec	0.35	1.08	0.12	0.41
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	0.43	1.17	0.23	0.84

HOWSE ONLY

ID	Name	DEPO-TPM (With Blasts)	DEPO-TPM (With Blasts)	DEPO-TPM (No Blasts)	DEPO-TPM (No Blasts)
R5	Innu Tent 5 (Rosemary Lake)	0.01	0.02	0.00	0.02
R7	Innu Tent 1 (Elross Lake)	0.01	0.04	0.01	0.03
R9	Young Naskapi Camp 7 (Pinette Lake)	0.07	0.18	0.06	0.17
R10	Young Naskapi Camp 3	0.06	0.17	0.04	0.13
R11	Young Naskapi Trailer tent (Triangle Lake)	0.04	0.15	0.03	0.13
R13	Naskapi - Uashat people's camp	0.04	0.14	0.03	0.13
R16	Innu - Uashat - Mani-Utenam Camp 1	0.03	0.08	0.02	0.07
R17	Innu - Uashat - Mani-Utenam Camp 2	0.02	0.07	0.01	0.06
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	0.06	0.16	0.06	0.15
R20	Innu Cabin 2	0.00	0.02	0.00	0.01
R24	Irony Mountain	0.03	0.10	0.03	0.09
R39	Schefferville (Town)	0.00	0.00	0.00	0.00
R40	TSMC Workers' Camp	0.08	0.22	0.08	0.21
--	"Off-Property Limit" Maximum - Quebec	0.13	0.42	0.13	0.42
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	0.26	0.89	0.23	0.84

- all values in g/m^2/30days. Red cell indicates above criteria.

Note to reader: Complete table of results for all sensitive receptors and averaging periods are available in Appendix L and Appendix M

Table 3-7 Summary Results – Dustfall – Maximum Annual and Monthly Deposition – With Blasts and No Blasts (Continued)

	WITH BLASTS		NO BLASTS	
Pollutant	DEPO-TPM	DEPO-TPM	DEPO-TPM	DEPO-TPM
Averaging Period	1-yr	30-day	1-yr	30-day
Selected Air Quality Assessement Criteria for Howse	**4.6**	**7**	**4.6**	**7**
BACKGROUND CONCENTRATIONS - PRE-DSO3	**1.7**	**2.6**	**1.7**	**2.6**

DSO3 + DSO4 + HOWSE

ID	Name	DEPO-TPM	DEPO-TPM	DEPO-TPM	DEPO-TPM
R5	Innu Tent 5 (Rosemary Lake)	0.01	0.04	0.01	0.03
R7	Innu Tent 1 (Elross Lake)	0.01	0.06	0.01	0.05
R9	Young Naskapi Camp 7 (Pinette Lake)	0.09	0.26	0.07	0.24
R10	Young Naskapi Camp 3	0.07	0.20	0.06	0.17
R11	Young Naskapi Trailer tent (Triangle Lake)	0.06	0.18	0.05	0.16
R13	Naskapi - Uashat people's camp	0.06	0.18	0.05	0.16
R16	Innu - Uashat - Mani-Utenam Camp 1	0.10	0.30	0.10	0.30
R17	Innu - Uashat - Mani-Utenam Camp 2	0.02	0.09	0.02	0.08
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	0.11	0.29	0.11	0.29
R20	Innu Cabin 2	0.01	0.03	0.01	0.03
R24	Irony Mountain	0.04	0.14	0.04	0.13
R39	Schefferville (Town)	0.00	0.01	0.00	0.01
R40	TSMC Workers' Camp	0.19	0.44	0.18	0.42
--	"Off-Property Limit" Maximum - Quebec	0.41	1.20	0.40	1.18
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	0.57	1.52	0.56	1.51

ALL: Background + DSO3 + DSO4 + HOWSE

ID	Name	DEPO-TPM	DEPO-TPM	DEPO-TPM	DEPO-TPM
R5	Innu Tent 5 (Rosemary Lake)	1.71	2.59	1.71	2.58
R7	Innu Tent 1 (Elross Lake)	1.71	2.61	1.71	2.60
R9	Young Naskapi Camp 7 (Pinette Lake)	1.79	2.81	1.77	2.79
R10	Young Naskapi Camp 3	1.77	2.75	1.76	2.72
R11	Young Naskapi Trailer tent (Triangle Lake)	1.76	2.73	1.75	2.71
R13	Naskapi - Uashat people's camp	1.76	2.73	1.75	2.71
R16	Innu - Uashat - Mani-Utenam Camp 1	1.80	2.85	1.80	2.85
R17	Innu - Uashat - Mani-Utenam Camp 2	1.72	2.64	1.72	2.63
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	1.81	2.84	1.81	2.84
R20	Innu Cabin 2	1.71	2.58	1.71	2.58
R24	Irony Mountain	1.74	2.69	1.74	2.68
R39	Schefferville (Town)	1.70	2.56	1.70	2.56
R40	TSMC Workers' Camp	1.89	2.99	1.88	2.97
--	"Off-Property Limit" Maximum - Quebec	2.11	3.75	2.10	3.73
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	2.27	4.07	2.26	4.06

- all values in g/m^2/30days. Red cell indicates above criteria.

Note to reader: Complete table of results for all sensitive receptors and averaging periods are available in Appendix L and Appendix M

Table 3-8 Summary Results – Non-CAC (Metals) – Maximum Annual Concentrations – With Blasts

WITH BLASTS

Pollutant	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Lead (Pb)	Mercury (Hg)	Silver (Ag)	Thallium (Tl)	Vanadium (V)
Averaging Period	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr
Selected Air Quality Assessement Criteria for Howse	**0.17**	**0.003**	**0.05**	**0.0004**	**0.0036**	**0.004**	**0.1**	**0.005**	**0.23**	**0.25**	**1**
BACKGROUND CONCENTRATIONS - PRE-DSO3	**0.001**	**0.002**	**0.02**	**0**	**0.0005**	**0.002**	**0.004**	**0.002**	**0.005**	**0.005**	**0.01**

DSO3 + DSO4 ONLY

ID	Description	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Lead (Pb)	Mercury (Hg)	Silver (Ag)	Thallium (Tl)	Vanadium (V)
R5	Innu Tent 5 (Rosemary Lake)	5.5E-08	3.1E-06	3.2E-05	1.7E-07	1.4E-08	9.0E-06	4.7E-06	4.4E-09	5.6E-08	3.7E-08	5.5E-06
R7	Innu Tent 1 (Elross Lake)	6.2E-08	3.4E-06	3.6E-05	1.9E-07	1.6E-08	1.0E-05	5.3E-06	5.0E-09	6.3E-08	4.2E-08	6.1E-06
R9	Young Naskapi Camp 7 (Pinette Lake)	3.6E-07	2.0E-05	2.1E-04	1.1E-06	9.2E-08	5.8E-05	3.1E-05	2.9E-08	3.6E-07	2.4E-07	3.5E-05
R10	Young Naskapi Camp 3	2.2E-07	1.2E-05	1.3E-04	6.7E-07	5.7E-08	3.6E-05	1.9E-05	1.8E-08	2.2E-07	1.5E-07	2.2E-05
R11	Young Naskapi Trailer tent (Triangle Lake)	2.0E-07	1.1E-05	1.2E-04	6.0E-07	5.2E-08	3.2E-05	1.7E-05	1.6E-08	2.0E-07	1.4E-07	2.0E-05
R13	Naskapi - Uashat people's camp	2.3E-07	1.3E-05	1.3E-04	6.9E-07	5.9E-08	3.7E-05	2.0E-05	1.9E-08	2.3E-07	1.6E-07	2.3E-05
R16	Innu - Uashat - Mani-Utenam Camp 1	8.2E-07	4.5E-05	4.8E-04	2.5E-06	2.1E-07	1.3E-04	7.0E-05	6.6E-08	8.3E-07	5.5E-07	8.1E-05
R17	Innu - Uashat - Mani-Utenam Camp 2	8.5E-08	4.7E-06	5.0E-05	2.5E-07	2.2E-08	1.4E-05	7.2E-06	6.8E-09	8.6E-08	5.7E-08	8.4E-06
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	1.5E-06	8.4E-05	8.9E-04	4.6E-06	3.9E-07	2.5E-04	1.3E-04	1.2E-07	1.5E-06	1.0E-06	1.5E-04
R20	Innu Cabin 2	7.6E-08	4.2E-06	4.4E-05	2.3E-07	2.0E-08	1.2E-05	6.5E-06	6.1E-09	7.7E-08	5.1E-08	7.5E-06
R24	Irony Mountain	3.1E-07	1.7E-05	1.8E-04	9.4E-07	8.1E-08	5.1E-05	2.7E-05	2.5E-08	3.2E-07	2.1E-07	3.1E-05
R39	Schefferville (Town)	2.4E-08	1.3E-06	1.4E-05	7.3E-08	6.3E-09	3.9E-06	2.1E-06	2.0E-09	2.5E-08	1.6E-08	2.4E-06
R40	TSMC Workers' Camp	3.2E-06	1.8E-04	1.9E-03	9.7E-06	8.3E-07	5.2E-04	2.8E-04	2.6E-07	3.3E-06	2.2E-06	3.2E-04
--	"Off-Property Limit" Maximum - Quebec	9.6E-06	5.3E-04	5.6E-03	2.9E-05	2.5E-06	1.6E-03	8.2E-04	7.7E-07	9.7E-06	6.5E-06	9.5E-04
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	8.5E-06	4.7E-04	5.0E-03	2.6E-05	2.2E-06	1.4E-03	7.3E-04	6.8E-07	8.6E-06	5.8E-06	8.4E-04

HOWSE ONLY

ID	Name	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Lead (Pb)	Mercury (Hg)	Silver (Ag)	Thallium (Tl)	Vanadium (V)
R5	Innu Tent 5 (Rosemary Lake)	7.4E-08	4.1E-06	4.3E-05	2.2E-07	1.9E-08	1.2E-05	6.3E-06	5.9E-09	7.5E-08	5.0E-08	7.3E-06
R7	Innu Tent 1 (Elross Lake)	8.5E-08	4.7E-06	4.9E-05	2.5E-07	2.2E-08	1.4E-05	7.2E-06	6.8E-09	8.5E-08	5.7E-08	8.4E-06
R9	Young Naskapi Camp 7 (Pinette Lake)	1.2E-06	6.7E-05	7.1E-04	3.7E-06	3.1E-07	2.0E-04	1.0E-04	9.8E-08	1.2E-06	8.2E-07	1.2E-04
R10	Young Naskapi Camp 3	7.6E-07	4.2E-05	4.4E-04	2.3E-06	1.9E-07	1.2E-04	6.4E-05	6.1E-08	7.6E-07	5.1E-07	7.5E-05
R11	Young Naskapi Trailer tent (Triangle Lake)	6.4E-07	3.5E-05	3.7E-04	1.9E-06	1.6E-07	1.0E-04	5.5E-05	5.1E-08	6.5E-07	4.3E-07	6.3E-05
R13	Naskapi - Uashat people's camp	7.3E-07	4.0E-05	4.2E-04	2.2E-06	1.9E-07	1.2E-04	6.2E-05	5.8E-08	7.3E-07	4.9E-07	7.2E-05
R16	Innu - Uashat - Mani-Utenam Camp 1	4.5E-07	2.5E-05	2.7E-04	1.4E-06	1.2E-07	7.4E-05	3.9E-05	3.6E-08	4.6E-07	3.1E-07	4.5E-05
R17	Innu - Uashat - Mani-Utenam Camp 2	1.8E-07	9.7E-06	1.0E-04	5.3E-07	4.5E-08	2.9E-05	1.5E-05	1.4E-08	1.8E-07	1.2E-07	1.7E-05
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	1.2E-06	6.7E-05	7.1E-04	3.7E-06	3.1E-07	2.0E-04	1.0E-04	9.8E-08	1.2E-06	8.3E-07	1.2E-04
R20	Innu Cabin 2	5.6E-08	3.1E-06	3.3E-05	1.7E-07	1.5E-08	9.1E-06	4.8E-06	4.5E-09	5.7E-08	3.8E-08	5.6E-06
R24	Irony Mountain	8.6E-07	4.7E-05	5.0E-04	2.6E-06	2.2E-07	1.4E-04	7.3E-05	6.9E-08	8.7E-07	5.8E-07	8.5E-05
R39	Schefferville (Town)	1.9E-08	1.1E-06	1.1E-05	5.8E-08	5.0E-09	3.1E-06	1.6E-06	1.6E-09	1.9E-08	1.3E-08	1.9E-06
R40	TSMC Workers' Camp	1.5E-06	8.4E-05	8.9E-04	4.6E-06	3.9E-07	2.5E-04	1.3E-04	1.2E-07	1.5E-06	1.0E-06	1.5E-04
--	"Off-Property Limit" Maximum - Quebec	2.9E-06	1.6E-04	1.7E-03	8.6E-06	7.4E-07	4.7E-04	2.4E-04	2.3E-07	2.9E-06	1.9E-06	2.8E-04
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	4.6E-06	2.5E-04	2.7E-03	1.4E-05	1.2E-06	7.4E-04	3.9E-04	3.7E-07	4.6E-06	3.1E-06	4.5E-04

- all values in μg/m^3. Red cell indicates above criteria.

Obtained metal concentrations in ambient air by multiplying TPM concentrations by metal fraction obtained from soil material analyses. See Appendix H of Air Quality Report for metal fractions.

Note to reader: Complete table of results for all sensitive receptors and averaging periods are available in Appendix L and Appendix M

Table 3-8 Summary Results – Non-CAC (Metals) – Maximum Annual Concentrations – With Blasts (Continued)

WITH BLASTS

AIR QUALITY - METALS FRACTION IN TPM

Pollutant	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Lead (Pb)	Mercury (Hg)	Silver (Ag)	Thallium (Tl)	Vanadium (V)
Averaging Period	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr
Selected Air Quality Assessement Criteria for Howse	**0.17**	**0.003**	**0.05**	**0.0004**	**0.0036**	**0.004**	**0.1**	**0.005**	**0.23**	**0.25**	**1**
BACKGROUND CONCENTRATIONS - PRE-DSO3	**0.001**	**0.002**	**0.02**	**0**	**0.0005**	**0.002**	**0.004**	**0.002**	**0.005**	**0.005**	**0.01**

DSO3 + DSO4 + HOWSE

ID	Name	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Lead (Pb)	Mercury (Hg)	Silver (Ag)	Thallium (Tl)	Vanadium (V)
R5	Innu Tent 5 (Rosemary Lake)	1.2E-07	6.8E-06	7.2E-05	3.7E-07	3.2E-08	2.0E-05	1.1E-05	1.0E-08	1.3E-07	8.4E-08	1.2E-05
R7	Innu Tent 1 (Elross Lake)	1.4E-07	7.9E-06	8.4E-05	4.3E-07	3.7E-08	2.3E-05	1.2E-05	1.2E-08	1.4E-07	9.7E-08	1.4E-05
R9	Young Naskapi Camp 7 (Pinette Lake)	1.5E-06	8.5E-05	9.0E-04	4.6E-06	4.0E-07	2.5E-04	1.3E-04	1.2E-07	1.6E-06	1.0E-06	1.5E-04
R10	Young Naskapi Camp 3	9.4E-07	5.2E-05	5.5E-04	2.8E-06	2.4E-07	1.5E-04	8.0E-05	7.5E-08	9.5E-07	6.3E-07	9.3E-05
R11	Young Naskapi Trailer tent (Triangle Lake)	8.4E-07	4.6E-05	4.9E-04	2.5E-06	2.2E-07	1.4E-04	7.1E-05	6.7E-08	8.5E-07	5.7E-07	8.3E-05
R13	Naskapi - Uashat people's camp	9.2E-07	5.1E-05	5.3E-04	2.8E-06	2.4E-07	1.5E-04	7.8E-05	7.4E-08	9.2E-07	6.2E-07	9.1E-05
R16	Innu - Uashat - Mani-Utenam Camp 1	1.3E-06	7.0E-05	7.4E-04	3.8E-06	3.3E-07	2.0E-04	1.1E-04	1.0E-07	1.3E-06	8.6E-07	1.3E-04
R17	Innu - Uashat - Mani-Utenam Camp 2	2.5E-07	1.4E-05	1.5E-04	7.5E-07	6.4E-08	4.0E-05	2.1E-05	2.0E-08	2.5E-07	1.7E-07	2.5E-05
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	2.7E-06	1.5E-04	1.6E-03	8.0E-06	6.9E-07	4.3E-04	2.3E-04	2.1E-07	2.7E-06	1.8E-06	2.6E-04
R20	Innu Cabin 2	1.3E-07	7.3E-06	7.7E-05	4.0E-07	3.4E-08	2.1E-05	1.1E-05	1.1E-08	1.3E-07	9.0E-08	1.3E-05
R24	Irony Mountain	1.2E-06	6.5E-05	6.8E-04	3.5E-06	3.0E-07	1.9E-04	1.0E-04	9.4E-08	1.2E-06	7.9E-07	1.2E-04
R39	Schefferville (Town)	4.3E-08	2.4E-06	2.5E-05	1.3E-07	1.1E-08	7.0E-06	3.7E-06	3.4E-09	4.3E-08	2.9E-08	4.3E-06
R40	TSMC Workers' Camp	4.5E-06	2.5E-04	2.6E-03	1.3E-05	1.1E-06	7.2E-04	3.8E-04	3.6E-07	4.5E-06	3.0E-06	4.4E-04
--	"Off-Property Limit" Maximum - Quebec	1.0E-05	5.5E-04	5.9E-03	3.0E-05	2.6E-06	1.6E-03	8.6E-04	8.1E-07	1.0E-05	6.8E-06	1.0E-03
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	1.1E-05	6.3E-04	6.6E-03	3.4E-05	2.9E-06	1.8E-03	9.7E-04	9.1E-07	1.1E-05	7.7E-06	1.1E-03

ALL: Background + DSO3 + DSO4 + HOWSE

ID	Name	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Lead (Pb)	Mercury (Hg)	Silver (Ag)	Thallium (Tl)	Vanadium (V)
R5	Innu Tent 5 (Rosemary Lake)	1.0E-03	2.0E-03	2.0E-02	3.7E-07	5.0E-04	2.0E-03	4.0E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R7	Innu Tent 1 (Elross Lake)	1.0E-03	2.0E-03	2.0E-02	4.3E-07	5.0E-04	2.0E-03	4.0E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R9	Young Naskapi Camp 7 (Pinette Lake)	1.0E-03	2.1E-03	2.1E-02	4.6E-06	5.0E-04	2.2E-03	4.1E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R10	Young Naskapi Camp 3	1.0E-03	2.1E-03	2.1E-02	2.8E-06	5.0E-04	2.2E-03	4.1E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R11	Young Naskapi Trailer tent (Triangle Lake)	1.0E-03	2.0E-03	2.0E-02	2.5E-06	5.0E-04	2.1E-03	4.1E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R13	Naskapi - Uashat people's camp	1.0E-03	2.1E-03	2.1E-02	2.8E-06	5.0E-04	2.1E-03	4.1E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R16	Innu - Uashat - Mani-Utenam Camp 1	1.0E-03	2.1E-03	2.1E-02	3.8E-06	5.0E-04	2.2E-03	4.1E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R17	Innu - Uashat - Mani-Utenam Camp 2	1.0E-03	2.0E-03	2.0E-02	7.5E-07	5.0E-04	2.0E-03	4.0E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	1.0E-03	2.1E-03	2.2E-02	8.0E-06	5.0E-04	2.4E-03	4.2E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R20	Innu Cabin 2	1.0E-03	2.0E-03	2.0E-02	4.0E-07	5.0E-04	2.0E-03	4.0E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R24	Irony Mountain	1.0E-03	2.1E-03	2.1E-02	3.5E-06	5.0E-04	2.2E-03	4.1E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R39	Schefferville (Town)	1.0E-03	2.0E-03	2.0E-02	1.3E-07	5.0E-04	2.0E-03	4.0E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R40	TSMC Workers' Camp	1.0E-03	2.2E-03	2.3E-02	1.3E-05	5.0E-04	2.7E-03	4.4E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
--	"Off-Property Limit" Maximum - Quebec	1.0E-03	2.6E-03	2.6E-02	3.0E-05	5.0E-04	3.6E-03	4.9E-03	2.0E-03	5.0E-03	5.0E-03	1.1E-02
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	1.0E-03	2.6E-03	2.7E-02	3.4E-05	5.0E-04	3.8E-03	5.0E-03	2.0E-03	5.0E-03	5.0E-03	1.1E-02

- all values in µg/m^3. Red cell indicates above criteria.

Obtained metal concentrations in ambient air by multiplying TPM concentrations by metal fraction obtained from soil material analyses. See Appendix H of Air Quality Report for metal fractions.

Note to reader: Complete table of results for all sensitive receptors and averaging periods are available in Appendix L and Appendix M

Table 3-9 Summary Results – Non-CAC (Metals) – Maximum Annual Concentrations – No Blasts

NO BLASTS

Pollutant	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Lead (Pb)	Mercury (Hg)	Silver (Ag)	Thallium (Tl)	Vanadium (V)
Averaging Period	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr
Selected Air Quality Assessement Criteria for Howse	**0.17**	**0.003**	**0.05**	**4E-04**	**0.004**	**0.004**	**0.1**	**0.005**	**0.23**	**0.25**	**1**

BACKGROUND CONCENTRATIONS - PRE-DSO3	**0.001**	**0.002**	**0.02**	**0**	**0.0005**	**0.002**	**0.004**	**0.002**	**0.005**	**0.005**	**0.01**

DSO3 + DSO4 ONLY

ID	Description	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Lead (Pb)	Mercury (Hg)	Silver (Ag)	Thallium (Tl)	Vanadium (V)
R5	Innu Tent 5 (Rosemary Lake)	5.4E-08	3.0E-06	3.2E-05	1.6E-07	1.4E-08	8.8E-06	4.6E-06	4.3E-09	5.5E-08	3.7E-08	5.4E-06
R7	Innu Tent 1 (Elross Lake)	5.3E-08	2.9E-06	3.1E-05	1.6E-07	1.4E-08	8.6E-06	4.5E-06	4.3E-09	5.3E-08	3.6E-08	5.2E-06
R9	Young Naskapi Camp 7 (Pinette Lake)	3.5E-07	1.9E-05	2.0E-04	1.0E-06	8.9E-08	5.6E-05	2.9E-05	2.8E-08	3.5E-07	2.3E-07	3.4E-05
R10	Young Naskapi Camp 3	2.2E-07	1.2E-05	1.3E-04	6.6E-07	5.6E-08	3.5E-05	1.9E-05	1.8E-08	2.2E-07	1.5E-07	2.2E-05
R11	Young Naskapi Trailer tent (Triangle Lake)	2.0E-07	1.1E-05	1.1E-04	5.9E-07	5.0E-08	3.2E-05	1.7E-05	1.6E-08	2.0E-07	1.3E-07	1.9E-05
R13	Naskapi - Uashat people's camp	2.3E-07	1.3E-05	1.3E-04	6.8E-07	5.9E-08	3.7E-05	1.9E-05	1.8E-08	2.3E-07	1.5E-07	2.3E-05
R16	Innu - Uashat - Mani-Utenam Camp 1	8.1E-07	4.5E-05	4.7E-04	2.4E-06	2.1E-07	1.3E-04	6.9E-05	6.5E-08	8.2E-07	5.5E-07	8.0E-05
R17	Innu - Uashat - Mani-Utenam Camp 2	8.3E-08	4.6E-06	4.8E-05	2.5E-07	2.1E-08	1.3E-05	7.1E-06	6.7E-09	8.4E-08	5.6E-08	8.2E-06
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	1.3E-06	7.2E-05	7.7E-04	3.9E-06	3.4E-07	2.1E-04	1.1E-04	1.1E-07	1.3E-06	8.9E-07	1.3E-04
R20	Innu Cabin 2	4.9E-08	2.7E-06	2.9E-05	1.5E-07	1.3E-08	8.0E-06	4.2E-06	3.9E-09	5.0E-08	3.3E-08	4.9E-06
R24	Irony Mountain	3.1E-07	1.7E-05	1.8E-04	9.2E-07	7.9E-08	5.0E-05	2.6E-05	2.5E-08	3.1E-07	2.1E-07	3.0E-05
R39	Schefferville (Town)	1.9E-08	1.0E-06	1.1E-05	5.6E-08	4.8E-09	3.0E-06	1.6E-06	1.5E-09	1.9E-08	1.3E-08	1.8E-06
R40	TSMC Workers' Camp	2.2E-06	1.2E-04	1.3E-03	6.5E-06	5.6E-07	3.5E-04	1.9E-04	1.8E-07	2.2E-06	1.5E-06	2.2E-04
--	"Off-Property Limit" Maximum - Quebec	7.3E-06	4.0E-04	4.3E-03	2.2E-05	1.9E-06	1.2E-03	6.3E-04	5.9E-07	7.4E-06	5.0E-06	7.3E-04
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	8.5E-06	4.7E-04	5.0E-03	2.6E-05	2.2E-06	1.4E-03	7.3E-04	6.8E-07	8.6E-06	5.8E-06	8.4E-04

HOWSE ONLY

ID	Name	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Lead (Pb)	Mercury (Hg)	Silver (Ag)	Thallium (Tl)	Vanadium (V)
R5	Innu Tent 5 (Rosemary Lake)	5.3E-08	2.9E-06	3.1E-05	1.6E-07	1.4E-08	8.6E-06	4.5E-06	4.3E-09	5.4E-08	3.6E-08	5.3E-06
R7	Innu Tent 1 (Elross Lake)	6.2E-08	3.4E-06	3.6E-05	1.9E-07	1.6E-08	1.0E-05	5.3E-06	5.0E-09	6.3E-08	4.2E-08	6.2E-06
R9	Young Naskapi Camp 7 (Pinette Lake)	9.0E-07	5.0E-05	5.2E-04	2.7E-06	2.3E-07	1.5E-04	7.7E-05	7.2E-08	9.1E-07	6.1E-07	8.9E-05
R10	Young Naskapi Camp 3	4.9E-07	2.7E-05	2.9E-04	1.5E-06	1.3E-07	7.9E-05	4.2E-05	3.9E-08	4.9E-07	3.3E-07	4.8E-05
R11	Young Naskapi Trailer tent (Triangle Lake)	3.7E-07	2.0E-05	2.2E-04	1.1E-06	9.5E-08	6.0E-05	3.1E-05	3.0E-08	3.7E-07	2.5E-07	3.6E-05
R13	Naskapi - Uashat people's camp	5.5E-07	3.1E-05	3.2E-04	1.7E-06	1.4E-07	9.0E-05	4.7E-05	4.4E-08	5.6E-07	3.7E-07	5.5E-05
R16	Innu - Uashat - Mani-Utenam Camp 1	3.4E-07	1.9E-05	2.0E-04	1.0E-06	8.7E-08	5.5E-05	2.9E-05	2.7E-08	3.4E-07	2.3E-07	3.4E-05
R17	Innu - Uashat - Mani-Utenam Camp 2	1.1E-07	6.3E-06	6.6E-05	3.4E-07	2.9E-08	1.8E-05	9.7E-06	9.1E-09	1.1E-07	7.7E-08	1.1E-05
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	1.2E-06	6.4E-05	6.8E-04	3.5E-06	3.0E-07	1.9E-04	9.9E-05	9.3E-08	1.2E-06	7.8E-07	1.1E-04
R20	Innu Cabin 2	4.4E-08	2.4E-06	2.6E-05	1.3E-07	1.1E-08	7.1E-06	3.8E-06	3.5E-09	4.4E-08	3.0E-08	4.4E-06
R24	Irony Mountain	6.8E-07	3.7E-05	4.0E-04	2.0E-06	1.7E-07	1.1E-04	5.8E-05	5.5E-08	6.9E-07	4.6E-07	6.7E-05
R39	Schefferville (Town)	1.5E-08	8.1E-07	8.5E-06	4.4E-08	3.8E-09	2.4E-06	1.2E-06	1.2E-09	1.5E-08	9.9E-09	1.4E-06
R40	TSMC Workers' Camp	1.5E-06	8.1E-05	8.6E-04	4.4E-06	3.8E-07	2.4E-04	1.3E-04	1.2E-07	1.5E-06	1.0E-06	1.5E-04
--	"Off-Property Limit" Maximum - Quebec	2.8E-06	1.5E-04	1.6E-03	8.3E-06	7.1E-07	4.5E-04	2.4E-04	2.2E-07	2.8E-06	1.9E-06	2.7E-04
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	4.1E-06	2.2E-04	2.4E-03	1.2E-05	1.0E-06	6.6E-04	3.5E-04	3.3E-07	4.1E-06	2.8E-06	4.0E-04

- all values in μg/m^3. Red cell indicates above criteria.

Obtained metal concentrations in ambient air by multiplying TPM concentrations by metal fraction obtained from soil material analyses. See Appendix H of Air Quality Report for metal fractions.

Note to reader: Complete table of results for all sensitive receptors and averaging periods are available in Appendix L and Appendix M

Table 3-9 Summary Results – Non-CAC (Metals) – Maximum Annual Concentrations – No Blasts (Continued)

	NO BLASTS										
	AIR QUALITY - METALS FRACTION IN TPM										
Pollutant	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Lead (Pb)	Mercury (Hg)	Silver (Ag)	Thallium (Tl)	Vanadium (V)
Averaging Period	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr	1-yr
Selected Air Quality Assessement Criteria for Howse	**0.17**	**0.003**	**0.05**	**4E-04**	**0.004**	**0.004**	**0.1**	**0.005**	**0.23**	**0.25**	**1**
BACKGROUND CONCENTRATIONS - PRE-DSO3	**0.001**	**0.002**	**0.02**	**0**	**0.0005**	**0.002**	**0.004**	**0.002**	**0.005**	**0.005**	**0.01**

DSO3 + DSO4 + HOWSE

ID	Name	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Lead (Pb)	Mercury (Hg)	Silver (Ag)	Thallium (Tl)	Vanadium (V)
R5	Innu Tent 5 (Rosemary Lake)	1.1E-07	5.9E-06	6.2E-05	3.2E-07	2.7E-08	1.7E-05	9.1E-06	8.5E-09	1.1E-07	7.2E-08	1.1E-05
R7	Innu Tent 1 (Elross Lake)	1.1E-07	6.3E-06	6.7E-05	3.4E-07	3.0E-08	1.9E-05	9.8E-06	9.2E-09	1.2E-07	7.8E-08	1.1E-05
R9	Young Naskapi Camp 7 (Pinette Lake)	1.2E-06	6.8E-05	7.2E-04	3.7E-06	3.2E-07	2.0E-04	1.0E-04	9.9E-08	1.2E-06	8.3E-07	1.2E-04
R10	Young Naskapi Camp 3	7.1E-07	3.9E-05	4.1E-04	2.1E-06	1.8E-07	1.1E-04	6.0E-05	5.7E-08	7.1E-07	4.8E-07	7.0E-05
R11	Young Naskapi Trailer tent (Triangle Lake)	5.5E-07	3.0E-05	3.2E-04	1.7E-06	1.4E-07	8.9E-05	4.7E-05	4.4E-08	5.5E-07	3.7E-07	5.4E-05
R13	Naskapi - Uashat people's camp	7.8E-07	4.3E-05	4.6E-04	2.3E-06	2.0E-07	1.3E-04	6.7E-05	6.3E-08	7.9E-07	5.3E-07	7.7E-05
R16	Innu - Uashat - Mani-Utenam Camp 1	1.1E-06	6.3E-05	6.7E-04	3.4E-06	2.9E-07	1.8E-04	9.7E-05	9.2E-08	1.2E-06	7.7E-07	1.1E-04
R17	Innu - Uashat - Mani-Utenam Camp 2	2.0E-07	1.1E-05	1.1E-04	5.9E-07	5.1E-08	3.2E-05	1.7E-05	1.6E-08	2.0E-07	1.3E-07	1.9E-05
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	2.4E-06	1.3E-04	1.4E-03	7.3E-06	6.3E-07	4.0E-04	2.1E-04	2.0E-07	2.5E-06	1.7E-06	2.4E-04
R20	Innu Cabin 2	9.3E-08	5.1E-06	5.4E-05	2.8E-07	2.4E-08	1.5E-05	7.9E-06	7.5E-09	9.4E-08	6.3E-08	9.2E-06
R24	Irony Mountain	9.9E-07	5.4E-05	5.7E-04	3.0E-06	2.5E-07	1.6E-04	8.4E-05	7.9E-08	9.9E-07	6.7E-07	9.7E-05
R39	Schefferville (Town)	3.3E-08	1.8E-06	1.9E-05	9.9E-08	8.5E-09	5.3E-06	2.8E-06	2.6E-09	3.3E-08	2.2E-08	3.3E-06
R40	TSMC Workers' Camp	3.7E-06	2.0E-04	2.1E-03	1.1E-05	9.4E-07	5.9E-04	3.1E-04	2.9E-07	3.7E-06	2.5E-06	3.6E-04
--	"Off-Property Limit" Maximum - Quebec	8.4E-06	4.6E-04	4.9E-03	2.5E-05	2.2E-06	1.4E-03	7.2E-04	6.8E-07	8.5E-06	5.7E-06	8.3E-04
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	1.1E-05	6.2E-04	6.5E-03	3.3E-05	2.9E-06	1.8E-03	9.5E-04	9.0E-07	1.1E-05	7.5E-06	1.1E-03

ALL: Background + DSO3 + DSO4 + HOWSE

ID	Name	Antimony (Sb)	Arsenic (As)	Barium (Ba)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Lead (Pb)	Mercury (Hg)	Silver (Ag)	Thallium (Tl)	Vanadium (V)
R5	Innu Tent 5 (Rosemary Lake)	1.0E-03	2.0E-03	2.0E-02	3.2E-07	5.0E-04	2.0E-03	4.0E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R7	Innu Tent 1 (Elross Lake)	1.0E-03	2.0E-03	2.0E-02	3.4E-07	5.0E-04	2.0E-03	4.0E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R9	Young Naskapi Camp 7 (Pinette Lake)	1.0E-03	2.1E-03	2.1E-02	3.7E-06	5.0E-04	2.2E-03	4.1E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R10	Young Naskapi Camp 3	1.0E-03	2.0E-03	2.0E-02	2.1E-06	5.0E-04	2.1E-03	4.1E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R11	Young Naskapi Trailer tent (Triangle Lake)	1.0E-03	2.0E-03	2.0E-02	1.7E-06	5.0E-04	2.1E-03	4.0E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R13	Naskapi - Uashat people's camp	1.0E-03	2.0E-03	2.0E-02	2.3E-06	5.0E-04	2.1E-03	4.1E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R16	Innu - Uashat - Mani-Utenam Camp 1	1.0E-03	2.1E-03	2.1E-02	3.4E-06	5.0E-04	2.2E-03	4.1E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R17	Innu - Uashat - Mani-Utenam Camp 2	1.0E-03	2.0E-03	2.0E-02	5.9E-07	5.0E-04	2.0E-03	4.0E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	1.0E-03	2.1E-03	2.1E-02	7.3E-06	5.0E-04	2.4E-03	4.2E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R20	Innu Cabin 2	1.0E-03	2.0E-03	2.0E-02	2.8E-07	5.0E-04	2.0E-03	4.0E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R24	Irony Mountain	1.0E-03	2.1E-03	2.1E-02	3.0E-06	5.0E-04	2.2E-03	4.1E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R39	Schefferville (Town)	1.0E-03	2.0E-03	2.0E-02	9.9E-08	5.0E-04	2.0E-03	4.0E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
R40	TSMC Workers' Camp	1.0E-03	2.2E-03	2.2E-02	1.1E-05	5.0E-04	2.6E-03	4.3E-03	2.0E-03	5.0E-03	5.0E-03	1.0E-02
--	"Off-Property Limit" Maximum - Quebec	1.0E-03	2.5E-03	2.5E-02	2.5E-05	5.0E-04	3.4E-03	4.7E-03	2.0E-03	5.0E-03	5.0E-03	1.1E-02
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	1.0E-03	2.6E-03	2.7E-02	3.3E-05	5.0E-04	3.8E-03	5.0E-03	2.0E-03	5.0E-03	5.0E-03	1.1E-02

- all values in µg/m^3. Red cell indicates above criteria.

Obtained metal concentrations in ambient air by multiplying TPM concentrations by metal fraction obtained from soil material analyses. See Appendix H of Air Quality Report for metal fractions.

Note to reader: Complete table of results for all sensitive receptors and averaging periods are available in Appendix L and Appendix M

Table 3-10 Summary Results – Non-CAC (Metals) – Maximum 24-hr and Monthly Concentrations – With Blasts

WITH BLASTS

		Arsenic (As)	Cadmium (Cd)	Copper (Cu)	Lead (Pb)		Mercury (Hg)	Nickel (Ni)	Vanadium (V)	Zinc (Zn)
	Averaging Period	24-hr	24-hr	24-hr	30-day	24-hr	24-hr	24-hr	24-hr	24-hr
	Selected Air Quality Assessement Criteria for Howse	**0.3**	**0.025**	**2.5**	**0.2**	**0.5**	**2**	**0.014**	**2**	**2.5**
	BACKGROUND CONCENTRATIONS - PRE-DSO3	**0.01**	**0.0025**	**0.2**	**0.0081**	**0.02**	**0.01**	**0.002**	**0.05**	**0.1**

DSO3 + DSO4 ONLY

ID	Description	Arsenic (As)	Cadmium (Cd)	Copper (Cu)	Lead (Pb)		Mercury (Hg)	Nickel (Ni)	Vanadium (V)	Zinc (Zn)
R5	Innu Tent 5 (Rosemary Lake)	7.3E-05	3.4E-07	5.0E-05	9.5E-06	1.1E-04	1.1E-07	5.7E-05	1.3E-04	9.8E-05
R7	Innu Tent 1 (Elross Lake)	6.9E-05	3.2E-07	4.8E-05	1.1E-05	1.1E-04	1.0E-07	5.4E-05	1.2E-04	9.4E-05
R9	Young Naskapi Camp 7 (Pinette Lake)	3.0E-04	1.4E-06	2.1E-04	6.1E-05	4.6E-04	4.3E-07	2.3E-04	5.4E-04	4.0E-04
R10	Young Naskapi Camp 3	1.7E-04	8.1E-07	1.2E-04	3.8E-05	2.7E-04	2.5E-07	1.4E-04	3.1E-04	2.4E-04
R11	Young Naskapi Trailer tent (Triangle Lake)	1.2E-04	5.6E-07	8.2E-05	3.4E-05	1.9E-04	1.7E-07	9.4E-05	2.2E-04	1.6E-04
R13	Naskapi - Uashat people's camp	2.5E-04	1.2E-06	1.7E-04	4.0E-05	3.8E-04	3.6E-07	1.9E-04	4.4E-04	3.3E-04
R16	Innu - Uashat - Mani-Utenam Camp 1	3.4E-04	1.6E-06	2.3E-04	1.4E-04	5.3E-04	5.0E-07	2.7E-04	6.1E-04	4.6E-04
R17	Innu - Uashat - Mani-Utenam Camp 2	6.7E-05	3.1E-07	4.6E-05	1.5E-05	1.0E-04	9.8E-08	5.3E-05	1.2E-04	9.1E-05
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	1.8E-03	8.2E-06	1.2E-03	2.6E-04	2.7E-03	2.6E-06	1.4E-03	3.2E-03	2.4E-03
R20	Innu Cabin 2	8.4E-05	3.9E-07	5.8E-05	1.3E-05	1.3E-04	1.2E-07	6.6E-05	1.5E-04	1.1E-04
R24	Irony Mountain	2.3E-04	1.1E-06	1.5E-04	5.4E-05	3.5E-04	3.3E-07	1.8E-04	4.0E-04	3.1E-04
R39	Schefferville (Town)	2.8E-05	1.3E-07	1.9E-05	4.2E-06	4.3E-05	4.0E-08	2.2E-05	4.9E-05	3.7E-05
R40	TSMC Workers' Camp	4.7E-03	2.2E-05	3.2E-03	5.5E-04	7.2E-03	6.8E-06	3.7E-03	8.4E-03	6.3E-03
--	"Off-Property Limit" Maximum - Quebec	1.0E-02	4.7E-05	7.0E-03	1.6E-03	1.6E-02	1.5E-05	8.0E-03	1.8E-02	1.4E-02
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	5.1E-03	2.4E-05	3.5E-03	1.5E-03	7.9E-03	7.4E-06	4.0E-03	9.1E-03	6.9E-03

HOWSE ONLY

ID	Name	Arsenic (As)	Cadmium (Cd)	Copper (Cu)	Lead (Pb)		Mercury (Hg)	Nickel (Ni)	Vanadium (V)	Zinc (Zn)
R5	Innu Tent 5 (Rosemary Lake)	1.7E-04	8.1E-07	1.2E-04	1.3E-05	2.7E-04	2.5E-07	1.4E-04	3.1E-04	2.3E-04
R7	Innu Tent 1 (Elross Lake)	1.2E-04	5.7E-07	8.5E-05	1.5E-05	1.9E-04	1.8E-07	9.7E-05	2.2E-04	1.7E-04
R9	Young Naskapi Camp 7 (Pinette Lake)	2.0E-03	9.2E-06	1.4E-03	2.1E-04	3.0E-03	2.9E-06	1.6E-03	3.5E-03	2.7E-03
R10	Young Naskapi Camp 3	1.6E-03	7.5E-06	1.1E-03	1.3E-04	2.5E-03	2.3E-06	1.3E-03	2.9E-03	2.2E-03
R11	Young Naskapi Trailer tent (Triangle Lake)	8.5E-04	4.0E-06	5.9E-04	1.1E-04	1.3E-03	1.2E-06	6.7E-04	1.5E-03	1.2E-03
R13	Naskapi - Uashat people's camp	2.2E-03	1.0E-05	1.5E-03	1.2E-04	3.4E-03	3.2E-06	1.7E-03	3.9E-03	3.0E-03
R16	Innu - Uashat - Mani-Utenam Camp 1	7.1E-04	3.3E-06	4.8E-04	7.8E-05	1.1E-03	1.0E-06	5.5E-04	1.3E-03	9.6E-04
R17	Innu - Uashat - Mani-Utenam Camp 2	6.6E-04	3.1E-06	4.5E-04	3.0E-05	1.0E-03	9.6E-07	5.2E-04	1.2E-03	9.0E-04
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	5.8E-04	2.7E-06	4.0E-04	2.1E-04	9.0E-04	8.4E-07	4.6E-04	1.0E-03	7.9E-04
R20	Innu Cabin 2	8.2E-05	3.8E-07	5.6E-05	9.7E-06	1.3E-04	1.2E-07	6.4E-05	1.5E-04	1.1E-04
R24	Irony Mountain	1.6E-03	7.6E-06	1.1E-03	1.5E-04	2.5E-03	2.4E-06	1.3E-03	2.9E-03	2.2E-03
R39	Schefferville (Town)	2.9E-05	1.3E-07	2.0E-05	3.3E-06	4.4E-05	4.2E-08	2.2E-05	5.1E-05	3.9E-05
R40	TSMC Workers' Camp	8.6E-04	4.0E-06	5.9E-04	2.6E-04	1.3E-03	1.3E-06	6.8E-04	1.5E-03	1.2E-03
--	"Off-Property Limit" Maximum - Quebec	2.6E-03	1.2E-05	1.8E-03	4.9E-04	4.1E-03	3.8E-06	2.1E-03	4.7E-03	3.6E-03
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	5.9E-03	2.8E-05	4.1E-03	7.9E-04	9.2E-03	8.7E-06	4.7E-03	1.1E-02	8.1E-03

- all values in μg/m^3. Red cell indicates above criteria.

Obtained metal concentrations in ambient air by multiplying TPM concentrations by metal fraction obtained from soil material analyses. See Appendix H of Air Quality Report for metal fractions.

Note to reader: Complete table of results for all sensitive receptors and averaging periods are available in Appendix L and Appendix M

Table 3-10 Summary Results – Non-CAC (Metals) – Maximum 24-hr and Monthly Concentrations – With Blasts (Continued)

WITH BLASTS

Pollutant	Arsenic (As)	Cadmium (Cd)	Copper (Cu)	Lead (Pb)		Mercury (Hg)	Nickel (Ni)	Vanadium (V)	Zinc (Zn)
Averaging Period	24-hr	24-hr	24-hr	30-day	24-hr	24-hr	24-hr	24-hr	24-hr
Selected Air Quality Assessement Criteria for Howse	**0.3**	**0.025**	**2.5**	**0.2**	**0.5**	**2**	**0.014**	**2**	**2.5**
BACKGROUND CONCENTRATIONS - PRE-DSO3	**0.01**	**0.0025**	**0.2**	**0.0081**	**0.02**	**0.01**	**0.002**	**0.05**	**0.1**

DSO3 + DSO4 + HOWSE

ID	Name	Arsenic (As)	Cadmium (Cd)	Copper (Cu)	Lead (Pb)		Mercury (Hg)	Nickel (Ni)	Vanadium (V)	Zinc (Zn)
R5	Innu Tent 5 (Rosemary Lake)	2.0E-04	9.2E-07	1.4E-04	2.1E-05	3.0E-04	2.9E-07	1.5E-04	3.5E-04	2.7E-04
R7	Innu Tent 1 (Elross Lake)	1.2E-04	5.8E-07	8.5E-05	2.5E-05	1.9E-04	1.8E-07	9.8E-05	2.2E-04	1.7E-04
R9	Young Naskapi Camp 7 (Pinette Lake)	2.0E-03	9.2E-06	1.4E-03	2.6E-04	3.0E-03	2.9E-06	1.6E-03	3.5E-03	2.7E-03
R10	Young Naskapi Camp 3	1.7E-03	7.8E-06	1.2E-03	1.6E-04	2.6E-03	2.4E-06	1.3E-03	3.0E-03	2.3E-03
R11	Young Naskapi Trailer tent (Triangle Lake)	8.7E-04	4.1E-06	6.0E-04	1.4E-04	1.4E-03	1.3E-06	6.9E-04	1.6E-03	1.2E-03
R13	Naskapi - Uashat people's camp	2.3E-03	1.1E-05	1.6E-03	1.6E-04	3.5E-03	3.3E-06	1.8E-03	4.1E-03	3.1E-03
R16	Innu - Uashat - Mani-Utenam Camp 1	7.1E-04	3.3E-06	4.9E-04	2.2E-04	1.1E-03	1.0E-06	5.6E-04	1.3E-03	9.7E-04
R17	Innu - Uashat - Mani-Utenam Camp 2	7.1E-04	3.3E-06	4.9E-04	4.3E-05	1.1E-03	1.0E-06	5.6E-04	1.3E-03	9.7E-04
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	1.8E-03	8.3E-06	1.2E-03	4.6E-04	2.7E-03	2.6E-06	1.4E-03	3.2E-03	2.4E-03
R20	Innu Cabin 2	1.4E-04	6.7E-07	9.9E-05	2.3E-05	2.2E-04	2.1E-07	1.1E-04	2.6E-04	1.9E-04
R24	Irony Mountain	1.6E-03	7.6E-06	1.1E-03	2.0E-04	2.5E-03	2.4E-06	1.3E-03	2.9E-03	2.2E-03
R39	Schefferville (Town)	5.6E-05	2.6E-07	3.8E-05	7.4E-06	8.6E-05	8.1E-08	4.4E-05	1.0E-04	7.5E-05
R40	TSMC Workers' Camp	4.7E-03	2.2E-05	3.2E-03	7.7E-04	7.2E-03	6.8E-06	3.7E-03	8.4E-03	6.3E-03
--	"Off-Property Limit" Maximum - Quebec	1.0E-02	4.7E-05	7.0E-03	1.7E-03	1.6E-02	1.5E-05	8.0E-03	1.8E-02	1.4E-02
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	7.0E-03	3.3E-05	4.8E-03	1.9E-03	1.1E-02	1.0E-05	5.5E-03	1.3E-02	9.4E-03

ALL: Background + DSO3 + DSO4 + HOWSE

ID	Name	Arsenic (As)	Cadmium (Cd)	Copper (Cu)	Lead (Pb)		Mercury (Hg)	Nickel (Ni)	Vanadium (V)	Zinc (Zn)
R5	Innu Tent 5 (Rosemary Lake)	1.0E-02	2.5E-03	2.0E-01	8.1E-03	2.0E-02	1.0E-02	2.2E-03	5.0E-02	1.0E-01
R7	Innu Tent 1 (Elross Lake)	1.0E-02	2.5E-03	2.0E-01	8.1E-03	2.0E-02	1.0E-02	2.1E-03	5.0E-02	1.0E-01
R9	Young Naskapi Camp 7 (Pinette Lake)	1.2E-02	2.5E-03	2.0E-01	8.3E-03	2.3E-02	1.0E-02	3.6E-03	5.4E-02	1.0E-01
R10	Young Naskapi Camp 3	1.2E-02	2.5E-03	2.0E-01	8.2E-03	2.3E-02	1.0E-02	3.3E-03	5.3E-02	1.0E-01
R11	Young Naskapi Trailer tent (Triangle Lake)	1.1E-02	2.5E-03	2.0E-01	8.2E-03	2.1E-02	1.0E-02	2.7E-03	5.2E-02	1.0E-01
R13	Naskapi - Uashat people's camp	1.2E-02	2.5E-03	2.0E-01	8.2E-03	2.4E-02	1.0E-02	3.8E-03	5.4E-02	1.0E-01
R16	Innu - Uashat - Mani-Utenam Camp 1	1.1E-02	2.5E-03	2.0E-01	8.3E-03	2.1E-02	1.0E-02	2.6E-03	5.1E-02	1.0E-01
R17	Innu - Uashat - Mani-Utenam Camp 2	1.1E-02	2.5E-03	2.0E-01	8.1E-03	2.1E-02	1.0E-02	2.6E-03	5.1E-02	1.0E-01
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	1.2E-02	2.5E-03	2.0E-01	8.5E-03	2.3E-02	1.0E-02	3.4E-03	5.3E-02	1.0E-01
R20	Innu Cabin 2	1.0E-02	2.5E-03	2.0E-01	8.1E-03	2.0E-02	1.0E-02	2.1E-03	5.0E-02	1.0E-01
R24	Irony Mountain	1.2E-02	2.5E-03	2.0E-01	8.3E-03	2.3E-02	1.0E-02	3.3E-03	5.3E-02	1.0E-01
R39	Schefferville (Town)	1.0E-02	2.5E-03	2.0E-01	8.1E-03	2.0E-02	1.0E-02	2.0E-03	5.0E-02	1.0E-01
R40	TSMC Workers' Camp	1.5E-02	2.5E-03	2.0E-01	8.8E-03	2.7E-02	1.0E-02	5.7E-03	5.8E-02	1.1E-01
--	"Off-Property Limit" Maximum - Quebec	2.0E-02	2.5E-03	2.1E-01	9.8E-03	3.6E-02	1.0E-02	1.0E-02	6.8E-02	1.1E-01
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	1.7E-02	2.5E-03	2.0E-01	1.0E-02	3.1E-02	1.0E-02	7.5E-03	6.3E-02	1.1E-01

- all values in µg/m^3. Red cell indicates above criteria.

Obtained metal concentrations in ambient air by multiplying TPM concentrations by metal fraction obtained from soil material analyses. See Appendix H of Air Quality Report for metal fractions.

Note to reader: Complete table of results for all sensitive receptors and averaging periods are available in Appendix L and Appendix M

Table 3-11 Summary Results – Non-CAC (Metals) – Maximum 24-hr and Monthly Concentrations – No Blasts

NO BLASTS

Pollutant	Arsenic (As)	Cadmium (Cd)	Copper (Cu)	Lead (Pb)		Mercury (Hg)	Nickel (Ni)	Vanadium (V)	Zinc (Zn)
Averaging Period	24-hr	24-hr	24-hr	30-day	24-hr	24-hr	24-hr	24-hr	24-hr
Selected Air Quality Assessement Criteria for Howse	**0.3**	**0.025**	**2.5**	**0.2**	**0.5**	**2**	**0.014**	**2**	**2.5**
BACKGROUND CONCENTRATIONS - PRE-DSO3	**0.01**	**0.0025**	**0.2**	**0.0081**	**0.02**	**0.01**	**0.002**	**0.05**	**0.1**

DSO3 + DSO4 ONLY

ID	Description	Arsenic (As)	Cadmium (Cd)	Copper (Cu)	Lead (Pb)		Mercury (Hg)	Nickel (Ni)	Vanadium (V)	Zinc (Zn)
R5	Innu Tent 5 (Rosemary Lake)	7.3E-05	3.4E-07	5.0E-05	9.3E-06	1.1E-04	1.1E-07	5.7E-05	1.3E-04	9.8E-05
R7	Innu Tent 1 (Elross Lake)	4.8E-05	2.2E-07	3.3E-05	9.1E-06	7.4E-05	7.0E-08	3.8E-05	8.6E-05	6.5E-05
R9	Young Naskapi Camp 7 (Pinette Lake)	3.0E-04	1.4E-06	2.1E-04	5.9E-05	4.6E-04	4.3E-07	2.3E-04	5.4E-04	4.0E-04
R10	Young Naskapi Camp 3	1.7E-04	8.0E-07	1.2E-04	3.8E-05	2.7E-04	2.5E-07	1.4E-04	3.1E-04	2.3E-04
R11	Young Naskapi Trailer tent (Triangle Lake)	1.2E-04	5.6E-07	8.2E-05	3.3E-05	1.9E-04	1.7E-07	9.4E-05	2.2E-04	1.6E-04
R13	Naskapi - Uashat people's camp	2.5E-04	1.1E-06	1.7E-04	3.9E-05	3.8E-04	3.6E-07	1.9E-04	4.4E-04	3.3E-04
R16	Innu - Uashat - Mani-Utenam Camp 1	3.4E-04	1.6E-06	2.3E-04	1.4E-04	5.3E-04	5.0E-07	2.7E-04	6.1E-04	4.6E-04
R17	Innu - Uashat - Mani-Utenam Camp 2	6.6E-05	3.1E-07	4.5E-05	1.4E-05	1.0E-04	9.6E-08	5.2E-05	1.2E-04	9.0E-05
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	5.6E-04	2.6E-06	3.9E-04	2.3E-04	8.7E-04	8.2E-07	4.4E-04	1.0E-03	7.6E-04
R20	Innu Cabin 2	5.1E-05	2.4E-07	3.5E-05	8.4E-06	7.8E-05	7.4E-08	4.0E-05	9.1E-05	6.9E-05
R24	Irony Mountain	2.3E-04	1.1E-06	1.5E-04	5.3E-05	3.5E-04	3.3E-07	1.8E-04	4.0E-04	3.1E-04
R39	Schefferville (Town)	2.5E-05	1.2E-07	1.7E-05	3.2E-06	3.9E-05	3.7E-08	2.0E-05	4.5E-05	3.4E-05
R40	TSMC Workers' Camp	9.7E-04	4.5E-06	6.7E-04	3.7E-04	1.5E-03	1.4E-06	7.6E-04	1.7E-03	1.3E-03
--	"Off-Property Limit" Maximum - Quebec	3.9E-03	1.8E-05	2.7E-03	1.3E-03	6.1E-03	5.7E-06	3.1E-03	7.1E-03	5.3E-03
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	5.1E-03	2.4E-05	3.5E-03	1.5E-03	7.9E-03	7.4E-06	4.0E-03	9.1E-03	6.9E-03

HOWSE ONLY

ID	Name	Arsenic (As)	Cadmium (Cd)	Copper (Cu)	Lead (Pb)		Mercury (Hg)	Nickel (Ni)	Vanadium (V)	Zinc (Zn)
R5	Innu Tent 5 (Rosemary Lake)	8.9E-05	4.2E-07	6.1E-05	9.1E-06	1.4E-04	1.3E-07	7.0E-05	1.6E-04	1.2E-04
R7	Innu Tent 1 (Elross Lake)	6.0E-05	2.8E-07	4.1E-05	1.1E-05	9.3E-05	8.7E-08	4.7E-05	1.1E-04	8.1E-05
R9	Young Naskapi Camp 7 (Pinette Lake)	4.4E-04	2.1E-06	3.1E-04	1.5E-04	6.9E-04	6.5E-07	3.5E-04	8.0E-04	6.0E-04
R10	Young Naskapi Camp 3	5.2E-04	2.4E-06	3.5E-04	8.4E-05	8.0E-04	7.5E-07	4.1E-04	9.2E-04	7.0E-04
R11	Young Naskapi Trailer tent (Triangle Lake)	2.8E-04	1.3E-06	2.0E-04	6.3E-05	4.4E-04	4.1E-07	2.2E-04	5.1E-04	3.9E-04
R13	Naskapi - Uashat people's camp	7.2E-04	3.3E-06	4.9E-04	9.5E-05	1.1E-03	1.0E-06	5.6E-04	1.3E-03	9.7E-04
R16	Innu - Uashat - Mani-Utenam Camp 1	2.1E-04	9.6E-07	1.4E-04	5.8E-05	3.2E-04	3.0E-07	1.6E-04	3.7E-04	2.8E-04
R17	Innu - Uashat - Mani-Utenam Camp 2	1.6E-04	7.6E-07	1.1E-04	1.9E-05	2.5E-04	2.4E-07	1.3E-04	2.9E-04	2.2E-04
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	5.7E-04	2.7E-06	3.9E-04	2.0E-04	8.8E-04	8.3E-07	4.5E-04	1.0E-03	7.7E-04
R20	Innu Cabin 2	8.0E-05	3.7E-07	5.5E-05	7.6E-06	1.2E-04	1.2E-07	6.3E-05	1.4E-04	1.1E-04
R24	Irony Mountain	6.0E-04	2.8E-06	4.1E-04	1.2E-04	9.3E-04	8.8E-07	4.7E-04	1.1E-03	8.2E-04
R39	Schefferville (Town)	2.8E-05	1.3E-07	1.9E-05	2.5E-06	4.3E-05	4.0E-08	2.2E-05	5.0E-05	3.7E-05
R40	TSMC Workers' Camp	8.5E-04	4.0E-06	5.9E-04	2.5E-04	1.3E-03	1.2E-06	6.7E-04	1.5E-03	1.2E-03
--	"Off-Property Limit" Maximum - Quebec	2.6E-03	1.2E-05	1.8E-03	4.8E-04	4.0E-03	3.8E-06	2.1E-03	4.7E-03	3.5E-03
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	4.0E-03	1.9E-05	2.7E-03	7.0E-04	6.1E-03	5.8E-06	3.1E-03	7.1E-03	5.4E-03

- all values in μg/m^3. Red cell indicates above criteria.

Obtained metal concentrations in ambient air by multiplying TPM concentrations by metal fraction obtained from soil material analyses. See Appendix H of Air Quality Report for metal fractions.

Note to reader: Complete table of results for all sensitive receptors and averaging periods are available in Appendix L and Appendix M

Table 3-11 Summary Results – Non-CAC (Metals) – Maximum 24-hr and Monthly Concentrations – No Blasts (Continued)

NO BLASTS

Pollutant	Arsenic (As)	Cadmium (Cd)	Copper (Cu)	Lead (Pb)		Mercury (Hg)	Nickel (Ni)	Vanadium (V)	Zinc (Zn)
Averaging Period	24-hr	24-hr	24-hr	30-day	24-hr	24-hr	24-hr	24-hr	24-hr
Selected Air Quality Assessement Criteria for Howse	**0.3**	**0.025**	**2.5**	**0.2**	**0.5**	**2**	**0.014**	**2**	**2.5**
BACKGROUND CONCENTRATIONS - PRE-DSO3	**0.01**	**0.0025**	**0.2**	**0.0081**	**0.02**	**0.01**	**0.002**	**0.05**	**0.1**

DSO3 + DSO4 + HOWSE

ID	Name	Arsenic (As)	Cadmium (Cd)	Copper (Cu)	Lead (Pb)		Mercury (Hg)	Nickel (Ni)	Vanadium (V)	Zinc (Zn)
R5	Innu Tent 5 (Rosemary Lake)	1.2E-04	5.7E-07	8.4E-05	1.8E-05	1.9E-04	1.8E-07	9.6E-05	2.2E-04	1.6E-04
R7	Innu Tent 1 (Elross Lake)	1.0E-04	4.8E-07	7.1E-05	2.0E-05	1.6E-04	1.5E-07	8.1E-05	1.8E-04	1.4E-04
R9	Young Naskapi Camp 7 (Pinette Lake)	5.9E-04	2.8E-06	4.1E-04	2.1E-04	9.2E-04	8.6E-07	4.7E-04	1.1E-03	8.0E-04
R10	Young Naskapi Camp 3	5.9E-04	2.7E-06	4.0E-04	1.2E-04	9.1E-04	8.6E-07	4.6E-04	1.1E-03	8.0E-04
R11	Young Naskapi Trailer tent (Triangle Lake)	3.6E-04	1.7E-06	2.5E-04	9.4E-05	5.5E-04	5.2E-07	2.8E-04	6.4E-04	4.9E-04
R13	Naskapi - Uashat people's camp	7.8E-04	3.6E-06	5.3E-04	1.3E-04	1.2E-03	1.1E-06	6.1E-04	1.4E-03	1.1E-03
R16	Innu - Uashat - Mani-Utenam Camp 1	4.3E-04	2.0E-06	3.0E-04	2.0E-04	6.6E-04	6.3E-07	3.4E-04	7.7E-04	5.8E-04
R17	Innu - Uashat - Mani-Utenam Camp 2	2.0E-04	9.2E-07	1.4E-04	3.4E-05	3.1E-04	2.9E-07	1.6E-04	3.6E-04	2.7E-04
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	1.1E-03	5.0E-06	7.4E-04	4.2E-04	1.7E-03	1.6E-06	8.4E-04	1.9E-03	1.4E-03
R20	Innu Cabin 2	1.3E-04	6.1E-07	9.0E-05	1.6E-05	2.0E-04	1.9E-07	1.0E-04	2.3E-04	1.8E-04
R24	Irony Mountain	7.8E-04	3.7E-06	5.4E-04	1.7E-04	1.2E-03	1.1E-06	6.2E-04	1.4E-03	1.1E-03
R39	Schefferville (Town)	5.2E-05	2.4E-07	3.6E-05	5.6E-06	8.1E-05	7.6E-08	4.1E-05	9.4E-05	7.1E-05
R40	TSMC Workers' Camp	1.6E-03	7.6E-06	1.1E-03	6.3E-04	2.5E-03	2.4E-06	1.3E-03	2.9E-03	2.2E-03
--	"Off-Property Limit" Maximum - Quebec	4.2E-03	2.0E-05	2.9E-03	1.4E-03	6.5E-03	6.1E-06	3.3E-03	7.6E-03	5.7E-03
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	6.9E-03	3.2E-05	4.8E-03	1.9E-03	1.1E-02	1.0E-05	5.5E-03	1.2E-02	9.4E-03

ALL: Background + DSO3 + DSO4 + HOWSE

ID	Name	Arsenic (As)	Cadmium (Cd)	Copper (Cu)	Lead (Pb)		Mercury (Hg)	Nickel (Ni)	Vanadium (V)	Zinc (Zn)
R5	Innu Tent 5 (Rosemary Lake)	1.0E-02	2.5E-03	2.0E-01	8.1E-03	2.0E-02	1.0E-02	2.1E-03	5.0E-02	1.0E-01
R7	Innu Tent 1 (Elross Lake)	1.0E-02	2.5E-03	2.0E-01	8.1E-03	2.0E-02	1.0E-02	2.1E-03	5.0E-02	1.0E-01
R9	Young Naskapi Camp 7 (Pinette Lake)	1.1E-02	2.5E-03	2.0E-01	8.3E-03	2.1E-02	1.0E-02	2.5E-03	5.1E-02	1.0E-01
R10	Young Naskapi Camp 3	1.1E-02	2.5E-03	2.0E-01	8.2E-03	2.1E-02	1.0E-02	2.5E-03	5.1E-02	1.0E-01
R11	Young Naskapi Trailer tent (Triangle Lake)	1.0E-02	2.5E-03	2.0E-01	8.1E-03	2.1E-02	1.0E-02	2.3E-03	5.1E-02	1.0E-01
R13	Naskapi - Uashat people's camp	1.1E-02	2.5E-03	2.0E-01	8.2E-03	2.1E-02	1.0E-02	2.6E-03	5.1E-02	1.0E-01
R16	Innu - Uashat - Mani-Utenam Camp 1	1.0E-02	2.5E-03	2.0E-01	8.2E-03	2.1E-02	1.0E-02	2.3E-03	5.1E-02	1.0E-01
R17	Innu - Uashat - Mani-Utenam Camp 2	1.0E-02	2.5E-03	2.0E-01	8.1E-03	2.0E-02	1.0E-02	2.2E-03	5.0E-02	1.0E-01
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	1.1E-02	2.5E-03	2.0E-01	8.5E-03	2.2E-02	1.0E-02	2.8E-03	5.2E-02	1.0E-01
R20	Innu Cabin 2	1.0E-02	2.5E-03	2.0E-01	8.1E-03	2.0E-02	1.0E-02	2.1E-03	5.0E-02	1.0E-01
R24	Irony Mountain	1.1E-02	2.5E-03	2.0E-01	8.2E-03	2.1E-02	1.0E-02	2.6E-03	5.1E-02	1.0E-01
R39	Schefferville (Town)	1.0E-02	2.5E-03	2.0E-01	8.1E-03	2.0E-02	1.0E-02	2.0E-03	5.0E-02	1.0E-01
R40	TSMC Workers' Camp	1.2E-02	2.5E-03	2.0E-01	8.7E-03	2.3E-02	1.0E-02	3.3E-03	5.3E-02	1.0E-01
--	"Off-Property Limit" Maximum - Quebec	1.4E-02	2.5E-03	2.0E-01	9.5E-03	2.7E-02	1.0E-02	5.3E-03	5.8E-02	1.1E-01
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	1.7E-02	2.5E-03	2.0E-01	1.0E-02	3.1E-02	1.0E-02	7.5E-03	6.2E-02	1.1E-01

- all values in μg/m^3. Red cell indicates above criteria.

Obtained metal concentrations in ambient air by multiplying TPM concentrations by metal fraction obtained from soil material analyses. See Appendix H of Air Quality Report for metal fractions.

Note to reader: Complete table of results for all sensitive receptors and averaging periods are available in Appendix L and Appendix M

Table 3-12 Summary Results – Non-CAC (VOC) – Maximum 24-hr and Monthly Concentrations – With Blasts/No Blasts

WITH BLASTS & NO BLASTS

Pollutant	Benzene	1,3-Butadiene		Formaldehyde	Acetaldehyde	Acrolein
Averaging Period	24-hr	1-yr	24-hr	24-hr	24-hr	24-hr
Selected Air Quality Assessement Criteria for Howse	**2.3**	**0.3**	**10**	**6.5**	**500**	**0.4**
BACKGROUND CONCENTRATIONS - PRE-DSO3	**0**	**0.27**	**1.4**	**0.5**	**0**	**0**

DSO3 + DSO4 ONLY

ID	Description	Benzene	1,3-Butadiene		Formaldehyde	Acetaldehyde	Acrolein
R5	Innu Tent 5 (Rosemary Lake)	3.8E-03	1.0E-05	2.2E-04	6.4E-02	2.0E-02	6.9E-03
R7	Innu Tent 1 (Elross Lake)	5.8E-03	1.4E-05	3.4E-04	9.8E-02	3.1E-02	1.1E-02
R9	Young Naskapi Camp 7 (Pinette Lake)	3.0E-02	6.6E-05	1.8E-03	5.1E-01	1.6E-01	5.5E-02
R10	Young Naskapi Camp 3	1.0E-02	2.7E-05	6.0E-04	1.7E-01	5.4E-02	1.9E-02
R11	Young Naskapi Trailer tent (Triangle Lake)	1.0E-02	2.5E-05	6.1E-04	1.7E-01	5.5E-02	1.9E-02
R13	Naskapi - Uashat people's camp	1.0E-02	3.0E-05	6.1E-04	1.7E-01	5.5E-02	1.9E-02
R16	Innu - Uashat - Mani-Utenam Camp 1	1.3E-02	8.6E-05	7.5E-04	2.1E-01	6.7E-02	2.3E-02
R17	Innu - Uashat - Mani-Utenam Camp 2	3.5E-03	1.3E-05	2.1E-04	5.9E-02	1.9E-02	6.4E-03
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	7.5E-02	3.8E-04	4.5E-03	1.3E+00	4.0E-01	1.4E-01
R20	Innu Cabin 2	4.5E-03	1.6E-05	2.7E-04	7.6E-02	2.4E-02	8.3E-03
R24	Irony Mountain	2.5E-02	6.3E-05	1.5E-03	4.2E-01	1.3E-01	4.6E-02
R39	Schefferville (Town)	2.4E-03	6.6E-06	1.4E-04	4.1E-02	1.3E-02	4.5E-03
R40	TSMC Workers' Camp	1.4E-01	8.9E-04	8.5E-03	2.4E+00	7.7E-01	2.6E-01
--	"Off-Property Limit" Maximum - Quebec	1.7E-01	8.1E-04	1.0E-02	2.9E+00	9.1E-01	3.1E-01
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	1.3E-01	9.6E-04	7.5E-03	2.1E+00	6.7E-01	2.3E-01

HOWSE ONLY

ID	Name	Benzene	1,3-Butadiene		Formaldehyde	Acetaldehyde	Acrolein
R5	Innu Tent 5 (Rosemary Lake)	3.0E-03	6.8E-06	1.8E-04	5.1E-02	1.6E-02	5.6E-03
R7	Innu Tent 1 (Elross Lake)	1.7E-03	6.7E-06	9.9E-05	2.8E-02	8.9E-03	3.1E-03
R9	Young Naskapi Camp 7 (Pinette Lake)	1.7E-02	8.1E-05	1.0E-03	2.9E-01	9.3E-02	3.2E-02
R10	Young Naskapi Camp 3	1.5E-02	5.9E-05	8.7E-04	2.5E-01	7.8E-02	2.7E-02
R11	Young Naskapi Trailer tent (Triangle Lake)	1.2E-02	3.6E-05	6.9E-04	2.0E-01	6.3E-02	2.2E-02
R13	Naskapi - Uashat people's camp	2.4E-02	7.3E-05	1.4E-03	4.1E-01	1.3E-01	4.4E-02
R16	Innu - Uashat - Mani-Utenam Camp 1	7.4E-03	3.7E-05	4.4E-04	1.2E-01	4.0E-02	1.4E-02
R17	Innu - Uashat - Mani-Utenam Camp 2	7.8E-03	1.8E-05	4.7E-04	1.3E-01	4.2E-02	1.4E-02
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	3.7E-02	1.1E-04	2.2E-03	6.2E-01	2.0E-01	6.8E-02
R20	Innu Cabin 2	2.0E-03	5.6E-06	1.2E-04	3.4E-02	1.1E-02	3.7E-03
R24	Irony Mountain	2.2E-02	8.1E-05	1.3E-03	3.7E-01	1.2E-01	4.0E-02
R39	Schefferville (Town)	9.1E-04	2.2E-06	5.4E-05	1.5E-02	4.9E-03	1.7E-03
R40	TSMC Workers' Camp	2.8E-02	1.1E-04	1.6E-03	4.7E-01	1.5E-01	5.1E-02
--	"Off-Property Limit" Maximum - Quebec	7.6E-02	2.4E-04	4.5E-03	1.3E+00	4.1E-01	1.4E-01
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	1.5E-01	4.5E-04	8.9E-03	2.5E+00	8.0E-01	2.8E-01

- all values in μg/m^3. Red cell indicates above criteria.

Obtained VOC concentrations in ambient air by multiplying HC concentrations by specific COV fraction obtained from EPA MOVES. See Appendix I.

Note to reader: Complete table of results for all sensitive receptors and averaging periods are available in Appendix L and Appendix M

Table 3-12 Summary Results – Non-CAC (VOC) – Maximum 24-hr and Monthly Concentrations – With Blasts/No Blasts (Continued)

	WITH BLASTS & NO BLASTS					
	VOLATIL ORGANIC COUMPOUNDS					
Pollutant	Benzene	1,3-Butadiene		Formaldehyde	Acetaldehyde	Acrolein
Averaging Period	24-hr	1-yr	24-hr	24-hr	24-hr	24-hr
Selected Air Quality Assessement Criteria for Howse	**2.3**	**0.3**	**10**	**6.5**	**500**	**0.4**
BACKGROUND CONCENTRATIONS - PRE-DSO3	**0**	**0.27**	**1.4**	**0.5**	**0**	**0**

DSO3 + DSO4 + HOWSE

ID	Name	Benzene	1,3-Butadiene		Formaldehyde	Acetaldehyde	Acrolein
R5	Innu Tent 5 (Rosemary Lake)	6.8E-03	1.7E-05	4.0E-04	1.1E-01	3.6E-02	1.3E-02
R7	Innu Tent 1 (Elross Lake)	5.9E-03	2.0E-05	3.5E-04	1.0E-01	3.2E-02	1.1E-02
R9	Young Naskapi Camp 7 (Pinette Lake)	3.0E-02	1.5E-04	1.8E-03	5.1E-01	1.6E-01	5.5E-02
R10	Young Naskapi Camp 3	2.3E-02	8.7E-05	1.4E-03	3.9E-01	1.2E-01	4.2E-02
R11	Young Naskapi Trailer tent (Triangle Lake)	1.6E-02	6.1E-05	9.6E-04	2.7E-01	8.7E-02	3.0E-02
R13	Naskapi - Uashat people's camp	2.6E-02	1.0E-04	1.5E-03	4.4E-01	1.4E-01	4.8E-02
R16	Innu - Uashat - Mani-Utenam Camp 1	1.3E-02	1.2E-04	7.5E-04	2.1E-01	6.7E-02	2.3E-02
R17	Innu - Uashat - Mani-Utenam Camp 2	9.3E-03	3.1E-05	5.6E-04	1.6E-01	5.0E-02	1.7E-02
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	7.5E-02	5.0E-04	4.5E-03	1.3E+00	4.0E-01	1.4E-01
R20	Innu Cabin 2	4.9E-03	2.1E-05	2.9E-04	8.3E-02	2.6E-02	9.0E-03
R24	Irony Mountain	3.2E-02	1.4E-04	1.9E-03	5.5E-01	1.7E-01	6.0E-02
R39	Schefferville (Town)	2.6E-03	8.7E-06	1.5E-04	4.3E-02	1.4E-02	4.7E-03
R40	TSMC Workers' Camp	1.5E-01	9.8E-04	8.7E-03	2.5E+00	7.8E-01	2.7E-01
--	"Off-Property Limit" Maximum - Quebec	1.7E-01	8.5E-04	1.0E-02	2.9E+00	9.1E-01	3.1E-01
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	1.5E-01	1.1E-03	9.2E-03	2.6E+00	8.2E-01	2.8E-01

ALL: Background + DSO3 + DSO4 + HOWSE

ID	Name	Benzene	1,3-Butadiene		Formaldehyde	Acetaldehyde	Acrolein
R5	Innu Tent 5 (Rosemary Lake)	6.8E-03	2.7E-01	1.4E+00	6.1E-01	3.6E-02	1.3E-02
R7	Innu Tent 1 (Elross Lake)	5.9E-03	2.7E-01	1.4E+00	6.0E-01	3.2E-02	1.1E-02
R9	Young Naskapi Camp 7 (Pinette Lake)	3.0E-02	2.7E-01	1.4E+00	1.0E+00	1.6E-01	5.5E-02
R10	Young Naskapi Camp 3	2.3E-02	2.7E-01	1.4E+00	8.9E-01	1.2E-01	4.2E-02
R11	Young Naskapi Trailer tent (Triangle Lake)	1.6E-02	2.7E-01	1.4E+00	7.7E-01	8.7E-02	3.0E-02
R13	Naskapi - Uashat people's camp	2.6E-02	2.7E-01	1.4E+00	9.4E-01	1.4E-01	4.8E-02
R16	Innu - Uashat - Mani-Utenam Camp 1	1.3E-02	2.7E-01	1.4E+00	7.1E-01	6.7E-02	2.3E-02
R17	Innu - Uashat - Mani-Utenam Camp 2	9.3E-03	2.7E-01	1.4E+00	6.6E-01	5.0E-02	1.7E-02
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	7.5E-02	2.7E-01	1.4E+00	1.8E+00	4.0E-01	1.4E-01
R20	Innu Cabin 2	4.9E-03	2.7E-01	1.4E+00	5.8E-01	2.6E-02	9.0E-03
R24	Irony Mountain	3.2E-02	2.7E-01	1.4E+00	1.0E+00	1.7E-01	6.0E-02
R39	Schefferville (Town)	2.6E-03	2.7E-01	1.4E+00	5.4E-01	1.4E-02	4.7E-03
R40	TSMC Workers' Camp	1.5E-01	2.7E-01	1.4E+00	3.0E+00	7.8E-01	2.7E-01
--	"Off-Property Limit" Maximum - Quebec	1.7E-01	2.7E-01	1.4E+00	3.4E+00	9.1E-01	3.1E-01
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	1.5E-01	2.7E-01	1.4E+00	3.1E+00	8.2E-01	2.8E-01

- all values in μg/m^3. Red cell indicates above criteria.

Obtained VOC concentrations in ambient air by multiplying HC concentrations by specific COV fraction obtained from EPA MOVES. See Appendix I.

Note to reader: Complete table of results for all sensitive receptors and averaging periods are available in Appendix L and Appendix M

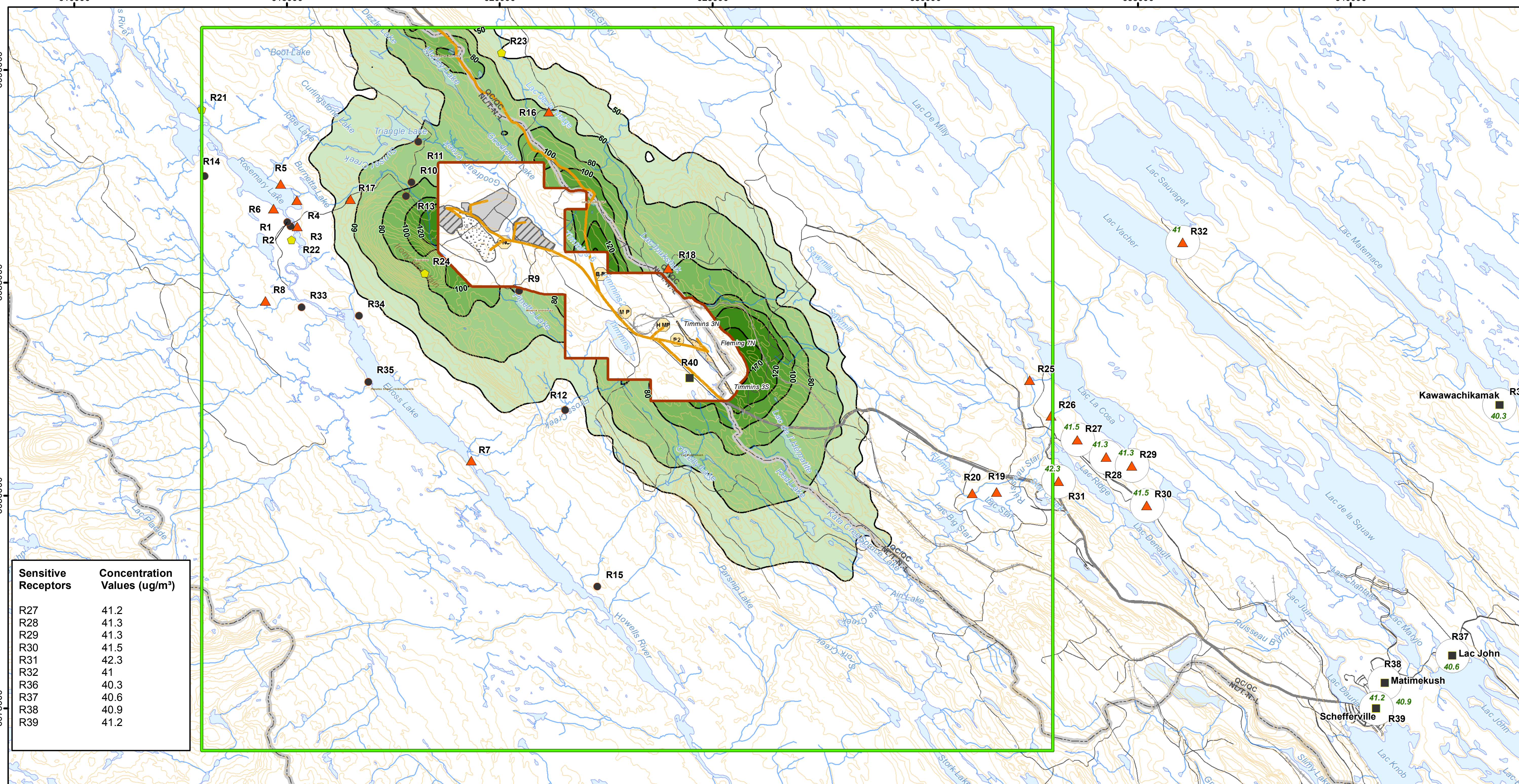
3.6 Isocentrations Contour Plots and Figures

In this section, for air pollutants having predicted maximum concentrations that exceed the applicable Project Air Quality Assessment Criteria, concentrations are presented in graphical format, eg. isoconcentrations contour plots.

It is important to note that the maximum predicted concentrations shown on the contour plots represent the single highest concentration predicted to occur at each location, at any time during the 5-year assessment period, and include background concentrations. Therefore, the contours shown do not represent a snapshot in time as these maxima may occur on different days, under different meteorological conditions. It should also be emphasized that the model results are based on the conservative emissions scenario described in Section 2.3.2 which assumes that all sites within the LSA (DSO3, DSO4 and Howse) operate at their maximum capacities over the entire 5 year meteorological assessment period. Therefore, the results presented below are expected to be lower than those predicted by the model.

Results are also shown for 10 sensitive receptors which are outside of the local study area, and so have no contour plots but have otherwise been included in the modelling process. Their values are shown and represented in a manner that corresponds with the figure legend.

Also, Figure 3.16 and Figure 3.17 show the locations of “Off-Property” grid receptors with maximum predicted concentrations for the "With Blasts" and "No Blasts" scenarios respectively. Refer to Section 3.3.2.3 for discussion on this subject.



Sensitive Receptors	Concentration Values (ug/m³)
R27	41.2
R28	41.3
R29	41.3
R30	41.5
R31	42.3
R32	41
R36	40.3
R37	40.6
R38	40.9
R39	41.2

LEGEND

Sensitive Receptors
- Naskapi
- Innu
- Permanent
- Other

Study Areas
- Local Study Area (LSA)
- Air Quality Modelling Perimeter
- Road Included in the Model
- Road Not-included in the Model

TPM (24-hour) - With Blasts
- Isocontour

Concentration Range (ug/m³)
- 0-50
- 50-60
- 60-80
- 80-100
- 100-120
- 120-170
- 170-252

Infrastructure and Mining Components
- P2 Plant 2
- MP Main processing Plant
- HMP Howse Mini-Plant
- BP Batch Plant
- FNC First Nations crusher/screener
- Existing Railroad
- Deposit
- Proposed Howse Pit
- Proposed Topsoil/ Overburden Stockpile
- Proposed Waste Dump/ In-Pit Dump
- Proposed Mine Haul Road

Basemap
- Existing road
- Contour Line (50 ft)
- Provincial Border
- Watercourse
- Water Body

*Hydronyms are oriented along the direction of water flow

FILE, PROJECT, DATE, AUTHOR:
GH-0678 , PR185-19-14, 2016-04-14, edickoum

N

0 2 4
Kilometers
UTM 19N NAD 83
SCALE: 1:90 000

SOURCES:

Basemap and Land Use Components
Government of Canada, NTDB, 1:50,000, 1979
Government of NL and government of Quebec,

Mining Components
Howse Minerals Limited/
MET-CHEM Howse Deposit Design
for General Layout., 2015
Groupe Hémisphères, Hydrology and update, 2013

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ENVIRONMENTAL IMPACT ASSESSMENT
HOWSE PROPERTY PROJECT

Maximum Concentrations - TPM (24-hour) - With Blasts

Howse Minerals Limited

GroupeHemispheres

5731, rue Saint-Louis,
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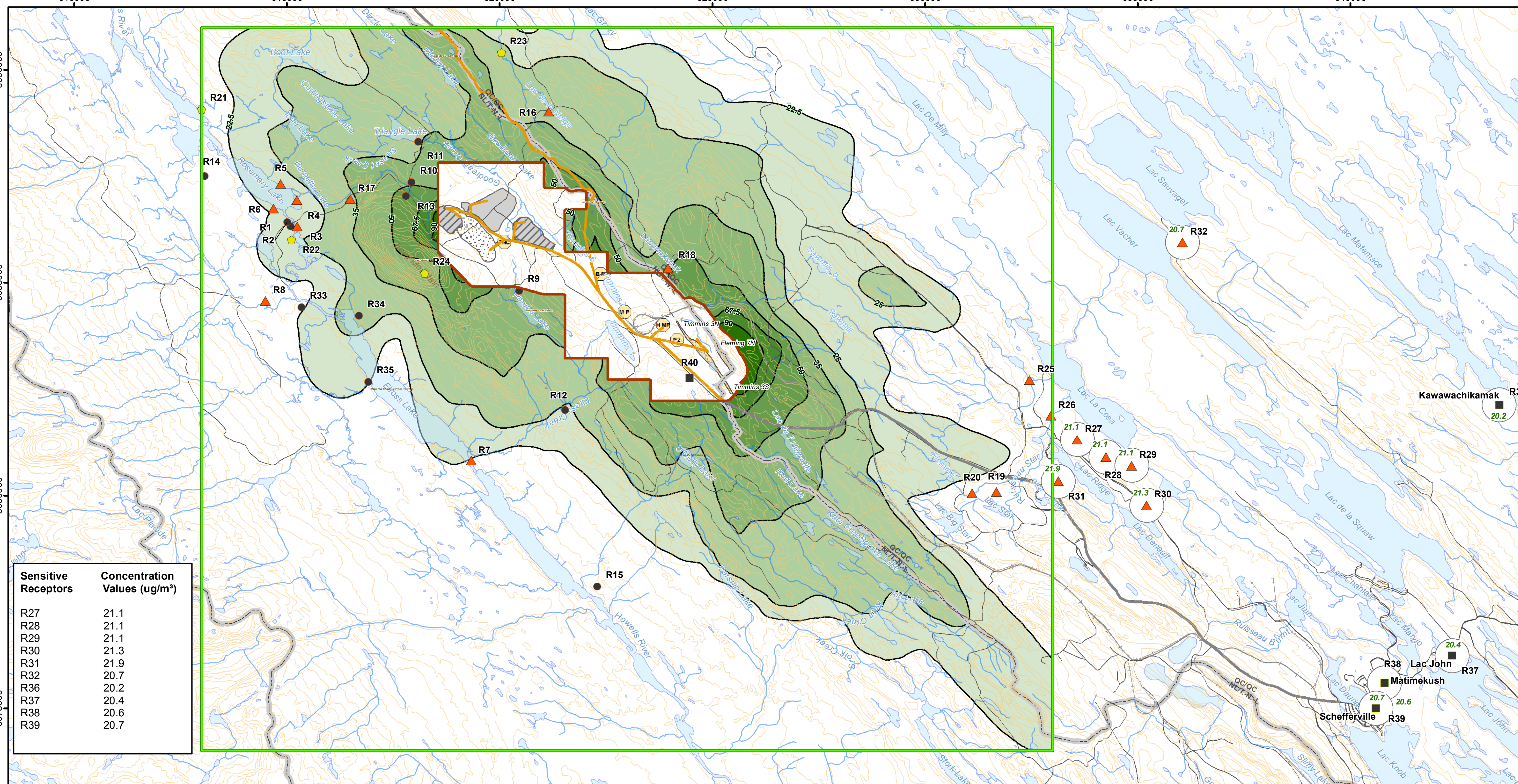
Canada, G6V 4E2

1453, rue Beaubien est,
Bureau 301, Montréal (QC)
Canada, H2G 3C6

Figure 3.2



Sensitive Receptors	Concentration Values (ug/m³)
R27	21.1
R28	21.1
R29	21.1
R30	21.3
R31	21.9
R32	20.7
R36	20.2
R37	20.4
R38	20.6
R39	20.7

LEGEND

Sensitive Receptors

- Naskapi
- Innu
- Permanent
- Other

Study Areas

- Local Study Area (LSA)
- Air Quality Modelling Perimeter
- Road Included in the Model
- Road Not-included in the Model

PM10 (24-hour) - With Blasts

- Isocontour

Concentration Range (ug/m³)

- 0-22.5
- 22.5-25
- 25-35
- 35-50
- 50-67.5
- 67.5-90
- 90-158

Infrastructure and Mining Components

- P2 Plant 2
- M P Main processing Plant
- H MP Howse Mini-Plant
- B P Batch Plant
- FNC First Nations crusher/screener
- Existing Railroad
- Deposit
- Proposed Howse Pit
- Proposed Topsoil/ Overburden Stockpile
- Proposed Waste Dump/ In-Pit Dump
- Proposed Mine Haul Road

Basemap

- Existing road
- Contour Line (50 ft)
- Provincial Border
- Watercourse
- Water Body

*Hydronyms are oriented along the direction of water flow

FILE, PROJECT, DATE, AUTHOR:
GH-0678 , PR185-19-14, 2016-04-14, edickoum

N

0 2 4
Kilometers

UTM 19N NAD 83 SCALE: 1:90 000

SOURCES:

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Mining Components
Howse Minerals Limited/
MET-CHEM Howse Deposit Design
for General Layout., 2015
Groupe Hémisphères, Hydrology and update, 2013

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ENVIRONMENTAL IMPACT ASSESSMENT
HOWSE PROPERTY PROJECT

Maximum Concentrations - PM10 (24-hour) - With Blasts

Howse Minerals Limited

GroupeHemispheres

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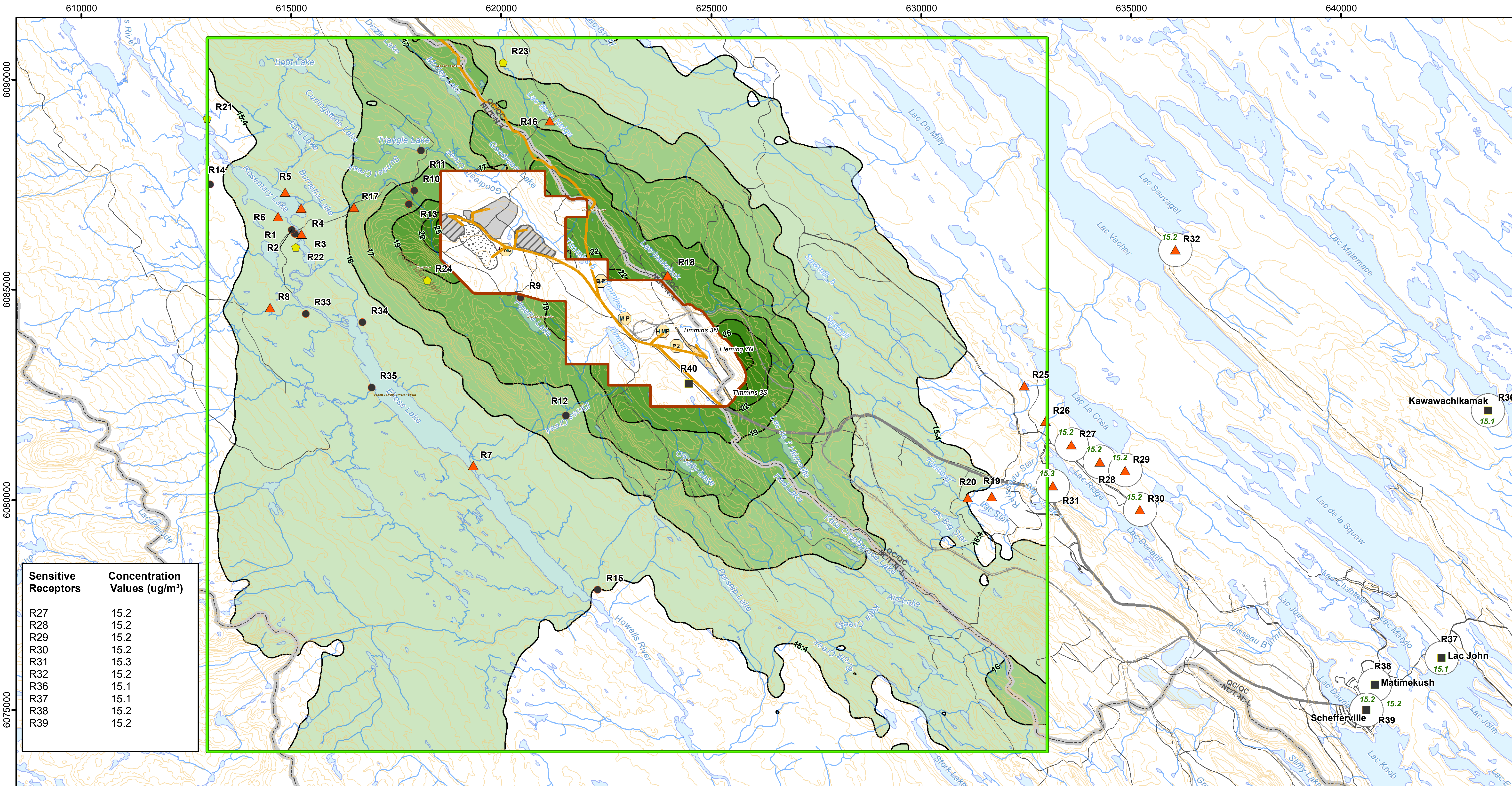
1453, rue Beaubien est, Bureau 301, Montréal (QC) Canada, H2G 3C6

Figure 3.3



Sensitive Receptors	Concentration Values (ug/m³)
R27	15.2
R28	15.2
R29	15.2
R30	15.2
R31	15.3
R32	15.2
R36	15.1
R37	15.1
R38	15.2
R39	15.2

LEGEND

Sensitive Receptors
- Naskapi
- Innu
- Permanent
- Other

Study Areas
- Local Study Area (LSA)
- Air Quality Modelling Perimeter
- Road Included in the Model
- Road Not-included in the Model

PM2.5 (24-hour) - With Blasts
- Isocontour

Concentration Range (ug/m³)
- 0-15.4
- 15.4-16
- 16-17
- 17-19
- 19-22
- 22-25
- 25-30

Infrastructure and Mining Components
- P2 Plant 2
- MP Main processing Plant
- HMP Howse Mini-Plant
- BP Batch Plant
- FNC First Nations crusher/screener
- Existing Railroad
- Deposit
- Proposed Howse Pit
- Proposed Topsoil/ Overburden Stockpile
- Proposed Waste Dump/ In-Pit Dump
- Proposed Mine Haul Road

Basemap
- Existing road
- Contour Line (50 ft)
- Provincial Border
- Watercourse
- Water Body

*Hydronyms are oriented along the direction of water flow

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N

0 2 4
Kilometers

UTM 19N NAD 83

SCALE: 1:90 000

SOURCES:

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Mining Components
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for General Layout., 2015
Groupe Hémisphères, Hydrology and update, 2013

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ENVIRONMENTAL IMPACT ASSESSMENT
HOWSE PROPERTY PROJECT

Maximum Concentrations - PM2.5 (24-hour) - With Blasts

Howse Minerals Limited

GroupeHemispheres

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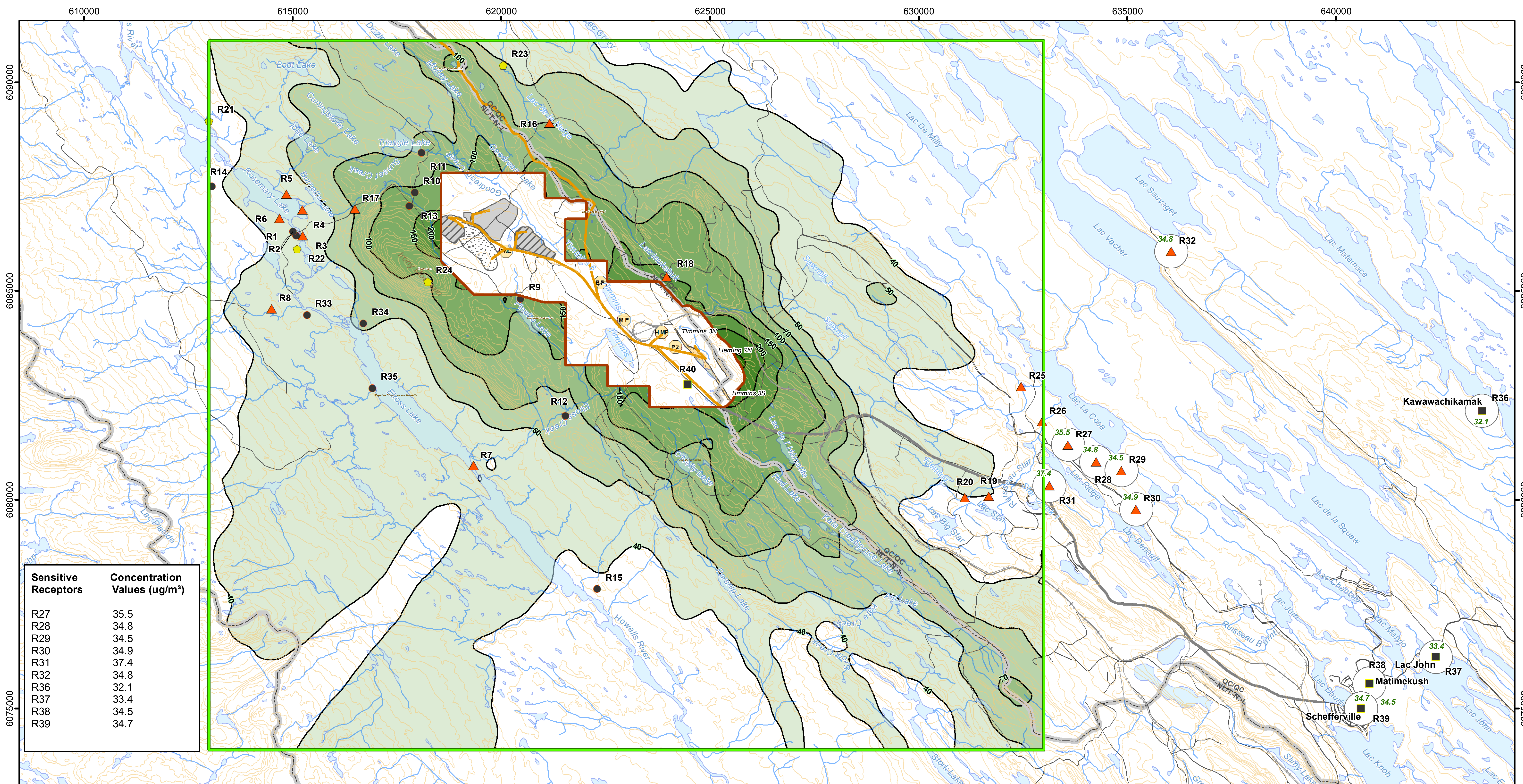
1453, rue Beaubien est, Bureau 301, Montréal (QC) Canada, H2G 3C6

Figure 3.4



Sensitive Receptors	Concentration Values (ug/m³)
R27	35.5
R28	34.8
R29	34.5
R30	34.9
R31	37.4
R32	34.8
R36	32.1
R37	33.4
R38	34.5
R39	34.7

LEGEND

Sensitive Receptors
- Naskapi
- Innu
- Permanent
- Other

Study Areas
- Local Study Area (LSA)
- Air Quality Modelling Perimeter
- Road Included in the Model
- Road Not-included in the Model

NO2 (24-hour) - With Blasts
- Isocontour

Concentration Range (ug/m³)
- 0-40
- 40-50
- 50-70
- 70-100
- 100-150
- 150-200
- 200-290
- 290-365

Infrastructure and Mining Components
- P2 Plant 2
- MP Main processing Plant
- HMP Howse Mini-Plant
- BP Batch Plant
- FNC First Nations crusher/screener
- Existing Railroad
- Deposit
- Proposed Howse Pit
- Proposed Topsoil/ Overburden Stockpile
- Proposed Waste Dump/ In-Pit Dump
- Proposed Mine Haul Road

Basemap
- Existing road
- Contour Line (50 ft)
- Provincial Border
- Watercourse
- Water Body

*Hydronyms are oriented along the direction of water flow

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N

0 2 4
Kilometers

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MET-CHEM Howse Deposit Design
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ENVIRONMENTAL IMPACT ASSESSMENT
HOWSE PROPERTY PROJECT

Maximum Concentrations - NO2 (24-hour) - With Blasts

Howse Minerals Limited

GroupeHemispheres

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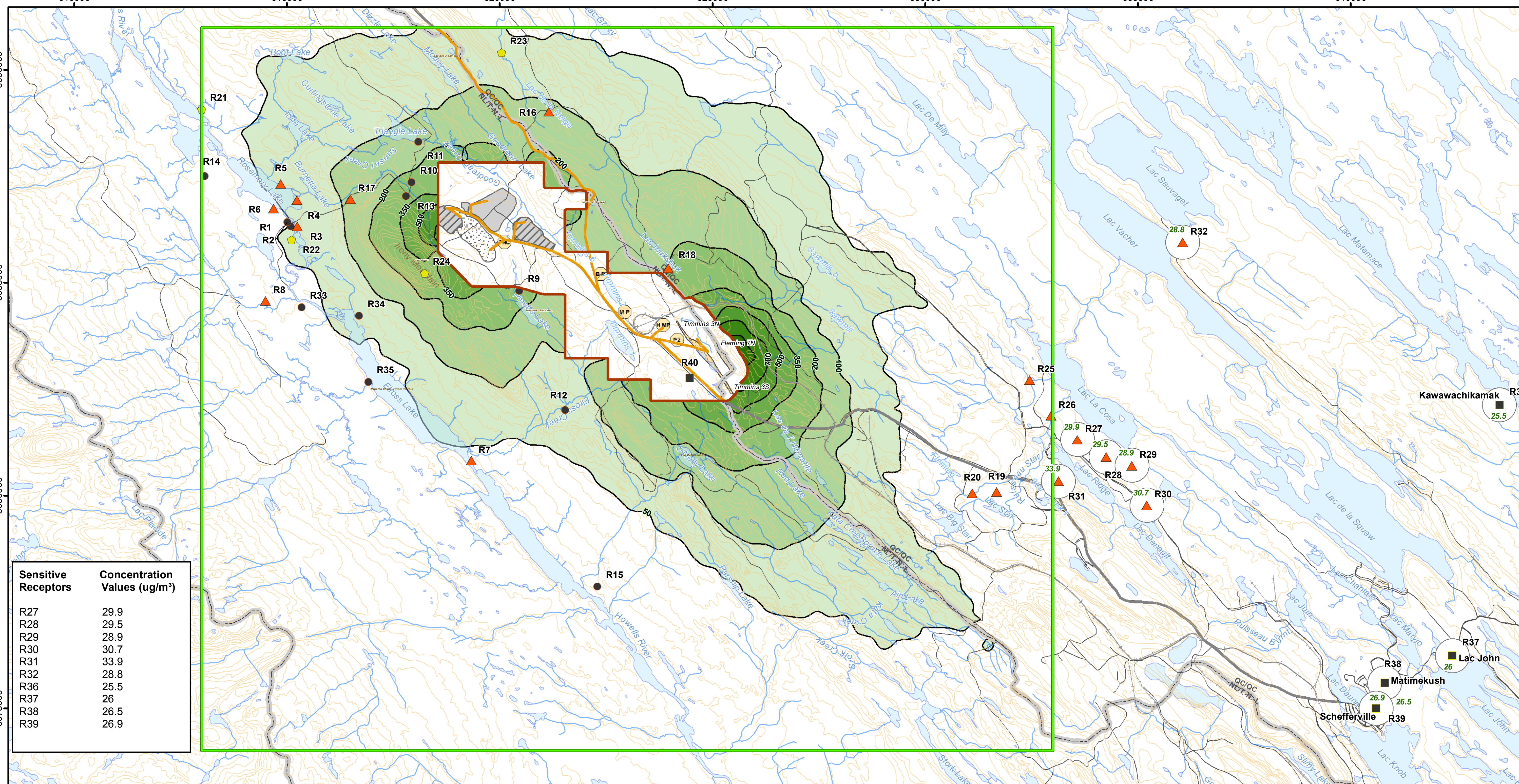
Bureau 201, Lévis (QC)
Canada, G6V 4E2

1453, rue Beaubien est,
Bureau 301, Montréal (QC)
Canada, H2G 3C6

Figure 3.5



Sensitive Receptors	Concentration Values (ug/m³)
R27	29.9
R28	29.5
R29	28.9
R30	30.7
R31	33.9
R32	28.8
R36	25.5
R37	26
R38	26.5
R39	26.9

LEGEND

Sensitive Receptors
- Naskapi
- Innu
- Permanent
- Other

Study Areas
- Local Study Area (LSA)
- Air Quality Modelling Perimeter
- Road Included in the Model
- Road Not-included in the Model

SO2 (1-hour) - With Blasts
- Isocontour

Concentration Range (ug/m³)
- 0-50
- 50-100
- 100-200
- 200-350
- 350-500
- 500-700
- 700-900
- 900-1230

Infrastructure and Mining Components
- P2 Plant 2
- MP Main processing Plant
- HMP Howse Mini-Plant
- BP Batch Plant
- FNC First Nations crusher/screener
- Existing Railroad
- Deposit
- Proposed Howse Pit
- Proposed Topsoil/ Overburden Stockpile
- Proposed Waste Dump/ In-Pit Dump
- Proposed Mine Haul Road

Basemap
- Existing road
- Contour Line (50 ft)
- Provincial Border
- Watercourse
- Water Body

*Hydronyms are oriented along the direction of water flow

FILE, PROJECT, DATE, AUTHOR:
GH-0678 , PR185-19-14, 2016-04-14, edickoum

N

0 2 4
Kilometers

UTM 19N NAD 83 SCALE: 1:90 000

SOURCES:

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Government of Canada, NTDB, 1:50,000, 1979
Government of NL and government of Quebec,

Mining Components
Howse Minerals Limited/
MET-CHEM Howse Deposit Design
for General Layout., 2015
Groupe Hémisphères, Hydrology and update, 2013

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ENVIRONMENTAL IMPACT ASSESSMENT
HOWSE PROPERTY PROJECT

Maximum Concentrations - SO2 (1-hour) - With Blasts

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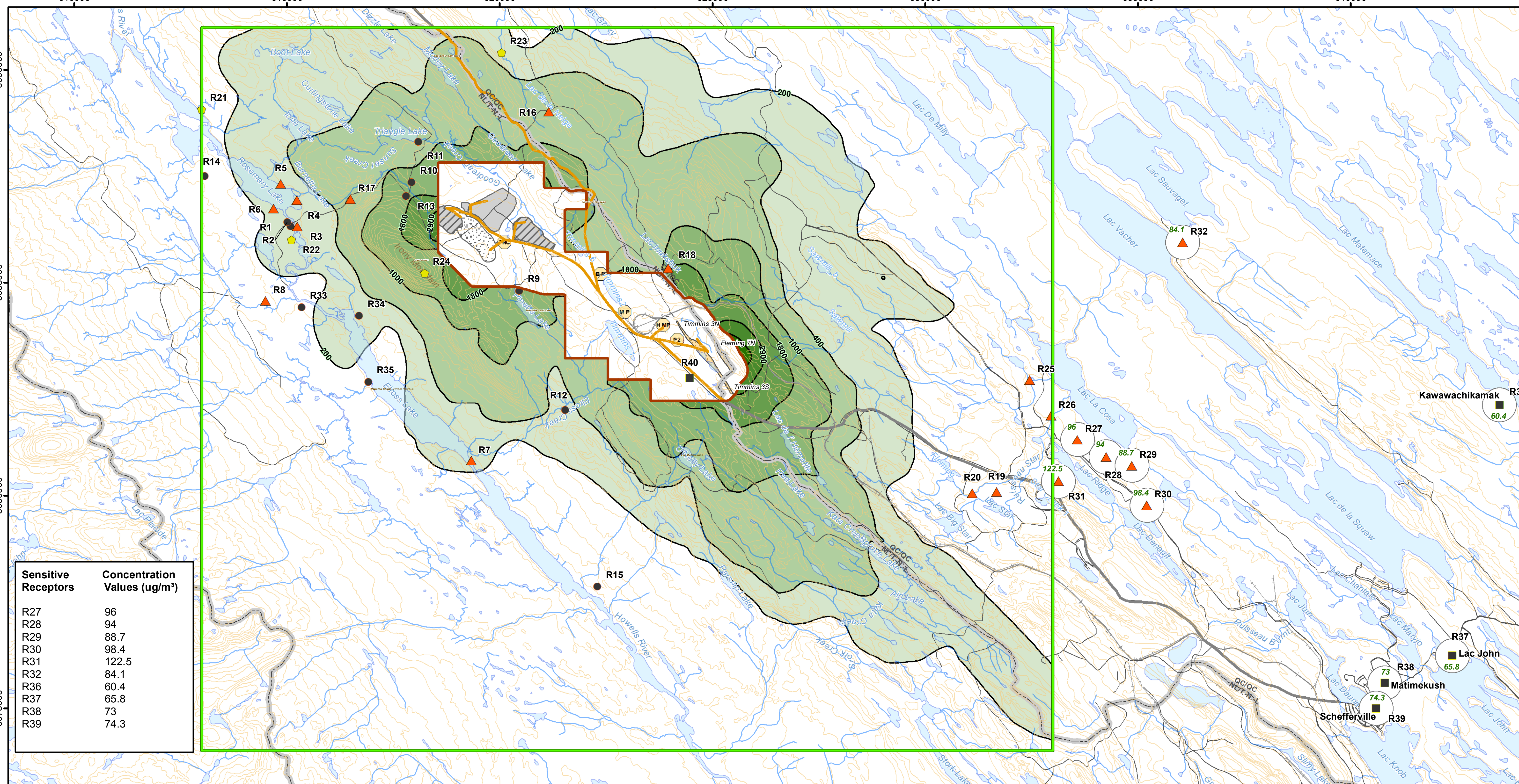
Figure 3.6



Sensitive Receptors	Concentration Values (ug/m³)
R27	96
R28	94
R29	88.7
R30	98.4
R31	122.5
R32	84.1
R36	60.4
R37	65.8
R38	73
R39	74.3

LEGEND

Sensitive Receptors
- Naskapi
- Innu
- Permanent
- Other

Study Areas
- Local Study Area (LSA)
- Air Quality Modelling Perimeter
- Road Included in the Model
- Road Not-included in the Model

NO2 (1-hour) - With Blasts
- Isocontour

Concentration Range (ug/m³)
- 0-200
- 200-400
- 400-1000
- 1000-1800
- 1800-2900
- 2900-4000
- 4000-5391

Infrastructure and Mining Components
- P2 Plant 2
- MP Main processing Plant
- HMP Howse Mini-Plant
- BP Batch Plant
- FNC First Nations crusher/screener
- Existing Railroad
- Deposit
- Proposed Howse Pit
- Proposed Topsoil/ Overburden Stockpile
- Proposed Waste Dump/ In-Pit Dump
- Proposed Mine Haul Road

Basemap
- Existing road
- Contour Line (50 ft)
- Provincial Border
- Watercourse
- Water Body

*Hydronyms are oriented along the direction of water flow

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N

0 2 4
Kilometers

UTM 19N NAD 83

SCALE: 1:90 000

SOURCES:

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Mining Components
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ENVIRONMENTAL IMPACT ASSESSMENT
HOWSE PROPERTY PROJECT

Maximum Concentrations - NO2 (1-hour) - With Blasts

Howse Minerals Limited

GroupeHemispheres

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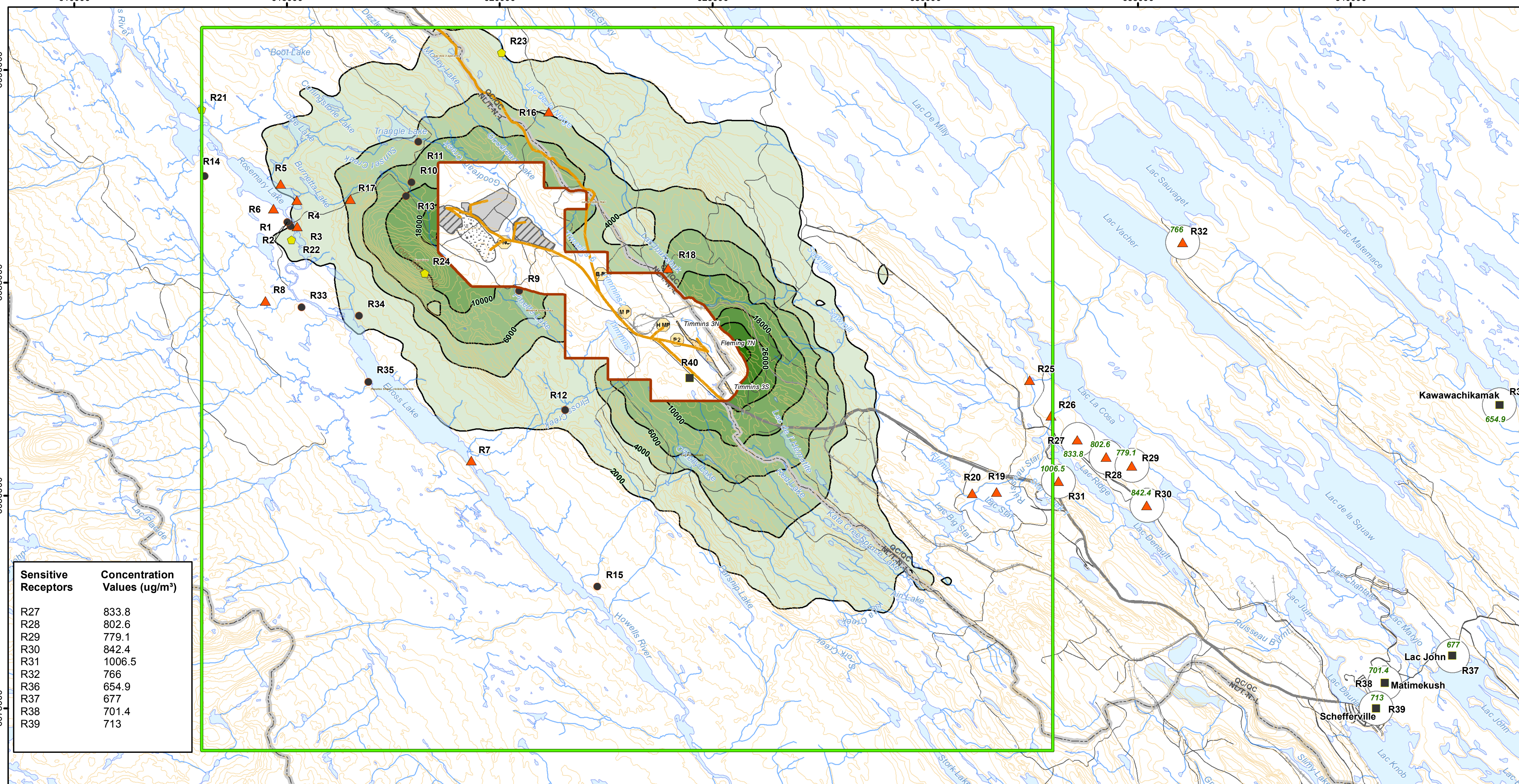
Canada, G6V 4E2

1453, rue Beaubien est,
Bureau 301, Montréal (QC)
Canada, H2G 3C6

Figure 3.7



Sensitive Receptors	Concentration Values (ug/m³)
R27	833.8
R28	802.6
R29	779.1
R30	842.4
R31	1006.5
R32	766
R36	654.9
R37	677
R38	701.4
R39	713

LEGEND

Sensitive Receptors
- Naskapi
- Innu
- Permanent
- Other

Study Areas
- Local Study Area (LSA)
- Air Quality Modelling Perimeter
- Road Included in the Model
- Road Not-included in the Model

CO (1-hour) - With Blasts
- Isocontour

Concentration Range (ug/m³)
- 0-2000
- 2000-4000
- 4000-6000
- 6000-10000
- 10000-18000
- 18000-26000
- 26000-34000
- 34000-42942

Infrastructure and Mining Components
- P2 Plant 2
- MP Main processing Plant
- HMP Howse Mini-Plant
- BP Batch Plant
- FNC First Nations crusher/screener
- Existing Railroad
- Deposit
- Proposed Howse Pit
- Proposed Topsoil/ Overburden Stockpile
- Proposed Waste Dump/ In-Pit Dump
- Proposed Mine Haul Road

Basemap
- Existing road
- Contour Line (50 ft)
- Provincial Border
- Watercourse
- Water Body

*Hydronyms are oriented along the direction of water flow

FILE, PROJECT, DATE, AUTHOR:
GH-0678 , PR185-19-14, 2016-04-14, edickoum

N

0 2 4
Kilometers

UTM 19N NAD 83 SCALE: 1:90 000

SOURCES:

Basemap and Land Use Components
Government of Canada, NTDB, 1:50,000, 1979
Government of NL and government of Quebec,

Mining Components
Howse Minerals Limited/
MET-CHEM Howse Deposit Design
for General Layout., 2015
Groupe Hémisphères, Hydrology and update, 2013

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ENVIRONMENTAL IMPACT ASSESSMENT
HOWSE PROPERTY PROJECT

Maximum Concentrations - CO (1-hour) - With Blasts

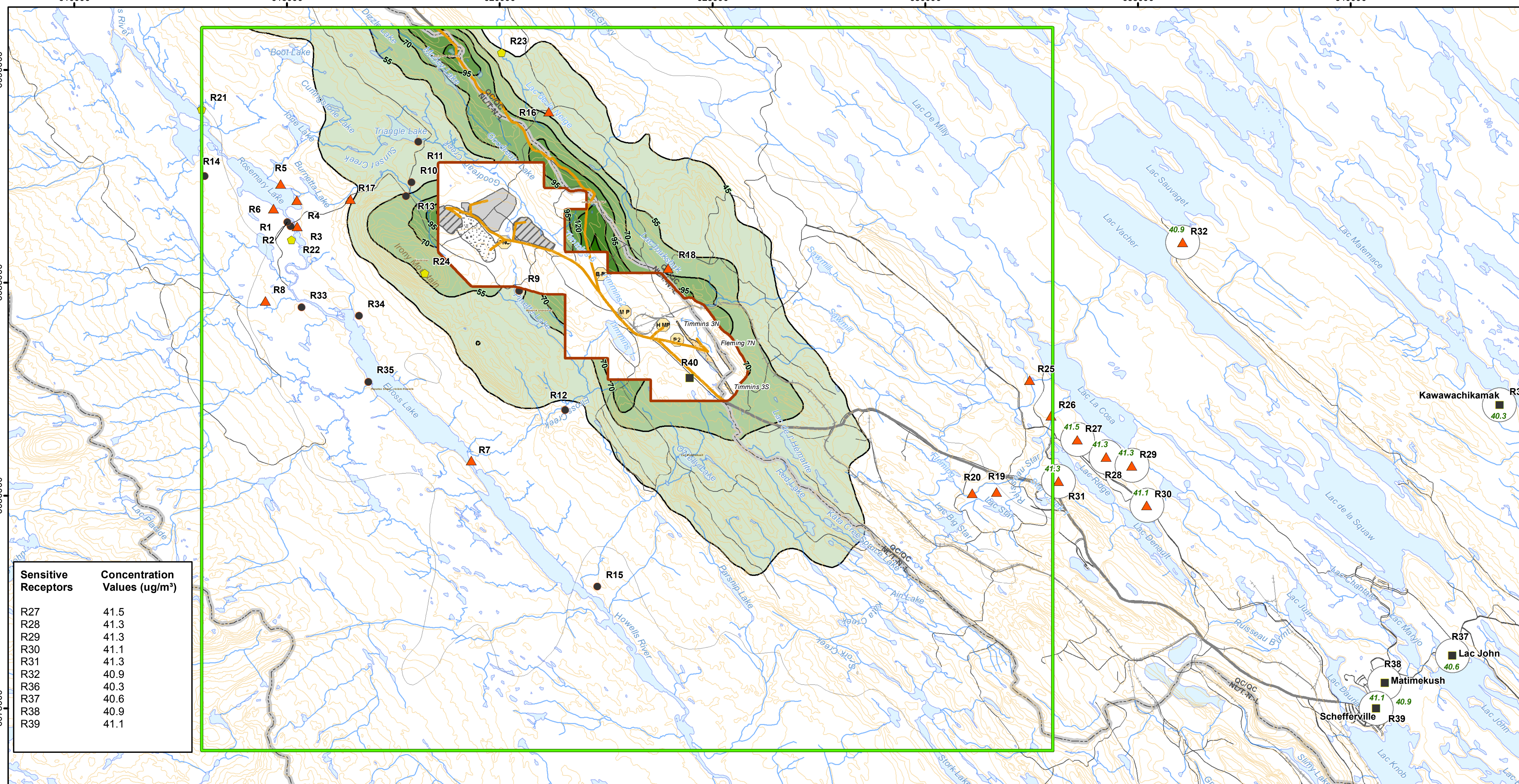
Howse Minerals Limited

GroupeHemispheres

5731, rue Saint-Louis,
Bureau 201, Lévis (QC)
Canada, G6V 4E2

1453, rue Beaubien est,
Bureau 301, Montréal (QC)
Canada, H2G 3C6

Figure 3.8



Sensitive Receptors	Concentration Values (ug/m³)
R27	41.5
R28	41.3
R29	41.3
R30	41.1
R31	41.3
R32	40.9
R36	40.3
R37	40.6
R38	40.9
R39	41.1

LEGEND

Sensitive Receptors
- Naskapi
- Innu
- Permanent
- Other

Study Areas
- Local Study Area (LSA)
- Air Quality Modelling Perimeter
- Road Included in the Model
- Road Not-included in the Model

TPM (24-hour) - No Blasts
- Isocontour

Concentration Range (ug/m³)
- 0-45
- 45-55
- 55-70
- 70-95
- 95-120
- 120-155
- 155-185

Infrastructure and Mining Components
- P2 Plant 2
- MP Main processing Plant
- HMP Howse Mini-Plant
- BP Batch Plant
- FNC First Nations crusher/screener
- Existing Railroad
- Deposit
- Proposed Howse Pit
- Proposed Topsoil/ Overburden Stockpile
- Proposed Waste Dump/ In-Pit Dump
- Proposed Mine Haul Road

Basemap
- Existing road
- Contour Line (50 ft)
- Provincial Border
- Watercourse
- Water Body

*Hydronyms are oriented along the direction of water flow

FILE, PROJECT, DATE, AUTHOR:
GH-0678 , PR185-19-14, 2016-04-15, edickoum

N

0 2 4
Kilometers

UTM 19N NAD 83
SCALE: 1:90 000

SOURCES:

Basemap and Land Use Components
Government of Canada, NTDB, 1:50,000, 1979
Government of NL and government of Quebec,

Mining Components
Howse Minerals Limited/
MET-CHEM Howse Deposit Design
for General Layout, 2015
Groupe Hémisphères, Hydrology and update, 2013

AECOM

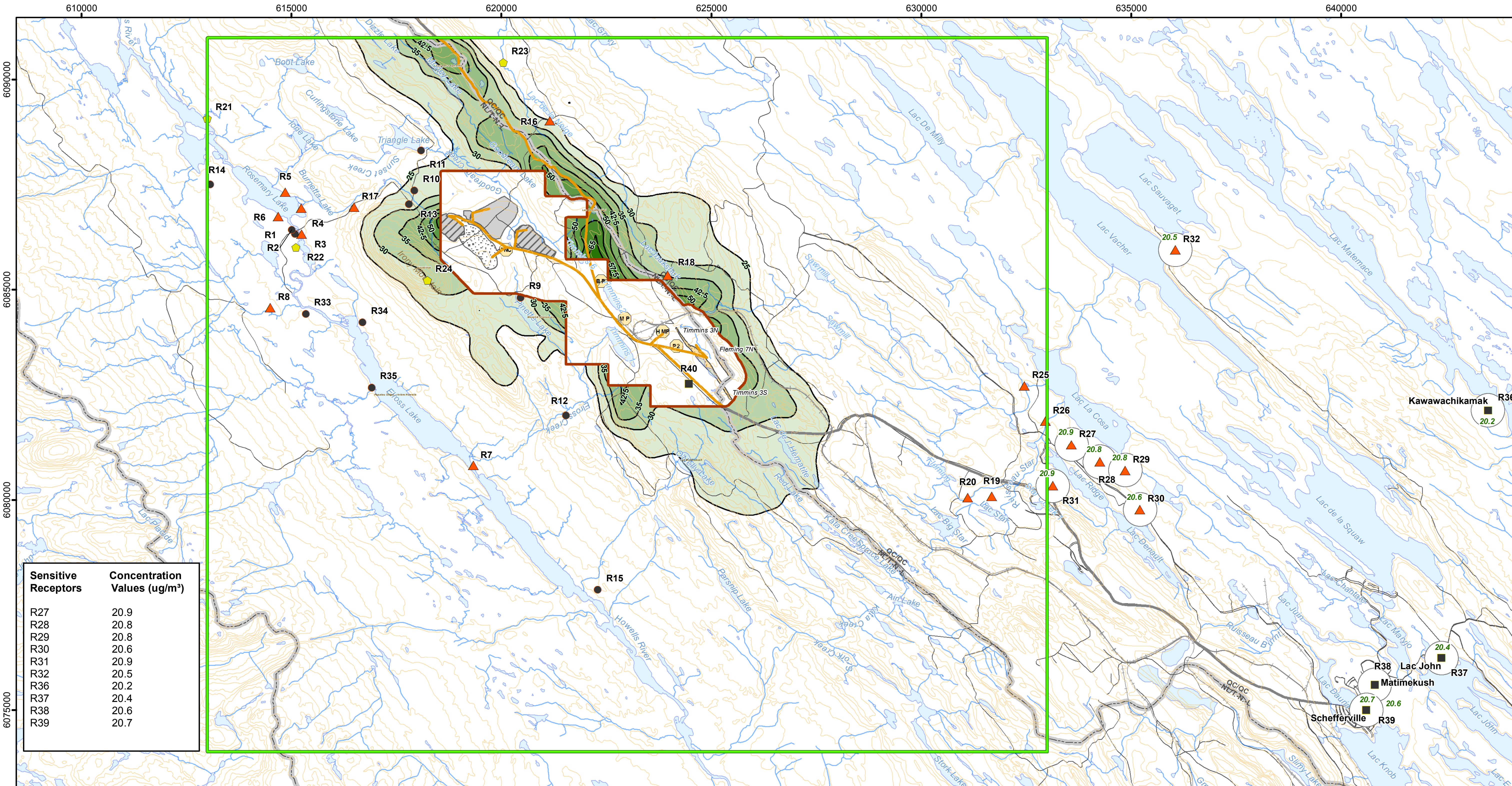
ENVIRONMENTAL IMPACT ASSESSMENT
HOWSE PROPERTY PROJECT

Maximum Concentrations - TPM (24-hour) - No Blasts

Howse Minerals Limited

GroupeHemispheres
5731, rue Saint-Louis, Bureau 201, Lévis (QC) Canada, G6V 4E2
1453, rue Beaubien est, Bureau 301, Montréal (QC) Canada, H2G 3C6

Figure 3.9



Sensitive Receptors	Concentration Values (ug/m³)
R27	20.9
R28	20.8
R29	20.8
R30	20.6
R31	20.9
R32	20.5
R36	20.2
R37	20.4
R38	20.6
R39	20.7

LEGEND

Sensitive Receptors
- Naskapi
- Innu
- Permanent
- Other

Study Areas
- Local Study Area (LSA)
- Air Quality Modelling Perimeter
- Road Included in the Model
- Road Not-included in the Model

PM10 (24-hour) - No Blasts
- Isocontour

Concentration Range (ug/m³)
- 0-25
- 25-30
- 30-35
- 35-42.5
- 42.5-50
- 50-57.5
- 57.5-65
- 65-78

Infrastructure and Mining Components
- P2 Plant 2
- MP Main processing Plant
- HMP Howse Mini-Plant
- BP Batch Plant
- FNC First Nations crusher/screener
- Existing Railroad
- Deposit
- Proposed Howse Pit
- Proposed Topsoil/ Overburden Stockpile
- Proposed Waste Dump/ In-Pit Dump
- Proposed Mine Haul Road

Basemap
- Existing road
- Contour Line (50 ft)
- Provincial Border
- Watercourse
- Water Body

*Hydronyms are oriented along the direction of water flow

FILE, PROJECT, DATE, AUTHOR:
GH-0678 , PR185-19-14, 2016-04-14, edickoum

N

0 2 4
Kilometers

UTM 19N NAD 83

SCALE: 1:90 000

SOURCES:

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Mining Components
Howse Minerals Limited/
MET-CHEM Howse Deposit Design
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Groupe Hémisphères, Hydrology and update, 2013

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ENVIRONMENTAL IMPACT ASSESSMENT
HOWSE PROPERTY PROJECT

Maximum Concentrations - PM10 (24-hour) - No Blasts

Howse Minerals Limited

GroupeHemispheres
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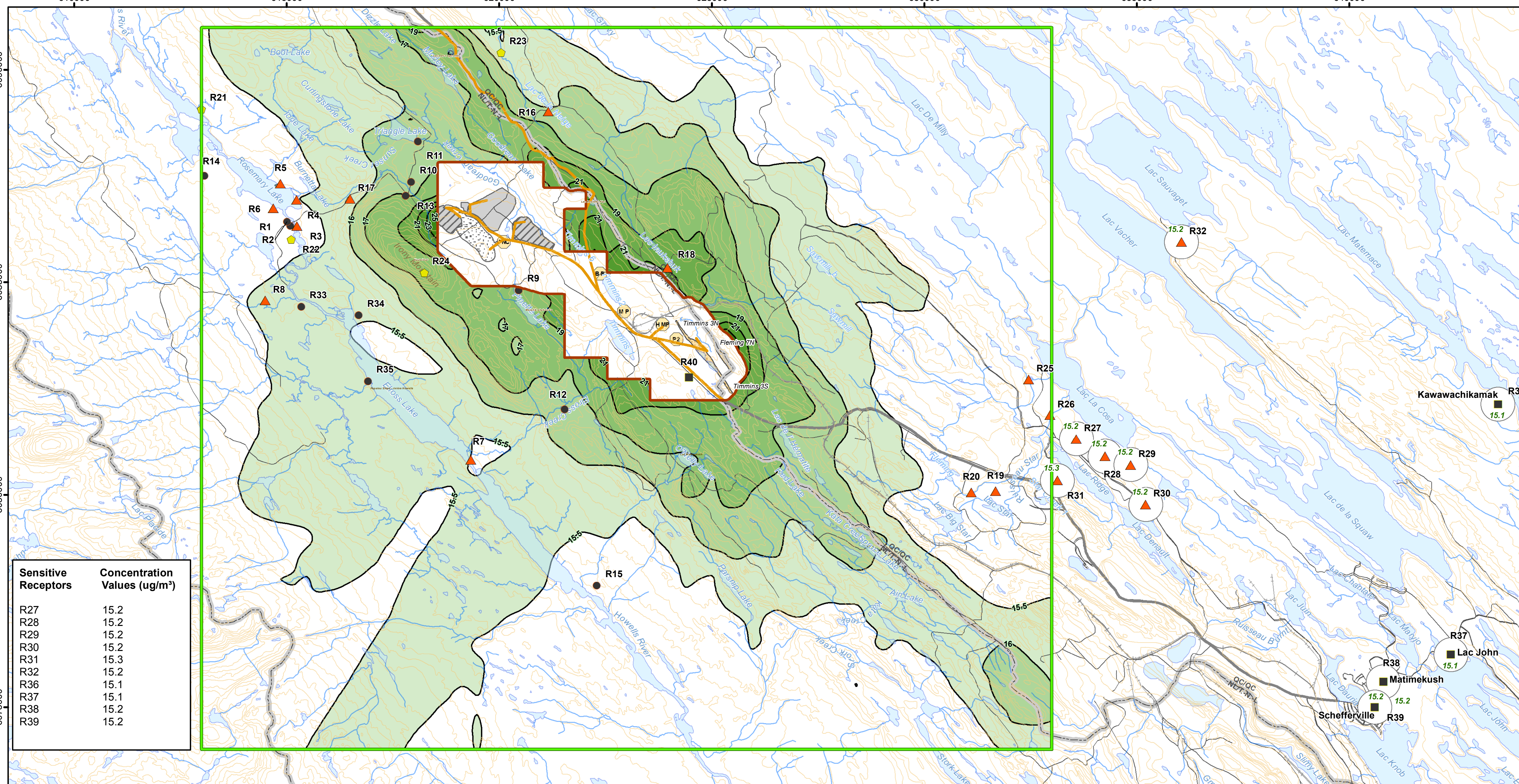
Canada, G6V 4E2
1453, rue Beaubien est,
Bureau 301, Montréal (QC)
Canada, H2G 3C6

Figure 3.10



Sensitive Receptors	Concentration Values (ug/m³)
R27	15.2
R28	15.2
R29	15.2
R30	15.2
R31	15.3
R32	15.2
R36	15.1
R37	15.1
R38	15.2
R39	15.2

LEGEND

Sensitive Receptors
- Naskapi
- Innu
- Permanent
- Other

Study Areas
- Local Study Area (LSA)
- Air Quality Modelling Perimeter
- Road Included in the Model
- Road Not-included in the Model

PM2.5 (24-hour) - No Blasts
- Isocontour

Concentration Range (ug/m³)
- 0-15.5
- 15.5-16
- 16-17
- 17-19
- 19-21
- 21-23
- 23-25
- 25-26

Infrastructure and Mining Components
- P2 Plant 2
- MP Main processing Plant
- HMP Howse Mini-Plant
- BP Batch Plant
- FNC First Nations crusher/screener
- Existing Railroad
- Deposit
- Proposed Howse Pit
- Proposed Topsoil/ Overburden Stockpile
- Proposed Waste Dump/ In-Pit Dump
- Proposed Mine Haul Road

Basemap
- Existing road
- Contour Line (50 ft)
- Provincial Border
- Watercourse
- Water Body

*Hydronyms are oriented along the direction of water flow

FILE, PROJECT, DATE, AUTHOR:
GH-0678 , PR185-19-14, 2016-04-14, edickoum

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Kilometers

UTM 19N NAD 83
SCALE: 1:90 000

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ENVIRONMENTAL IMPACT ASSESSMENT
HOWSE PROPERTY PROJECT

Maximum Concentrations - PM2.5 (24-hour) - No Blasts

Howse Minerals Limited

GroupeHemispheres

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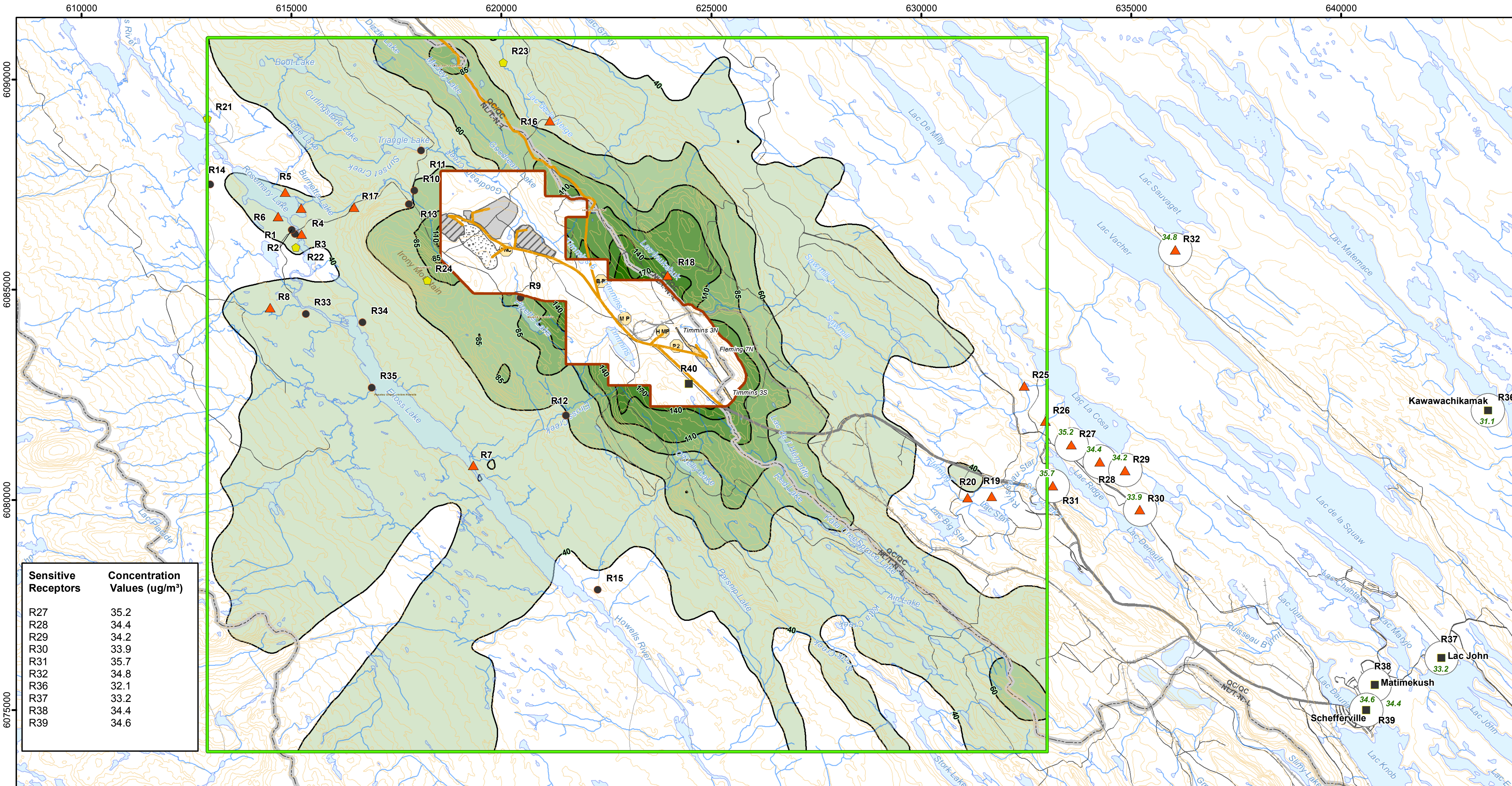
Canada, G6V 4E2

1453, rue Beaubien est,
Bureau 301, Montréal (QC)
Canada, H2G 3C6

Figure 3.11



Sensitive Receptors	Concentration Values (ug/m³)
R27	35.2
R28	34.4
R29	34.2
R30	33.9
R31	35.7
R32	34.8
R36	32.1
R37	33.2
R38	34.4
R39	34.6

LEGEND

Sensitive Receptors
- Naskapi
- Innu
- Permanent
- Other

Study Areas
- Local Study Area (LSA)
- Air Quality Modelling Perimeter
- Road Included in the Model
- Road Not-included in the Model

NO2 (24-hour) - No Blasts
- Isocontour

Concentration Range (ug/m³)
- 0-40
- 40-60
- 60-85
- 85-110
- 110-140
- 140-170
- 170-316

Infrastructure and Mining Components
- P2 Plant 2
- MP Main processing Plant
- HMP Howse Mini-Plant
- BP Batch Plant
- FNC First Nations crusher/screener
- Existing Railroad
- Deposit
- Proposed Howse Pit
- Proposed Topsoil/ Overburden Stockpile
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- Proposed Mine Haul Road

Basemap
- Existing road
- Contour Line (50 ft)
- Provincial Border
- Watercourse
- Water Body

*Hydronyms are oriented along the direction of water flow

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Kilometers

UTM 19N NAD 83

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Groupe Hémisphères, Hydrology and update, 2013

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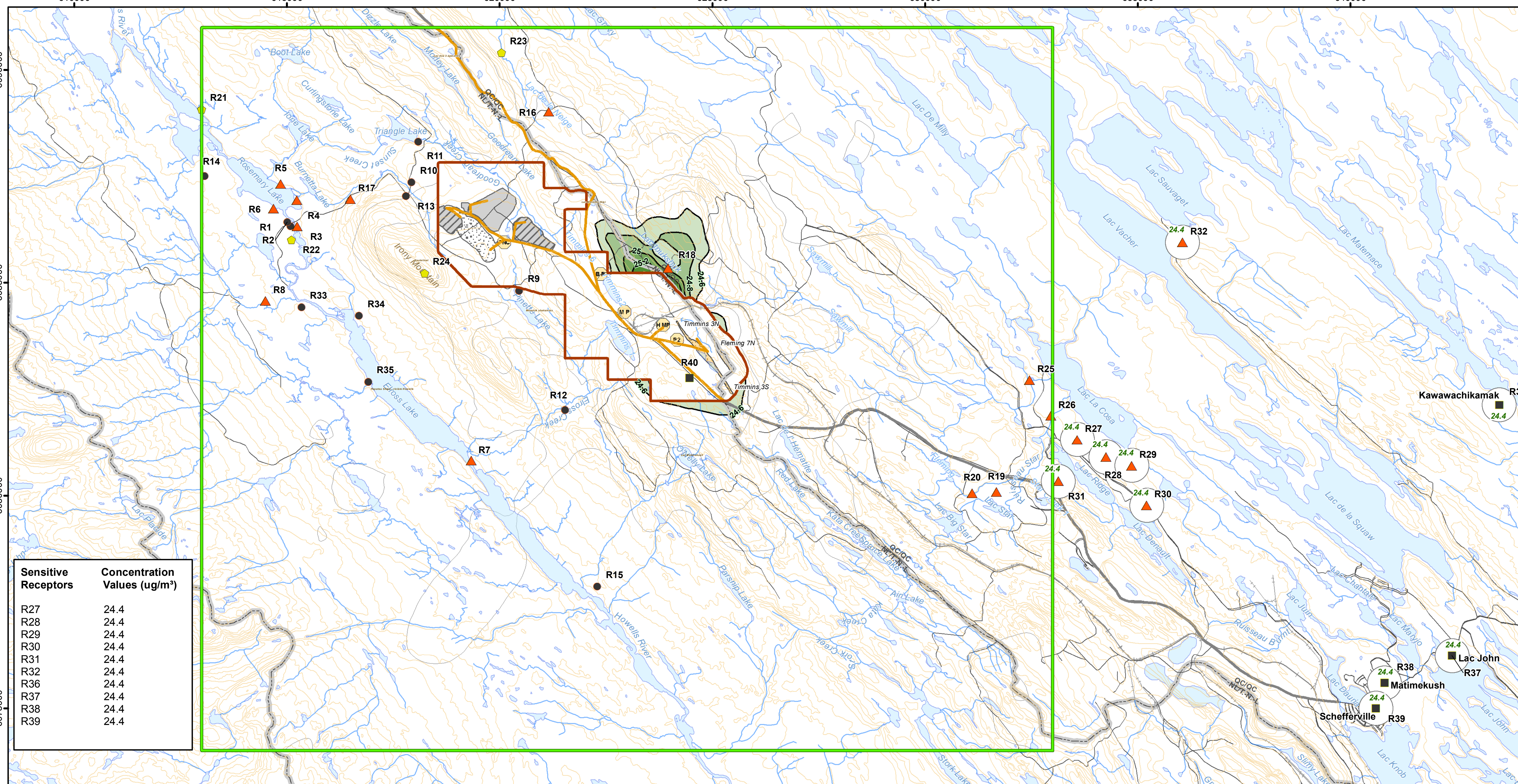
ENVIRONMENTAL IMPACT ASSESSMENT
HOWSE PROPERTY PROJECT

Maximum Concentrations - NO2 (24-hour) - No Blasts

Howse Minerals Limited

GroupeHemispheres
5731, rue Saint-Louis,
Bureau 201, Lévis (QC)
Canada, G6V 4E2
1453, rue Beaubien est,
Bureau 301, Montréal (QC)
Canada, H2G 3C6

Figure 3.12



Sensitive Receptors	Concentration Values (ug/m³)
R27	24.4
R28	24.4
R29	24.4
R30	24.4
R31	24.4
R32	24.4
R36	24.4
R37	24.4
R38	24.4
R39	24.4

LEGEND

Sensitive Receptors
- Naskapi
- Innu
- Permanent
- Other

Study Areas
- Local Study Area (LSA)
- Air Quality Modelling Perimeter
- Road Included in the Model
- Road Not-included in the Model

SO2 (1-hour) - No Blasts
- Isocontour

Concentration Range (ug/m³)
- 0-24.6
- 24.6-24.8
- 24.8-25
- 25-25.2
- 25.2-25.4
- 25.4-26

Infrastructure and Mining Components
- P2 Plant 2
- MP Main processing Plant
- HMP Howse Mini-Plant
- BP Batch Plant
- FNC First Nations crusher/screener
- Existing Railroad
- Deposit
- Proposed Howse Pit
- Proposed Topsoil/ Overburden Stockpile
- Proposed Waste Dump/ In-Pit Dump
- Proposed Mine Haul Road

Basemap
- Existing road
- Contour Line (50 ft)
- Provincial Border
- Watercourse
- Water Body

*Hydronyms are oriented along the direction of water flow

FILE, PROJECT, DATE, AUTHOR:
GH-0678 , PR185-19-14, 2016-04-14, edickoum

N

0 2 4
Kilometers

UTM 19N NAD 83

SCALE: 1:90 000

SOURCES:

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Mining Components
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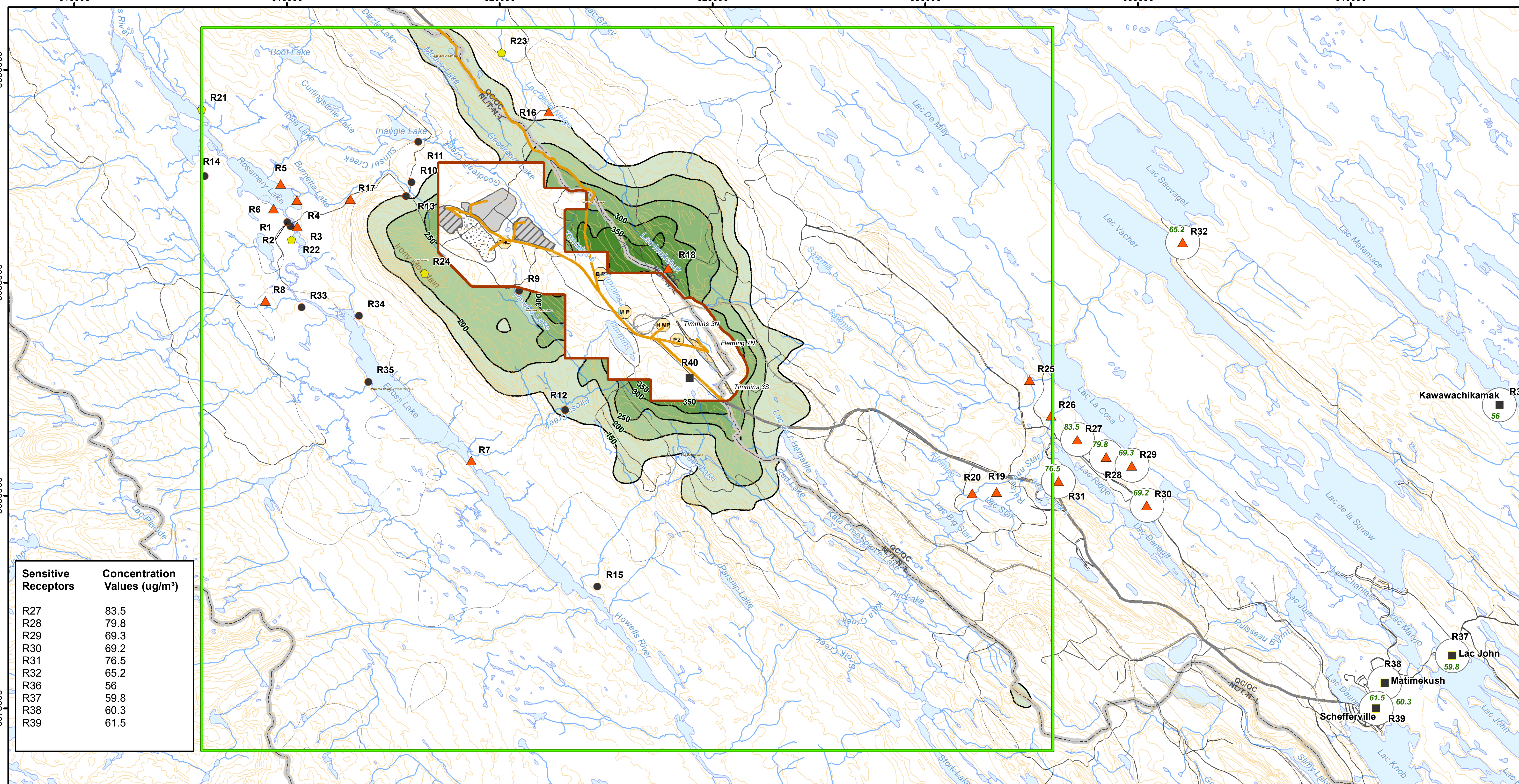
ENVIRONMENTAL IMPACT ASSESSMENT
HOWSE PROPERTY PROJECT

Maximum Concentrations - SO2 (1-hour) - No Blasts

Howse Minerals Limited

GroupeHemispheres
5731, rue Saint-Louis, Bureau 201, Lévis (QC) Canada, G6V 4E2
1453, rue Beaubien est, Bureau 301, Montréal (QC) Canada, H2G 3C6

Figure 3.13



Sensitive Receptors	Concentration Values (ug/m³)
R27	83.5
R28	79.8
R29	69.3
R30	69.2
R31	76.5
R32	65.2
R36	56
R37	59.8
R38	60.3
R39	61.5

LEGEND

Sensitive Receptors
- Naskapi
- Innu
- Permanent
- Other

Study Areas
- Local Study Area (LSA)
- Air Quality Modelling Perimeter
- Road Included in the Model
- Road Not-included in the Model

NO2 (1-hour) - No Blasts
- Isocontour

Concentration Range (ug/m³)
- 0-150
- 150-200
- 200-250
- 250-300
- 300-350
- 350-400
- 400- 488

Infrastructure and Mining Components
- P2 Plant 2
- MP Main processing Plant
- HMP Howse Mini-Plant
- BP Batch Plant
- FNC First Nations crusher/screener
- Existing Railroad
- Deposit
- Proposed Howse Pit
- Proposed Topsoil/ Overburden Stockpile
- Proposed Waste Dump/ In-Pit Dump
- Proposed Mine Haul Road

Basemap
- Existing road
- Contour Line (50 ft)
- Provincial Border
- Watercourse
- Water Body

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Kilometers

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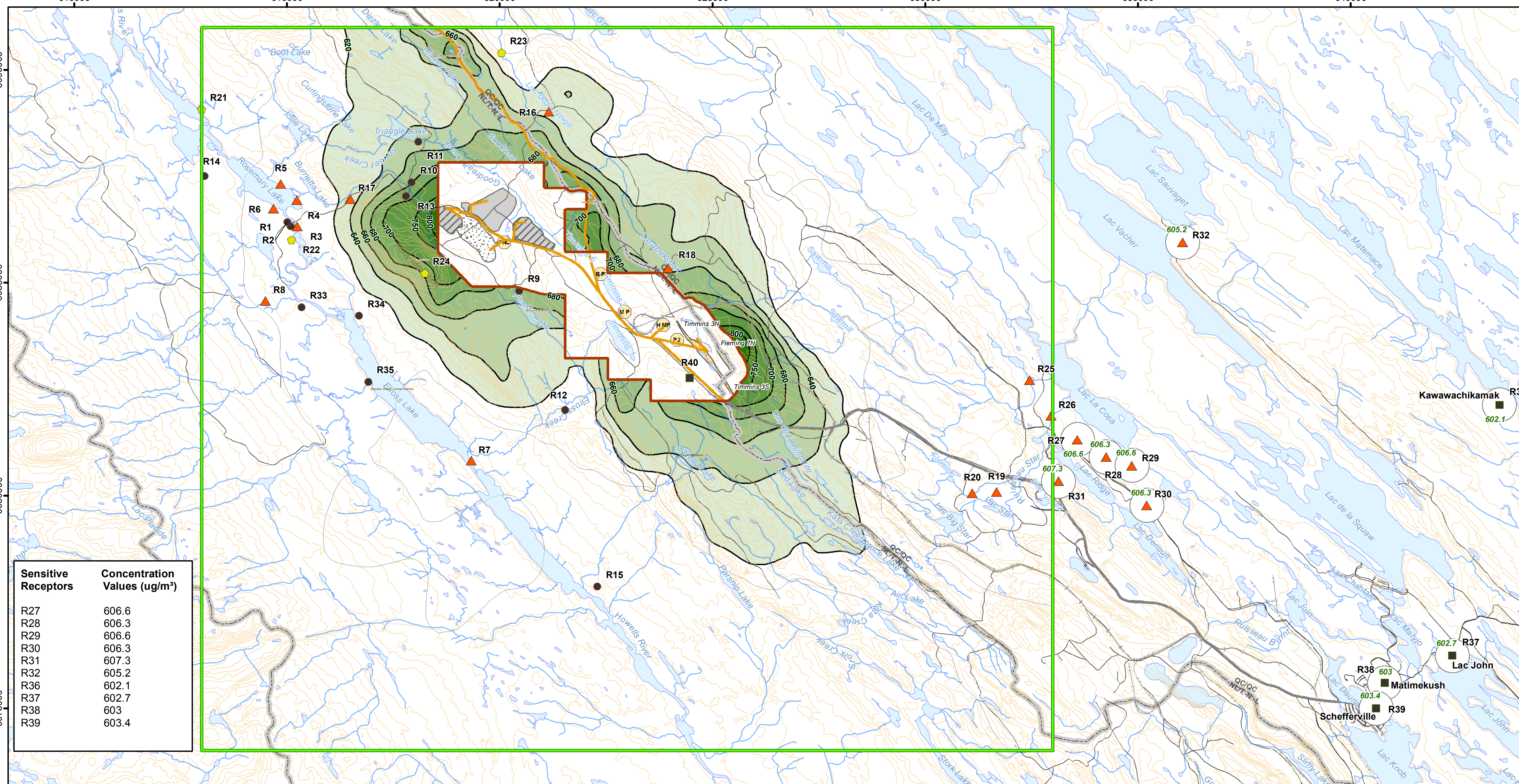
ENVIRONMENTAL IMPACT ASSESSMENT
HOWSE PROPERTY PROJECT

Maximum Concentrations - NO2 (1-hour) - No Blasts

Howse Minerals Limited

GroupeHemispheres
5731, rue Saint-Louis, Bureau 201, Lévis (QC) Canada, G6V 4E2
1453, rue Beaubien est, Bureau 301, Montréal (QC) Canada, H2G 3C6

Figure 3.14



Sensitive Receptors	Concentration Values (ug/m³)
R27	606.6
R28	606.3
R29	606.6
R30	606.3
R31	607.3
R32	605.2
R36	602.1
R37	602.7
R38	603
R39	603.4

LEGEND

Sensitive Receptors
- Naskapi
- Innu
- Permanent
- Other

Study Areas
- Local Study Area (LSA)
- Air Quality Modelling Perimeter
- Road Included in the Model
- Road Not-included in the Model

CO (1-hour) - No Blasts
- Isocontour

Concentration Range (ug/m³)
- 0-620
- 620-640
- 640-660
- 660-680
- 680-700
- 700-750
- 750-800
- 800-927

Infrastructure and Mining Components
- P2 Plant 2
- MP Main processing Plant
- HMP Howse Mini-Plant
- BP Batch Plant
- FNC First Nations crusher/screener
- Existing Railroad
- Deposit
- Proposed Howse Pit
- Proposed Topsoil/ Overburden Stockpile
- Proposed Waste Dump/ In-Pit Dump
- Proposed Mine Haul Road

Basemap
- Existing road
- Contour Line (50 ft)
- Provincial Border
- Watercourse
- Water Body

FILE, PROJECT, DATE, AUTHOR:
GH-0678 , PR185-19-14, 2016-04-15, edickoum

N

0 2 4
Kilometers

UTM 19N NAD 83 SCALE: 1:90 000

SOURCES:

Basemap and Land Use Components
Government of Canada, NTDB, 1:50,000, 1979
Government of NL and government of Quebec,

Mining Components
Howse Minerals Limited/
MET-CHEM Howse Deposit Design
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AECOM

ENVIRONMENTAL IMPACT ASSESSMENT
HOWSE PROPERTY PROJECT

Maximum Concentrations - CO (1-hour) - No Blasts

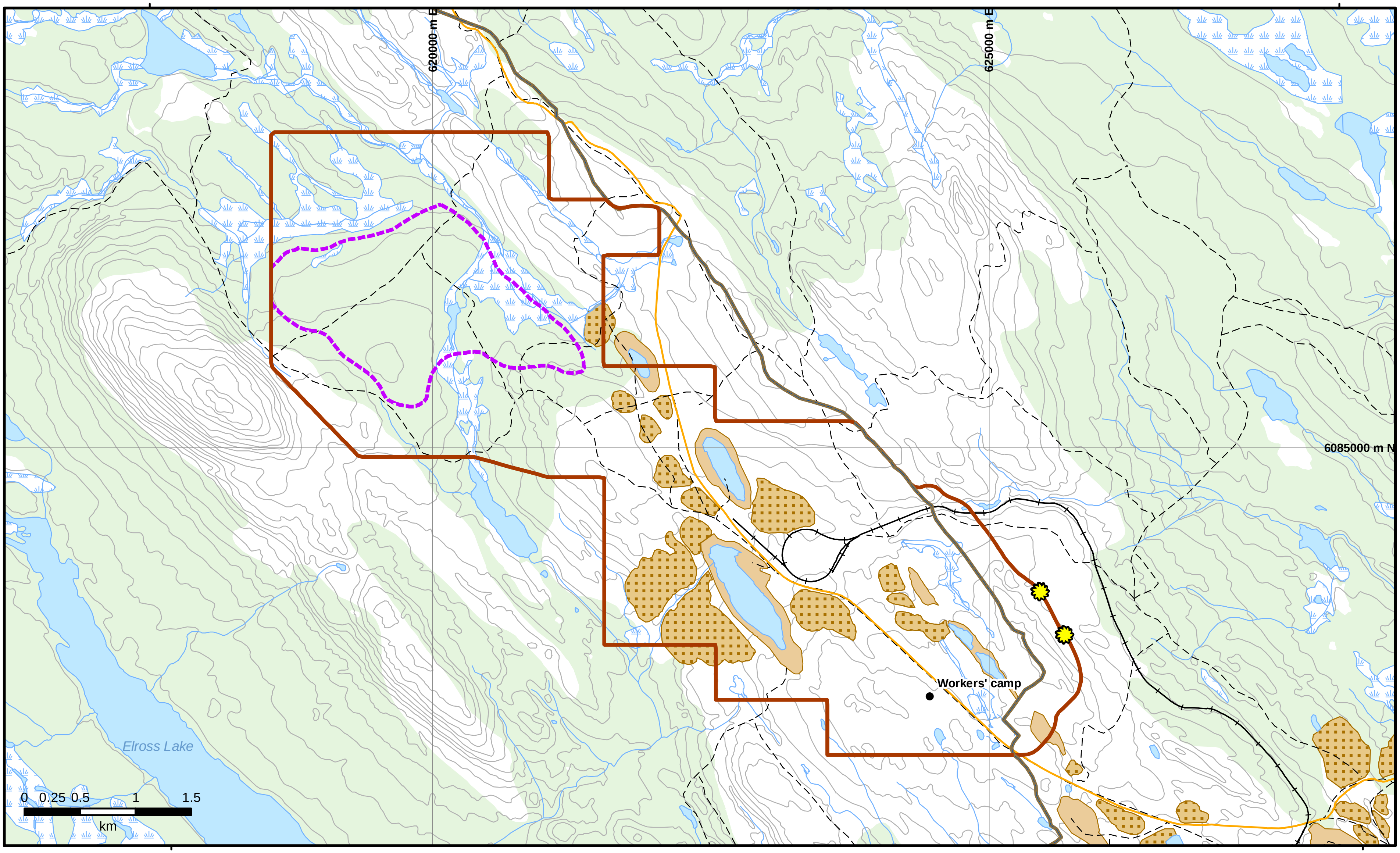
Howse Minerals Limited

GroupeHemispheres

5731, rue Saint-Louis, Bureau 201, Lévis (QC) Canada, G6V 4E2

1453, rue Beaubien est, Bureau 301, Montréal (QC) Canada, H2G 3C6

Figure 3.15



LEGEND / LÉGENDE

- Border / Frontière
- Railway / Voie ferrée
- Main Access Road / Route d'accès principale
- Road / Route
- Air Quality Modeling Perimeter / Périmètre de modélisation de la qualité de l'air
- Watercourse / Cours d'eau
- Waterbody / Plan d'eau
- Existing mined-out Pit / Fosse existante épuisée
- Existing Waste Dump / Halde de stériles existante
- Maximum concentrations with blasting
- HOWSE Project / Projet HOWSE

HOWSE Project
Location of "Off-Property" Grid Receptors
with Maximum Concentrations – With Blasts

UTM 19N NAD 83

SCALE / ECHELLE:
1:50 000

AECOM

SOURCES:

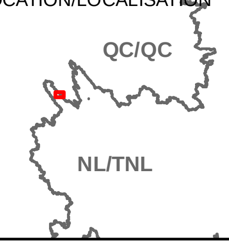
NTDB, 1:50,000, 1979
Gov. of NL and Gov. of Qc, Border
NML, Mining sites and roads
GH, Hydrology update, 2008

BNDT, 1/50 000, 1979
Gouv. de T-N-L et Gouv. du Qc, frontière
NML, gisements et routes
GH, mise-à-jour de l'hydrologie, 2008

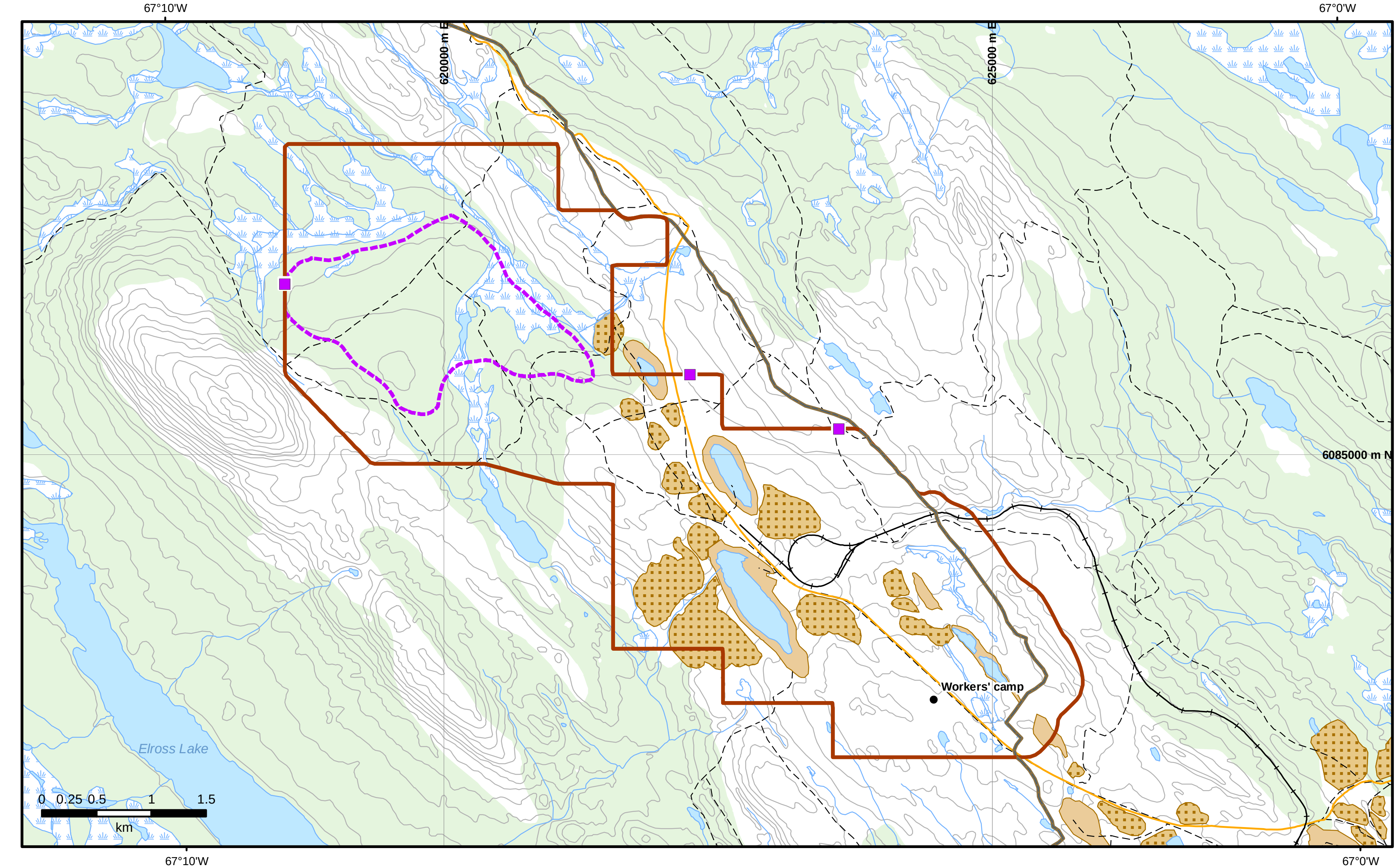
DATE: 2015-10-30

Figure 3.16

LOCATION/LOCALISATION



K:\CAMTL2\Projets\60437924_TATA_HealthRiskAsses\900-Travaux\920-929-Geomatique\09_produit\Figure 3.16 - Location of "Off-Property" Grid Receptors with Maximum Concentrations – With Blasts.mxd



LEGEND / LÉGENDE

- Border / Frontière
- Railway / Voie ferrée
- Main Access Road / Route d'accès principale
- Road / Route
- Air Quality Modeling Perimeter / Périmètre de modélisation de la qualité de l'air
- Watercourse / Cours d'eau
- Waterbody / Plan d'eau
- Existing mined-out Pit / Fosse existante épuisée
- Existing Waste Dump / Halde de stériles existante
- Maximum concentrations without blasting
- HOWSE Project / Projet HOWSE

HOWSE Project
Location of "Off-Property" Grid Receptors with Maximum Concentrations – No Blasts

UTM 19N NAD 83

SCALE / ECHELLE: 1:50 000

AECOM

SOURCES:

NTDB, 1:50,000, 1979
Gov. of NL and Gov. of Qc, Border
NML, Mining sites and roads
GH, Hydrology update, 2008

BNDT, 1/50 000, 1979
Gouv. de T-N-L et Gouv. du Qc, frontière
NML, gisements et routes
GH, mise-à-jour de l'hydrologie, 2008

DATE: 2015-10-30

Figure 3.17

LOCATION/LOCALISATION

4 References

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Appendix A
Emission Rates Calculations

SELECTED FOR AIR MODELLING SCENARIO (MAXIMUM SCENARIO)		
Mining Area and Production	Unit	Air Modelling
HOWSE		
Ore to Main Plant	kt	0
Ore to Howse Mini-Plant	kt	3,077
Ore to Plant 2	kt	0
Overburden	kt	6,778
Waste	kt	3,968
Total mined	*kt*	*13,823*
DSO3 - Fleming 7N		
Ore to Main Plant	kt	0
Ore to Howse Mini-Plant	kt	0
Ore to Plant 2	kt	1,109
Overburden	kt	46
Waste	kt	2,228
Total mined	*kt*	*3,383*
Ore hauled from DSO4 to Main Plant	kt	7,384

MINE PLAN SUMMARY													
Mining Area and Production	Unit	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
HOWSE													
Ore to Main Plant	kt	0	0	0	0	0	0	0	0	0	0	0	0
Ore to Howse Mini-Plant	kt	0	1319	3077	3077	3077	3246	3077	3077	3077	3077	3077	3077
Ore to Plant 2	kt	0	0	0	0	0	0	0	0	0	0	0	0
Overburden	kt	6346	5095	6295	0	0	6687	6778	6778	6778	3388	3388	3388
Waste	kt	0	112	332	2866	2879	2242	3968	3968	3968	6916	6916	6916
Total mined	*kt*	*6346*	*6525*	*9703*	*5943*	*5956*	*12175*	*13823*	*13823*	*13823*	*13381*	*13381*	*13381*
DSO3 - Fleming 7N													
Ore to Main Plant	kt	0	0	0	0	0	0	0	0	0	0	0	0
Ore to Howse Mini-Plant	kt	0	0	0	0	0	0	0	0	0	0	0	0
Ore to Plant 2	kt	485	1109	1103	1105	1123	977	0	0	0	0	0	0
Overburden	kt	452	46	0	0	0	0	0	0	0	0	0	0
Waste	kt	1533	2228	1628	1622	1550	1367	0	0	0	0	0	0
Total mined	*kt*	*2471*	*3383*	*2730*	*2726*	*2673*	*2344*	*0*	*0*	*0*	*0*	*0*	*0*
DSO3 - Timmins 3N													
Ore to Main Plant	kt	0	0	0	0	0	0	0	0	0	0	0	0
Ore to Howse Mini-Plant	kt	0	0	0	0	0	0	0	0	0	0	0	0
Ore to Plant 2	kt	0	0	0	0	0	0	47	384	521	662	420	0
Overburden	kt	0	0	0	0	0	0	1193	211	0	0	0	0
Waste	kt	0	0	0	0	0	0	1240	2578	1715	1247	313	0
Total mined	*kt*	*0*	*0*	*0*	*0*	*0*	*0*	*2479*	*3173*	*2236*	*1909*	*733*	*0*
DSO3 - Timmins 7, Timmins 4N, Timmins 4S													
Ore to Main Plant	kt	0	0	0	0	0	0	0	0	0	0	0	0
Ore to Howse Mini-Plant	kt	0	0	0	0	0	0	0	0	0	0	0	0
Ore to Plant 2	kt	0	0	0	0	0	0	0	0	0	0	0	0
Overburden	kt	0	0	0	0	0	0	0	0	0	0	0	0
Waste	kt	0	0	0	0	0	0	0	0	0	0	0	0
Total mined	*kt*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
Ore hauled from DSO4 to Main Plant	kt	2377	6409	6308	6375	6298	6455	7384	7085	6931	6763	6961	4194
Total Ore Production	kt	2863	8837	10488	10557	10498	10678	10507	10546	10528	10502	10458	7271

Description	Units	FY-2017		FY-2018		FY-2019		FY-2020		FY-2021		FY	FY	FY	FY	Total
		Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	2022 - 24	2025 - 27	2028 - 30	2031 - 32	
Ore to Dry Plant	kt	1,200	0	2,800	0	2,800	0	2,800	0	2,800	0	8,400	8,400	8,400	5,642	43,243
Fe	%	64.2	0	64.7	0	62.8	0	62.9	0	62.2	0	62.8	63.2	62.4	62.7	62.9
SiO	%	4.4	0	3.8	0	6.2	0	6	0	6.4	0	6.4	5.8	7	6.9	6.2
Al	%	0.8	0	0.8	0	1	0	0.9	0	1.2	0	1	1	1.1	0.9	1
MnO	%	0.15	0	0.15	0	0.15	0	0.13	0	0.13	0	0.16	0.14	0.11	0.08	0.13
LOI	%	3	0	3	0	3	0	2.8	0	3	0	2.6	2.4	2.1	2.1	2.5
Ore to Stockpile		0	0	0	0	0	0	47	0	154	0	0	0	1,872	779	2,851
Fe	%	0	0	0	0	0	0	55.1	0	56.7	0	0	0	58.8	59.2	58.8
SiO	%	0	0	0	0	0	0	16	0	14.3	0	0	0	11.6	11.6	11.8
Al	%	0	0	0	0	0	0	0.9	0	1.2	0	0	0	1.1	1	1.1
MnO	%	0	0	0	0	0	0	0.08	0	0.12	0	0	0	0.11	0.06	0.1
LOI	%	0	0	0	0	0	0	3.2	0	3.2	0	0	0	2.8	2.2	2.7
Total	kt	102	4,636	302	5,728	2,608	0	2,620	0	2,040	6,085	29,337	28,130	13,182	6,754	107,297
Overburden	kt	0	4,636	0	5,728	0	0	0	0	0	6,085	18,503	9,248	0	0	49,975
Waste Rock	kt	102	0	302	0	2,608	0	2,620	0	2,040	0	10,834	18,881	13,182	6,754	57,322

Description	Units	FY-2017		FY-2018		FY-2019		FY-2020		FY-2021		2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
		Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter											
Ore to Dry Plant	kt	1,200	0	2,800	0	2,800	0	2,800	0	2,800	0	2,800	2,800	2,800	2,800	2800	2800	2800	2800	2800	2821	2821
Ore to Stockpile	kt	0	0	0	0	0	0	47	0	154	0	0	0	0	0	0	0	624	624	624	389.5	389.5
Total Ore	kt	1,200	0	2,800	0	2,800	0	2,847	0	2,954	0	2,800	2,800	2,800	2,800	2,800	2,800	3,424	3,424	3,424	3,211	3,211
Overburden	kt	0	4636	0	5728	0	0	0	0	0	6085	6,168	6,168	6167.666667	3082.666667	3082.666667	3082.666667	0	0	0	0	0
Waste Rock	kt	102	0	302	0	2608	0	2620	0	2040	0	3,611	3,611	3611.333333	6293.666667	6293.666667	6293.666667	4394	4394	4394	2251.333	2251.333

Description	Units	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Total Ore	kt	1200	2800	2800	2800	2954	2800	2800	2800	2800	2800	2800	3424	3424	3424	3210.5	3210.5
Overburden	kt	4636	5728	0	0	6085	6167.7	6167.7	6167.7	3082.7	3082.7	3082.7	0.0	0.0	0.0	0.0	0.0
Waste Rock	kt	102	302	2608	2620	2040	3611.3	3611.3	3611.3	3611.3	6293.7	6293.7	4394.0	4394.0	4394.0	4394.0	2251.3
Sum	Kt	5938	8830	5408	5420	11079	12579	12579	12579	9494	12176.3	12176.3	7818.0	7818.0	7818.0	7604.5	5461.8

	ROM	OB	WAS		
Annual Excavation (Mtpa)	3.0769	6.7777	3.9685	Moisture content	9%
Days	200				
Sum total in kt	13823.077				
Sum OB+WST in kt	10746.154				

Emissions from stockpiles wind erosion

Equation used:

$$FE = 1.12 \times 10^{-4} \times J \times 1.7 \times \left(\frac{s}{1.5}\right) \times \left(365 \times \frac{(365 - P)}{235}\right) \times \left(\frac{I}{15}\right) \qquad (8.11)$$

ref: http://www.ec.gc.ca/pdb/npri/documents/ToolBox/docs/pits_quarries_f.cfm#8_9

FE = Emission factor (kg/m^2)
s = Average silt load on stockpile (%)
P = Number of days per year were precipitation was at least 0,254 mm
I = Proportion of time per year where wind speed is > 19,3 km/hr (%)
J = Particulates aerodynamic factor
Particulates aerodynamic factor of TPM, PM10 and PM2.5 is :

J(TPM) = 1
J(PM10) = 0.5

PM2.5/PM10 ratio = 0.15 <--- Ref: Proposed Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors, 2006

2556.818182

Data

Average Density of stockpiled material	3.0	tonnes/m3	*Email Jean-Christophe Vanier, Ingenium Construction, 2014-03-31*
I=	35	%	*Ref:Meteorological data 2004-2008*
Reduction emission factor (dump)=	0%		*Hypothesis to consider moisture content and inactive part*

Calculations

									Before applying Attenuation factor						Before applying Attenuation factor		
									FE	FE	FE				Emission rate		
	Silt content	Total tonnage stockpiled	Angle of slant	Volume	Height	Exposed Diameter	Exposed Area	Equivalent Flat Diameter	TPM	PM 10	PM 2,5	TPM	PM 10	PM 2,5	TPM	PM 10	PM 2,5
	%	tonnes	degrees	m3	m	m	m2	m	kg/m^2-yr	kg/m^2-yr	kg/m^2-yr	kg/yr	kg/yr	kg/yr	g/s	g/s	g/s
Dump - Flemming 7N	1.5		37		192.2	510	255,789		0.1622	0.0811	0.0122	41,478.0	20,739.0	3,110.9	1.3153	0.6576	0.0986
Overburden - Flemming 7N	1.5		37		114.5	304	90,884		0.1622	0.0811	0.0122	14,737.5	7,368.8	1,105.3	0.4673	0.2337	0.0350
Dump - Timmins 3N	1.5		37		192.2	510	255,789		0.1622	0.0811	0.0122	41,478.0	20,739.0	3,110.9	1.3153	0.6576	0.0986
Overburden - Timmins 3N	1.5		37		114.5	304	90,884		0.1622	0.0811	0.0122	14,737.5	7,368.8	1,105.3	0.4673	0.2337	0.0350
Dump and Overburden- Timmins 4	1.5		37		114.5	304	90,884		0.1622	0.0811	0.0122	14,737.5	7,368.8	1,105.3	0.4673	0.2337	0.0350
Dump and Overburden-Timmins 7	1.5		37		120.0	319	99,797		0.1622	0.0811	0.0122	16,182.8	8,091.4	1,213.7	0.5132	0.2566	0.0385
Dump and Overburden-HOWSE	1.5		37		216.0	573	323,304		0.1622	0.0811	0.0122	52,426.1	26,213.1	3,932.0	1.6624	0.8312	0.1247
SP_T4 - Stockpiles near T4	1.5	167832	37	55944	31.2	83	6,738	92.6	0.1622	0.0811	0.0122	1,092.6	546.3	81.9	0.0346	0.0173	0.0026
SP_NP1 - Stockpiles North of Plant 1	1.5	62258	37	20753	22.4	59	3,479	66.6	0.1622	0.0811	0.0122	564.1	282.1	42.3	0.0179	0.0089	0.0013
SP_P2 - Stockpiles near Plant 2	1.5	322172	37	107391	38.8	103	10,408	115.1	0.1622	0.0811	0.0122	1,687.7	843.8	126.6	0.0535	0.0268	0.0040
SP_F7-1 - Stockpiles near T3 and F7	1.5	329976	37	109992	39.1	104	10,575	116.0	0.1622	0.0811	0.0122	1,714.8	857.4	128.6	0.0544	0.0272	0.0041
SP_F7_2 - Stockpiles near F7 (Eastern)	1.5	138292	37	46097	29.2	78	5,922	86.8	0.1622	0.0811	0.0122	960.3	480.2	72.0	0.0305	0.0152	0.0023
SP_P1 - Stockpiles at of Plant 1	1.5	100000	37	33333	26.2	70	4,771	77.9	0.1622	0.0811	0.0122	773.7	386.8	58.0	0.0245	0.0123	0.0018
SP_SIN - Sinterfines product stockpile	11.2		37		27.7	73	5,305		1.2108	0.6054	0.0908	6,423.5	3,211.8	481.8	0.2037	0.1018	0.0153
SP_SUP - Superfines product stockpile (Northern pile)			37		17.7	47	2,159										
SP_SUP - Superfines product stockpile (Southern pile)			37		17.0	45	1,997										
SP_SUP - Superfines product stockpiles (2 SP modeled as one)	84.5				17.3		4,156		9.1349	4.5674	0.6851	37,963.0	18,981.5	2,847.2	1.2038	0.6019	0.0903
SP_ HOW - Product, ROM & ROM backup stockpile (3 SP modelled as one)	1.5	261500	37	87167	36.2	96	9,056	107.4	0.1622	0.0811	0.0122	1,468.5	734.3	110.1	0.0466	0.0233	0.0035

* estimated from drawing GIS-ML-20-18-01

	Months											
	1	2	3	4	5	6	7	8	9	10	11	12
Days in the month	31	28.25	31	30	31	30	31	31	30	31	30	31
Days with Snow Depth >= 5 cm	31	28.25	31	29	16.8	0.7	0	0.05	0.13	11.3	25.9	31
Days with Precipitation >= 0.2 mm	17.1	14.3	16.4	16.2	15.8	16.1	19	18.4	20.4	21.8	21.3	19
Days with Snow Depth >= 5 cm + [1 - (Snow>5cm) / (Days in month)] * (Precipitation>0.2mm) ***	31.0	28.3	31.0	29.5	24.0	16.4	19.0	18.4	20.4	25.2	28.8	31.0
Monthly P value projected Yearly	365	365	365	359	283	200	224	217	249	296	351	365
Monthly attenuation factor [(365-P) / 235]	0.0000	0.0000	0.0000	0.0238	0.3488	0.7029	0.6012	0.6303	0.4949	0.2929	0.0616	0.0000

Ref: http://www.climate.weatheroffice.ec.gc.ca/climate_normals - Schefferville (1971-2000)

*** The " [1 - (Snow>5cm) / (Days in month)] * (Precipitation>0.2mm) " expression determines the monthly percentage of days with precipitations > 0.2 mm within the month, then assigns this percentage to the remaining days of the month which have no snow cover.

Example: In a month of 30 days, there is 12 days of snow cover > 5cm and 24 days with precipitations > 0.2mm. Assuming equal repartition of the days with precipitations > 0.2mm over all days of the month, there will be a fraction of 0.4 days (12/30) with snow cover, meaning a fraction of 0.6 days without snow cover, therefore 14.4 days (0.6x24) can be calculated as being days WITHOUT snow cover but WITH precipitations > 0.2mm. You can then add the number of days WITH snow cover to calculate the total number of days with either Snow cover > 5 cm OR precipitations > 0.2mm. This number of days with attenuation can then be projected yearly to calculate a monthly P value that can be applied independently to individual months which will fit into the equation quoted above originally designed for yearly calculations.

*(Snow>5cm) + [1 - (Snow>5cm) / (Days in month)] * (Precipitation>0.2mm) = 12 + [1 - 12/30] * 24 = 26.4 days with attenuation*
*Monthly P value projected yearly = 26.4 days / 30 days within the month * 365 days within the year = 321.2 days*
Monthly attenuation factor = [(365-P) / 235] = (365 - 321.2) / 235 = 0.1864

Emissions from Kivivic Ore transportation activities (Engines)

Source: EPA Tier2 - Spec sheet (775G, CAT Mining truck*)*

PM		0.2	g/kW-h	https://www.dieselnet.com/standards/us/nonroad.php
NOx	NMHC+NOx	6.4	g/kW-h	https://www.dieselnet.com/standards/us/nonroad.php
CO		3.5	g/kW-h	https://www.dieselnet.com/standards/us/nonroad.php
HC		0.400	g/kW-h	https://www.dieselnet.com/standards/us/nonroad.php & EPA420-R-05-015 Table 8.pdf

*EPA420-R-05-015; Table8

Data

Sulfur in fuel	0.0015%		*REF: Email François Saulnier Exxon Mobil, Jan 5th, 2011*
	15	mg/kg	
Engine Gross power	615	kW	*Source: Spec sheets* **775G** CAT Mining truck*)*
Motor load	50%		*hypothesis based on motor work cycle*
Engine power (50% load)	307.50	kW	
Fuel consumption	78.55	L/h	*Source : Haul truck fuel consumption and CO2 emission under various engine load conditions by V. Kecojevic and D. Komljenovic*
Average speed	35	km/h	*Source : phone conv. Aug 16 2011 - JC Bourassa*
LHV	42,780	kJ/kg	*Source: Spec sheets* 775G CAT Mining truck*)*
Densité diesel	0.8389	kg/l	*Source: Spec sheets* 775G CAT Mining truck*)*
PM < 1 um			*Source : AP-42, Gasoline And Diesel Industrial Engines, tableau 3.3-1.*

Transported ore weight	64.0	tonnes	*Source: Spec sheets* 775G CAT Mining truck*)*	
	70.5	tons lb	*Source: Spec sheets* 775G CAT Mining truck*)*	
Weight empty vehicle	47.8	tonnes		
	52.7	tons lb		
W (average vehicle weight)	88.0	tons lb		
Nbre d'heures / an	8760	hr/yr	*Ref: New Millenium*	365 days/year

<u>Ore transport</u> Ore coming from Kivivic 7,384,000 tonnes/yr

Road Width:	20	m	Hypothesis
Road max lenght	200	m	Lenght:width ratio 10:1, CALPUFF User Guide, (Scire, 2000)

Calculs

Diesel Consumption per vehicle	78.55	L/h	/	35	km/h					=	2.2 L/KPV
Diesel Consumption	78.55	L/h	X	0.8389	kg/l					=	65.9 kg/h
Hp-h Diesel	65.9	kg/h	X	42780	kJ/kg	X	1 h	/	2684.5 kJ/hp-h	=	1050.2 hp-h
											(energy from the fuel)
PM Emission rate	307.5	kW	X	0.2	g/kW-h	/	35 km/h	/	1000 g/kg	=	0.0018 kg/KPV
CO Emission rate	307.5	kW	X	3.5	g/kW-h	/	35 km/h	/	1000 g/kg	=	0.0308 kg/KPV
NO_X Emissions rate	307.5	kW	X	6.4	g/kW-h	/	35 km/h	/	1000 g/kg	=	0.0562 kg/KPV
SO_2 Emission rate (15ppm sulphur)	2.2	L/km parcouru \	X	0.84	kg/L	X	15 mg S/kg	X	2 kg SO_2/kg S	=	5.65E-05 kg/KPV
HC Emission rate	307.5	kW	X	0.4	g/kW-h	/	35 km/h	/	1000 g/kg	=	0.0035 kg/KPV

Ore coming from Kivivic

Voy/year - go/ret	7,384,000	T/an	/	64.0	tonnes	X	2	aller-retour	=	230,750	voy/an		
PM(kg/km)	0.0018	kg/KPV	X	230,750	voyages/an	=	405	kg/km	=	405	g/m		
PM(g/s/m2)	405	g/m	/	20	m	/	31,536,000	s			=	**6.43E-07**	**g/s/m2**
CO(kg/km)	0.0308	kg/KPV	X	230,750	voyages/an	=	7,096	kg/km	=	7,096	g/m		
CO(g/s/m2)	7,096	g/m	/	20	m	/	31,536,000	s			=	**1.12E-05**	**g/s/m2**
NOx(kg/km)	0.06	kg/KPV	X	230,750	voyages/an	=	12,975	kg/km	=	12,975	g/m		
NOx(g/s/m2)	12,975	g/m	/	20	m	/	31,536,000	s			=	**2.06E-05**	**g/s/m2**
SO2(kg/km)	0.00006	kg/KPV	X	230,750	voyages/an	=	13	kg/km	=	13	g/m		
SO2(g/s/m2)	13	g/m	/	20	m	/	31,536,000	s			=	**2.07E-08**	**g/s/m2**
HC(kg/km)	0.0035	kg/KPV	X	230,750	voyages/an	=	810.9214286	kg/km	=	810.9214286	g/m		
HC(g/s/m2)	811	g/m	/	20	m	/	31,536,000	s			=	**1.29E-06**	**g/s/m2**

Emissions from Kivivic Ore transportation activities (PM)

Equation used:

E =0.282* k*(s/12)^a*(W/3)^b — *Ref.: U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.2 Unpaved Roads, Equation (1)*

E = Emission factor (lb/Vehicule mile traveled)

k,a,b = constant

s= % silt

W= Vehicule average weight (tons lb)

Eext= E((365-P)/365) — *Réf.: U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.2 Unpaved Roads, Equation (2)*

Eext= Emmision factor - natural mitigation (lb/Vehicule mile traveled) — ***Applied monthly in CALPUFF as variable emission factors***

P = Number of days per year were precipitation was at least 0,254 mm

Data

	PM2.5	PM10	MPT
k (lb/MVP)	0.15	1.50	4.90
a	0.90	0.90	0.70
b	0.45	0.45	0.45

Réf.: U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.2 Unpaved Roads, Table 13.2.2-2

s (% silt)		8.0	%	*Pierre concassée, ref: email JC Bourassa 23 March 2010 - DSO Phase 2a(2) - silt.msg*
Transported ore weight		64.0	tonnes	*Source: Spec sheets* 775G CAT Mining truck*)*
		70.5	tons lb	*Source: Spec sheets* 775G CAT Mining truck*)*
Weight empty vehicle		47.8	tonnes	
		52.7	tons lb	
W (average vehicle weight)		88.0	tons lb	
Ore transport	Ore coming from Kivivic	7,384,000	tonnes/yr	
Nb hours / year		8760	hr/yr	*Ref: New Millenium* 200 days/year
Road width	20 m			
Road max lenght	200 m			*Lenght:width ratio 10:1, CALPUFF User Guide, (Scire, 2000)*

Emission control: road spray

Efficiency: ***70%*** *Source.: Environment Canada - NPRI Toolbox - Unpaved Industrial Road Dust Excel Calculator*
http://ec.gc.ca/inrp-npri/default.asp?lang=En&n=6DE7F8BC-1

Calculations

Ore coming from Kivivic

Voy/year - go/ret	7,384,000	T/year	/	64.0	tonnes/load	X	2	trips/load	=	230,750	trips/year
PM2.5 (kg/KPV)	0.13	lb/VMT	X	0.454	kg/lb	X	0.621	km/mile	=	0.04	kg/VKT
PM2.5 (kg/km)	0.0379	kg/VKT	X	230,750	trips/year	=	8,738	kg/km yr	=	8,738	g/m year
PM2.5 (g/s m)	8,738	g/m year	/	31,536,000	s/yr	X	(1 - 0,70)		=	8.31E-05	g/s m
PM2.5 (g/s m2)	8.31E-05	g/s m	/	20	m				=	**4.16E-06**	**g/s m2**
PM10 (lb/year)	1.34	lb/MVP	X	0.454	kg/lb	X	0.621	km/mile	=	0.38	kg/VKT
PM10 (kg/km)	0.38	kg/KPV	X	230,750	trips/year	=	87,380	kg/km yr	=	87,380	g/m year
PM10 (g/s m)	87,380	g/m year	/	31,536,000	s/yr	X	(1 - 0,70)		=	8.31E-04	g/s m
PM10 (g/s m2)	8.31E-04	g/s m	/	20	m				=	**4.16E-05**	**g/s/m2**
MPT (lb/year)	4.76	lb/MVP	X	0.454	kg/lb	X	0.621	km/mile	=	1.34	kg/VKT
MPT (kg/an)	1.34	kg/KPV	X	230,750	trips/year	=	309,552	kg/km yr	=	309,552	g/m year
MPT (g/s m)	309,552	g/m year	/	31,536,000	s/yr	X	(1 - 0,70)		=	2.94E-03	g/s m
MPT (g/s m2)	2.94E-03	g/s m	/	20	m				=	**1.47E-04**	**g/s/m2**

Emissions from 10 wheelers for HOWSE Overburden transportation activities (Engines)

Source: EPA MOVES2014 for a 2010 Diesel Single Unit Heavy Truck

PM	0.024326897	g/km		
NOx	0.822850764	g/km		
CO	0.25617829	g/km		
HC	0.069	g/km		
*EPA420-R-05-015; Table8				
Data				
Sulfur in fuel	0.0015%			*REF: Email François Saulnier Exxon Mobil, Jan 5th, 2011*
	15	mg/kg		
Engine Gross power	350	kW	*Source: CT680-CAT*	
Motor load	50%		*hypothesis based on motor work cycle*	
Engine power (50% load)	175.00	kW		
Fuel consumption	45.35	L/h	*Source : Haul truck fuel consumption and CO2 emission under various engine load conditions by V. Kecojevic and D. Komljenovic*	
Average speed	35	km/h		
LHV	42,780	kJ/kg		
Densité diesel	0.8389	kg/l		
PM < 1 um			*Source : AP-42, Gasoline And Diesel Industrial Engines, tableau 3.3-1.*	

Transported ore weight	20.0	tonnes	*Source:http://www.ancai.com/loi_89.html*
	22.0	tons lb	
Weight empty vehicle	13.4	tonnes	*Source: http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=71EF09D7-1&offset=3#s_c_2_2*
	14.8	tons lb	
W (average vehicle weight)	25.8	tons lb	
Nbre d'heures / an	2400	hr/yr	*Assumption of 12h/day activities, 200 days/year*

<u>Ore transport</u>

Overburden by First Nations	100,000	tonnes/yr

Road Width:	20	m	Hypothesis
Road max lenght	200	m	Lenght:width ratio 10:1, CALPUFF User Guide, (Scire, 2000)

<u>Calculs</u>

Diesel Consumption per vehicle	45.35	L/h	/	35	km/h				=	1.3	L/KPV				
PM Emission rate	0.02433	g/km	/	1000	g/kg				=	0.000024327	kg/KPV				
CO Emission rate	0.25618	g/km	/	1000	g/kg				=	0.000256178	kg/KPV				
NO_X Emissions rate	0.82285	g/km	/	1000	g/kg				=	0.000822851	kg/KPV				
SO_2 Emission rate (15ppm sulphur)	1.3	L/km parcouru \	X	0.8389	kg/L	X	15	mg S/kg	X	2	kg SO_2/kg S	=	3.26E-05	kg/KPV	
HC Emission rate	0.06935	g/km	/	1000	g/kg				=	0.000069351	kg/KPV				

Overburden by First Nations

Voy/year - go/ret	100,000	T/an	/	20.0	tonnes	X	2	aller-retour	=	10,000	voy/an		
PM(kg/km)	0.0000243	kg/KPV	X	10,000	voyages/an	=	0.24327	kg/km	=	0.24327	g/m		
PM(g/s/m2)	0.24327	g/m	/	20	m	/	8,640,000	s			=	**1.41E-09**	**g/s/m2**
CO(kg/km)	0.0002562	kg/KPV	X	10,000	voyages/an	=	2.56178	kg/km	=	2.56178	g/m		
CO(g/s/m2)	2.56178	g/m	/	20	m	/	8,640,000	s			=	**1.48E-08**	**g/s/m2**
NOx(kg/km)	0.0008229	kg/KPV	X	10,000	voyages/an	=	8.22851	kg/km	=	8.22851	g/m		
NOx(g/s/m2)	8.22851	g/m	/	20	m	/	8,640,000	s			=	**4.76E-08**	**g/s/m2**
SO2(kg/km)	0.0000326	kg/KPV	X	10,000	voyages/an	=	0.32608	kg/km	=	0.32608	g/m		
SO2(g/s/m2)	0.32608	g/m	/	20	m	/	8,640,000	s			=	**1.89E-09**	**g/s/m2**
HC(kg/km)	0.0000694	kg/KPV	X	10,000	voyages/an	=	0.69351	kg/km	=	0.69351	g/m		
HC(g/s/m2)	0.69351	g/m	/	20	m	/	8,640,000	s			=	**4.01E-09**	**g/s/m2**

Emissions from 10 wheelers for HOWSE Overburden transportation activities (PM)

Equation used:

E =0.282* k*(s/12)^a*(W/3)^b — *Ref.: U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.2 Unpaved Roads, Equation (1)*

E = Emission factor (lb/Vehicule mile traveled)

k,a,b = constant

s= % silt

W= Vehicule average weight (tons lb)

Eext= E((365-P)/365) — *Réf.: U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.2 Unpaved Roads, Equation (2)*

Eext= Emmision factor - natural mitigation (lb/Vehicule mile traveled) — ***Applied monthly in CALPUFF as variable emission factors***

P = Number of days per year were precipitation was at least 0,254 mm

Data

	PM2.5	PM10	MPT
k (lb/MVP)	0.15	1.50	4.90
a	0.90	0.90	0.70
b	0.45	0.45	0.45

Réf.: U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.2 Unpaved Roads, Table 13.2.2-2

s (% silt)	8.0	%	*Pierre concassée, ref: email JC Bourassa 23 March 2010 - DSO Phase 2a(2) - silt.msg*
Transported ore weight	20.0	tonnes	*Source:http://www.ancai.com/loi_89.html*
	22.0	tons lb	
Weight empty vehicle	13.4	tonnes	*Source: http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=71EF09D7-1&offset=3#s_c_2_2*
	14.8	tons lb	
W (average vehicle weight)	25.8	tons lb	

Ore transport

Overburden by First Nations	100,000	tonnes/yr	
Nb hours / year	2400	hr/yr	*Assumption of 12h/day activities, 200 days/year*

Road width 20 m

Road max lenght 200 m — *Lenght:width ratio 10:1, CALPUFF User Guide, (Scire, 2000)*

Emission control: road spray

Efficiency: ***70%*** *Source.: Environment Canada - NPRI Toolbox - Unpaved Industrial Road Dust Excel Calculator*
http://ec.gc.ca/inrp-npri/default.asp?lang=En&n=6DE7F8BC-1

Calculations

Overburden by First Nations

Voy/year - go/ret	100,000	T/year	/	20.0	tonnes/load	X	2	trips/load	=	10,000	trips/year
PM2.5 (kg/KPV)	0.08	lb/VMT	X	0.454	kg/lb	X	0.621	km/mile	=	0.02	kg/VKT
PM2.5 (kg/km)	0.0218	kg/VKT	X	10,000	trips/year	=	218	kg/km yr	=	218	g/m year
PM2.5 (g/s m)	218	g/m year	/	8,640,000	s/yr	X	(1 - 0,70)		=	7.57E-06	g/s m
PM2.5 (g/s m2)	7.57E-06	g/s m	/	20	m				=	**3.78E-07**	**g/s m2**
PM10 (lb/year)	0.77	lb/MVP	X	0.454	kg/lb	X	0.621	km/mile	=	0.22	kg/VKT
PM10 (kg/km)	0.22	kg/KPV	X	10,000	trips/year	=	2,179	kg/km yr	=	2,179	g/m year
PM10 (g/s m)	2,179	g/m year	/	8,640,000	s/yr	X	(1 - 0,70)		=	7.57E-05	g/s m
PM10 (g/s m2)	7.57E-05	g/s m	/	20	m				=	**3.78E-06**	**g/s/m2**
MPT (lb/year)	2.74	lb/MVP	X	0.454	kg/lb	X	0.621	km/mile	=	0.77	kg/VKT
MPT (kg/an)	0.77	kg/KPV	X	10,000	trips/year	=	7,721	kg/km yr	=	7,721	g/m year
MPT (g/s m)	7,721	g/m year	/	8,640,000	s/yr	X	(1 - 0,70)		=	2.68E-04	g/s m
MPT (g/s m2)	2.68E-04	g/s m	/	20	m				=	**1.34E-05**	**g/s/m2**

Emissions from Pickup transportation activities (Engines)

Source: EPA MOVES2014 for a 2010 Gasoline Light Commercial Truck

PM	0.00472805	g/km
NOx	0.04083921	g/km
CO	1.19968413	g/km
HC	0.006	g/km

*EPA420-R-05-015; Table8

Brochure - Ford F150	
5L 4-valve-v8 FFV 4*2 combined	
Feul consumption (mpg)	*15*
GVWR	8200
POWER (HP)	360
Engine type	Flex-fuel (FFV)

Data

Sulfur in fuel	0.0030%		
	30	mg/kg	*Source : http://www.ec.gc.ca/energie-energy/default.asp?lang=En&n=9863FC87-1&offset=2#2.2.1*
Engine Gross power	269	kW	*Source: Spec sheet F150*
Motor load	50%		*hypothesis based on motor work cycle*
Engine power (50% load)	134.28	kW	
Fuel consumption	0.16	L/km	*Source: Ford F150 Pickup Specification sheet*
Average speed	50	km/h	*Source : Conference call with Loic Didillon on July 08, 2015*
Density gasoline	0.734	kg/L	*Source : http://publications.gc.ca/collections/collection_2014/ec/En14-170-2003-fra.pdf*
PM < 1 um			*Source : AP-42, Gasoline And Diesel Industrial Engines, tableau 3.3-1.*

Transported ore weight	0.0	tonnes	*Source: Spec sheets* Pickup
	0.0	tons lb	
Weight empty vehicle	2.0	tonnes	*Source: Spec sheets Pickup-supercrew*
	2.2	tons lb	
W (average vehicle weight)	2.2	tons lb	
Nbre d'heures / an	4563	hr/yr	*Assumption of 12.5h/day activities, 365 days/year*
Nbr of Travels btw 9-15 july	2084	travels	*Source: E-mail sent by Loic Didillon on July 18th, 2015*
Nbr of Travels per day	300	travels/day	*(2084 travels over 7 days)*
Nbr of Travels per hour	24	travels/hr	*(300 travels over 12.5hr/day)*

<u>Percentage of Traveling rate to consider</u>

Rate DSO3-DSO4 - 25%	25%
Rate DSO3-Schefferville - 100%	100%

Road Width:	20	m	Hypothesis
Road max lenght	200	m	Lenght:width ratio 10:1, CALPUFF User Guide, (Scire, 2000)

Calculs

Diesel Consumption per vehicle	0.16	L/h	/	50	km/h				=	0.003130	L/KPV			
PM Emission rate	0.00473	g/km	/	1000	g/kg				=	0.000004728	kg/KPV			
CO Emission rate	1.19968	g/km	/	1000	g/kg				=	0.001199684	kg/KPV			
NO_X Emissions rate	0.04084	g/km	/	1000	g/kg				=	0.000040839	kg/KPV			
SO_2 Emission rate (30ppm sulphur)	0.003130	L/km (KPV)	X	0.7340	kg/L	X	30	mg S/kg	X	2	kg SO_2/kg S	=	1.38E-07	kg/KPV
HC Emission rate	0.00586	g/km	/	1000	g/kg				=	0.000005860	kg/KPV			

Rate DSO3-DSO4 - 25%

Voy/year - go/ret	24	travels/hr	X	4563	hr/yr	X	25%		=	27,375	voy/an		
PM(kg/km)	0.0000047	kg/KPV	X	27,375	voyages/an	=	0.12943	kg/km	=	0.12943	g/m		
PM(g/s/m2)	0.12943	g/m	/	20	m	/	16,425,000	s			=	**3.94E-10**	**g/s/m2**
CO(kg/km)	0.0011997	kg/KPV	X	27,375	voyages/an	=	32.84135	kg/km	=	32.84135	g/m		
CO(g/s/m2)	32.84135	g/m	/	20	m	/	16,425,000	s			=	**1.00E-07**	**g/s/m2**
NOx(kg/km)	0.0000408	kg/KPV	X	27,375	voyages/an	=	1.11797	kg/km	=	1.11797	g/m		
NOx(g/s/m2)	1.11797	g/m	/	20	m	/	16,425,000	s			=	**3.40E-09**	**g/s/m2**
SO2(kg/km)	0.0000001	kg/KPV	X	27,375	voyages/an	=	0.00377	kg/km	=	0.00377	g/m		
SO2(g/s/m2)	0.00377	g/m	/	20	m	/	16,425,000	s			=	**1.15E-11**	**g/s/m2**
HC(kg/km)	0.0000059	kg/KPV	X	27,375	voyages/an	=	0.16043	kg/km	=	0.16043	g/m		
HC(g/s/m2)	0.16043	g/m	/	20	m	/	16,425,000	s			=	**4.88E-10**	**g/s/m2**

Rate DSO3-Schefferville - 100%

Voy/year - go/ret	24	travels/hr	X	4563	hr/yr	X	100%		=	109,500	voy/an		
PM(kg/km)	0.000004728	kg/KPV	X	109,500	voyages/an	=	0.51772	kg/km	=	0.51772	g/m		
PM(g/s/m2)	0.51772	g/m	/	20	m	/	16,425,000	s			=	**1.58E-09**	**g/s/m2**
CO(kg/km)	0.001199684	kg/KPV	X	109,500	voyages/an	=	131.36541	kg/km	=	131.36541	g/m		
CO(g/s/m2)	131.36541	g/m	/	20	m	/	16,425,000	s			=	**4.00E-07**	**g/s/m2**
NOx(kg/km)	0.000040839	kg/KPV	X	109,500	voyages/an	=	4.47189	kg/km	=	4.47189	g/m		
NOx(g/s/m2)	4.47189	g/m	/	20	m	/	16,425,000	s			=	**1.36E-08**	**g/s/m2**
SO2(kg/km)	0.000000138	kg/KPV	X	109,500	voyages/an	=	0.01510	kg/km	=	0.01510	g/m		
SO2(g/s/m2)	0.01510	g/m	/	20	m	/	16,425,000	s			=	**4.60E-11**	**g/s/m2**
HC(kg/km)	0.0000059	kg/KPV	X	109,500	voyages/an	=	0.64172	kg/km	=	0.64172	g/m		
HC(g/s/m2)	0.64172	g/m	/	20	m	/	16,425,000	s			=	**1.95E-09**	**g/s/m2**

Emissions from Pickup transportation activities (PM)

Equation used:

E =0.282* k*(s/12)^a*(W/3)^b — *Ref.: U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.2 Unpaved Roads, Equation (1)*

E = Emission factor (lb/Vehicule mile traveled)

k,a,b = constant

s= % silt

W= Vehicule average weight (tons lb)

Eext= E((365-P)/365) — *Réf.: U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.2 Unpaved Roads, Equation (2)*

Eext= Emmision factor - natural mitigation (lb/Vehicule mile traveled) — ***Applied monthly in CALPUFF as variable emission factors***

P = Number of days per year were precipitation was at least 0,254 mm

Data

	PM2.5	PM10	MPT
k (lb/MVP)	0.15	1.50	4.90
a	0.90	0.90	0.70
b	0.45	0.45	0.45

Réf.: U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.2 Unpaved Roads, Table 13.2.2-2

s (% silt)	8.0	%	*Pierre concassée, ref: email JC Bourassa 23 March 2010 - DSO Phase 2a(2) - silt.msg*
Transported ore weight	0.0	tonnes	*Source:http://www.ancai.com/loi_89.html*
	0.0	tons lb	
Weight empty vehicle	2.0	tonnes	*Source: http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=71EF09D7-1&offset=3#s_c_2_2*
	2.2	tons lb	
W (average vehicle weight)	2.2	tons lb	

Percentage of Traveling rate to consider

Rate DSO3-DSO4 - 25%	25%
Rate DSO3-Schefferville - 100%	100%

Nbre d'heures / an	4563	hr/yr	*Assumption of 12.5h/day activities, 365 days/year*
Nbr of Travels btw 9-15 july	2084	travels	*Source: E-mail sent by Loic Didillon on July 18th, 2015*
Nbr of Travels per day	300	travels/day	*(2084 travels over 7 days)*
Nbr of Travels per hour	24	travels/hr	*(300 travels over 12.5hr/day)*

Road width	20	m	
Road max lenght	200	m	*Lenght:width ratio 10:1, CALPUFF User Guide, (Scire, 2000)*

Emission control: road spray

Efficiency: ***70%*** *Source.: Environment Canada - NPRI Toolbox - Unpaved Industrial Road Dust Excel Calculator*
http://ec.gc.ca/inrp-npri/default.asp?lang=En&n=6DE7F8BC-1

Calculations

Rate DSO3-DSO4 - 25%

Voy/year - go/ret	24	travels/hr	X	4563	hr/yr	X	25%		=	27,375	voy/an
PM2.5 (kg/KPV)	0.03	lb/VMT	X	0.454	kg/lb	X	0.621	km/mile	=	0.01	kg/VKT
PM2.5 (kg/km)	0.0072	kg/VKT	X	27,375	trips/year	=	197	kg/km yr	=	197	g/m year
PM2.5 (g/s m)	197	g/m year	/	16,425,000	s/yr	X	(1 - 0,70)		=	3.60E-06	g/s m
PM2.5 (g/s m2)	3.60E-06	g/s m	/	20	m				=	**1.80E-07**	**g/s m2**
PM10 (lb/year)	0.26	lb/MVP	X	0.454	kg/lb	X	0.621	km/mile	=	0.07	kg/VKT
PM10 (kg/km)	0.07	kg/KPV	X	27,375	trips/year	=	1,973	kg/km yr	=	1,973	g/m year
PM10 (g/s m)	1,973	g/m year	/	16,425,000	s/yr	X	(1 - 0,70)		=	3.60E-05	g/s m
PM10 (g/s m2)	3.60E-05	g/s m	/	20	m				=	**1.80E-06**	**g/s/m2**
MPT (lb/year)	0.91	lb/MVP	X	0.454	kg/lb	X	0.621	km/mile	=	0.26	kg/VKT
MPT (kg/an)	0.26	kg/KPV	X	27,375	trips/year	=	6,990	kg/km yr	=	6,990	g/m year
MPT (g/s m)	6,990	g/m year	/	16,425,000	s/yr	X	(1 - 0,70)		=	1.28E-04	g/s m
MPT (g/s m2)	1.28E-04	g/s m	/	20	m				=	**6.38E-06**	**g/s/m2**

Rate DSO3-Schefferville - 100%

Voy/year - go/ret	24	travels/hr	X	4563	hr/yr	X	100%		=	109,500	voy/an
PM2.5 (kg/KPV)	0.03	lb/MVP	X	0.454	kg/lb	X	0.621	km/mile	=	0.01	kg/VKT
PM2.5 (kg/km)	0.01	kg/KPV	X	109,500	passages/an	=	789	kg/km	=	789	g/m year
PM2.5 (g/s m)	789	g/m year	/	16,425,000	s/an	X	(1 - 0,70)		=	1.44E-05	g/s m
PM2.5 (g/s m2)	1.44E-05	g/s m	/	20	m				=	**7.21E-07**	**g/s/m2**
PM10 (lb/year)	0.26	lb/MVP	X	0.454	kg/lb	X	0.621	km/mille	=	0.07	kg/VKT
PM10 (kg/km)	0.07	kg/KPV	X	109,500	passages/an	=	7,893	kg/km	=	7,893	g/m year
PM10 (g/s m)	7,893	g/m year	/	16,425,000	s/an	X	(1 - 0,70)		=	1.44E-04	g/s m
PM10 (g/s m2)	1.44E-04	g/s m	/	20	m				=	**7.21E-06**	**g/s/m2**
MPT (lb/year)	0.91	lb/MVP	X	0.454	kg/lb	X	0.621	km/mille	=	0.26	kg/VKT
MPT (kg/an)	0.26	kg/KPV	X	109,500	passages/an	=	27,960	kg/km	=	27,960	g/m year
MPT (g/s m)	27,960	g/m year	/	16,425,000	s/an	X	(1 - 0,70)		=	5.11E-04	g/s m
MPT (g/s m2)	5.11E-04	g/s m	/	20	m				=	**2.55E-05**	**g/s/m2**

Emissions from HOWSE Ore transportation activities (Engines)

Source: EPA Tier2 - Spec sheet (775G, CAT Mining truck*)*

PM	0.2	g/kW-h	https://www.dieselnet.com/standards/us/nonroad.php
NOx	6.4	g/kW-h	https://www.dieselnet.com/standards/us/nonroad.php
CO	3.5	g/kW-h	https://www.dieselnet.com/standards/us/nonroad.php
HC	0.400	g/kW-h	https://www.dieselnet.com/standards/us/nonroad.php & EPA420-R-05-015 Table 8.pdf

Data

Sulfur in fuel	0.0015%		*REF: Email François Saulnier Exxon Mobil, Jan 5th, 2011*
	15	mg/kg	
Engine Gross power	615	kW	*Source: Spec sheets* **775G** CAT Mining truck*)*
Motor load	50%		*hypothesis based on motor work cycle*
Engine power (50% load)	307.50	kW	
Fuel consumption	78.55	L/h	*Source : Haul truck fuel consumption and CO2 emission under various engine load conditions by V. Kecojevic and D. Komljenovic*
Average speed	35	km/h	*Source : phone conv. Aug 16 2011 - JC Bourassa*
LHV	42,780	kJ/kg	*Source: Spec sheets* 775G CAT Mining truck*)*
Densité diesel	0.8389	kg/l	*Source: Spec sheets* 775G CAT Mining truck*)*
PM < 1 um			*Source : AP-42, Gasoline And Diesel Industrial Engines, tableau 3.3-1.*

Transported ore weight	64.0	tonnes	*Source: Spec sheets* 775G CAT Mining truck*)*
	70.5	tons lb	*Source: Spec sheets* 775G CAT Mining truck*)*
Weight empty vehicle	47.8	tonnes	
	52.7	tons lb	
W (average vehicle weight)	88.0	tons lb	

Nbre d'heures / an	HOWSE to O.B.	3600	hr/yr	Howse to Waste/Ore	4800	hr/yr

Ore transport	HOWSE to O.B.	6,777,656	tonnes/yr
	HOWSE Ore transport	3,076,923	tonnes/yr
	HOWSE to Waste	3,968,498	tonnes/yr

Road Width:	20 m	Hypothesis
Road max lenght	200 m	Lenght:width ratio 10:1, CALPUFF User Guide, (Scire, 2000)

Calculs

Diesel Consumption per vvehicle	78.55 L/h	/	35 km/h					=	2.2 L/KPV
Diesel Consumption	78.55 L/h	X	0.8389 kg/l					=	65.9 kg/h
Hp-h Diesel	65.9 kg/h	X	42780 kJ/kg	X	1 h	/	2684.5 kJ/hp-h	=	1050.2 hp-h
									(energy from the fuel)
PM Emission rate	307.5 kW	X	0.2 g/kW-h	/	35 km/h	/	1000 g/kg	=	0.0018 kg/KPV
CO Emission rate	307.5 kW	X	3.5 g/kW-h	/	35 km/h	/	1000 g/kg	=	0.0308 kg/KPV
NO_X Emissions rate	307.5 kW	X	6.4 g/kW-h	/	35 km/h	/	1000 g/kg	=	0.0562 kg/KPV
SO_2 Emission rate (15ppm sulphur)	2.2 L/km parcouru véhicule (KPV)	X	0.84 kg/L	X	15 mg S/kg	X	2 kg SO_2/kg S	=	5.65E-05 kg/KPV
HC Emissions rate	307.5 kW	X	0.400 g/kW-h	/	35 km/h	/	1000 g/kg	=	0.0035 kg/KPV
*EPA420-R-05-015; Table8									

HOWSE to O.B.

Voy/year - go/ret	6,777,656	T/an	/	64.0	tonnes	X	2	aller-retour	=	211,802	voy/an			
PM(kg/km)	0.0018	kg/KPV	X	211,802	voyages/an	=	372	kg/km	=	372	g/m			
PM(g/s/m2)	372	g/m	/	20	m	/	12,960,000	s			=	**1.44E-06**	**g/s/m2**	
CO(kg/km)	0.0308	kg/KPV	X	211,802	voyages/an	=	6,513	kg/km	=	6,513	g/m			
CO(g/s/m2)	6,513	g/m	/	20	m	/	12,960,000	s			=	**2.51E-05**	**g/s/m2**	
NOx(kg/km)	0.06	kg/KPV	X	211,802	voyages/an	=	11,909	kg/km	=	11,909	g/m			
NOx(g/s/m2)	11,909	g/m	/	20	m	/	12,960,000	s			=	**4.59E-05**	**g/s/m2**	
SO2(kg/km)	0.00006	kg/KPV	X	211,802	voyages/an	=	12	kg/km	=	12	g/m			
SO2(g/s/m2)	12	g/m	/	20	m	/	12,960,000	s			=	**4.62E-08**	**g/s/m2**	
HC(kg/km)	0.0035	kg/KPV	X	211,802	voyages/an	=	744	kg/km	=	744	g/m			
HC(g/s/m2)	744	g/m	/	20	m	/	12,960,000	s			=	**2.872E-06**	**g/s/m2**	

HOWSE Ore transport

Voy/year - go/ret	3,076,923	T/an	/	64.0	tonnes	X	2	aller-retour	=	96,154	voy/an		
PM(kg/km)	0.0018	kg/KPV	X	96,154	voyages/an	=	169	kg/km	=	169	g/m		
PM(g/s/m2)	169	g/m	/	20	m	/	17,280,000	s			=	**4.89E-07**	**g/s/m2**
CO(kg/km)	0.0308	kg/KPV	X	96,154	voyages/an	=	2,957	kg/km	=	2,957	g/m		
CO(g/s/m2)	2,957	g/m	/	20	m	/	17,280,000	s			=	**8.56E-06**	**g/s/m2**
NOx(kg/km)	0.06	kg/KPV	X	96,154	voyages/an	=	5,407	kg/km	=	5,407	g/m		
NOx(g/s/m2)	5,407	g/m	/	20	m	/	17,280,000	s			=	**1.56E-05**	**g/s/m2**
SO2(kg/km)	0.00006	kg/KPV	X	96,154	voyages/an	=	5	kg/km	=	5	g/m		
SO2(g/s/m2)	5	g/m	/	20	m	/	17,280,000	s			=	**1.57E-08**	**g/s/m2**
HC(kg/km)	0.0035	kg/KPV	X	96,154	voyages/an	=	338	kg/km	=	338	g/m		
HC(g/s/m2)	338	g/m	/	20	m	/	17280000	s			=	**9.78E-07**	**g/s/m2**

HOWSE to Waste

Voy/year - go/ret	3968498.17	T/an	/	64	tonnes	X	2	aller-retour	=	124016	voy/an		
PM(kg/km)	0.00175714	kg/KPV	X	124015.5678	voyages/an	=	217.9130691	kg/km	=	217.913	g/m		
PM(g/s/m2)	217.913069	g/m	/	20	m	/	17280000	s			=	6.30536E-07	g/s/m2
CO(kg/km)	0.03075	kg/KPV	X	124015.5678	voyages/an	=	3813.478709	kg/km	=	3813.48	g/m		
CO(g/s/m2)	3813.47871	g/m	/	20	m	/	17280000	s			=	1.10344E-05	g/s/m2
NOx(kg/km)	0.05622857	kg/KPV	X	124015.5678	voyages/an	=	6973.21821	kg/km	=	6973.22	g/m		
NOx(g/s/m2)	6973.21821	g/m	/	20	m	/	17280000	s			=	2.01771E-05	g/s/m2
SO2(kg/km)	5.6484E-05	kg/KPV	X	124015.5678	voyages/an	=	7.004933956	kg/km	=	7.00493	g/m		
SO2(g/s/m2)	7.00493396	g/m	/	20	m	/	17280000	s			=	2.02689E-08	g/s/m2
HC(kg/km)	0.0035	kg/KPV	X	124,016	voyages/an	=	436	kg/km	=	436	g/m		
HC(g/s/m2)	436	g/m	/	20	m	/	17280000	s			=	**1.26E-06**	**g/s/m2**

Emissions from HOWSE Ore transportation activities (PM)

Equation used:

E =0.282* k*(s/12)^a*(W/3)^b — *Ref.: U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.2 Unpaved Roads, Equation (1)*

E = Emission factor (lb/Vehicule mile traveled)

k,a,b = constant

s= % silt

W= Vehicule average weight (tons lb)

Eext= E((365-P)/365) — *Réf.: U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.2 Unpaved Roads, Equation (2)*

Eext= Emmision factor - natural mitigation (lb/Vehicule mile traveled) — ***Applied monthly in CALPUFF as variable emission factors***

P = Number of days per year were precipitation was at least 0,254 mm

Data

	PM2.5	PM10	MPT
k (lb/MVP)	0.15	1.50	4.90
a	0.90	0.90	0.70
b	0.45	0.45	0.45

Réf.: U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.2 Unpaved Roads, Table 13.2.2-2

s (% silt)		8.0	%	*Pierre concassée, ref: email JC Bourassa 23 March 2010 - DSO Phase 2a(2) - silt.msg*
Transported ore weight		64.0	tonnes	*Source: Spec sheets* **775G** CAT Mining truck)
		70.5	tons lb	*Source: Spec sheets* **775G** CAT Mining truck)
Weight empty vehicle		47.8	tonnes	
		52.7	tons lb	
W (average vehicle weight)		88.0	tons lb	
Ore transport	HOWSE to O.B.	6,777,656	tonnes/yr	
	HOWSE Ore transport	3,076,923	tonnes/yr	
	HOWSE to Waste	3,968,498	tonnes/yr	
Nb hours / year	O.B.	3600	hr/yr	Waste+Ore 4800 hr/year
Road width		20 m		
Road max lenght		200 m		*Lenght:width ratio 10:1, CALPUFF User Guide, (Scire, 2000)*

Emission control: road spray

Efficiency: ***70%*** — *Source.: Environment Canada - NPRI Toolbox - Unpaved Industrial Road Dust Excel Calculator*
http://ec.gc.ca/inrp-npri/default.asp?lang=En&n=6DE7F8BC-1

Calculations

HOWSE to O.B.

Voy/year - go/ret	6,777,656	T/year	/	64.0	tonnes/load	X	2	trips/load	=	211,802	trips/year
PM2.5 (kg/KPV)	0.13	lb/VMT	X	0.454	kg/lb	X	0.621	km/mile	=	0.04	kg/VKT
PM2.5 (kg/km)	0.0379	kg/VKT	X	211,802	trips/year	=	8,020	kg/km yr	=	8,020	g/m year
PM2.5 (g/s m)	8,020	g/m year	/	12,960,000	s/yr	X	(1 - 0,70)		=	1.86E-04	g/s m
PM2.5 (g/s m2)	1.86E-04	g/s m	/	20	m				=	**9.28E-06**	**g/s m2**
PM10 (lb/year)	1.34	lb/MVP	X	0.454	kg/lb	X	0.621	km/mile	=	0.38	kg/VKT
PM10 (kg/km)	0.38	kg/KPV	X	211,802	trips/year	=	80,204	kg/km yr	=	80,204	g/m year
PM10 (g/s m)	80,204	g/m year	/	12,960,000	s/yr	X	(1 - 0,70)		=	1.86E-03	g/s m
PM10 (g/s m2)	1.86E-03	g/s m	/	20	m				=	**9.28E-05**	**g/s/m2**
MPT (lb/year)	4.76	lb/MVP	X	0.454	kg/lb	X	0.621	km/mile	=	1.34	kg/VKT
MPT (kg/an)	1.34	kg/KPV	X	211,802	trips/year	=	284,133	kg/km yr	=	284,133	g/m year
MPT (g/s m)	284,133	g/m year	/	12,960,000	s/yr	X	(1 - 0,70)		=	6.58E-03	g/s m
MPT (g/s m2)	6.58E-03	g/s m	/	20	m				=	**3.29E-04**	**g/s/m2**

HOWSE Ore transport

Voy/year - go/ret	3,076,923	T/year	/	64.0	tonnes/load	X	2	trips/load	=	96,154	trips/year
PM2.5 (kg/KPV)	0.13	lb/MVP	X	0.454	kg/lb	X	0.621	km/mile	=	0.04	kg/VKT
PM2.5 (kg/km)	0.04	kg/KPV	X	96,154	passages/an	=	3,641	kg/km	=	3,641	g/m year
PM2.5 (g/s m)	3,641	g/m year	/	17,280,000	s/an	X	(1 - 0,70)		=	6.32E-05	g/s m
PM2.5 (g/s m2)	6.32E-05	g/s m	/	20	m				=	**3.16E-06**	**g/s/m2**
PM10 (lb/year)	1.34	lb/MVP	X	0.454	kg/lb	X	0.621	km/mille	=	0.38	kg/VKT
PM10 (kg/km)	0.38	kg/KPV	X	96,154	passages/an	=	36,411	kg/km	=	36,411	g/m year
PM10 (g/s m)	36,411	g/m year	/	17,280,000	s/an	X	(1 - 0,70)		=	6.32E-04	g/s m
PM10 (g/s m2)	6.32E-04	g/s m	/	20	m				=	**3.16E-05**	**g/s/m2**
MPT (lb/year)	4.76	lb/MVP	X	0.454	kg/lb	X	0.621	km/mille	=	1.34	kg/VKT
MPT (kg/an)	1.34	kg/KPV	X	96,154	passages/an	=	128,991	kg/km	=	128,991	g/m year
MPT (g/s m)	128,991	g/m year	/	17,280,000	s/an	X	(1 - 0,70)		=	2.24E-03	g/s m
MPT (g/s m2)	2.24E-03	g/s m	/	20	m				=	**1.12E-04**	**g/s/m2**

HOWSE to Waste

Voy/year - go/ret	3,968,498	T/year	/	64.0	tonnes/load	X	2	trips/load	=	124,016	trips/year
PM2.5 (kg/KPV)	0.13	lb/MVP	X	0.454	kg/lb	X	0.621	km/mile	=	0.04	kg/VKT
PM2.5 (kg/km)	0.04	kg/KPV	X	124,016	passages/an	=	4,696	kg/km	=	4,696	g/m year
PM2.5 (g/s m)	4,696	g/m year	/	17,280,000	s/an	X	(1 - 0,70)		=	8.15E-05	g/s m
PM2.5 (g/s m2)	8.15E-05	g/s m	/	20	m				=	**4.08E-06**	**g/s/m2**
PM10 (lb/year)	1.34	lb/MVP	X	0.454	kg/lb	X	0.621	km/mille	=	0.38	kg/VKT
PM10 (kg/km)	0.38	kg/KPV	X	124,016	passages/an	=	46,962	kg/km	=	46,962	g/m year
PM10 (g/s m)	46,962	g/m year	/	17,280,000	s/an	X	(1 - 0,70)		=	8.15E-04	g/s m
PM10 (g/s m2)	8.15E-04	g/s m	/	20	m				=	**4.08E-05**	**g/s/m2**
MPT (lb/year)	4.76	lb/MVP	X	0.454	kg/lb	X	0.621	km/mille	=	1.34	kg/VKT
MPT (kg/an)	1.34	kg/KPV	X	124,016	passages/an	=	166,367	kg/km	=	166,367	g/m year
MPT (g/s m)	166,367	g/m year	/	17,280,000	s/an	X	(1 - 0,70)		=	2.89E-03	g/s m
MPT (g/s m2)	2.89E-03	g/s m	/	20	m				=	**1.44E-04**	**g/s/m2**

Emissions from DSO3 Ore transportation activities (PM)

Equation used:

E =0.282* k*(s/12)^a*(W/3)^b — *Ref.: U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.2 Unpaved Roads, Equation (1)*

E = Emission factor (lb/Vehicule mile traveled)

k,a,b = constant

s= % silt

W= Vehicule average weight (tons lb)

Eext= E((365-P)/365) — *Réf.: U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.2 Unpaved Roads, Equation (2)*

Eext= Emmision factor - natural mitigation (lb/Vehicule mile traveled) — ***Applied monthly in CALPUFF as variable emission factors***

P = Number of days per year were precipitation was at least 0,254 mm

Data

	PM2.5	PM10	MPT
k (lb/MVP)	0.15	1.50	4.90
a	0.90	0.90	0.70
b	0.45	0.45	0.45

Réf.: U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.2 Unpaved Roads, Table 13.2.2-2

s (% silt)	8.0	%	*Pierre concassée, ref: email JC Bourassa 23 March 2010 - DSO Phase 2a(2) - silt.msg*
Transported ore weight	55.0	tonnes	*Source: Spec sheets* 773F CAT Mining truck)
	60.6	tons lb	*Source: Spec sheets* 773F CAT Mining truck)
Weight empty vehicle	45.7	tonnes	
	50.4	tons lb	
W (average vehicle weight)	80.7	tons lb	

<u>Ore transport</u>

F7 to O.B. + Waste	2,273,750	tonnes/yr
F7 to Plant 2	1,109,110	tonnes/yr
Plant 2 to Rail loading	3,504,000	tonnes/yr
T3 to O.B.+Waste	2,788,100	tonnes/yr
T3 to Plant 2	384,450	tonnes/yr

Nb hours / year	8760	hr/yr	*Ref: New Millenium*	12 months/year
Road width	20 m			
Road max lenght	200 m		*Lenght:width ratio 10:1, CALPUFF User Guide, (Scire, 2000)*	

<u>Emission control: road spray</u>

Efficiency: ***70%*** *Source.: Environment Canada - NPRI Toolbox - Unpaved Industrial Road Dust Excel Calculator*
http://ec.gc.ca/inrp-npri/default.asp?lang=En&n=6DE7F8BC-1

Calculations

<u>F7 to O.B. + Waste</u>

Voy/year - go/ret	2,273,750	T/year	/	55.0	tonnes/load	X	2	trips/load	=	82,682	trips/year
PM2.5 (kg/KPV)	0.13	lb/MVP	X	0.454	kg/lb	X	0.621	km/mile	=	0.04	kg/VKT
PM2.5 (kg/km)	0.04	kg/KPV	X	82,682	passages/an	=	3,011	kg/km	=	3,011	g/m year
PM2.5 (g/s m)	3,011	g/m year	/	31,536,000	s/an	X	(1 - 0,70)		=	2.86E-05	g/s m
PM2.5 (g/s m2)	2.86E-05	g/s m	/	20	m				=	**1.43E-06**	**g/s/m2**
PM10 (lb/year)	1.29	lb/MVP	X	0.454	kg/lb	X	0.621	km/mille	=	0.36	kg/VKT
PM10 (kg/km)	0.36	kg/KPV	X	82,682	passages/an	=	30,114	kg/km	=	30,114	g/m year
PM10 (g/s m)	30,114	g/m year	/	31,536,000	s/an	X	(1 - 0,70)		=	2.86E-04	g/s m
PM10 (g/s m2)	2.86E-04	g/s m	/	20	m				=	**1.43E-05**	**g/s/m2**
MPT (lb/year)	4.58	lb/MVP	X	0.454	kg/lb	X	0.621	km/mille	=	1.29	kg/VKT
MPT (kg/an)	1.29	kg/KPV	X	82,682	passages/an	=	106,683	kg/km	=	106,683	g/m year
MPT (g/s m)	106,683	g/m year	/	31,536,000	s/an	X	(1 - 0,70)		=	1.01E-03	g/s m
MPT (g/s m2)	1.01E-03	g/s m	/	20	m				=	**5.07E-05**	**g/s/m2**

<u>F7 to Plant 2</u>

Voy/year - go/ret	1,109,110	T/year	/	55.0	tonnes/load	X	2	trips/load	=	40,331	trips/year
PM2.5 (kg/KPV)	0.13	lb/MVP	X	0.454	kg/lb	X	0.621	km/mile	=	0.04	kg/VKT
PM2.5 (kg/km)	0.04	kg/KPV	X	40,331	passages/an	=	1,469	kg/km	=	1,469	g/m year
PM2.5 (g/s m)	1,469	g/m year	/	31,536,000	s/an	X	(1 - 0,70)		=	1.40E-05	g/s m
PM2.5 (g/s m2)	1.40E-05	g/s m	/	20	m				=	**6.99E-07**	**g/s/m2**
PM10 (lb/year)	1.29	lb/MVP	X	0.454	kg/lb	X	0.621	km/mille	=	0.36	kg/VKT
PM10 (kg/km)	0.36	kg/KPV	X	40,331	passages/an	=	14,689	kg/km	=	14,689	g/m year
PM10 (g/s m)	14,689	g/m year	/	31,536,000	s/an	X	(1 - 0,70)		=	1.40E-04	g/s m
PM10 (g/s m2)	1.40E-04	g/s m	/	20	m				=	**6.99E-06**	**g/s/m2**
MPT (lb/year)	4.58	lb/MVP	X	0.454	kg/lb	X	0.621	km/mille	=	1.29	kg/VKT
MPT (kg/an)	1.29	kg/KPV	X	40,331	passages/an	=	52,039	kg/km	=	52,039	g/m year
MPT (g/s m)	52,039	g/m year	/	31,536,000	s/an	X	(1 - 0,70)		=	4.95E-04	g/s m
MPT (g/s m2)	4.95E-04	g/s m	/	20	m				=	**2.48E-05**	**g/s/m2**

<u>Plant 2 to Rail loading</u>

Voy/year - go/ret	3,504,000	T/year	/	55.0	tonnes/load	X	2	trips/load	=	127,418	trips/year
PM2.5 (kg/KPV)	0.13	lb/MVP	X	0.454	kg/lb	X	0.621	km/mile	=	0.04	kg/VKT
PM2.5 (kg/km)	0.04	kg/KPV	X	127,418	passages/an	=	4,641	kg/km	=	4,641	g/m year
PM2.5 (g/s m)	4,641	g/m year	/	31,536,000	s/an	X	(1 - 0,70)		=	4.41E-05	g/s m
PM2.5 (g/s m2)	4.41E-05	g/s m	/	20	m				=	**2.21E-06**	**g/s/m2**
PM10 (lb/year)	1.29	lb/MVP	X	0.454	kg/lb	X	0.621	km/mille	=	0.36	kg/VKT
PM10 (kg/km)	0.36	kg/KPV	X	127,418	passages/an	=	46,408	kg/km	=	46,408	g/m year
PM10 (g/s m)	46,408	g/m year	/	31,536,000	s/an	X	(1 - 0,70)		=	4.41E-04	g/s m
PM10 (g/s m2)	4.41E-04	g/s m	/	20	m				=	**2.21E-05**	**g/s/m2**
MPT (lb/year)	4.58	lb/MVP	X	0.454	kg/lb	X	0.621	km/mille	=	1.29	kg/VKT
MPT (kg/an)	1.29	kg/KPV	X	127,418	passages/an	=	164,406	kg/km	=	164,406	g/m year
MPT (g/s m)	164,406	g/m year	/	31,536,000	s/an	X	(1 - 0,70)		=	1.56E-03	g/s m
MPT (g/s m2)	1.56E-03	g/s m	/	20	m				=	**7.82E-05**	**g/s/m2**

T3 to O.B.+Waste

Voy/year - go/ret	2,788,100	T/year	/	55.0	tonnes/load	X		2	trips/load	=	101,385	trips/year
PM2.5 (kg/KPV)	0.13	lb/MVP	X	0.454	kg/lb	X	0.621		km/mile	=	0.04	kg/VKT
PM2.5 (kg/km)	0.04	kg/KPV	X	101,385	passages/an	=	3,693		kg/km	=	3,693	g/m year
PM2.5 (g/s m)	3,693	g/m year	/	31,536,000	s/an	X	(1 - 0,70)			=	3.51E-05	g/s m
PM2.5 (g/s m2)	3.51E-05	g/s m	/	20	m					=	**1.76E-06**	**g/s/m2**
PM10 (lb/year)	1.29	lb/MVP	X	0.454	kg/lb	X	0.621		km/mille	=	0.36	kg/VKT
PM10 (kg/km)	0.36	kg/KPV	X	101,385	passages/an	=	36,927		kg/km	=	36,927	g/m year
PM10 (g/s m)	36,927	g/m year	/	31,536,000	s/an	X	(1 - 0,70)			=	3.51E-04	g/s m
PM10 (g/s m2)	3.51E-04	g/s m	/	20	m					=	**1.76E-05**	**g/s/m2**
MPT (lb/year)	4.58	lb/MVP	X	0.454	kg/lb	X	0.621		km/mille	=	1.29	kg/VKT
MPT (kg/an)	1.29	kg/KPV	X	101,385	passages/an	=	130,816		kg/km	=	130,816	g/m year
MPT (g/s m)	130,816	g/m year	/	31,536,000	s/an	X	(1 - 0,70)			=	1.24E-03	g/s m
MPT (g/s m2)	1.24E-03	g/s m	/	20	m					=	**6.22E-05**	**g/s/m2**

T3 to Plant 2

Voy/year - go/ret	384,450	T/year	/	55.0	tonnes/load	X		2	trips/load	=	13,980	trips/year
PM2.5 (kg/KPV)	0.13	lb/MVP	X	0.454	kg/lb	X	0.621		km/mile	=	0.04	kg/VKT
PM2.5 (kg/km)	0.04	kg/KPV	X	13,980	passages/an	=	509		kg/km	=	509	g/m year
PM2.5 (g/s m)	509	g/m year	/	31,536,000	s/an	X	(1 - 0,70)			=	4.84E-06	g/s m
PM2.5 (g/s m2)	4.84E-06	g/s m	/	20	m					=	**2.42E-07**	**g/s/m2**
PM10 (lb/year)	1.29	lb/MVP	X	0.454	kg/lb	X	0.621		km/mille	=	0.36	kg/VKT
PM10 (kg/km)	0.36	kg/KPV	X	13,980	passages/an	=	5,092		kg/km	=	5,092	g/m year
PM10 (g/s m)	5,092	g/m year	/	31,536,000	s/an	X	(1 - 0,70)			=	4.84E-05	g/s m
PM10 (g/s m2)	4.84E-05	g/s m	/	20	m					=	**2.42E-06**	**g/s/m2**
MPT (lb/year)	4.58	lb/MVP	X	0.454	kg/lb	X	0.621		km/mille	=	1.29	kg/VKT
MPT (kg/an)	1.29	kg/KPV	X	13,980	passages/an	=	18,038		kg/km	=	18,038	g/m year
MPT (g/s m)	18,038	g/m year	/	31,536,000	s/an	X	(1 - 0,70)			=	1.72E-04	g/s m
MPT (g/s m2)	1.72E-04	g/s m	/	20	m					=	**8.58E-06**	**g/s/m2**

Emissions from DSO3 Ore transportation activities (Engines)

Source: EPA Tier3 - Spec sheet (773F, CAT Mining truck*)*

PM		0.2	g/kW-h	https://www.dieselnet.com/standards/us/nonroad.php
NOx	NMHC+NOx	4	g/kW-h	https://www.dieselnet.com/standards/us/nonroad.php
CO		3.5	g/kW-h	https://www.dieselnet.com/standards/us/nonroad.php
HC		0.267	g/kW-h	https://www.dieselnet.com/standards/us/nonroad.php & EPA420-R-05-015 Table 8.pdf

Data

Sulfur in fuel	0.0015%		*REF: Email François Saulnier Exxon Mobil, Jan 5th, 2011*
	15	mg/kg	
Engine Net power	552	kW	*Source: Spec sheets 773F CAT Mining truck)*
Motor load	50%		*hypothesis based on motor work cycle*
Engine power (50% load)	276.00	kW	
Fuel consumption	70.66	L/h	*Source : Haul truck fuel consumption and CO2 emission under various engine load conditions by V. Kecojevic and D. Komljenovic*
Average speed	35	km/h	*Source : phone conv. Aug 16 2011 - JC Bourassa*
LHV	42,780	kJ/kg	*Source: Spec sheets* 773F CAT Mining truck*)*
Densité diesel	0.8389	kg/l	*Source: Spec sheets* 773F CAT Mining truck*)*
PM < 1 um			*Source : AP-42, Gasoline And Diesel Industrial Engines, tableau 3.3-1.*

Transported ore weight	55.0	tonnes	*CAT 773F (Email from Loic Didillon October 7th 2014)*	
	60.6	tons lb	*Source: Spec sheets* 773F CAT Mining truck*)*	
Weight empty vehicle	45.7	tonnes		
	50.4	tons lb		
W (average vehicle weight)	80.7	tons lb		
Nbre d'heures / an	8760	hr/yr	*Ref: New Millenium*	12 months/yr

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Ore transport

F7 to O.B. + Waste	2,273,750	tonnes/yr
F7 to Plant 2	1,109,110	tonnes/yr
Plant 2 to Rail loading	3,504,000	tonnes/yr

Road Width:	20	m	Hypothesis
Road max lenght	200	m	Lenght:width ratio 10:1, CALPUFF User Guide, (Scire, 2000)

Calculs

Diesel Consumption per vvehicle	70.66 L/h	/	35 km/h					=	2.0 L/KPV
Diesel Consumption	70.66 L/h	X	0.8389 kg/l					=	59.3 kg/h
Hp-h Diesel	59.3 kg/h	X	42780 kJ/kg	X	1 h	/	2684.5 kJ/hp-h	=	944.6 hp-h
									(energy from the fuel)
PM Emission rate	276.0 kW	X	0.2 g/kW-h	/	35 km/h	/	1000 g/kg	=	0.0016 kg/KPV
CO Emission rate	276.0 kW	X	3.5 g/kW-h	/	35 km/h	/	1000 g/kg	=	0.0276 kg/KPV
NO_X Emissions rate	276.0 kW	X	4 g/kW-h	/	35 km/h	/	1000 g/kg	=	0.0315 kg/KPV
SO_2 Emission rate (15ppm sulphur)	2.0 L/km parcouru \	X	0.84 kg/L	X	15 mg S/kg	X	2 kg SO_2/kg S	=	5.08E-05 kg/KPV
HC Emissions rate*	276.0 kW	X	0.267 g/kW-h	/	35 km/h	/	1000 g/kg	=	0.0021 kg/KPV

*EPA420-R-05-015; Table8

F7 to O.B. + Waste

Voy/year - go/ret	2,273,750	T/an	/	55.0	tonnes	X	2	aller-retour	=	82,682	voy/an		
PM(kg/km)	0.0016	kg/KPV	X	82,682	voyages/an	=	130	kg/km	=	130	g/m		
PM(g/s/m2)	130	g/m	/	20	m	/	31,536,000	s			=	**2.07E-07**	**g/s/m2**
CO(kg/km)	0.0276	kg/KPV	X	82,682	voyages/an	=	2,282	kg/km	=	2,282	g/m		
CO(g/s/m2)	2,282	g/m	/	20	m	/	31,536,000	s			=	**3.62E-06**	**g/s/m2**
NOx(kg/km)	0.03	kg/KPV	X	82,682	voyages/an	=	2,608	kg/km	=	2,608	g/m		
NOx(g/s/m2)	2,608	g/m	/	20	m	/	31,536,000	s			=	**4.13E-06**	**g/s/m2**
SO2(kg/km)	0.00005	kg/KPV	X	82,682	voyages/an	=	4	kg/km	=	4	g/m		
SO2(g/s/m2)	4	g/m	/	20	m	/	31,536,000	s			=	**6.66E-09**	**g/s/m2**
HC(kg/km)	0.0021	kg/KPV	X	82,682	voyages/an	=	174	kg/km	=	174	g/m		
HC(g/s/m2)	174	g/m	/	20	m	/	31,536,000	s			=	**2.76E-07**	**g/s/m2**

F7 to Plant 2

Voy/year - go/ret	1,109,110	T/an	/	55.0	tonnes	X	2	aller-retour	=	40,331	voy/an		
PM(kg/km)	0.0016	kg/KPV	X	40,331	voyages/an	=	64	kg/km	=	64	g/m		
PM(g/s/m2)	64	g/m	/	20	m	/	31,536,000	s			=	**1.01E-07**	**g/s/m2**
CO(kg/km)	0.0276	kg/KPV	X	40,331	voyages/an	=	1,113	kg/km	=	1,113	g/m		
CO(g/s/m2)	1,113	g/m	/	20	m	/	31,536,000	s			=	**1.76E-06**	**g/s/m2**
NOx(kg/km)	0.03	kg/KPV	X	40,331	voyages/an	=	1,272	kg/km	=	1,272	g/m		
NOx(g/s/m2)	1,272	g/m	/	20	m	/	31,536,000	s			=	**2.02E-06**	**g/s/m2**
SO2(kg/km)	0.00005	kg/KPV	X	40,331	voyages/an	=	2	kg/km	=	2	g/m		
SO2(g/s/m2)	2	g/m	/	20	m	/	31,536,000	s			=	**3.25E-09**	**g/s/m2**
HC(kg/km)	0.0021	kg/KPV	X	40,331	voyages/an	=	85	kg/km	=	85	g/m		
HC(g/s/m2)	85	g/m	/	20	m	/	31,536,000	s			=	**1.34E-07**	**g/s/m2**

Plant 2 to Rail loading

Voy/year - go/ret	3,504,000	T/an	/	55.0	tonnes	X	2	aller-retour	=	127,418	voy/an		
PM(kg/km)	0.0016	kg/KPV	X	127,418	voyages/an	=	201	kg/km	=	201	g/m		
PM(g/s/m2)	201	g/m	/	20	m	/	31,536,000	s			=	**3.19E-07**	**g/s/m2**
CO(kg/km)	0.0276	kg/KPV	X	127,418	voyages/an	=	3,517	kg/km	=	3,517	g/m		
CO(g/s/m2)	3,517	g/m	/	20	m	/	31,536,000	s			=	**5.58E-06**	**g/s/m2**
NOx(kg/km)	0.03	kg/KPV	X	127,418	voyages/an	=	4,019	kg/km	=	4,019	g/m		
NOx(g/s/m2)	4,019	g/m	/	20	m	/	31,536,000	s			=	**6.37E-06**	**g/s/m2**
SO2(kg/km)	0.00005	kg/KPV	X	127,418	voyages/an	=	6	kg/km	=	6	g/m		
SO2(g/s/m2)	6	g/m	/	20	m	/	31,536,000	s			=	**1.03E-08**	**g/s/m2**
HC(kg/km)	0.0021	kg/KPV	X	127,418	voyages/an	=	268	kg/km	=	268	g/m		
HC(g/s/m2)	268	g/m	/	20	m	/	31,536,000	s			=	**4.25E-07**	**g/s/m2**

DSO PLANT - AIR DISPERSION MODELING
Dryer stack emissions characteristics

Legend

1) WINTER 7 months per year

***Description of scenario* : all gases from generators are sent to the flash dryer, Rotary and flash Dryers and Energy Recovery (Scrubber)**

Data

Fuel Oil consumption:			
Generators	2584	l/hr	*CAT175-16 Caterpillar spec sheet for 75% prime duty load x 5 generators = 516.8 L/hr x 5*
Rotary and flash Dryer	3108	l/hr	*REF:FLSmidth drawing DSOT-DV-2750-PR-4852 rev 3 - Overestimation - conserv hyp.*
Total	5692	l/hr	
Oil density	832	kg/m^3	*REF: Email François Saulnier Exxon Mobil, Jan 5th, 2011*
Generators Fuel Oil consumption:	2150	kg/hr	
Dryers Fuel Oil consumption:	2586	kg/hr	
Total Fuel Oil consumption:	4736	kg/hr	
HV	45,000	kJ/kg	*REF: Email François Saulnier Exxon Mobil, Jan 5th, 2011*
Building height	40.5	m	*Reference: drawing DSOT-DW-3300-GE-0002*
Stack height	65.7	m	
Diameter	2.44	m	*Reference: DSOT-VP-3210-MS-0170-0021 - I.D. = 96 inches*
Temperature	40	°C	*REF: Mass Balance, R. Gagnon, June 16*
	313	K	
Gas flow at stack (wet)	170.60	t/hr	*REF:FLSmidth drawing DSOT-DV-2750-PR-4853*
Gas flow at stack (wet)	147,100	Nm^3/hr	*REF:FLSmidth drawing DSOT-DV-2750-PR-4853*
Particulate flow after ESP- ($PM_{2.5}$)	7.36	kg/hr	*PM emission rate: 50 mg/Nm³ Criteria required for the supplier*
Wet scrubber estimated efficiency	***25%***		*Scrubber - Heat recovery system* *Data from supplier (DUCON)*
Particulate flow after dryer scrubber- ($PM_{2.5}$)	5.52	kg/hr	*= Particulate flow after ESP- (PM 2.5) X wet scrubber typical efficiency*
All particulates are considered < 2.5 um			*Electrostatic precipitator & Scrubber efficiency*

Calculations

Gas flow at stack	147,100	Nm^3/hr	X	313	K	/	273	K	=	168,653	Am^3/hr
Gas velocity	168,653	Am^3/hr	/	4.7	m^2	/	3600	s/hr	=	10.0	m/s
Total Capacity	4736	kg/hr	X	45000	kJ/kg	/	1.E+06	kJ/GJ	=	213.1	GJ/hr
Dryer capacity	2586	kg/hr	X	45000	kJ/kg	/	1.E+06	kJ/GJ	=	116.4	GJ/hr

61 MMBtu/hr (Rotary Dryer)
50 MMBtu/hr (Flash Dryer)

Generators

Total number of engines	**5**		10281 Total 24h average load kW	Ref: "Genset load calculations-winter.xlsx" sent by Plamen Kurktchiev
Engine power	2118.75 kW	=2825kW *75%	10593.75 total kW during Winter	
	2841.24375 hp	(load approximately 75% for power requirement)		

Exhaust emission data:				75%	100%
Nitrogen oxides (NOx)	31013	g/h	*REF:CAT C175-16 performance data sheet [WYB01014]*	26338.33	21442
Carbon Monoxide (CO)	1349	g/h	*REF:CAT C175-16 performance data sheet [WYB01014]*	1278.56	2651.8
Particulate matter (PM)	257	g/h	*REF:CAT C175-16 performance data sheet [WYB01014]*	255.7119	227.3
Hydrocarbon (HC)	758	g/h	*REF:CAT C175-16 performance data sheet [WYB01014]*		530.37

Emission rate NOx	31013	g/h	/	3600	s/hr	X	5	=	43.1	g/s
Emission rate CO	1349	g/h	/	3600	s/hr	X	5	=	1.9	g/s
Emission rate $PM_{2.5}$	257	g/h	/	3600	s/hr	X	5	=	0.4	g/s
Emission rate HC	758	g/h	/	3600	s/hr	X	5	=	1.1	g/s

Dryer

Nitrogen oxides (NOx)	50	g/GJ	*Maximum NOx emission rate: 50 g/GJ - article 19 NFL Air Pollution control regulation , article 19*
Carbon Monoxide (CO)	0.6	kg/ 10^3 litres	*Reference : AP-42, Fuel oil combustion, Table 1.3-1.*
Particulate matter (PM)	0.24	kg/ 10^3 litres	*Reference : AP-42, Fuel oil combustion, Table 1.3-1.*
Hydrocarbon (HC)	0.03024	kg/ 10^3 litres	*Reference : AP-42, Fuel oil combustion, Table 1.3-3.*

Emission rate NO_x	50.0	g/GJ	/	3600	s/hr	X	116.4	GJ/h	=	1.6	g/s
Emission rate CO	0.60	g/litres	X	3108	l/hr	/	3600	s/hr	=	0.52	g/s
Emission rate $PM_{2.5}$	0.24	g/litres	X	3108	l/hr	/	3600	s/hr	=	0.21	g/s
Emission rate HC	0.03	g/litres	X	3108	l/hr	/	3600	s/hr	=	0.03	g/s

Sulphur dioxide (SO2)

% of sulphur in oil	0.0015%		*REF: Email François Saulnier Exxon Mobil, Jan 5th, 2011*								
Emission rate SO_2	4736 kg/hr	X	0.0015%	X	2	kg SO_2/kg S	X	1000 g/kg	/		
	3600 s/hr	X	(1 -		0.000%	)			=	**0.0395**	**g/s**
	0.039 g/s	X	3600 s/hr	X	24	h/d	X	30 d/month			
	7 months/y	/	1,000,000 g/ton						=	**0.7**	**tons SO2 over 7 months period**

Particulate Matter (PM)

Emission rate $PM_{2.5}$	5.52 kg/hr	X	1000 g/kg	/	3600	s/hr			=	**1.532**	**g/s**
	1.5 g/s	X	3600 s/hr	X	24	h/j	X	30 d/month			
	7 months/y	/	1000000 g/ton						=	**27.8**	**tons over 7 months period**

Nitrogen oxides (NOx)

Emission rate NO_x **44.690 g/s** *(Generator + Dryer)*

CO

Emission rate CO **2.392 g/s** *(Generator + Dryer)*

Hydrocarbon (HC)

Emission rate HC **1.079 g/s** *(Generator + Dryer)*

DSO PLANT - AIR DISPERSION MODELING

2) SUMMER 5 months per year

Scenario description : Drying not in function.

Data

Fuel Oil consumption:			
Generators	1550	l/hr	*CAT175-16 Caterpillar spec sheet for 75% prime duty load x 3 generators = 516.8 L/hr x 5*
Oil density	832	kg/m^3	*REF: Email François Saulnier Exxon Mobil, Jan 5th, 2011*
Total Fuel Oil consumption:	1290	kg/hr	
HV	45,000	kJ/kg	*REF: Email François Saulnier Exxon Mobil, Jan 5th, 2011*
Building height	40.5	m	*Reference: drawing DSOT-DW-3300-GE-0002*
Stack height	65.7	m	
Diameter	2.44	m	*Reference: DSOT-VP-3210-MS-0170-0021 - I.D. = 96 inches*
Temperature	451.2	°C	
	724.2	K	
Gas flow from generators	81,270	m3/hr	*REF: supplier Data Sheet*
Temperature (from generators)	451.2	°C	*REF:supplier Data Sheet*
Gas flow at stack (wet)	36,431	Nm^3/hr	*Gas flow for generators*

Calculations

Gas flow at stack	36,431	Nm^3/hr	X	724	K	/	273	K	=	96,643	Am^3/hr
Gas velocity	96,643	Am^3/hr	/	4.7	m^2	/	3600	s/hr	=	5.7	m/s
Total Capacity	1290	kg/hr	X	45000	kJ/kg	/	1.E+06	kJ/GJ	=	58.0	GJ/hr

Generators

Total number of engines	**3**			6356	total kW required during Summer
Engine power	2118.75	kW	=2825kW *75%	6348	Total 24h average load (Ref: "Genset load calculations-summer.xlsx" sent by Plamen Kurktchiev
	2841.24375	hp	(load approximately 75% for power requirement)		

<u>Exhaust emission data:</u>

Nitrogen oxides (NOx)	31013	g/h	REF:CAT C175-16 performance data sheet [WYB01014]
Carbon Monoxide (CO)	1349	g/h	REF:CAT C175-16 performance data sheet [WYB01014]
Particulate matter (PM)	257	g/h	REF:CAT C175-16 performance data sheet [WYB01014]
Hydrocarbon (HC)	758	g/h	REF:CAT C175-16 performance data sheet [WYB01014]

Emission rate NOx	31013	g/h	/	3600	s/hr	X	3	=	25.8 g/s	TO GENERATOR STACK
Emission rate CO	1349	g/h	/	3600	s/hr	X	3	=	1.1 g/s	TO GENERATOR STACK
Emission rate $PM_{2.5}$	257	g/h	/	3600	s/hr	X	3	=	0.2 g/s	TO GENERATOR STACK
Emission rate HC	758.00	g/h	/	3600	s/hr	X	3	=	0.6 g/s	TO GENERATOR STACK

Sulphur dioxide (SO2)

% of sulphur in oil	0.0015%		*REF: Email François Saulnier Exxon Mobil, Jan 5th, 2011*									
Emission rate SO_2 generators	1290	kg/hr	X	0.0015%	X	2	kg SO_2/kg S	X	1000 g/kg	/		
	3600	s/hr	X	(1	-	0%	)			=	**<u>0.011 g/s</u>**	TO GENERATOR STACK
	0.011	g/s	X	3600 s/hr	X	24	h/d	X	30 d/month			
	5	months/y	/	1,000,000 g/ton						=	**<u>0.14 ton during summer</u>**	

Particulate Matter (PM)

Emission rate $PM_{2.5}$	0.214	g/s	X	3600 s/hr	X	24	h/j	X	30 d/month	=	**<u>2.8 tons during summer</u>**
	5	months/y	/	1,000,000 g/ton							

Nitrogen oxides (NOx)

Emission rate NOx **<u>25.84 g/s</u>**

CO

Emission rate CO **<u>1.12 g/s</u>**

Hydrocarbon HC

Emission rate HC **<u>0.63 g/s</u>**

Emissions from equipment at main Plant

Data

Capacity of crushers	6,132,000	tonnes/yr	*Production data of year 2015-2017*		
	16,800	tonnes/day			
	700	tonnes/hr	(Conservative assumption that crushers are processing their nominal capacity 24h all year long)		

Production rate of the main Plant

Sinterfines production rate	3,227,184	tonnes/yr		
	8,842	tonnes/day	61,891	tonnes/week
	368.4	tonnes/hr		Ref: Drawings DSOT-DV-2750-PR-4851/4852/4853
Superfines production rate	1,572,420	tonnes/yr		
	4,308	tonnes/day	30,156	tonnes/week
	179.5	tonnes/hr		Ref: Drawings DSOT-DV-2750-PR-4851/4852/4853

Description		Emission rate TPM	Emission rate PM 10	Emission rate PM 2.5	Units	References	Period/ frequency	Notes
Apron Conveyor	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne			
	0%	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	Hourly rate % below:	0.0490	0.0161	0.0046	kg/hr		12 months per year	
	100%	**0.0136**	**0.00447**	**0.00126**	**g/s**		average rate over 24h	
Primary Crusher	Reduction % below:	0.000600	0.000270	0.0000500	kg/tonne			
	0%	0.000600	0.000270	0.0000500	kg/tonne	1		Reference 1: Tertiary Crushing (controlled)
	Hourly rate % below:	0.4200	0.1890	0.0350	kg/hr		12 months per year	
	100%	**0.1167**	**0.05250**	**0.00972**	**g/s**		average rate over 24h	
Chute from Crusher	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne			
	0%	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	Hourly rate % below:	0.0490	0.0161	0.0046	kg/hr		12 months per year	
	100%	**0.0136**	**0.00447**	**0.00126**	**g/s**		average rate over 24h	
Unload + Conveyor + Primary sizer + Chute		**0.3125**	**0.1204**	**0.0212**	**g/s**	**as volume source VMP_SZ1**		
Conveyor	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne			
	0%	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	Hourly rate % below:	0.0490	0.0161	0.0046	kg/hr		12 months per year	
	100%	**0.0136**	**0.00447**	**0.00126**	**g/s**		average rate over 24h	
Secondary Crusher	Reduction % below:	0.000600	0.000270	0.0000500	kg/tonne			
	0%	0.000600	0.000270	0.0000500	kg/tonne	1		Reference 1: Tertiary Crushing (controlled)
	Hourly rate % below:	0.4200	0.1890	0.0350	kg/hr		12 months per year	
	100%	**0.1167**	**0.05250**	**0.00972**	**g/s**		average rate over 24h	
Chute from Crusher	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne			
	0%	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	Hourly rate % below:	0.0490	0.0161	0.0046	kg/hr		12 months per year	
	100%	**0.0136**	**0.00447**	**0.00126**	**g/s**		average rate over 24h	
Conveyor + Secondary sizer + Chute		**0.1439**	**0.0614**	**0.0123**	**g/s**	**as volume source VMP_SZ2**		
MAIN PLANT								
Conveyor to Sinterfines stockpiles	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne			Reference 1: Conveyor Transfer Point (controlled)
	75%	0.000018	0.000006	0.0000016	kg/tonne	1		Reference 2: Dust emission control - telescopic chute: 75% reduction (Table 3, NPI, "Emission estimation Technique Manual for Mining and Processiong of Non-Metal Minerals, 1999)
	Hourly rate % below:	0.0064	0.0021	0.0006	kg/hr		12 months per year	
	100%	**0.0018**	**0.00059**	**0.00017**	**g/s**		average rate over 24h	
Conveyor to Sinterfines stockpiles		**0.001791**	**0.000588**	**0.000166**	**g/s**	**as volume source VMP_SIN**		
Conveyor to Superfines stockpiles	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne			Reference 1: Conveyor Transfer Point (controlled)
	75%	0.000018	0.000006	0.0000016	kg/tonne	1		Reference 2: Dust emission control - telescopic chute: 75% reduction (Table 3, NPI, "Emission estimation Technique Manual for Mining and Processiong of Non-Metal Minerals, 1999)
	Hourly rate % below:	0.0031	0.0010	0.0003	kg/hr		12 months per year	
	100%	**0.0009**	**0.00029**	**0.00008**	**g/s**		average rate over 24h	
Conveyor to Superfines stockpiles		**0.0008726**	**0.0002867**	**0.0000810**	**g/s**	**as volume source VMP_SUP**		
Wheel loaders activities Loading / Unloading into Belt Feeder during Rail Loading						1	Hours of operation per day: 16	- With 7 trains/week loading 16 hours/day. - Train is assumed to have 240 cars loaded at 100 tonnes/car therefore having 24000 tonnes/train. - It is assumed that during rail loading, Bypass Tower is diverting main plant output one of the product to the reclaim conveyor (rate substracted = average rate between superfines and sinterfines)
		2.8431	**0.9951**	**0.1507**	**g/s over 16h**		Hourly rate % below: 100%	
Load/Unload during Rail Loading		**1.8954**	**0.6634**	**0.1005**	**g/s over 24h**	**as volume source VMP_HDRL**		
Rail loading	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne		Hours of operation per day: 16	
	90%	0.00000700	0.00000230	0.00000065	kg/tonne	1 , 2		- With 7 trains/week loading 16 hours/day. - Train is assumed to have 240 cars loaded at 100 tonnes/car therefore having 24000 tonnes/train. Reference 1: Conveyor Transfer Point (controlled) Reference 2: Uni-load loading system : 90% reduction
	Hourly rate % below: 100%	**0.0029167**	**0.0009583**	**0.0002708**	**g/s over 16h**		Hourly rate % below: 100%	
Rail loading		**0.0019**	**0.0006**	**0.0002**	**g/s over 24h**	**as volume source VMP_RAIL**		

4 ROOF VENTS, 14 WALL FANS AND 3 VACUUM PUMPS

Reference Drawing No.: DSOT-DW-3144-MS-0165
DSOT-DW-3144-MS-0109

D175DD63.pdf

DSOT-DW-3144-MS-0109(DSOT-DW-3144-MS-0109.pdf)

4 roof vents at the top of the dome. Each roof vent is connected to two fans. For air recirculation and exchanges.
14 wall vents on the side of the dome, approx. 8 m high. 10 vents on the South side (road side) and 4 vents on the North side (Admin building side). For air recirculation and exchanges.
3 vacuum pumps, 1 used at the Pan Filter and 2 used at the Drum Filters. Exhaust pipe diameter (50 cm and 40 cm respectively). These vents extend horizontally outside of the Dome wall (North-East corner)

A. INVENTORY

	Parameter	Units	Summer	Winter	Notes
	Months per year	months	5	7	
Wall exhausts	Flow Rate (total 14 fans)	cfm	289300	125358	From DSOT-DW-3144-MS-0165
		Nm3/hr	491519	212983	Assume air is at 25°C
	Flow rate per fan	cfm	20664	8954	Design fan capacity is 22,000 cfm
		Nm3/hr	35109	15213	
	Dust Concentration in exhaust	mg/Nm3	1.0	1.0	Equals Dust Concentration inside Dome. Assume all PM2.5 Engineering Estimate based on Ref. 1
	Dust Emissions (total 14 fans)	kg/h	0.49	0.21	
		g/s	0.137	0.059	
		Tonnes/period	1.79	1.09	
		Tonnes/year	2.88		

	Parameter	Units	Summer	Winter	Notes
Roof exhausts	Flow Rate (total 4 fans)	cfm	150000	0	From DSOT-DW-3144-MS-0165
		Nm3/hr	254849	0	Assume air is at 25°C
	Dust Concentration inside Dome. Assume all $PM_{2.5}$	mg/Nm3	1	1	Engineering Estimate based on Ref. 1
	Dust Emissions (total 4 fans)	kg/h	0.25	0.00	
		g/s	0.071	0.000	
		Tonnes/period	0.93	0.00	
		Tonnes/year	0.93		

	Parameter	Units	Summer	Winter	Notes
3 Vacuum Pumps	3 exhausts	kg/h	0.18	0.18	See calculations below
		g/s	0.05	0.05	
		Tonnes/period	0.66	0.93	
		Tonnes/year	1.59		

	Parameter	Units	Summer	Winter
Wall Fans + Vacuum Pumps + Roof exhausts	Total Emissions	tonnes/period	3.39	2.02
		tonnes/year	5.41	

Ref. 1: Using Ventilation Control Technology to Reduce Respirable Dust Exposures at U.S. Metal/Nonmetal Mining Operations, NIOSH, USA

B. DATA TO USE IN AIR MODELING

1. Wall Exhausts SOUTH (Main Road Side)

Model as one horizontal stack, located in the center, SOUTH side of the dome at 8 meter high. 2 conditions: winter and summer

	Parameter	Units	Summer	Winter	Notes
Wall Exhausts - SOUTH	Months per year	months	5	7	
	10 vents on South Side	Each, Nm3/hr	35109	15213	Ref: DSOT-DW-3144-MS-0165
		Total, Nm3/hr	351085	152130	Ref: DSOT-DW-3144-MS-0165
	Dust Concentration in exhaust	mg/Nm3	1.0	1.0	Equals Dust Concentration inside Dome. Assume all PM2.5 Engineering Estimate based on Ref. 1
	Dust Emissions (total 10 fans)	kg/h	0.35	0.15	
		g/s	0.098	0.042	
	Exhaust Temperature	°C	25		Average. Equals dome inside air temperature.
	Exhaust orientation	--	Horizontal		For modeling, Vs = 0.1 m/s
	Exhaust velocity	m/s	0.1		For modeling, Vs = 0.1 m/s due to downward horizontal orientation
	Exhaust height	meters	7.3		Ref: DSOT-DW-3300-GE-0002
	Dimension	m	3 m x 1.27 m		Actual dimensions (Ref: DSOT-DW-3300-GE-0002)
			11.1	7.3	Equivalent diameter for modelling a vertical velocity of 0.1 m/s

2. Wall Exhausts NORTH (Admin Building Side)

Model as one horizontal stack, located in the center, NORTH side of the dome at 8 meter high. 2 conditions: winter and summer

	Parameter	Units	Summer	Winter	Notes
Wall Exhausts - NORTH	Months per year	months	5	7	
	4 vents on North Side	Each, Nm3/hr	35109	15213	Ref: DSOT-DW-3144-MS-0165
		Total, Nm3/hr	140434	60852	Ref: DSOT-DW-3144-MS-0165
	Dust Concentration in exhaust	mg/Nm3	1.0	1.0	Equals Dust Concentration inside Dome. Assume all $PM_{2.5}$ Engineering Estimate based on Ref. 1
	Dust Emissions (total 4 fans)	kg/h	0.14	0.06	Assume all $PM_{2.5}$
		g/s	0.039	0.017	Assume all $PM_{2.5}$
	Exhaust Temperature	°C	25		Average. Equals dome inside air temperature.
	Exhaust orientation	--	Horizontal		For modeling, Vs = 0.1 m/s
	Exhaust velocity	m/s	0.1		For modeling, Vs = 0.1 m/s due to downward horizontal orientation
	Exhaust height	meters	7.3		Ref: DSOT-DW-3300-GE-0002
	Dimension	m	3 m x 1.27 m		Actual dimensions (Ref: DSOT-DW-3300-GE-0002)
			11.1	7.3	Equivalent diameter for modelling a vertical velocity of 0.1 m/s

3. Vacuum Pumps NORTH-EAST corner of the Dome

Model as one horizontal stack, located at the North-East corner of the dome. 7 meter high. 2 conditions: winter and summer

	Parameter	Units	Summer	Winter	Notes
2 drum filter vacuum pumps and one pan filter suction blower	Months per year	months	5	7	12 months per year, constant. Ref: DSOT-DW-3144-MS-0165
	Total Air Flow	Total, cfm	10700	10700	Ref: DSOT-DW-3144-MS-0165
		Total, Nm3/hr	18179	18179	
	Dust Concentration in exhaust	mg/Nm3	10	10	Engineering Estimate
	Dust Emissions (total)	kg/h	0.18	0.18	
		g/s	0.050	0.050	
	Exhaust Temperature	°C	25		
	Exhaust orientation	--	Horizontal		Each of the three vacuum pump has an exhaust pipe (40/50 cm). These pipes extend horizontally outside of the Dome wall (North-East corner), 10 meters from the Dome wall. 7 meters above ground. For air modeling purposes they are grouped into one horizontal stack
	Exhaust height	meters	7.0		
	Dimension	m	0.51		
			8.0	8.0	Equivalent diameter for modelling a vertical velocity of 0.1 m/s

4. Roof Exhausts

Model as one vertical stack, located in the center of the dome. 2 conditions: winter and summer

	Parameter	Units	Summer	Winter	Notes
Roof Exhausts	Months per year	months	5	7	
	4 roof exhausts	Each, Nm3/hr	63712	0	2 fans are connected to each roof exhaust. 63,712 Nm3/hr air flow is for both fans
		Total, Nm3/hr	254849	0	Ref: DSOT-DW-3144-MS-0165
	Dust Concentration in exhaust	mg/Nm3	1.0	1.0	Equals Dust Concentration inside Dome. Assume all PM2.5 Engineering Estimate based on Ref. 1
	Dust Emissions (total 4 exhausts)	kg/h	0.25	0	
		g/s	0.0708	0	
	Exhaust Temperature	°C	25		Average. Equals dome inside air temperature.
	Exhaust orientation	--	Vertical		Model as one horizontal stack, located in the center of the dome
	Dimension	cm	200		Diameter (Ref: DSOT-DW-3144-MS-0109).
	Exhaust velocity	m/s	5.6	0	Calculated
	Exhaust height	meters	46.29		Ref: DSOT-DW-3144-MS-0109

DUST COLLECTOR (FABRIC FILTER) - RAIL LOAD-OUT TOWER - BIN VENT

Reference Drawing No.: Ultra Industries Inc - Customer data 10/31/12

93C9D6E1.pdf

PCE Sales and Engineering. Drawing 2K12-460-10

51C91C97.pdf

The rail load-out tower bin vent dust collector is located at the load-out tower and captures dust emissions from processed ore falling from the conveyor in the bin. The dust collector exhaust on the side of the load-out tower, through a 513 mm diameter outlet, horizontally, approximately 35 m above ground.
Potential dust emissions from this source are negligeable and were not included in air modeling

A. INVENTORY AND MODELING PARAMETERS

Parameter	Units	Yearly	Notes
Months per year	months	12	
Hours per day	hours	16	
Flow Rate	Nm3/hr	8496	Ref: Ultra Industries Inc - Customer data 10/31/12
Maximum Inlet Dust Loading Concentration	g/Nm3	42.6	Ref: Ultra Industries Inc - Customer data 10/31/12
Outlet Dust Concentration	mg/Nm3	50.0	Ref: Email from Daniel Hahn, Ultra Industries. 27-Aug-2015. Dust Emissions = 0.02 gr/acf = 45.8 mg/m3, rounded up to 50 mg/Nm3
Collector efficiency (Calculated)	%	99.9%	Typical new equipment design efficiencies are between 99 and 99.9% (ref. USEPA Document Air Pollution Control Technology Fact Sheet)
Dust Emission Rate	kg/h	0.42	Maximum hourly rate
	g/s, daily average	0.079	Calculated, hourly rate multiplied by 16 hours/d over 24 hours
	tonnes/year	2.48	16 hours per day. 365 days per year
Exhaust Temperature	°C	0	Ref: Ultra Industries Inc - Customer data 10/31/12
Exhaust orientation	--	Horizontal	
Exhaust velocity	m/s	10.5	Calculated
Exhaust height	meters	35	Ref: Ultra Industries Inc - Customer data 10/31/12
Exhaust diameter	m	0.513	Actual diameter. Ref: Ultra Industries Inc - Customer data 10/31/12
		5.2	Equivalent diameter for modelling a vertical velocity of 0.1 m/s

Emissions from truck loading activities at F7N

Equation used:

EF = k * 0.0016 * (U/2.2)^1.3 * (M/2)^-1.4 (kg/tons) *Ref: 1*

TPM k= 1 PM10 k= 0.35 PM2.5 k=0.053

M (moisture) %: 9 *Ref: Adam Friedberg, email August 2014*

U average wind speed (m/s): 4.6 m/s *Ref: http://www.climate.weatheroffice.ec.gc.ca/climate_normals*

TPM (kg/t) =	0.000508227	kg/t
PM10 (kg/t)=	0.00017788	kg/t
PM-2.5 (kg/t) =	2.69361E-05	kg/t

1- U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.4 Aggregate Handling and storage piles , equation (1)

Data:

Duration	8760	hours	24 h/day, All year
Surface	7,563	m2	Surface corresponding approx. to the area affected by a blast

Calculation:

MPT (kg/yr)	0.000508227	kg/T	X	3,382,860	T/year	=	1719	kg/yr			
MPT (kg/h)	1,719	kg/yr	/	8,760	h/year	=	0.2	kg/h			
MPT (g/s)	0.2	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0545**	**g/s**
MPT (g/m2/s)	0.0545	g/s	/	7,563	m2	=	**7.20892E-06**	**g/m2/s**			
PM-10 (kg/yr)	0.00017788	kg/T	X	3,382,860	T/year	=	602	kg/yr			
PM-10 (kg/h)	602	kg/yr	/	8,760	h/year	=	0.1	kg/h			
PM-10 (g/s)	0.1	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0191**	**g/s**
PM-10 (g/m2/s)	0.0191	g/s	/	7,563	m2	=	**2.52312E-06**	**g/m2/s**			
PM-2.5 (kg/yr)	2.69361E-05	kg/T	X	3,382,860	T/year	=	91	kg/yr			
PM-2.5 (kg/h)	91	kg/yr	/	8,760	h/year	=	0.0	kg/h			
PM-2.5 (g/s)	0.0	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0029**	**g/s**
PM-2.5 (g/m2/s)	0.0029	g/s	/	7,563	m2	=	**3.82073E-07**	**g/m2/s**			

Emissions from bulldozer excavation activities at F7N

Equation used:

EF = 2.6 * (s)^1.2 * (M)^-1.3 (kg/hr)

1- U.S. EPA AP-42 Fifth Edition, Volume I Chapter 11, Mineral Products Industry, section 11.9: Western Surface Coal Mining, tableau 11.9-2.

Data:

M (Moisture content) %:	9 %	*Ref: Adam Friedberg, email August 2014*
s: Silt content	1.5 %	*Ref: Loic Dillon, Mars 2014*
PM10 factor	0.35	*Réf.: AP-42* *U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.4 Aggregate Handling and storage piles (k values for Equation 1)*
PM2.5 factor	0.053	

Surface 7,563 m2 *Surface corresponding approx. to the area affected by a blast*

Calculations

MPT (g/s)	0.2	kg/hr	X	1,000	g/s	/	3600	s/hr	=	**0.068**	**g/s**
MPT (g/s/m2)	0.068	g/s	/	7,563	m2	=	**8.93E-06**	**g/s m2**			
PM-10 (g/s)	0.09	kg/hr	X	1,000	g/s	/	3600	s/hr	=	**0.024**	**g/s**
MPT (g/s/m2)	0.024	g/s	/	7,563	m2	=	**3.13E-06**	**g/s m2**			
PM-2.5 (g/s)	0.013	kg/hr	X	1,000	g/s	/	3600	s/hr	=	**0.0036**	**g/s**
MPT (g/s/m2)	0.0036	g/s	/	7,563	m2	=	**4.73E-07**	**g/s m2**			

Emissions from truck loading activities at HOWSE (O.B.---- 5 months/year)

Equation used:

EF = k * 0.0016 * (U/2.2)^1.3 * (M/2)^-1.4 (kg/tons) *Ref: 1*

TPM k= 1 PM10 k= 0.35 PM2.5 k=0.053

M (moisture) %:	9			*Ref: Adam Friedberg, email August 2014*
U average wind speed (m/s):		4.6	m/s	*Ref: http://www.climate.weatheroffice.ec.gc.ca/climate_normals*

TPM (kg/t) =	0.000508227	kg/t
PM10 (kg/t)=	0.00017788	kg/t
PM-2.5 (kg/t) =	2.69361E-05	kg/t

1- U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.4 Aggregate Handling and storage piles , equation (1)

Data:

Duration	3600	hours	24 h/day, 150 days/year
Surface	7,563	m2	Surface corresponding approx. to the area affected by a blast

Calculation:

MPT (kg/yr)	0.000508227	kg/T	X	6,777,656	T/year	=	3445	kg/yr			
MPT (kg/h)	3,445	kg/yr	/	3,600	h/year	=	1.0	kg/h			
MPT (g/s)	1.0	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.2658**	**g/s**
MPT (g/m2/s)	0.2658	g/s	/	7,563	m2	=	**3.51453E-05**	**g/m2/s**			
PM-10 (kg/yr)	0.00017788	kg/T	X	6,777,656	T/year	=	1206	kg/yr			
PM-10 (kg/h)	1,206	kg/yr	/	3,600	h/year	=	0.3	kg/h			
PM-10 (g/s)	0.3	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0930**	**g/s**
PM-10 (g/m2/s)	0.0930	g/s	/	7,563	m2	=	**1.23009E-05**	**g/m2/s**			
PM-2.5 (kg/yr)	2.69361E-05	kg/T	X	6,777,656	T/year	=	183	kg/yr			
PM-2.5 (kg/h)	183	kg/yr	/	3,600	h/year	=	0.1	kg/h			
PM-2.5 (g/s)	0.1	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0141**	**g/s**
PM-2.5 (g/m2/s)	0.0141	g/s	/	7,563	m2	=	**1.8627E-06**	**g/m2/s**			

Emissions from bulldozer excavation activities at HOWSE (O.B.----5 months/year)

Equation used:

EF = 2.6 * (s)^1.2 * (M)^-1.3 (kg/hr)

1- U.S. EPA AP-42 Fifth Edition, Volume I Chapter 11, Mineral Products Industry, section 11.9: Western Surface Coal Mining, tableau 11.9-2.

Data:

M (Moisture content) %:	9	%	*Ref: Adam Friedberg, email August 2014*
s: Silt content	1.5	%	*Ref: Loic Dillon, Mars 2014*
PM10 factor	0.35		*Réf.: AP-42* *U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.4 Aggregate Handling and storage piles (k values for Equation 1)*
PM2.5 factor	0.053		
Surface	7,563	m2	*Surface corresponding approx. to the area affected by a blast*

Calculations

MPT (g/s)	0.2	kg/hr	X	1,000	g/s	/	3600	s/hr	=	**0.068**	**g/s**
MPT (g/s/m2)	0.068	g/s	/	7,563	m2	=	**8.93E-06**	**g/s m2**			
PM-10 (g/s)	0.09	kg/hr	X	1,000	g/s	/	3600	s/hr	=	**0.024**	**g/s**
MPT (g/s/m2)	0.024	g/s	/	7,563	m2	=	**3.13E-06**	**g/s m2**			
PM-2.5 (g/s)	0.013	kg/hr	X	1,000	g/s	/	3600	s/hr	=	**0.0036**	**g/s**
MPT (g/s/m2)	0.0036	g/s	/	7,563	m2	=	**4.73E-07**	**g/s m2**			

Emissions from truck loading activities at HOWSE (Ore+Waste---- 7 months/year)

Equation used:

EF = k * 0.0016 * (U/2.2)^1.3 * (M/2)^-1.4 (kg/tons) *Ref: 1*

TPM k= 1 PM10 k= 0.35 PM2.5 k=0.053

M (moisture) %:	9			*Ref: Adam Friedberg, email August 2014*
U average wind speed (m/s):		4.6	m/s	*Ref: http://www.climate.weatheroffice.ec.gc.ca/climate_normals*

TPM (kg/t) =	0.000508227	kg/t
PM10 (kg/t)=	0.00017788	kg/t
PM-2.5 (kg/t) =	2.69361E-05	kg/t

1- U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.4 Aggregate Handling and storage piles , equation (1)

Data:

Duration	4800	hours	24 h/day, 200 days/year
Surface	7,563	m2	Surface corresponding approx. to the area affected by a blast

Calculation:

MPT (kg/yr)	0.000508227	kg/T	X	7,045,421	T/year	=	3581	kg/yr			
MPT (kg/h)	3,581	kg/yr	/	4,800	h/year	=	0.7	kg/h			
MPT (g/s)	0.7	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.2072**	**g/s**
MPT (g/m2/s)	0.2072	g/s	/	7,563	m2	=	**2.74003E-05**	**g/m2/s**			
PM-10 (kg/yr)	0.00017788	kg/T	X	7,045,421	T/year	=	1253	kg/yr			
PM-10 (kg/h)	1,253	kg/yr	/	4,800	h/year	=	0.3	kg/h			
PM-10 (g/s)	0.3	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0725**	**g/s**
PM-10 (g/m2/s)	0.0725	g/s	/	7,563	m2	=	**9.59012E-06**	**g/m2/s**			
PM-2.5 (kg/yr)	2.69361E-05	kg/T	X	7,045,421	T/year	=	190	kg/yr			
PM-2.5 (kg/h)	190	kg/yr	/	4,800	h/year	=	0.0	kg/h			
PM-2.5 (g/s)	0.0	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0110**	**g/s**
PM-2.5 (g/m2/s)	0.0110	g/s	/	7,563	m2	=	**1.45222E-06**	**g/m2/s**			

Emissions from bulldozer excavation activities at HOWSE (Ore+Waste---- 7 months/year)

Equation used:

EF = 2.6 * (s)^1.2 * (M)^-1.3 (kg/hr)

1- U.S. EPA AP-42 Fifth Edition, Volume I Chapter 11, Mineral Products Industry, section 11.9: Western Surface Coal Mining, tableau 11.9-2.

Data:

M (Moisture content) %:	9	%	*Ref: Adam Friedberg, email August 2014*
s: Silt content	1.5	%	*Ref: Loic Dillon, Mars 2014*
PM10 factor	0.35		*Réf.: AP-42* *U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.4 Aggregate Handling and storage piles (k values for Equation 1)*
PM2.5 factor	0.053		
Surface	7,563	m2	*Surface corresponding approx. to the area affected by a blast*

Calculations

MPT (g/s)	0.2	kg/hr	X	1,000	g/s	/	3600	s/hr	=	**0.068**	**g/s**
MPT (g/s/m2)	0.068	g/s	/	7,563	m2	=	**8.93E-06**	**g/s m2**			
PM-10 (g/s)	0.09	kg/hr	X	1,000	g/s	/	3600	s/hr	=	**0.024**	**g/s**
MPT (g/s/m2)	0.024	g/s	/	7,563	m2	=	**3.13E-06**	**g/s m2**			
PM-2.5 (g/s)	0.013	kg/hr	X	1,000	g/s	/	3600	s/hr	=	**0.0036**	**g/s**
MPT (g/s/m2)	0.0036	g/s	/	7,563	m2	=	**4.73E-07**	**g/s m2**			

Emissions from truck unloading activities of OverBurden and Waste from F7N

Equation used:

EF = k * 0.0016 * (U/2.2)^1.3 * (M/2)^-1.4 (kg/tons) *Ref: 1*

TPM k= 1 PM10 k= 0.35 PM2.5 k=0.053

M (moisture) %: 9 *Ref: Adam Friedberg, email August 2014*

U average wind speed (m/s): 4.6 m/s *Ref: http://www.climate.weatheroffice.ec.gc.ca/climate_normals*

TPM (kg/t) =	0.000508227	kg/t
PM10 (kg/t)=	0.00017788	kg/t
PM-2.5 (kg/t) =	2.69361E-05	kg/t

1- U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.4 Aggregate Handling and storage piles , equation (1)

Data:

Duration	8760	hours	24 h/day, All year
Surface	30,000	m2	Surface corresponding approx. to the area of operation *Ref: Email Jeff Cassoff, March 20 2012*

Calculation:

MPT (kg/yr)	0.000508227	kg/T	X	2,273,750	T/year	=	1156	kg/yr			
MPT (kg/h)	1,156	kg/yr	/	8,760	h/year	=	0.1	kg/h			
MPT (g/s)	0.1	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0366**	**g/s**
MPT (g/m2/s)	0.0366	g/s	/	30,000	m2	=	**1.22144E-06**	**g/m2/s**			
PM-10 (kg/yr)	0.00017788	kg/T	X	2,273,750	T/year	=	404	kg/yr			
PM-10 (kg/h)	404	kg/yr	/	8,760	h/year	=	0.0	kg/h			
PM-10 (g/s)	0.0	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0128**	**g/s**
PM-10 (g/m2/s)	0.0128	g/s	/	30,000	m2	=	**4.27505E-07**	**g/m2/s**			
PM-2.5 (kg/yr)	2.69361E-05	kg/T	X	2,273,750	T/year	=	61	kg/yr			
PM-2.5 (kg/h)	61	kg/yr	/	8,760	h/year	=	0.0	kg/h			
PM-2.5 (g/s)	0.0	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0019**	**g/s**
PM-2.5 (g/m2/s)	0.0019	g/s	/	30,000	m2	=	**6.47364E-08**	**g/m2/s**			

Emissions from truck unloading activities of OverBurden and Waste from T3

Equation used:

EF = k * 0.0016 * (U/2.2)^1.3 * (M/2)^-1.4 (kg/tons) *Ref: 1*

TPM k= 1 PM10 k= 0.35 PM2.5 k=0.053

M (moisture) %: 9 *Ref: Adam Friedberg, email August 2014*

U average wind speed (m/s): 4.6 m/s *Ref: http://www.climate.weatheroffice.ec.gc.ca/climate_normals*

TPM (kg/t) =	0.000508227	kg/t
PM10 (kg/t)=	0.00017788	kg/t
PM-2.5 (kg/t) =	2.69361E-05	kg/t

1- U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.4 Aggregate Handling and storage piles , equation (1)

Data:

Duration				8760	hours		24 h/day, All year				
Surface				30,000	m2		Surface corresponding approx. to the area of operation				
							Ref: Email Jeff Cassoff, March 20 2012				

Calculation:

MPT (kg/yr)	0.000508227	kg/T	X	2,788,100	T/year	=	1417	kg/yr			
MPT (kg/h)	1,417	kg/yr	/	8,760	h/year	=	0.2	kg/h			
MPT (g/s)	0.2	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0449**	**g/s**
MPT (g/m2/s)	0.0449	g/s	/	30,000	m2	=	**1.49775E-06**	**g/m2/s**			
PM-10 (kg/yr)	0.00017788	kg/T	X	2,788,100	T/year	=	496	kg/yr			
PM-10 (kg/h)	496	kg/yr	/	8,760	h/year	=	0.1	kg/h			
PM-10 (g/s)	0.1	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0157**	**g/s**
PM-10 (g/m2/s)	0.0157	g/s	/	30,000	m2	=	**5.24212E-07**	**g/m2/s**			
PM-2.5 (kg/yr)	2.69361E-05	kg/T	X	2,788,100	T/year	=	75	kg/yr			
PM-2.5 (kg/h)	75	kg/yr	/	8,760	h/year	=	0.0	kg/h			
PM-2.5 (g/s)	0.0	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0024**	**g/s**
PM-2.5 (g/m2/s)	0.0024	g/s	/	30,000	m2	=	**7.93806E-08**	**g/m2/s**			

Emissions from truck unloading activities of OverBurden and Waste at HOWSE (O.B. --- 5 month/year)

Equation used:

EF = k * 0.0016 * (U/2.2)^1.3 * (M/2)^-1.4 (kg/tons) *Ref: 1*

TPM k= 1 PM10 k= 0.35 PM2.5 k=0.053

M (moisture) %: 9 *Ref: Adam Friedberg, email August 2014*

U average wind speed (m/s): 4.6 m/s *Ref: http://www.climate.weatheroffice.ec.gc.ca/climate_normals*

TPM (kg/t) =	0.000508227	kg/t
PM10 (kg/t)=	0.00017788	kg/t
PM-2.5 (kg/t) =	2.69361E-05	kg/t

1- U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.4 Aggregate Handling and storage piles , equation (1)

Data:

Duration				3600	hours		24 h/day, 150 days/year				
Surface				30,000	m2		Surface corresponding approx. to the area of operation				
							Ref: Email Jeff Cassoff, March 20 2012				

Calculation:

MPT (kg/yr)	0.000508227	kg/T	X	6,777,656	T/year	=	3445	kg/yr			
MPT (kg/h)	3,445	kg/yr	/	3,600	h/year	=	0.957	kg/h			
MPT (g/s)	1.0	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.2658**	**g/s**
MPT (g/m2/s)	0.2658	g/s	/	30,000	m2	=	**8.85954E-06**	**g/m2/s**			

PM-10 (kg/yr)	0.00017788	kg/T	X	6,777,656	T/year	=	1206	kg/yr			
PM-10 (kg/h)	1,206	kg/yr	/	3,600	h/year	=	0.335	kg/h			
PM-10 (g/s)	0.3	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0930**	**g/s**
PM-10 (g/m2/s)	0.0930	g/s	/	30,000	m2	=	**3.10084E-06**	**g/m2/s**			
PM-2.5 (kg/yr)	2.69361E-05	kg/T	X	6,777,656	T/year	=	183	kg/yr			
PM-2.5 (kg/h)	183	kg/yr	/	3,600	h/year	=	0.0507	kg/h			
PM-2.5 (g/s)	0.1	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0141**	**g/s**
PM-2.5 (g/m2/s)	0.0141	g/s	/	30,000	m2	=	**4.69556E-07**	**g/m2/s**			

Emissions from truck unloading activities of OverBurden and Waste at HOWSE (Waste --- 7 month/year)

Equation used:

EF = k * 0.0016 * (U/2.2)^1.3 * (M/2)^-1.4 (kg/tons) *Ref: 1*

TPM k= 1 PM10 k= 0.35 PM2.5 k=0.053

M (moisture) %: 9 *Ref: Adam Friedberg, email August 2014*

U average wind speed (m/s): 4.6 m/s *Ref: http://www.climate.weatheroffice.ec.gc.ca/climate_normals*

TPM (kg/t) =	0.000508227	kg/t
PM10 (kg/t)=	0.00017788	kg/t
PM-2.5 (kg/t) =	2.69361E-05	kg/t

1- U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.4 Aggregate Handling and storage piles , equation (1)

Data:

Duration	4800	hours	24 h/day, 200 days/year
Surface	30,000	m2	Surface corresponding approx. to the area of operation Ref: Email Jeff Cassoff, March 20 2012

Calculation:

MPT (kg/yr)	0.000508227	kg/T	X	3,968,498	T/year	=	2017	kg/yr			
MPT (kg/h)	2,017	kg/yr	/	4,800	h/year	=	0.420	kg/h			
MPT (g/s)	0.4	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.1167**	**g/s**
MPT (g/m2/s)	0.1167	g/s	/	30,000	m2	=	**3.89062E-06**	**g/m2/s**			
PM-10 (kg/yr)	0.00017788	kg/T	X	3,968,498	T/year	=	706	kg/yr			
PM-10 (kg/h)	706	kg/yr	/	4,800	h/year	=	0.147	kg/h			
PM-10 (g/s)	0.1	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0409**	**g/s**
PM-10 (g/m2/s)	0.0409	g/s	/	30,000	m2	=	**1.36172E-06**	**g/m2/s**			
PM-2.5 (kg/yr)	2.69361E-05	kg/T	X	3,968,498	T/year	=	107	kg/yr			
PM-2.5 (kg/h)	107	kg/yr	/	4,800	h/year	=	0.0223	kg/h			
PM-2.5 (g/s)	0.0	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0062**	**g/s**
PM-2.5 (g/m2/s)	0.0062	g/s	/	30,000	m2	=	**2.06203E-07**	**g/m2/s**			

Calculations of emission factors of additional diesel powered equipment :

Name	Description	Qty	Tier level	Engine power (kW)	Estimated load	Corresponding PM EF for Tier/Power (g/kW-hr)	Corresponding NOx EF for Tier/Power (g/kW-hr)	Corresponding CO EF for Tier/Power (g/kW-hr)	Corresponding HC EF for Tier/Power (g/kW-hr)**	TPM EF (g/s)	PM10 EF (g/s)	PM2.5 EF (g/s)	SO2 EF (g/s)	NOx EF (g/s)	CO EF (g/s)	HC EF (g/s)
Drill: Gardner Denver SCH5000 DTH	Engine: Caterpillar C11	1	3	242	50%	0.2	4.0	3.5	0.2667	0.00672	0.00672	0.00672	0.000182	0.134	0.118	0.009
Drill: Cubex 920XR	Engine: Caterpillar C15	1	3	403	50%	0.2	4.0	3.5	0.2667	0.01119	0.01119	0.01119	0.000182	0.224	0.196	0.015
Excavator: Caterpillar 390	Engine: Caterpillar C18 ACERT	2	4i	390	50%	0.02	4.0	3.5	0.2667	0.00108	0.00108	0.00108	0.000182	0.217	0.190	0.014
Excavator: Komatsu 1250	Engine: Komatsu SAA6D170E-3	1	2	486	50%	0.2	6.4	3.5	0.4000	0.01350	0.01350	0.01350	0.000182	0.432	0.236	0.027
Excavator: Komatsu 490	Engine: Komatsu SAA6D125E-6-A	1	4i	270	50%	0.02	4.0	3.5	0.2667	0.00075	0.00075	0.00075	0.000182	0.150	0.131	0.010
Dozer: Caterpillar D8	Engine: Caterpillar C15 ACERT	4	4i	237	50%	0.02	4.0	3.5	0.2667	0.00066	0.00066	0.00066	0.000182	0.132	0.115	0.009
Loader: Caterpillar 988	Engine: Caterpillar C18 ACERT	3	3	414	50%	0.2	4.0	3.5	0.2667	0.01150	0.01150	0.01150	0.000182	0.230	0.201	0.015
Water Truck: Caterpillar 773	773F Tier 3	1	3	524	50%	0.2	4.0	3.5	0.2667	0.01456	0.01456	0.01456	0.000182	0.291	0.255	0.019
Grader: Caterpillar 16M	Engine: Caterpillar C13 ACERT VHP	1	4i	221	50%	0.02	4.0	3.5	0.2667	0.00061	0.00061	0.00061	0.000182	0.123	0.107	0.008
Grader: Caterpillar 14M	Engine: Caterpillar C11 ACERT VHP	1	3	219	50%	0.20	4.0	3.5	0.2667	0.00608	0.00608	0.00608	0.000182	0.122	0.106	0.008
Compactor/Roller: Dynapac CS76	Engine: Caterpillar C6.6	2	3	130	50%	0.2	4.0	3.5	0.2667	0.00361	0.00361	0.00361	0.000182	0.072	0.063	0.005
Loader: Caterpillar IT 38	Engine: Caterpillar C6.6 ACERT	1	3	147	50%	0.2	4.0	3.5	0.2667	0.00408	0.00408	0.00408	0.000182	0.082	0.071	0.005
Lighting Plants: Magnum MLT3060	Engine: Mitsubishi L3E-W461ML***	8	4i	10.5	100%	0.4	7.5	6.6	0.8036	0.00117	0.00117	0.00117	0.000015	0.022	0.019	0.002
6" Dewatering Pumps: Godwin Dri-Prime CD150M	Engine: John Deere 4045TF290	3	4i	55	100%	0.3	4.7	5.0	0.2686	0.00458	0.00458	0.00458	0.000076	0.072	0.076	0.004
Locomotive at rail loop	Tier 1 engine : Line-Haul Duty-Cycle during rail loading (Notch levels conservatively estimated as 84% Idle, 6% notch 1, 5% notch 2, 5% notch 3)	1	1	113 bhp		0.22 g/bhp-hr	7.4 g/bhp-hr	2.2 g/bhp-hr	0.55 g/bhp-hr	0.0069	0.0069	0.0069	0.000364	0.232	0.069	0.017

** Tier3 EF are used for Tier 4i in EPA420-R-05-015; Table8

For SO2 emission factor calculations, which is based on fuel consumption, fuel consumption has been very conservatively rounded up to a CAT773 truck running at 50% load:

Oil consumption 26.28 L/hr X 832 kg/m^3 / 1000 l/m3 = 21.9 kg/hr

Emission rate SO_2 21.9 kg/hr X 0.0015% X 2 kg SO_2/kg S X 1000 g/kg / 3600 s/hr = **0.000182** g/s

* All diesel fuel on site is 15ppm sulphur

** Conversion Factors for Hydrocarbon Emission
Components NR-002c.
Report EPA420-R-05-015; Table8

References for calculations

Name	References
Drill: Gardner Denver SCH5000 DTH	http://www.womp-int.com/story/2007vol5/story027.htm http://www.hastingsdeering.com.au/home/news/Caterpillar_in_the_track_drill_business https://mining.cat.com/products/surface-mining/drills/track#MD5125 http://www.drillerschoiceinc.com/PDF/Reedrill/sch5000.pdf
Drill: Cubex 920XR	http://www2.sandvik.com/sandvik/0120/Internet/Poland/S004947.nsf/Alldocs/Products*5CDrill*rigs*and*rock*drills*5CSurface*DTH*drill*rigs*2AQXR920 http://mining.sandvik.com/sandvik/0120/Global/Internet/S003137.nsf/LUSL/SLFrameForm17B6F9E690B5F4CDFC1257965003C9724?OpenDocument
Excavator: Caterpillar 390	http://www.cat.com/en_AU/products/new/equipment/excavators/large-excavators/17859554.html https://www.dieselnet.com/news/2010/04cat.php
Excavator: Komatsu 1250	http://www.komatsu.com.au/AboutKomatsu/NewsAndPublications/Brochures/New%20Equipment%20Brochures/Excavator/PC1250LC-7/PC1250LC-7.pdf http://www.ritchiespecs.com/specification?type=&category=Hydraulic+Excavator&make=Komatsu&model=PC1250-7&modelid=103548
Excavator: Komatsu 490	http://www.komatsuamerica.com/equipment/excavators/70001-260000lbs/pc490lc-10
Dozer: Caterpillar D8	http://www.cat.com/en_US/products/new/equipment/dozers.html http://www.cat.com/en_US/products/new/equipment/dozers/large-dozers/18175886.html
Loader: Caterpillar 988	http://media.lectura-specs.com/data_sheets/it_38h_en(255).pdf
Water Truck: Caterpillar 773	Same as hauling trucks for ore transport
Grader: Caterpillar 16M	http://www.cat.com/en_US/products/new/equipment/motor-graders/m-series-motor-graders/18346813.html https://mining.cat.com/products/surface-mining/motor-graders
Compactor/Roller: Dynapac CS76	http://xml.catmms.com/servlet/ImageServlet?imageId=C334049
Loader: Caterpillar IT 38	http://media.lectura-specs.com/data_sheets/it_38h_en(255).pdf
Lighting Plants: Magnum MLT3060	http://www.m-p-llc.com/products/lighttowers/series3000/mlt3060.html http://www.det-mitsubishi.com/en/mitsubishi-diesel-motoren/toepassingen/magnum
6" Dewatering Pumps: Godwin Dri-Prime CD150M	http://godwinpumps.com/index.php/godwin-products/cd-range/cd150m/ http://www.deere.com/en_US/products/engines_and_drivetrain/industrial/interim_tier_4/powertech_m/4045_series/4045TF290_A.page
Locomotive at rail loop	Table 5.3 for % of avg rated bhp for switch-haul locomotives: http://www.polb.com/civica/filebank/blobdload.asp?BlobID=5377
EPA Tier levels	Nonroad Compression-Ignition Engines -- Exhaust Emission Standards : http://www.epa.gov/otaq/standards/nonroad/nonroadci.htm Locomotives -- Exhaust Emission Standards : http://www.epa.gov/otaq/standards/nonroad/locomotives.htm

Emissions from conveyors and various transfer points equipment at HOWSE Mini Plant

Data
Capacity

INPUT to Mini Plant	3,076,923	tonnes/yr	(Projected Yearly data from Dryer throughput applied for 24 hours operations)
	15,385	tonnes/day	
	641	tonnes/hr	Size of stockpiles is used to estimate 0-10mm vs 10-32mm percentages for process flow
OUTPUT from Mini Plant	2,978,723	tonnes/yr	
(Dried product)	14,893.62	tonnes/day	Moisture content IN 9%
	620.57	tonnes/hr	Moisture content OUT 6%

Description		Emission rate TPM	Emission rate PM 10	Emission rate PM 2.5	Units	References	Period/ frequency	Notes
Jaw Crusher	Reduction % below:	0.000600	0.000270	0.0000500	kg/tonne	1		Reference 1: Tertiary Crushing (controlled)
	0%	0.000600	0.000270	0.0000500	kg/tonne			
	Hourly rate % below:	0.3846	0.1731	0.0321	kg/hr		7 months per year	
	100%	**0.1068**	**0.04808**	**0.00890**	**g/s**		average rate over 24h	
Feed Conveyor #1	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0449	0.0147	0.0042	kg/hr		7 months per year	
	100%	**0.0125**	**0.00410**	**0.00116**	**g/s**		average rate over 24h	
Feed Conveyor #2	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0449	0.0147	0.0042	kg/hr		7 months per year	
	100%	**0.0125**	**0.00410**	**0.00116**	**g/s**		average rate over 24h	
PRE-Dryer Volume Source		**0.2223**	**0.0879**	**0.0160**	**g/s**	Including Truck Unloading at Ramp		
D R Y E R								
Transfer Conveyor #3	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0434	0.0143	0.0040	kg/hr		7 months per year	
	100%	**0.0121**	**0.00396**	**0.00112**	**g/s**		average rate over 24h	
Screen	Reduction % below:	0.001100	0.000370	0.000025	kg/tonne	1		Reference 1: Screening (controlled)
	0%	0.001100	0.000370	0.000025	kg/tonne			
	Hourly rate % below:	0.6826	0.2296	0.0155	kg/hr		7 months per year	
	100%	**0.1896**	**0.06378**	**0.00431**	**g/s**		average rate over 24h	
Transfer Conveyor #4	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0000	0.0000	0.0000	kg/hr		7 months per year	
	0%	**0.0000**	**0.00000**	**0.00000**	**g/s**		average rate over 24h	
Fines Stacker Conveyor	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0000	0.0000	0.0000	kg/hr		7 months per year	
	0%	**0.0000**	**0.00000**	**0.00000**	**g/s**		average rate over 24h	
Transfer Conveyor #5 (to Cone Crusher)	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0043	0.0014	0.0004	kg/hr		7 months per year	
	10%	**0.0012**	**0.00040**	**0.00011**	**g/s**		average rate over 24h	
Transfer Conveyor #6 (to Cone Crusher)	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0043	0.0014	0.0004	kg/hr		7 months per year	
	10%	**0.0012**	**0.00040**	**0.00011**	**g/s**		average rate over 24h	
Cone Crusher	Reduction % below:	0.000600	0.000270	0.0000500	kg/tonne	1		Reference 1: Tertiary Crushing (controlled)
	0%	0.000600	0.000270	0.0000500	kg/tonne			
	Hourly rate % below:	0.0372	0.0168	0.0031	kg/hr		7 months per year	
	10%	**0.0103**	**0.00465**	**0.00086**	**g/s**		average rate over 24h	

POST-Dryer Volume Source	0.3690	0.1273	0.0147	g/s	Including Truck Loading at Plant Exit

(1) Source : U.S. EPA Fifth Edition, Volume I Chapter 11, section 11.19. 2, Crushed Stone Processing and Pulverized Mineral Processing, table 11.19-2-1
Wet suppression system is used to control dust emissions (moisture content of 0,55 % to 2,88 %).

Emissions from truck unloading activities at entrance of Mini Plant with unprocessed product

Equation used:

EF = k * 0.0016 * (U/2.2)^1.3 * (M/2)^-1.4			(kg/tons)	*Ref: 1*	
TPM k= 1	PM10 k= 0.35		PM2.5 k=0.053		
M (moisture) %:	9				*Ref: Adam Friedberg, email August 2014*
U average wind speed (m/s):		4.6	m/s		*Ref: http://www.climate.weatheroffice.ec.gc.ca/climate_normals*

TPM (kg/t) =	0.000508227	kg/t
PM10 (kg/t)=	0.00017788	kg/t
PM-2.5 (kg/t) =	2.69361E-05	kg/t

1- U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.4 Aggregate Handling and storage piles , equation (1)

Data:

Duration	4800	hours	24 h/day, 7 month/year
Surface	1,000	m2	Surface corresponding approx. to the area of operation

Calculation:

MPT (kg/yr)	0.000508227	kg/T	X	3,076,923	T/year	=	1564	kg/yr			
MPT (kg/h)	1,564	kg/yr	/	4,800	h/year	=	0.3	kg/h			
MPT (g/s)	0.3	kg/h	X	1,000	g/kg	/	3600	s/h	=	0.0905	g/s
MPT (g/m2/s)	0.0905	g/s	/	1,000	m2	=	**9.04963E-05**	**g/m2/s**			
PM-10 (kg/yr)	0.00017788	kg/T	X	3,076,923	T/year	=	547	kg/yr			
PM-10 (kg/h)	547	kg/yr	/	4,800	h/year	=	0.1	kg/h			
PM-10 (g/s)	0.1	kg/h	X	1,000	g/kg	/	3600	s/h	=	0.0317	g/s
PM-10 (g/m2/s)	0.0317	g/s	/	1,000	m2	=	**3.16737E-05**	**g/m2/s**			
PM-2.5 (kg/yr)	2.69361E-05	kg/T	X	3,076,923	T/year	=	83	kg/yr			
PM-2.5 (kg/h)	83	kg/yr	/	4,800	h/year	=	0.0	kg/h			
PM-2.5 (g/s)	0.0	kg/h	X	1,000	g/kg	/	3600	s/h	=	0.0048	g/s
PM-2.5 (g/m2/s)	0.0048	g/s	/	1,000	m2	=	**4.79631E-06**	**g/m2/s**			

Emissions from truck loading activities leaving Mini Plant with processed product

Equation used:

EF = k * 0.0016 * (U/2.2)^1.3 * (M/2)^-1.4			(kg/tons)	*Ref: 1*	
TPM k= 1	PM10 k= 0.35		PM2.5 k=0.053		
M (moisture) %:	6				*(Mini Plant output moisture target)*
U average wind speed (m/s):		4.6	m/s		*Ref: http://www.climate.weatheroffice.ec.gc.ca/climate_normals*

TPM (kg/t) =	0.000896574	kg/t
PM10 (kg/t)=	0.000313801	kg/t
PM-2.5 (kg/t) =	4.75184E-05	kg/t

1- U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.4 Aggregate Handling and storage piles , equation (1)

Data:

Duration	4800	hours	24 h/day, 7 month/year
Surface	1,000	m2	Surface corresponding approx. to the area of operation

Calculation:

MPT (kg/yr)	0.000896574	kg/T	X	2,978,723	T/year	=	2671	kg/yr			
MPT (kg/h)	2,671	kg/yr	/	4,800	h/year	=	0.6	kg/h			
MPT (g/s)	0.6	kg/h	X	1,000	g/kg	/	3600	s/h	=	0.1546	g/s
MPT (g/m2/s)	0.1546	g/s	/	1,000	m2	=	**0.000154551**	**g/m2/s**			
PM-10 (kg/yr)	0.000313801	kg/T	X	2,978,723	T/year	=	935	kg/yr			
PM-10 (kg/h)	935	kg/yr	/	4,800	h/year	=	0.2	kg/h			
PM-10 (g/s)	0.2	kg/h	X	1,000	g/kg	/	3600	s/h	=	0.0541	g/s
PM-10 (g/m2/s)	0.0541	g/s	/	1,000	m2	=	**5.40929E-05**	**g/m2/s**			
PM-2.5 (kg/yr)	4.75184E-05	kg/T	X	2,978,723	T/year	=	142	kg/yr			
PM-2.5 (kg/h)	142	kg/yr	/	4,800	h/year	=	0.0	kg/h			
PM-2.5 (g/s)	0.0	kg/h	X	1,000	g/kg	/	3600	s/h	=	0.0082	g/s
PM-2.5 (g/m2/s)	0.0082	g/s	/	1,000	m2	=	**8.19121E-06**	**g/m2/s**			

Note regarding Controlled sources from Table 11.19.2.1 - U.S. EPA Fifth Edition, Volume I Chapter 11, section 11.19. 2, Crushed Stone Processing and Pulverized Mineral Processing

Emission Estimations for Dryer/Baghouse at Howse Mini Plant

250 metric tons/h

	short tons/year		
	#2 Fuel Oil	BagHouse	Total Exhaust
MPT	6.00	9.00	15.00
PM10		4.50	4.50
PM2.5		1.35	1.35
NOx	72.00	0.00	72.00
SO2	42.60	0.00	42.60
CO	15.00	0.00	15.00
HC**	0.76	0.00	0.76

450 metric tons/h

	short tons/year		
	#2 Fuel Oil	BagHouse	Total Exhaust
MPT	10.20	11.52	21.72
PM10		5.76	5.76
PM2.5		1.73	1.73
NOx	122.40	0.00	122.40
SO2	72.42	0.00	72.42
CO	25.50	0.00	25.50
HC	1.29	0.00	1.29

320.5 metric tons/h

	short tons/year		
	#2 Fuel Oil	BagHouse	Total Exhaust
MPT	7.48	9.89	17.37
PM10		4.94	4.94
PM2.5		1.48	1.48
NOx	89.77	0.00	89.77
SO2	53.11	0.00	53.11
CO	18.70	0.00	18.70
HC	0.94	0.00	0.94

Firing rate at 250 tons/h	100	MMBTU/h
Firing rate at 450 tons/h	170	MMBTU/h
Baghouse Vent at 250 tons/h	50000	CFM
Baghouse Vent at 450 tons/h	64000	CFM
Firing rate at 320.5 tons/h	124.67949	MMBTU/h
Baghouse Vent at 320.5 tons/h	54935.897	CFM

Flow rate	25.926856	Cubic meter/sec
Speed	13	m/s
A	1.99	m2
R	0.80	m
Diameter	1.59	m

* Based on Emission Estimations sheet provided by used equipment supplier "*Worldwide Recycling Equipment Sales, LLC*"
(Estimations for 250 metric tons/h and 450 metric tons/h)

** http://www3.epa.gov/ttn/chief/ap42/ch01/final/c01s03.pdf -Table 1.3-3.

250 metric tons/h

	metric tons/year		
	#2 Fuel Oil	BagHouse	Total Exhaust
MPT	5.44	8.16	13.61
PM10*	5.44	4.08	4.08
PM2.5*	5.44	1.22	1.22
NOx	65.32	0.00	65.32
SO2	38.65	0.00	38.65
CO	13.61	0.00	13.61
HC	0.69	0.00	0.69

450 metric tons/h

	metric tons/year			*Dryer*
	#2 Fuel Oil	BagHouse	Total Exhaust	(g/s)
MPT	9.25	10.45	19.70	0.6335
PM10*	9.25	5.23	14.48	0.4655
PM2.5*	9.25	1.57	10.82	0.3479
NOx	111.04	0.00	111.04	3.5699
SO2	65.70	0.00	65.70	2.1122
CO	23.13	0.00	23.13	0.7437
HC	1.17	0.00	1.17	0.0375

320.51 metric tons/h

	metric tons/year			Dryer
	#2 Fuel Oil	BagHouse	Total Exhaust	(g/s)
MPT	6.79	8.97	15.76	0.51
PM10*	6.79	4.49	11.27	0.36
PM2.5*	6.79	1.35	8.13	0.26
NOx	81.44	0.00	81.44	2.62
SO2	0.72	0.00	0.72	0.0232
CO	16.97	0.00	16.97	0.55
HC	0.86	0.00	0.86	0.03

1 short ton = 0.90718474 metric ton
360 days/year
24 h/day
3600 seconds/h
1000000 g/metric ton

* All PM attributed to PM2.5 for modeling purposes

Stack Height =	15	m
Gas Flow Generator =	3567	CFM
Gas Flow Dryer =	64000	CFM
Temperature Outlet Gen =	709	K
Temperature Outlet Dryer =	373	K

Ajustments for sulfur content in fuel oil

Concentration used as reference =	1000	ppm
Sulfur in diesel fuel on-site =	15	ppm
Ratio of original EF to consider =	0.015	

Emissions from conveyors and various transfer points equipment at Plant 2

Data

Capacity					
INPUT to Plant 2	3,942,000	tonnes/yr	(Projected Yearly data from Dryer throughput applied for 24 hours operations)		
	10,800	tonnes/day			
	450	tonnes/hr	Size of stockpiles is used to estimate 0-10mm vs 10-32mm percentages for process flow		
			0-10 mm (kT) =	40	**88.9%**
OUTPUT from Plant 2	3,504,000	tonnes/yr	(Dried product) / 10-32 mm (kT) =	5	**11.1%**
(Dried product)	9,600	tonnes/day	67,200 tonnes/week		
	400	tonnes/hr			

Description		Emission rate TPM	Emission rate PM 10	Emission rate PM 2.5	Units	References	Period/ frequency	Notes
Jaw Crusher	Reduction % below:	0.000600	0.000270	0.0000500	kg/tonne	1		Reference 1: Tertiary Crushing (controlled)
	0%	0.000600	0.000270	0.0000500	kg/tonne			
	Hourly rate % below:	0.2700	0.1215	0.0225	kg/hr		12 months per year	
	100%	**0.0750**	**0.03375**	**0.00625**	**g/s**		average rate over 24h	
Feed Conveyor #1	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0315	0.0104	0.0029	kg/hr		12 months per year	
	100%	**0.0088**	**0.00288**	**0.00081**	**g/s**		average rate over 24h	
Feed Conveyor #2	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0315	0.0104	0.0029	kg/hr		12 months per year	
	100%	**0.0088**	**0.00288**	**0.00081**	**g/s**		average rate over 24h	
PRE-Dryer Volume Source		**0.1560**	**0.0617**	**0.0112**	g/s	Including Truck Unloading at Ramp		
D R Y E R								
Addition of 2 conveyors IN and OUT of the MIXER	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			Converyors Chutes are conservatively assumed to process ALL material IN and OUT of the MIXER as if Mixer was operated all year and processing all Plant 2 material (for modeling simplicity).
	Hourly rate % below:	0.0280	0.0092	0.0026	kg/hr		12 months per year	
	100%	**0.0156**	**0.0051**	**0.0014**	**g/s**		average rate over 24h	
Transfer Conveyor #3	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0280	0.0092	0.0026	kg/hr		12 months per year	
	100%	**0.0078**	**0.00256**	**0.00072**	**g/s**		average rate over 24h	
Screen	Reduction % below:	0.001100	0.000370	0.000025	kg/tonne	1		Reference 1: Screening (controlled)
	0%	0.001100	0.000370	0.000025	kg/tonne			
	Hourly rate % below:	0.4400	0.1480	0.0100	kg/hr		12 months per year	
	100%	**0.1222**	**0.04111**	**0.00278**	**g/s**		average rate over 24h	
Lump Stacker Conveyor	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0031	0.0010	0.0003	kg/hr		12 months per year	
	11%	**0.0009**	**0.00028**	**0.00008**	**g/s**		average rate over 24h	
Transfer Conveyor #4	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0249	0.0082	0.0023	kg/hr		12 months per year	
	89%	**0.0069**	**0.00227**	**0.00064**	**g/s**		average rate over 24h	
Fines Stacker Conveyor	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0249	0.0082	0.0023	kg/hr		12 months per year	
	89%	**0.0069**	**0.00227**	**0.00064**	**g/s**		average rate over 24h	
Transfer Conveyor #5 (to Cone Crusher)	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0028	0.0009	0.0003	kg/hr		12 months per year	
	10%	**0.0008**	**0.00026**	**0.00007**	**g/s**		average rate over 24h	
Transfer Conveyor #6 (to Cone Crusher)	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0028	0.0009	0.0003	kg/hr		12 months per year	
	10%	**0.0008**	**0.00026**	**0.00007**	**g/s**		average rate over 24h	

Cone Crusher	Reduction % below:	0.000600	0.000270	0.0000500	kg/tonne	1		Reference 1: Tertiary Crushing (controlled)
	0%	0.000600	0.000270	0.0000500	kg/tonne			
	Hourly rate % below:	0.0240	0.0108	0.0020	kg/hr		12 months per year	
	10%	**0.0067**	**0.00300**	**0.00056**	**g/s**		average rate over 24h	
POST-Dryer Volume Source		**0.2681**	**0.0920**	**0.0123**	**g/s**	Including Truck Loading at Plant Exit		

(1) Source : U.S. EPA Fifth Edition, Volume I Chapter 11, section 11.19. 2, Crushed Stone Processing and Pulverized Mineral Processing, table 11.19-2-1
Wet suppression system is used to control dust emissions (moisture content of 0,55 % to 2,88 %).

Emissions from truck unloading activities at entrance of Plant 2 with unprocessed product

Equation used:

EF = k * 0.0016 * (U/2.2)^1.3 * (M/2)^-1.4			(kg/tons)	*Ref: 1*	
TPM k= 1	PM10 k= 0.35		PM2.5 k=0.053		
M (moisture) %:	9				*Ref: Adam Friedberg, email August 2014*
U average wind speed (m/s):		4.6	m/s		*Ref: http://www.climate.weatheroffice.ec.gc.ca/climate_normals*

TPM (kg/t) =	0.000508227	kg/t
PM10 (kg/t)=	0.00017788	kg/t
PM-2.5 (kg/t) =	2.69361E-05	kg/t

1- U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.4 Aggregate Handling and storage piles , equation (1)

Data:

Duration	8760	hours	24 h/day, All year
Surface	1,000	m2	Surface corresponding approx. to the area of operation

Calculation:

MPT (kg/yr)	0.000508227	kg/T	X	3,942,000	T/year	=	2003	kg/yr			
MPT (kg/h)	2,003	kg/yr	/	8,760	h/year	=	0.2	kg/h			
MPT (g/s)	0.2	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0635**	g/s
MPT (g/m2/s)	0.0635	g/s	/	1,000	m2	=	**6.35284E-05**	**g/m2/s**			
PM-10 (kg/yr)	0.00017788	kg/T	X	3,942,000	T/year	=	701	kg/yr			
PM-10 (kg/h)	701	kg/yr	/	8,760	h/year	=	0.1	kg/h			
PM-10 (g/s)	0.1	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0222**	g/s
PM-10 (g/m2/s)	0.0222	g/s	/	1,000	m2	=	**2.2235E-05**	**g/m2/s**			
PM-2.5 (kg/yr)	2.69361E-05	kg/T	X	3,942,000	T/year	=	106	kg/yr			
PM-2.5 (kg/h)	106	kg/yr	/	8,760	h/year	=	0.0	kg/h			
PM-2.5 (g/s)	0.0	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0034**	g/s
PM-2.5 (g/m2/s)	0.0034	g/s	/	1,000	m2	=	**3.36701E-06**	**g/m2/s**			

Emissions from truck loading activities leaving Plant 2 with processed product

Equation used:

EF = k * 0.0016 * (U/2.2)^1.3 * (M/2)^-1.4			(kg/tons)	*Ref: 1*	
TPM k= 1	PM10 k= 0.35		PM2.5 k=0.053		
M (moisture) %:	6				*(Plant 2 output moisture target)*
U average wind speed (m/s):		4.6	m/s		*Ref: http://www.climate.weatheroffice.ec.gc.ca/climate_normals*

TPM (kg/t) =	0.000896574	kg/t
PM10 (kg/t)=	0.000313801	kg/t
PM-2.5 (kg/t) =	4.75184E-05	kg/t

1- U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.4 Aggregate Handling and storage piles , equation (1)

Data:

Duration	8760	hours	24 h/day, All year
Surface	1,000	m2	Surface corresponding approx. to the area of operation

Calculation:

MPT (kg/yr)	0.000896574	kg/T	X	3,504,000	T/year	=	3142	kg/yr			
MPT (kg/h)	3,142	kg/yr	/	8,760	h/year	=	0.4	kg/h			
MPT (g/s)	0.4	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0996**	g/s
MPT (g/m2/s)	0.0996	g/s	/	1,000	m2	=	**9.96193E-05**	**g/m2/s**			
PM-10 (kg/yr)	0.000313801	kg/T	X	3,504,000	T/year	=	1100	kg/yr			
PM-10 (kg/h)	1,100	kg/yr	/	8,760	h/year	=	0.1	kg/h			
PM-10 (g/s)	0.1	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0349**	g/s
PM-10 (g/m2/s)	0.0349	g/s	/	1,000	m2	=	**3.48667E-05**	**g/m2/s**			
PM-2.5 (kg/yr)	4.75184E-05	kg/T	X	3,504,000	T/year	=	167	kg/yr			
PM-2.5 (kg/h)	167	kg/yr	/	8,760	h/year	=	0.0	kg/h			
PM-2.5 (g/s)	0.0	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0053**	g/s
PM-2.5 (g/m2/s)	0.0053	g/s	/	1,000	m2	=	**5.27982E-06**	**g/m2/s**			

Note regarding Controlled sources from Table 11.19.2.1 - U.S. EPA Fifth Edition, Volume I Chapter 11, section 11.19. 2, Crushed Stone Processing and Pulverized Mineral Processing

Emission Estimations for Dryer/Baghouse at Plant 2

250 metric tons/h	short tons/year		
	#2 Fuel Oil	BagHouse	Total Exhaust
MPT	6.00	9.00	15.00
PM10		4.50	4.50
PM2.5		1.35	1.35
NOx	72.00	0.00	72.00
SO2	42.60	0.00	42.60
CO	15.00	0.00	15.00
HC**	0.76	0.00	0.76

450 metric tons/h	short tons/year		
	#2 Fuel Oil	BagHouse	Total Exhaust
MPT	10.20	11.52	21.72
PM10		5.76	5.76
PM2.5		1.73	1.73
NOx	122.40	0.00	122.40
SO2	72.42	0.00	72.42
CO	25.50	0.00	25.50
HC	1.29	0.00	1.29

Firing rate at 250 tons/h	100	MMBTU/h
Firing rate at 450 tons/h	170	MMBTU/h
Baghouse Vent at 250 tons/h	50000	CFM
Baghouse Vent at 450 tons/h	64000	CFM

* Based on Emission Estimations sheet provided by used equipment supplier "*Worldwide Recycling Equipment Sales, LLC*"
(Estimations for 250 metric tons/h and 450 metric tons/h)
** http://www3.epa.gov/ttn/chief/ap42/ch01/final/c01s03.pdf -Table 1.3-3.

250 metric tons/h	metric tons/year		
	#2 Fuel Oil	BagHouse	Total Exhaust
MPT	5.44	8.16	13.61
PM10*	5.44	4.08	4.08
PM2.5*	5.44	1.22	1.22
NOx	65.32	0.00	65.32
SO2	38.65	0.00	38.65
CO	13.61	0.00	13.61
HC	0.69	0.00	0.69

450 metric tons/h	metric tons/year			*Dryer*
	#2 Fuel Oil	BagHouse	Total Exhaust	(g/s)
MPT	9.25	10.45	19.70	0.6335
PM10*	9.25	5.23	14.48	0.4655
PM2.5*	9.25	1.57	10.82	0.3479
NOx	111.04	0.00	111.04	3.5699
SO2	***0.985***	0.00	0.99	0.0317
CO	23.13	0.00	23.13	0.7437
HC	1.17	0.00	1.17	0.0375

1	short ton	=	0.90718474	metric ton
360	days/year			
24	h/day			
3600	seconds/h			
1000000	g/metric ton			

* All PM attributed to PM2.5 for modeling purposes

Stack Height =	15	m
Gas Flow Generator =	3567	CFM
Gas Flow Dryer =	64000	CFM
Temperature Outlet Gen =	709	K
Temperature Outlet Dryer =	373	K

Ajustments for sulfur content in fuel oil

Concentration used as reference =	1000	ppm
Sulfur in diesel fuel on-site =	15	ppm
Ratio of original EF to consider =	0.015	

Emissions from conveyors and various transfer points equipment at Quarry Mini plant

Data

Capacity

INPUT to Quarry Mini plant	100,000	tonnes/yr
	500.00	tonnes/day
	21	tonnes/hr
Days in operation per year =	200	days

Description		Emission rate TPM	Emission rate PM 10	Emission rate PM 2.5	Units	References	Period/ frequency	Notes
Crusher	Reduction % below:	0.000600	0.000270	0.0000500	kg/tonne	1		Reference 1: Tertiary Crushing (controlled)
	0%	0.000600	0.000270	0.0000500	kg/tonne			
	Hourly rate % below:	0.0138	0.0062	0.0011	kg/hr		7 months per year	
	110%	**0.0038**	**0.00172**	**0.00032**	**g/s**		average rate over 24h	
Feed Conveyor #1	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0016	0.0005	0.0001	kg/hr		7 months per year	
	110%	**0.0004**	**0.00015**	**0.00004**	**g/s**		average rate over 24h	
Feed Conveyor #2	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0016	0.0005	0.0001	kg/hr		7 months per year	
	110%	**0.0004**	**0.00015**	**0.00004**	**g/s**		average rate over 24h	
Screen	Reduction % below:	0.001100	0.000370	0.000025	kg/tonne	1		Reference 1: Screening (controlled)
	0%	0.001100	0.000370	0.000025	kg/tonne			
	Hourly rate % below:	0.0252	0.0085	0.0006	kg/hr		7 months per year	
	110%	**0.0070**	**0.00236**	**0.00016**	**g/s**		average rate over 24h	
Transfer Conveyor #4	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0015	0.0005	0.0001	kg/hr		7 months per year	
	100%	**0.0004**	**0.00013**	**0.00004**	**g/s**		average rate over 24h	
Fines Stacker Conveyor	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0015	0.0005	0.0001	kg/hr		7 months per year	
	100%	**0.0004**	**0.00013**	**0.00004**	**g/s**		average rate over 24h	
Transfer Conveyor #5 (back to Jaw Crusher)	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0001	0.0000	0.0000	kg/hr		7 months per year	
	10%	**0.0000**	**0.00001**	**0.00000**	**g/s**		average rate over 24h	
Transfer Conveyor #6 (back to Jaw Crusher)	Reduction % below:	0.000070	0.000023	0.0000065	kg/tonne	1		Reference 1: Conveyor Transfer Point (controlled)
	0%	0.000070	0.000023	0.0000065	kg/tonne			
	Hourly rate % below:	0.0001	0.0000	0.0000	kg/hr		7 months per year	
	10%	**0.0000**	**0.00001**	**0.00000**	**g/s**		average rate over 24h	
FN Quarry Volume Source		**0.0185**	**0.0067**	**0.0010**	**g/s over 200 days**			

(1) Source : U.S. EPA Fifth Edition, Volume I Chapter 11, section 11.19. 2, Crushed Stone Processing and Pulverized Mineral Processing, table 11.19-2-1

Wet suppression system is used to control dust emissions (moisture content of 0,55 % to 2,88 %).

Emissions from10-wheelers unloading of uncrushed ore at entrance of the plant, and from 10-wheelers loading activities of crushed ore when leaving the Quarry Mini-Plant

Equation used:

EF = k * 0.0016 * (U/2.2)^1.3 * (M/2)^-1.4 (kg/tons) *Ref: 1*

TPM k= 1	PM10 k= 0.35		PM2.5 k=0.053		
M (moisture) %:	9				
U average wind speed (m/s):		4.6	m/s		*Ref: http://www.climate.weatheroffice.ec.gc.ca/climate_normals*
TPM (kg/t) =	0.000508227	kg/t			
PM10 (kg/t)=	0.00017788	kg/t			
PM-2.5 (kg/t) =	2.69361E-05	kg/t			

1- U.S. EPA Fifth Edition, Volume I Chapter 13, Miscellaneous Sources, section 13.2.4 Aggregate Handling and storage piles , equation (1)

Data:

Duration	4,800	hours	24 h/day, 7 months/year
Surface	1,000	m2	Surface corresponding approx. to the area of operation

Calculation:

MPT (kg/yr)	0.000508227	kg/T	X	200,000	T/year	=	102	kg/yr			
MPT (kg/h)	102	kg/yr	/	4,800	h/year	=	0.0	kg/h			
MPT (g/s)	0.0	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0059**	**g/s**
MPT (g/m2/s)	0.0059	g/s	/	1,000	m2	=	**5.88226E-06**	**g/m2/s**			
PM-10 (kg/yr)	0.00017788	kg/T	X	200,000	T/year	=	36	kg/yr			
PM-10 (kg/h)	36	kg/yr	/	4,800	h/year	=	0.0	kg/h			
PM-10 (g/s)	0.0	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0021**	**g/s**
PM-10 (g/m2/s)	0.0021	g/s	/	1,000	m2	=	**2.05879E-06**	**g/m2/s**			
PM-2.5 (kg/yr)	2.69361E-05	kg/T	X	200,000	T/year	=	5	kg/yr			
PM-2.5 (kg/h)	5	kg/yr	/	4,800	h/year	=	0.0	kg/h			
PM-2.5 (g/s)	0.0	kg/h	X	1,000	g/kg	/	3600	s/h	=	**0.0003**	**g/s**
PM-2.5 (g/m2/s)	0.0003	g/s	/	1,000	m2	=	**3.1176E-07**	**g/m2/s**			

Drilling emissions

References:

1- U.S. EPA AP-42 Fifth Edition, Volume I Chapter 11, Mineral Products Industry, section 11.9: Western Surface Coal Mining, tableau 11.9-2.

2- U.S. EPA AP-42 Fifth Edition, Volume I Chapter 11, Mineral Products Industry, section 11.9: Western Surface Coal Mining, tableau 11.9-4.

3- Mojave Desert Air Quality Management District, Antelope Valley Air Pollution Control District, Emissions Inventory Guidance, Mineral Handling Handbook and Processing Industries, 10 avril 2000

*** Factors based on water drilling*

Data — *Production data of year 2015*

	Ore		Overburden		Waste		Total	
Timmins 3N	384,450	tons/yr	210,600	tons/yr	2,577,500	tons/yr	3,172,550	tons/yr
Fleming 7N	1,109,110	tons/yr	45,900	tons/yr	2,227,850	tons/yr	3,382,860	tons/yr
HOWSE	3,076,923	tons/yr	6,777,656	tons/yr	3,968,498	tons/yr	13,823,077	tons/yr

*C 11 & 12 do not have reference because the related tab was not usefull and was deleted.

Overburden	365	days/yr
Overburden	24	hr/day
Waste	365	days/yr
	24	hr/day

A = horizontal area (m^2), for blasting at depth ≤ 21 m, by explosion

Surface	7,563	m2	Surface corresponding approx. to the area affected by a blast, considering 250 holes drilled (Ref: Email Jeff Cassoff, March 20 2012)
Tonnes of material / hole	1,920	tonnes/hole drilled	Based on 2013 tonnes blasted/ # holes ratio (Mining Plan)

Number of Holes Drilled	Ore		Overburden		Waste		Total			
Timmins 3N	201	holes	110	holes	1,343	holes	1,654	holes		
Fleming 7N	578	holes	24	holes	1,161	holes	1,763	holes		
HOWSE	1,603	holes	3,531	holes	2,067	holes	7,201	holes		
HOWSE with 50% blasted	801.50	holes	1,766	holes	1,034	holes	3,601	holes	50	% blasted
(because of softer material)								HOWSE OB schedule =	150	days/year
								HOWSE Ore+Waste schedule =	200	days/year

Calculations

Description	Variables		Emission rate TPM	Emission rate PM 10	Emission rate PM 2.5	Units	References	period/ frequency	Notes
Timmins 3N - Hole drilling (All)	A	30.25	0.59	0.31	0.31	kg/hole	2, 3	24h/24h - 12 months	
	nt	1654	976	513	513	kg/yr			
			0.031	**0.016**	**0.016**	**g/s**			12 months per year
			4.09E-06	**2.15E-06**	**2.15E-06**	**g/m2/s**			
Flemming 7N- Hole drilling (All)	A	30.25	0.59	0.31	0.31	kg/hole	2, 3	24h/24h - 12 months	
	nt	1763	1,040	547	547	kg/yr			
			0.033	**0.017**	**0.017**	**g/s**			12 months per year
			4.36E-06	**2.29E-06**	**2.29E-06**	**g/m2/s**			
HOWSE - OB only Hole drilling (Softer material = only 50% blasted)	A	30.25	0.59	0.31	0.31	kg/hole	2, 3	24h/24h - 5 months	Only 50% of material blasted
	nt	1766	1,042	547	547	kg/yr			
			0.080	**0.042**	**0.042**	**g/s over 150 days**			150 days per year (5 months per year)
			1.06E-05	**5.58E-06**	**5.58E-06**	**g/m2/s**			
HOWSE - Ore+Waste only Hole drilling (Softer material = only 50% blasted)	A	30.25	0.59	0.31	0.31	kg/hole	2, 3	24h/24h - 7 months	Only 50% of material blasted
	nt	1835	1,083	569	569	kg/yr			
			0.063	**0.033**	**0.033**	**g/s over 200 days**			200 days per year (7 months per year)
			8.28E-06	**4.35E-06**	**4.35E-06**	**g/m2/s**			

Blasting emissions

Equation used:

1- U.S. EPA AP-42 Fifth Edition, Volume I Chapter 11, Mineral Products Industry, section 11.9: Western Surface Coal Mining, tableau 11.9-2.

Data

A = horizontal area (m^2), for blasting at depth ≤ 21 m, by explosion

Surface	7,563	m2	Surface corresponding approx. to the area affected by a blast — Ref: Email Jeff Cassoff, March 20 2012
Lenght and width of blast area	87	m	
Burden	8	m	Ref: Mining Plan 2013
Spacing	8	m	
Density	3	tonnes/m3	
Bench Height	10	m	
Number of holes in each direction	12	holes	
Nb drilled holes/blast	144		
Tonnes/ blast	226,875	tonnes	

	F7N	HOWSE
Tonnes from pit per month	281,905	2,102,260
Percentage to be blasted	100%	50%
Tonnes to be blasted per month	281,905	1,051,130
Number of blasts per month	1.24	4.63

Volume source parameters

Equivalent diameter of area = 98.12683 m

Release Height = 15 m

Initial Sigma-y = 100 m (from equivalent diameter of blasted zone)

Initial Sigma-z = 7.5 m

Ref: Alpha Coal Mine Project Air Quality Assessment - Supplementary Report, URS, 2011

(http://gvkhancockcoal.com/documents/Publications/EIS/ACPSEIS2011/Volume2/Volume%202%20Appendix%20P%20Air%20Quality%20Issue%203%20Final.pdf)

Modeling parameter

NO2/NOx ratio used for modeling of blasting emissions was chosen as ***0.5*** instead of the ***0.2*** used for all diesel engines for a conservative and acceptable value.

Ref: Additional Clarification Regarding Application of Appendix W ModelingGuidance for the 1-hour N02 ,National Ambient Air Quality Standard, USEPA, 2011

(http://www.epa.gov/scram001/guidance/clarification/Additional_Clarifications_AppendixW_Hourly-NO2-NAAQS_FINAL_03-01-2011.pdf)

Calculations

Emission rate TPM	Emission rate PM 10	Emission rate PM 2.5	Units	References	Comments
TPM = 0,00022 x (Area)^1,5	PM10 = TPM x 0.52	PM2.5 = TPM x 0.03			
144.68	75.24	4.341	kg/explosion	1	
40.19	20.90	1.206	g/s		over 1 hour
5.31E-03	**2.76E-03**	**1.59E-04**	**g/s/m2**		Divided by blasting surface

Explosives - emission rates calculation

Equation used:

Ref:

1- U.S. EPA AP-42 Fifth Edition, Volume I Chapter 13, section 13.3: Explosive detonation

Data

Explosive ut. rate:	0.15	kg/tonne ore and waste blasted	**Ref: Based on weekly … rate- Andrew Garrity December 16th, 2014)**
Tonnes/ blast	226,875	tonnes	
Surface	7,563	m2	Surface corresponding approx. to the area affected by a blast

Ref: Email Jeff Cassoff, March 20 2012

Calculations

Explosive ut. Rate (kg/blast): 34,031 kg

		(kg of gas/ton of explosive)	kg emitted / blast	Emission rates (g/s)	Emission rates (g/m2/s)	
Apex Gold 2171 (listed in AP-42 as ANFO)	CO	34.000000	1157.1	**321.4063**	**4.25E-02**	
	SO2	1.000000	34.0	**9.4531**	**1.25E-03**	
	NO_X	8.000000	272.3	**75.6250**	**1.00E-02**	
	HC	0.000000	0.0	**0.0000**	**0.00E+00**	Ref: AP42-C13S03 Table 13.3-1

** rates calculated over an hour*

Emission rate (kg emitted / blast)= Emission rate (kg of gas/ton of explosive) *Explosive rate (kg/blast)/1000

Emission rates (g/s)= Emission rate (kg emitted / blast)*1000/3600

Emission rates (g/m2/s)= Emission rates (g/s)/surface (m2)

Example of CO

Emission rate (kg emitted / blast)=	34.000000	x	34031.25	/	1000	=	1157.06
Emission rates (g/s)=	1157.0625	x	1000	/	3600	=	321.41
Emission rates (g/m2/s)=	321.40625	/	7,563			=	4.25E-02

Réf: http://www.climate.weatheroffice.ec.gc.ca/climate_normals - Schefferville (1971-2000)

	1	2	3	4	5	6	7	8	9	10	11	12
	0	0	0	0.015333	0.224599	0.452522	0.387097	0.405796	0.318613	0.188595	0.039633	0
Months												
Days in the month	31	28.25	31	30	31	30	31	31	30	31	30	31
Days with Snow Depth >= 1 cm	31	28.25	31	30	21.7	1.1	0	0.09	0.74	17.4	28.5	31
Days with Snow Depth >= 5 cm	31	28.25	31	29	16.8	0.7	0	0.05	0.13	11.3	25.9	31
Days with Precipitation >= 0.2 mm	17.1	14.3	16.4	16.2	15.8	16.1	19	18.4	20.4	21.8	21.3	19
Days with Rainfall >= 0.2 mm	0.3	0.3	1	2.9	8.6	14.7	19	18.4	17.2	7.3	1.8	0.64
Days with Snowfall >= 0.2 cm	17.4	14.3	16.6	14.6	10.3	3.4	0.17	0.33	6.4	19	21.3	19.2
Days with Snow Depth >= 1 cm + [1 - (Snow>1cm) / (Days in month)] * (Precipitation>0.2mm)	31.0	28.3	31.0	30.0	26.4	16.6	19.0	18.4	20.6	27.0	29.6	31.0
Fraction of days without attenuation	0.0000	0.0000	0.0000	0.0000	0.1471	0.4463	0.3871	0.4053	0.3121	0.1302	0.0145	0.0000
Days with Snow Depth >= 5 cm + [1 - (Snow>5cm) / (Days in month)] * (Precipitation>0.2mm) ***	31.0	28.3	31.0	29.5	24.0	16.4	19.0	18.4	20.4	25.2	28.8	31.0
Fraction of days without attenuation	0.0000	0.0000	0.0000	0.0153	0.2246	0.4525	0.3871	0.4058	0.3186	0.1886	0.0396	0.0000

Ref: http://www.climate.weatheroffice.ec.gc.ca/climate_normals - Schefferville (1971-2000)

*** The " [1 - (Snow>5cm) / (Days in month)] * (Precipitation>0.2mm) " expression determines the monthly percentage of days with precipitations > 0.2 mm within the month, then assigns this percentage to the remaining days of the month which have no snow cover.

Example: In a month of 30 days, there is 12 days of snow cover > 5cm and 24 days with precipitations > 0.2mm. Assuming equal repartition of the days with precipitations > 0.2mm over all days of the month, there will be a fraction of 0.4 days (12/30) with snow cover, meaning a fraction of 0.6 days without snow cover, therefore 14.4 days (0.6x24) can be calculated as being days WITHOUT snow cover but WITH precipitations > 0.2mm. You can then add the number of days WITH snow cover to calculate the total number of days with either Snow cover > 5 cm OR precipitations > 0.2mm. This number of days with attenuation can then be projected yearly to calculate a monthly P value that can be applied independently to individual months which will fit into the correction equations for dust control of unpaved roads. This is ultimately used to calculate monthly variable emission factors as input into CALPUFF for unpaved roads emissions.

*(Snow>5cm) + [1 - (Snow>5cm) / (Days in month)] * (Precipitation>0.2mm) = 12 + [1 - 12/30] * 24 = 26.4 days with attenuation*

Fraction of days of the month without attenuation = [(30 days within the month) - (26.4 days with attenuation)] / (30 days within the month) = 0.120

Calculations for NO2/NOx ratio

From guidance GD-PPD-019.1 of Newfoundland and Labrador:

Table 9.1

Emission Source	In-stack NO_2 / NO_x ratio
Power Boilers	0.1
Compressors and Gas Turbines	0.6
Diesel Power Generating Units	0.2

Based on the PVMRM method, ratios are molar-based.
Considering emission factors are always given as "mass of NOx (expressed as NO2)",
new mass based ratios must be calculated for NO2 and NO to pre-process
emission factors of those two substances for CALPUFF input.

Molar masses

NO2 =	46.005	g/mol
NO =	30.006	g/mol

1 g NOx (expressed as NO2) = 1 g NOx (expressed as NO2) / 46.005 g NO2/mol NOx
1 g NOx (expressed as NO2) = 0.021737 mol NOx

<u>Calculation example for Diesel Power Generating Units</u>

[NO2] =	0.2	x	[NOx]	=	0.2	x	0.021737	=	0.004347	mol NO2
[NO] =	0.8	x	[NOx]	=	0.8	x	0.021737	=	0.017389	mol NO

g NO2 =	0.004347354	mol NO2	x	46.005	g NO2/mol NO2	=	0.2	g NO2 / g NOx
g NO =	0.017389414	mol NO	x	30.006	g NO/mol NO	=	0.52179	g NO / g NOx

<u>Conversion table</u>

NO2 / NOx ratio	g NO2/g NOx	g NO/g NOx
0.1	0.1	0.5870
0.2	0.2	0.5218
0.3	0.3	0.4566
0.4	0.4	0.3913
0.5	0.5	0.3261
0.6	0.6	0.2609
0.7	0.7	0.1957
0.8	0.8	0.1304
0.9	0.9	0.0652
0.05	0.05	0.6196
0.15	0.15	0.5544
0.25	0.25	0.4892

Emissions from each of the 2MW generators at HOWSE Plant

Generator 1935 ekW operating at Prime 75% Load — *Reference: Ingenius Construction Plant 1 Design Generator specifications*

Data — *Reference: Ingenius Construction Plant 2 Design Generator specifications*

Generator power	1451	ekW	
Fuel oil consumption	397	L/hr	*Reference: at 100% Prime*
% of sulphur in oil	0.0015%		*Reference : email Rock Gagnon, March 14 2011*
Oil density	832	kg/m^3	*REF: Email François Saulnier Exxon Mobil, Jan 5th, 2011*
lHV	42,780	kJ/kg	*Reference: D* iesel Generator Technical data sheet - Caterpillar 275 ekW
Gas flow at stack	504	m3/min	*Reference: Ingenius Construction Plant 2 Design Generator specifications*
Stack height	3.35	m	
Diameter	0.450	m	
Temperature	505	°C	
	778	K	
Emission factor NO_X	7.100	g/kWh	*Reference: TSMC PLANT 2-Permit information*
Emission factor CO	0.600	g/kWh	*Reference: TSMC PLANT 2-Permit information*
Emission factor PM2.5/ PM10/ PMT	0.0600	g/kWh	*Reference: TSMC PLANT 2-Permit information*
Emission factor HC	0.4733	g/kWh	*Reference: TSMC PLANT 2-Permit information & EPA420-R-05-015.pdf*
All particulates are considered < 1 um			*Reference: AP-42, Gasoline And Diesel Industrial Engines, tableau 3.3-1.*

Calculations

Gas velocity	504	m3/min	X	60	min/hr	/	0.15904	m^2	/	3600	s/hr	=	52.82	m/s
Oil consumption	397	L/hr	X	832	kg/m^3	/	1000	l/m3				=	330.3	kg/hr
Emission rate SO_2	330.3	kg/hr	X	0.0015%		X	2	kg SO_2/kg S	X	1000	g/kg	/		
	3600	s/hr										=	0.0027525	g/s
Emission rate $PM_{2.5}$	1451	ekW	X				0.06	g/kWh	/	3600	s/hr	=	0.0241875	g/s
Emission rate NO_X	1451	ekW	X				7.100	g/kWh	/	3600	s/hr	=	2.8622	g/s
Emission rate CO	1451	ekW	X				0.600	g/kWh	/	3600	s/hr	=	0.2419	g/s
Emission rate HC	1451	ekW	X				0.473	g/kWh	/	3600	s/hr	=	0.1908	g/s

CALPUFF input - gas velocity (to correct speed that is too high with a more conservative assumption) 15 m/s

CALPUFF input - Diameter (to correct speed that is too high with a more conservative assumption) 0.84 m calculation details: = real stack diameter*(real Gas velocity/calpuff input Gas velocity)^0.5

Emissions from each of the 2MW generators at Plant 2

Generator 1935 ekW operating at Prime 75% Load — *Reference: Ingenius Construction Plant 1 Design Generator specifications*

Data — *Reference: Ingenius Construction Plant 2 Design Generator specifications*

Generator power	1451	ekW	
Fuel oil consumption	397	L/hr	*Reference: at 100% Prime*
% of sulphur in oil	0.0015%		*Reference : email Rock Gagnon, March 14 2011*
Oil density	832	kg/m^3	*REF: Email François Saulnier Exxon Mobil, Jan 5th, 2011*
lHV	42,780	kJ/kg	*Reference: D* iesel Generator Technical data sheet - Caterpillar 275 ekW
Gas flow at stack	504	m3/min	*Reference: Ingenius Construction Plant 2 Design Generator specifications*
Stack height	3.35	m	
Diameter	0.450	m	
Temperature	505	°C	
	778	K	
Emission factor NO_X	7.100	g/kWh	*Reference: TSMC PLANT 2-Permit information*
Emission factor CO	0.600	g/kWh	*Reference: TSMC PLANT 2-Permit information*
Emission factor PM2.5/ PM10/ PMT	0.0600	g/kWh	*Reference: TSMC PLANT 2-Permit information*
Emission factor HC	0.4733	g/kWh	*Reference: TSMC PLANT 2-Permit information & EPA420-R-05-015*
All particulates are considered < 1 um			*Reference: AP-42, Gasoline And Diesel Industrial Engines, tableau 3.3-1.*

Calculations

Gas velocity	504 m3/min	X	60 min/hr	/	0.15904 m^2	/	3600 s/hr	=	52.82 m/s
Oil consumption	397 L/hr	X	832 kg/m^3	/	1000 l/m3			=	330.3 kg/hr
Emission rate SO_2	330.3 kg/hr	X	0.0015%	X	2 kg SO_2/kg S	X	1000 g/kg	/	
	3600 s/hr							=	0.0027525 g/s
Emission rate $PM_{2.5}$	1451 ekW	X			0.06 g/kWh	/	3600 s/hr	=	0.0241875 g/s
Emission rate NO_X	1451 ekW	X			7.100 g/kWh	/	3600 s/hr	=	2.8622 g/s
Emission rate CO	1451 ekW	X			0.600 g/kWh	/	3600 s/hr	=	0.2419 g/s
Emission rate HC	1451 ekW	X			0.473 g/kWh	/	3600 s/hr	=	0.1908 g/s

CALPUFF input - gas velocity (to correct speed that is too high with a more conservative assumption) 15 m/s

CALPUFF input - Diameter (to correct speed that is too high with a more conservative assumption) 0.84 m calculation details: = real stack diameter*(real Gas velocity/calpuff input Gas velocity)^0.5

Emissions from generator (of RapidMixer 400)

Generator at 80% load | *Reference: FPT N67-TE2X Engine specs -------------->* K:\\05\\21\\500\\ 0521500_DSO Proj

<u>Data</u> | *Reference: Email de TATA Steel (Loïc Didillion)*

Fuel oil consumption	38.90	L/hr	*Reference: FPT N67-TE2X Engine specs*
% of sulphur in oil	0.0015%		*Reference : email Rock Gagnon, March 14 2011*
Oil density	832	kg/m^3	*REF: Email François Saulnier Exxon Mobil, Jan 5th, 2011*
lHV	42,780	kJ/kg	*Reference: Specs sheets for generators CAT Prime 725 ekW and CUMMINS 800DQFAB 795 ekW*
Generator power (@ 80% load)	146	ekW	*Reference: FPT N67-TE2X Engine specs*
Gas flow at stack	28.6	m3/min	*Reference: Similarly sized CAT Generator 175eKW*
Stack height	4	m	*Reference: Estimated Height from the RAPIDMIX400 Mixer pictures in which the generator is enclosed --->* K:\\05\\21\\500\\ 0521500_DSO Proj
Diameter	0.15	m	*Reference: Similarly sized CAT Generator 175eKW*
Temperature	666	°C	*Reference: Similarly sized CAT Generator 175eKW*
	939	K	
Emission factor NO_X	2.983	g/hp-hr	*Reference: EPA Tier 3 engine*
Emission factor CO	2.610	g/hp-hr	*Reference: EPA Tier 3 engine*
Emission factor PM2.5/ PM10/ PMT	0.14914	g/hp-hr	*Reference: EPA Tier 3 engine*
Emission factor HC	0.19886	g/hp-hr	*Reference: EPA Tier 3 engine & EPA420-R-05-015 Table 8.pdf*

All particulates are considered < 1 um

<u>Calculations</u>

Gas velocity	28.6	m3/min	X	60	min/hr	/	0.018	m^2	/	3600	s/hr	=	27.0	m/s
Oil consumption	38.90	L/hr	X	832	kg/m^3	/	1000	l/m3				=	32.4	kg/hr
Emission rate $PM_{2.5}$	146	ekW	X	1.341	hp/kW	X	0.14914	g/hp-hr	/	3600	s/hr	=	0.0081	g/s
Emission rate SO_2	32.4	kg/hr	X	0.0015%		X	2	kg SO_2/kg S	X	1000	g/kg	/		
	3600	s/hr										=	0.00026971	g/s
Emission rate NO_X	146	ekW	X	1.341	hp/kW	X	2.98	g/hp-hr	/	3600	s/hr	=	0.1618	g/s
Emission rate CO	146	ekW	X	1.341	hp/kW	X	2.61	g/hp-hr	/	3600	s/hr	=	0.142	g/s
Emission rate HC	146	ekW	X	1.341	hp/kW	X	0.20	g/hp-hr	/	3600	s/hr	=	0.011	g/s

CALPUFF input - gas velocity (in order to simulate a horizontal stack) 0.1 m/s

CALPUFF input - Diameter (in order to simulate a horizontal stack) 2.46 m calculation details: = real stack diameter*(real Gas velocity/calpuff input Gas velocity)^0.5

Emissions from generators (at Concrete Batch Plant)

Generators at 100% load *Reference: CAT Prime 157.5 kW Prime Diesel 60 Hz Engine family APKXL06.6PJ1*

Data

Generator power (@ 100% load)	157.5	kW	*Reference: CAT Prime 157.5 kW Prime Diesel 60 Hz Engine family APKXL06.6PJ1*
Fuel oil consumption	50.2	L/hr	*Reference: 100% Load*
% of sulphur in oil	0.0015%		*Reference : email Rock Gagnon, March 14 2011*
Oil density	832	kg/m^3	*REF: Email François Saulnier Exxon Mobil, Jan 5th, 2011*
lHV	42,780	kJ/kg	*Reference: Diesel Generator Technical data sheet - Caterpillar 275 ekW*
Gas flow at stack	28.6	m3/min	*Reference: CAT Prime 157.5 kW Prime Diesel 60 Hz Engine family APKXL06.6PJ1*
Stack height	4.6	m	*Reference: email, Bruno Savard, December 14 2012*
Diameter	0.153	m	*Reference: Hewitt, drawing ME101402, revF*
Temperature	666	°C	*Reference: CAT Prime 157.5 kW Prime Diesel 60 Hz Engine family APKXL06.6PJ1*
	939	K	
Emission factor NO_X	4.00	g/kW-hr	*Reference: EPA Tier 3 engine*
Emission factor CO	3.50	g/kW-hr	*Reference: EPA Tier 3 engine*
Emission factor PM2.5/ PM10/ PMT	0.2	g/kW-hr	*Reference: EPA Tier 3 engine*
Emission factor HC	0.267	g/kW-hr	*Reference: EPA Tier 3 engine*
All particulates are considered < 1 um			*Reference: AP-42, Gasoline And Diesel Industrial Engines, tableau 3.3-1.*

Calculations

Gas velocity	28.6	m3/min	X	60	min/hr	/	0.0184	m^2	/	3600	s/hr	=	25.9	m/s
Oil consumption	50.2	L/hr	X	832	kg/m^3	/	1000	l/m3				=	41.8	kg/hr
Emission rate SO_2	41.8	kg/hr	X	0.0015%		X	2	kg SO_2/kg S	X	1000	g/kg	/		
	3600	s/hr										=	0.0003481	g/s
Emission rate $PM_{2.5}$	157.5	kW	X	0.2	g/kW-hr	/	3600	s/hr	=	0.0087500	g/s			
Emission rate NO_X	157.5	kW	X	4.00	g/kW-hr	/	3600	s/hr	=	0.1750000	g/s			
Emission rate CO	157.5	kW	X	3.50	g/kW-hr	/	3600	s/hr	=	0.1531250	g/s			
Emission rate HC	157.5	kW	X	0.27	g/kW-hr	/	3600	s/hr	=	0.0116667	g/s			

Emissions from generators (First Nation Quarry)

Generators at 100% load

Data

Fuel oil consumption (3 generators)	80.3	L/hr	*Reference: D* iesel Generator Technical data sheet - Caterpillar 275 ekW - hyp:100% load
% of sulphur in oil	0.0015%		*Reference : email Rock Gagnon, March 14 2011*
Oil density	832	kg/m^3	*REF: Email François Saulnier Exxon Mobil, Jan 5th, 2011*
lHV	42,780	kJ/kg	*Reference: D* iesel Generator Technical data sheet - Caterpillar 275 ekW
Generator power (3 @ 100% load)	275	ekW	*Reference: D* iesel Generator Technical data sheet - Caterpillar 275 ekW
Gas flow at stack	53.76	m3/min	*Reference: D* iesel Generator Technical data sheet - Caterpillar 275 ekW
Stack height	2.75	m	*Reference: Hewitt, drawing ME403196 rev 0*
Diameter	0.15	m	*(Visit on site Nov.25 2014, approximately 6 inches)*
Temperature	497	°C	*Reference: D* iesel Generator Technical data sheet - Caterpillar 275 ekW
	770	K	
Emission factor NO_X	3.71	g/hp-hr	*Reference: D* iesel Generator Technical data sheet - Caterpillar 275 ekW
Emission factor CO	0.23	g/hp-hr	*Reference: D* iesel Generator Technical data sheet - Caterpillar 275 ekW
Emission factor PM2.5/ PM10/ PMT	0.03	g/hp-hr	*Reference: D* iesel Generator Tecnical data sheet - Caterpillar 275 ekW
Emission factor HC	0.07	g/hp-hr	*Reference: Diesel Generator Tecnical data sheet - Caterpillar 275 ekW*
All particulates are considered < 1 um			*Reference: AP-42, Gasoline And Diesel Industrial Engines, tableau 3.3-1.*

Calculations

Gas velocity	54	m3/min	X	60	min/hr	/	0.0	m^2	/	3600	s/hr	=	50.7	m/s
Oil consumption	80.3	L/hr	X	832	kg/m^3	/	1000	l/m3				=	66.8	kg/hr
Emission rate $PM_{2.5}$	275	ekW	X	1.341	hp/kW	X	0.03	g/hp-hr	/	3600	s/hr	=	0.003073	g/s
Emission rate SO_2	66.8	kg/hr	X	0.0015%		X	2	kg SO_2/kg S	X	1000	g/kg	/		
	3600	s/hr										=	0.0005567	g/s
Emission rate NO_X	275	ekW	X	1.341	hp/kW	X	3.7	g/hp-hr	/	3600	s/hr	=	0.380043	g/s
Emission rate CO	275	ekW	X	1.341	hp/kW	X	0.23	g/hp-hr	/	3600	s/hr	=	0.02356	g/s
Emission rate HC	275	ekW	X	1.341	hp/kW	X	0.07	g/hp-hr	/	3600	s/hr	=	0.00717	g/s

CALPUFF input - gas velocity (to correct speed that is too high with a more conservative assumption) 15 m/s

CALPUFF input - Diameter (to correct speed that is too high with a more conservative assumption) 0.28 m calculation details: = real stack diameter*(real Gas velocity/calpuff input Gas velocity)^0.5

Emissions from generators (Near Workers' Camp)- GEN 1-2-3

Generators at 100% load

Data

Fuel oil consumption (3 generators)	80.3	L/hr	*Reference: D* iesel Generator Technical data sheet - Caterpillar 275 ekW - hyp:100% load
% of sulphur in oil	0.0015%		*Reference : email Rock Gagnon, March 14 2011*
Oil density	832	kg/m^3	*REF: Email François Saulnier Exxon Mobil, Jan 5th, 2011*
lHV	42,780	kJ/kg	*Reference: D* iesel Generator Technical data sheet - Caterpillar 275 ekW
Generator power (3 @ 100% load)	275	ekW	*Reference: D* iesel Generator Technical data sheet - Caterpillar 275 ekW
Gas flow at stack	53.76	m3/min	*Reference: D* iesel Generator Technical data sheet - Caterpillar 275 ekW
Stack height	2.75	m	*Reference: Hewitt, drawing ME403196 rev 0*
Diameter	0.15	m	*(Visit on site Nov.25 2014, approximately 6 inches)*
Temperature	497	°C	*Reference: D* iesel Generator Technical data sheet - Caterpillar 275 ekW
	770	K	
Emission factor NO_X	3.71	g/hp-hr	*Reference: D* iesel Generator Technical data sheet - Caterpillar 275 ekW
Emission factor CO	0.23	g/hp-hr	*Reference: D* iesel Generator Technical data sheet - Caterpillar 275 ekW
Emission factor PM2.5/ PM10/ PMT	0.03	g/hp-hr	*Reference: D* iesel Generator Tecnical data sheet - Caterpillar 275 ekW
Emission factor HC	0.07	g/hp-hr	*Reference: Diesel Generator Tecnical data sheet - Caterpillar 275 ekW*
All particulates are considered < 1 um			*Reference: AP-42, Gasoline And Diesel Industrial Engines, tableau 3.3-1.*

Calculations

Gas velocity	54	m3/min	X	60	min/hr	/	0.0	m^2	/	3600	s/hr	=	50.7	m/s
Oil consumption	80.3	L/hr	X	832	kg/m^3	/	1000	l/m3				=	66.8	kg/hr
Emission rate $PM_{2.5}$	275	ekW	X	1.341	hp/kW	X	0.03	g/hp-hr	/	3600	s/hr	=	0.003073	g/s
Emission rate SO_2	66.8	kg/hr	X	0.0015%		X	2	kg SO_2/kg S	X	1000	g/kg	/		
	3600	s/hr										=	0.0005567	g/s
Emission rate NO_X	275	ekW	X	1.341	hp/kW	X	3.7	g/hp-hr	/	3600	s/hr	=	0.380043	g/s
Emission rate CO	275	ekW	X	1.341	hp/kW	X	0.23	g/hp-hr	/	3600	s/hr	=	0.02356	g/s
Emission rate HC	275	ekW	X	1.341	hp/kW	X	0.07	g/hp-hr	/	3600	s/hr	=	0.00717	g/s

CALPUFF input - gas velocity (to correct speed that is too high with a more conservative assumption)	15	m/s	
CALPUFF input - Diameter (to correct speed that is too high with a more conservative assumption)	0.28	m	calculation details: = real stack diameter*(real Gas velocity/calpuff input Gas velocity)^0.5

Emissions from generators (near Worker's Camp) - GENCP4

Gen4

Generator 1000 ekW operating at 100% Standby

Reference: Caterpillar C32 1000ekW - Specs

Data

Reference: Caterpillar C32 1000ekW - Performance data - DM9933

Generator power	1000	ekW	*Reference: Caterpillar C32 1000ekW - Specs*
Fuel oil consumption	272.1	L/hr	*Reference: 100% Load*
% of sulphur in oil	0.0015%		*Reference : email Rock Gagnon, March 14 2011*
Oil density	832	kg/m^3	*REF: Email François Saulnier Exxon Mobil, Jan 5th, 2011*
lHV	42,780	kJ/kg	*Reference: Caterpillar C32 1000ekW - Specs*
Gas flow at stack	228	m3/min	*Reference: Caterpillar C32 1000ekW - Specs*
Stack height	2.75	m	
Diameter	0.150	m	*(Visit on site Nov.25 2014, approximately 6 inches, expecting similar diameter when this generator is installed)*
Temperature	476	°C	*Reference: Caterpillar C32 1000ekW - Specs*
	749	K	
Emission factor NO_X	6611.13	g/hr	*Reference: Caterpillar C32 1000ekW - Performance data - DM9933*
Emission factor CO	174.33	g/hr	*Reference: Caterpillar C32 1000ekW - Performance data - DM9933*
Emission factor PM2.5/ PM10/ PMT	24.138	g/hr	*Reference: Caterpillar C32 1000ekW - Performance data - DM9933*
Emission factor HC	13.410	g/hr	

All particulates are considered < 1 um

Hypothesis

Generator is working at 300kW, 24 hour per day

Calculations

Gas velocity	228 m3/min	X	60 min/hr	/	0.01767 m^2	/	3600 s/hr	=	215.41 m/s				
Oil consumption	272.1 L/hr	X	832 kg/m^3	/	1000 l/m3			=	226.4 kg/hr				
Emission rate SO_2	226.4 kg/hr	X	0.0015%	X	2 kg SO_2/kg S	X	1000 g/kg	/					
	3600 s/hr							=	0.001887 g/s				
										NO2/NOx ratio = 0.2			
Emission rate $PM_{2.5}$					24.138 g/hr	/	3600 s/hr	=	0.0067050 g/s				
										NO_2 (g/s)	NO (g/s)		
Emission rate NO_X					6611.13 g/hr	/	3600 s/hr	=	1.8364250 g/s	0.367	0.958		
Emission rate CO					174.33 g/hr	/	3600 s/hr	=	0.0484250 g/s				
Emission rate HC					13.41 g/hr	/	3600 s/hr	=	0.0037250 g/s				

CALPUFF input - gas velocity (to correct speed that is too high with a more conservative assumption) 15 m/s

CALPUFF input - Diameter (to correct speed that is too high with a more conservative assumption) 0.57 m calculation details: = real stack diameter*(real Gas velocity/calpuff input Gas velocity)^0.5

Appendix B
Summary Table of Modelling Data

Modeling data - DSO Project

Projet: 0521500

SOURCE		TYPE (1)	IDENTIFICATION	Lenght	Width	Height	Groud elevation	Syo (init. Lat. dim)	Szo (init. vert. dim)*	Release height / effective height **	Emission rate TSP	PM10	PM2.5	SO2	NOx	CO	HC	TOTAL Emission rate TSP	PM10	PM2.5	SO2	NOx	CO	HC
				(m)	(m)	(m)	(m)	(m)	(m)	m	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s/m2	g/s/m2	g/s/m2	g/s/m2	g/s/m2	g/s/m2	g/s/m2
OVERBURDEN+WASTE F7N	***All operations***	surface	F7_WST			-	740	-	0	86	1.819	0.904	0.136					6.746E-06	3.353E-06	5.030E-07				
	Piles - wind erosion (OB + WST)					-	-	-	-	-	1.7826	0.8913	0.1337					6.610E-06	3.305E-06	4.958E-07				
	Unload. O.B. + Unload WST			surface totale:	269676	-	-	-	-	-	0.0366	0.0128	0.0019					1.359E-07	4.756E-08	7.202E-09				
						-	-	-	-	-														
OVERBURDEN+WASTE Timmins 7	Piles - wind erosion	surface	T7_WST				710	-	0	60	0.5132	0.2566	0.0385					6.44E-06	3.22E-06	4.83E-07				
						-	-	-	-	-														
				surface totale:	79700	-	-	-	-	-														
						-		-	-	-														
OVERBURDEN+WASTE HOWSE	***Wind erosion + Unload O.B.***	surface	HOW_WST				660	-	0	20.0	1.9282	0.9242	0.1388				Wind erosion + Unload O.B.	1.780E-06	8.532E-07	1.281E-07				
	Piles - wind erosion					-	-	-	-		1.6624	0.8312	0.1247				Piles - wind erosion	1.535E-06	7.673E-07	1.151E-07				
	Unload. O.B. (winter)			surface totale:	1083297	-	-	-	-		0.2658	0.0930	0.0141				Unload. O.B. (winter)	2.453E-07	8.587E-08	1.300E-08				
	Unload WST (summer)					-		-	-	-	0.1167	0.0409	0.0062				Unload WST (summer)	1.077E-07	3.771E-08	5.710E-09				
Flemming 7N	Excavation	surface	F7N	c		-	640	-	2.3	5	0.068	0.024	0.004					2.59E-05	1.32E-05	8.39E-06	9.72E-08	1.27E-04	1.07E-04	8.42E-06
	Loading					-	-	-	-	-	0.055	0.019	0.003											
	drilling			surface:	7500	-	-	-	-	-	0.0330	0.0173	0.0173											
	Engines: Truck+Excav+Loader+Drill			Surface corresponding approx. to the area affected by a blast						-	0.0391	0.0391	0.0391	0.000729	0.9541	0.7994	0.0632							
HOWSE	Excavation	surface	HOWSE	c		-	550	-	2.3	5	0.1351	0.0473	0.0072					6.99E-05	3.01E-05	1.42E-05	1.21E-07	1.61E-04	1.31E-04	1.06E-05
	Loading					-	-	-	-	-	0.2658	0.0930	0.0141											
	drilling			surface:	7500	-	-	-	-	-	0.0804	0.0422	0.0422											
	Engines: Truck+Excav+Excav+Loader+Drill			Surface corresponding approx. to the area affected by a blast						-	0.0432	0.0432	0.0432	0.0009	1.2079	0.9861	0.0796							
Flemming 7N	Blasting	Volume	VBLAST_F7N				640	100	7.5	0	40.190	20.899	1.206	9.453	75.625	321.406	0.000							
				625.2426	6083.222		-	-	-	-														
							-	-	-	-														
										-														
HOWSE	Blasting	Volume	VBLAST_H				550	100	7.5	0	40.190	20.899	1.206	9.453	75.625	321.406	0.000							
				6085.199	6085.199		-	-	-	-														
							-	-	-	-														
										-														
Stockpiles near T4	Piles - wind erosion	surface	SP_T4				700	-	0.0	15.6	0.03465	0.01732	0.002599					5.14E-06	2.57E-06	3.86E-07				
				diameter:	92.6	-	-	-	-	-														
				surface:	6738	-	-	-	-	-														
						-		-	-	-														
Stockpiles North of Plant 1	Piles - wind erosion	surface	SP_NP1				710	-	0.0	11.2	0.01789	0.008944	0.001342					5.14E-06	2.57E-06	3.86E-07				
				diameter:	66.6	-	-	-	-	-														
				surface:	3479	-	-	-	-	-														
						-		-	-	-														
Stockpiles near Plant 2	Piles - wind erosion	surface	SP_P2				715	-	0.0	19.4	0.05352	0.02676	0.004014					5.14E-06	2.57E-06	3.86E-07				
				diameter:	115.1	-	-	-	-	-														
				surface:	10408	-	-	-	-	-														
						-		-	-	-														
Stockpiles near T3 and F7	Piles - wind erosion	surface	SP_F7_1				725	-	0.0	19.5	0.05438	0.02719	0.004078					5.14E-06	2.57E-06	3.86E-07				
				diameter:	116.0	-	-	-	-	-														
				surface:	10575	-	-	-	-	-														
						-		-	-	-														
Stockpiles near F7 (Eastern)	Piles - wind erosion	surface	SP_F7_2				740	-	0.0	14.6	0.03045	0.01523	0.002284					5.14E-06	2.57E-06	3.86E-07				
				diameter:	86.8	-	-	-	-	-														
				surface:	5922	-	-	-	-	-														
						-		-	-	-														
Stockpiles at Plant 1	Piles - wind erosion	surface	SP_P1				683	-	0.0	13.1	0.02453	0.01227	0.00184					5.14E-06	2.57E-06	3.86E-07				
				diameter:	77.9	-	-	-	-	-														
				surface:	4771	-	-	-	-	-														
						-		-	-	-														
Stockpile - Sinterfines	Piles - wind erosion	surface	SP_SIN				682	-	0.0	13.8	0.20369	0.10184	0.01528					4.81E-05	2.40E-05	3.61E-06				
						-	-	-	-	-														
				surface:	4237	-	-	-	-	-														
						-		-	-	-														
Stockpile - Superfines	Piles - wind erosion	surface	SP_SUP				682	-	0.0	8.7	1.20380	0.60190	0.09028					3.63E-04	1.81E-04	2.72E-05				
						-	-	-	-	-														
				surface:	3319	-	-	-	-	-														
						-		-	-	-														
Stockpile - HOWSE	Piles - wind erosion	surface	SP_HOW				690	-	0.0	18.1	0.04657	0.02328	0.00349					6.44E-06	3.22E-06	4.83E-07				
						-	-	-	-	-														
				surface:	7232	-	-	-	-	-														
						-		-	-	-														
F7 to O.B. + Waste	Road : Dust + Truck Engine	surface		200	20	3	See input file	-	2.3	5						F7 to OB/WASTE		5.095E-05	1.453E-05	1.639E-06	6.660E-09	4.135E-06	3.618E-06	2.757E-07
			RF7WST_xx	-	-	-		-	-	-						F7 to OB/WASTE : Engine		2.067E-07	2.067E-07	2.067E-07	6.660E-09	4.135E-06	3.618E-06	2.757E-07
				-	-	-		-	-	-						F7 to OB/WASTE : PM		5.074E-05	1.432E-05	1.432E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00
				-	-	-		-	-	-														
F7 to Plant 2	Road : Dust + Truck Engine	surface		200	20	3	See input file	-	2.3	5						F7 to P2		2.485E-05	7.088E-06	7.995E-07	3.249E-09	2.017E-06	1.765E-06	1.345E-07
			RF7_xx	-	-	-		-	-	-						F7 to P2 : Engine		1.009E-07	1.009E-07	1.009E-07	3.249E-09	2.017E-06	1.765E-06	1.345E-07
				-	-	-		-	-	-						F7 to P2 : PM		2.475E-05	6.987E-06	6.987E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00
				-	-	-		-	-	-														
Plant 2 to Rail loading	Road : Dust + Truck Engine	surface		200	20	3	See input file	-	2.3	5						P2 to Rail		7.852E-05	2.239E-05	2.526E-06	1.026E-08	6.372E-06	5.576E-06	4.248E-07
			RP2_xx	-	-	-		-	-	-						P2 to Rail : Engine		3.186E-07	3.186E-07	3.186E-07	1.026E-08	6.372E-06	5.576E-06	4.248E-07
				-	-	-		-	-	-						P2 to Rail : PM		7.820E-05	2.207E-05	2.207E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00
				-	-	-		-	-	-														
HOWSE to O.B.	Road : Dust + Truck Engine	surface		200	20	3	See input file	-	2.3	5						Howse to OB		3.303E-04	9.427E-05	1.072E-05	4.616E-08	4.595E-05	2.513E-05	2.872E-06
			RH_OB_xx	-	-	-		-	-	-						Howse to OB : Engine		1.436E-06	1.436E-06	1.436E-06	4.616E-08	4.595E-05	2.513E-05	2.872E-06
				-	-	-		-	-	-						Howse to OB : PM		3.289E-04	9.283E-05	9.283E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00
				-	-	-		-	-	-														
Overburden by First Nations	Road : Dust + Truck Engine	surface		200	20	3	See input file	-	2.3	5						OB to First Nations		1.341E-05	3.785E-06	3.798E-07	1.887E-09	4.762E-08	1.483E-08	4.013E-09
			RQUA_xx	-	-	-		-	-	-						OB to First Nations : Engine		1.408E-09	1.408E-09	1.408E-09	1.887E-09	4.762E-08	1.483E-08	4.013E-09
			RFN_xx	-	-	-		-	-	-						OB to First Nations : PM		1.340E-05	3.784E-06	3.784E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00
				-	-	-		-	-	-														
HOWSE to Waste	Road : Dust + Truck Engine	surface		200	20	3	See input file	-	2.3	5						Howse to WST		1.450E-04	4.140E-05	4.707E-06	2.027E-08	2.018E-05	1.103E-05	1.261E-06
			RH_WST_xx	-	-	-		-	-	-						Howse to WST : Engine		6.305E-07	6.305E-07	6.305E-07	2.027E-08	2.018E-05	1.103E-05	1.261E-06
				-	-	-		-	-	-						Howse to WST : PM		1.444E-04	4.077E-05	4.077E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00
				-	-	-		-	-	-														
Howse Ore + Howse Waste	Road : Dust + Truck Engine	surface		200	20	3	See input file	-	2.3	5						Howse Ore + Howse Waste		2.58E-04	7.35E-05	8.36E-06	3.60E-08	3.58E-05	1.96E-05	2.24E-06
			RH_01 to 11	-	-	-		-	-	-						Howse Ore + Howse Waste : Engine		1.12E-06	1.12E-06	1.12E-06	3.60E-08	3.58E-05	1.96E-05	2.24E-06
				-	-	-		-	-	-						Howse Ore + Howse Waste : PM		2.56E-04	7.24E-05	7.24E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
				-	-	-		-	-	-														
Howse Ore + 10wheelers	Road : Dust + Truck Engine	surface		200	20	3	See input file	-	2.3	5						Howse Ore + 10 wheelers		1.26E-04	3.59E-05	4.03E-06	1.76E-08	1.57E-05	8.57E-06	9.82E-07
			RH_12 to 25	-	-	-		-	-	-						Howse Ore + 10 wheelers : Engine		4.90E-07	4.90E-07	4.90E-07	1.76E-08	1.57E-05	8.57E-06	9.82E-07
				-	-	-		-	-	-						Howse Ore + 10 wheelers : PM		1.25E-04	3.54E-05	3.54E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
				-	-	-		-	-	-														
Ore from HOWSE to Mini Plant	Road : Dust + Truck Engine	surface		200	20	3	See input file	-	2.3	5						Howse Ore to MiniPlant		1.12E-04	3.21E-05	3.65E-06	1.57E-08	1.56E-05	8.56E-06	9.78E-07
			RH_26 to 35	-	-	-		-	-	-						Howse Ore to MiniPlant : Engine		4.89E-07	4.89E-07	4.89E-07	1.57E-08	1.56E-05	8.56E-06	9.78E-07
				-	-	-		-	-	-						Howse Ore to MiniPlant : PM		1.12E-04	3.16E-05	3.16E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
				-	-	-		-	-	-						Howse Ore to MiniPlant IN & OUT		2.25E-04	6.42E-05	7.30E-06	3.14E-08	3.13E-05	1.71E-05	1.96E-06
Pickups DSO3	Road : Dust + Truck Engine	surface		200	20	3	See input file	-	2.3	5						Pickups at 100% rate (DSO3)		2.554E-05	7.209E-06	7.224E-07	4.595E-11	1.361E-08	3.999E-07	1.953E-09
(100%)			RPK_01 to 18	-	-	-		-	-	-						Pickups at 100% rate (DSO3) : Engine		1.576E-09	1.576E-09	1.576E-09	4.595E-11	1.361E-08	3.999E-07	1.953E-09
				-	-	-		-	-	-						Pickups at 100% rate (DSO3) : PM		2.553E-05	7.208E-06	7.208E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00
				-	-	-		-	-	-														
																Pickups + 10wheelers (for Winter calc.)		3.894E-05	1.099E-05	1.102E-06	1.933E-09	6.123E-08	4.147E-07	5.967E-09
																Pickups at 100% rate (DSO3) : Engine		1.576E-09	1.576E-09	1.576E-09	4.595E-11	1.361E-08	3.999E-07	1.953E-09
				-	-	-		-	-	-						Pickups at 100% rate (DSO3) : PM		2.553E-05	7.208E-06	7.208E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00
				-	-	-		-	-	-														
																Pickups + 10wheelers (for Summer calc.)		3.894E-05	1.099E-05	1.102E-06	1.933E-09	6.123E-08	4.147E-07	5.967E-09
																Pickups + 10wheelers (Summer) : Engine		2.984E-09	2.984E-09	2.984E-09	1.933E-09	6.123E-08	4.147E-07	5.967E-09
				-	-	-		-	-	-						Pickups + 10wheelers (Summer) : PM		3.894E-05	1.099E-05	1.099E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00
				-	-	-		-	-	-														
Ore from DSO4 + 25% pickups	Road : Dust + Truck Engine	surface		200	20	3	See input file	-	2.3	5						Ore from DSO4 + 25% pickups		1.54E-04	4.40E-05	4.98E-06	2.07E-08	2.06E-05	1.13E-05	1.29E-06
			R_KIV_00A B C	-	-	-		-	-	-						Ore from DSO4 + 25% pickups : Engine		6.43E-07	6.43E-07	6.43E-07	2.07E-08	2.06E-05	1.13E-05	1.29E-06

Modeling data - DSO Project

Projet: 0521500

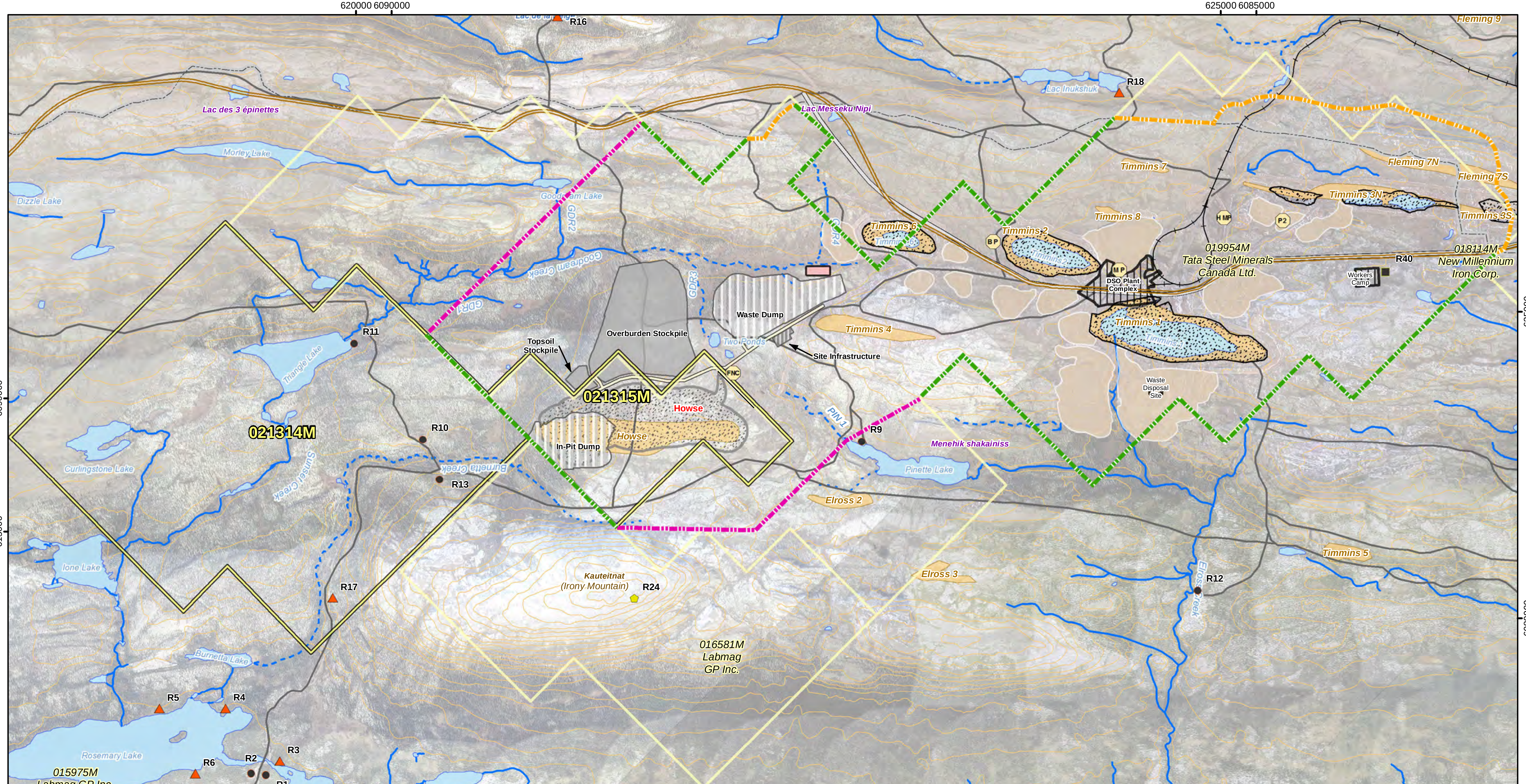
SOURCE		TYPE (1)	IDENTIFICATION	Lenght	Width	Height	Groud elevation	Syo (init. Lat. dim)	Szo (init. vert. dim)*	Release height / effective height **
				(m)	(m)	(m)	(m)	(m)	(m)	m
		surface	R_KIV_01 to 45	-	-	-		-	-	-
				-	-	-		-	-	-
Unload + Conveyor + Primary sizer + Chute	See "Pre_Post_MainPlant" sheet	volume	VMP_SZ1				698	0.9	3.0	10.5
Conveyor + Secondary sizer + Chute	See "Pre_Post_MainPlant" sheet	volume	VMP_SZ2				695	0.7	2.1	13.5
Conveyor to Sinterfines stockpiles	See "Pre_Post_MainPlant" sheet	volume	VMP_SIN				685	0.3	0.5	28.7
Conveyor to Superfines stockpiles	See "Pre_Post_MainPlant" sheet	volume	VMP_SUP				685	0.3	0.5	18.3
Load/Unload during Rail Loading	See "Pre_Post_MainPlant" sheet + Engines: 4 loaders	volume	VMP_HDRL				685	0.9	1.8	4.9
Rail loading	See "Pre_Post_MainPlant" sheet	volume	VMP_RAIL				684	5.2	3.8	4.1
Pre Dryer-Plant 2	See "DSO3-P2_Plant" sheet	volume	VP2_PreDry				715	1.6	2.3	5
Post Dryer-Plant 2	See "DSO3-P2_Plant" sheet	volume	VP2_PostDry				715	1.7	0.8	6.5
Pre Dryer-Howse Mini Plant	See "Howse_Plant" Sheet	volume	VHOW_PreDry				690	1.6	2.3	5
Post Dryer-Howse Mini Plant	See "Howse_Plant_New" sheet	volume	VHOW_PostDry				690	1.7	0.8	6.5
VOLUME-Quarry Mini Plant	See "Howse_Plant_New" Sheet	volume	VQUA				670	1.6	2.3	5
Dryer stack at Mini Plant	Stack- 7 month per year	Point	HOW_Dry			15	690	-	-	-
Dryer stack 2 at Mini Plant	Stack- 7 month per year	Point	HOW_Dry2			15	690	-	-	-
GEN CP 1 / 2 / 3	Stack - Yearly	point	GENCP_1-2-3	-	-	3.5	742	-	-	-
GEN CP 4	Stack - Yearly	point	GENCP_4	-	-	2.75	742	-	-	-
GEN 2MW Plant 2	Stack - Yearly	point	GENP2_1	-	-	3.35	715	-	-	-
GEN 2MW HOWSE Plant	Stack - Yearly	point	GENHOW_1	-	-	3.35	690	-	-	-
GEN Quarry Mini Plant	Stack - Yearly	point	GENQUA			3.5	670			
GEN Batch Plant	Stack - Yearly	point	GENBATCH	-	-	4.6	695	-	-	-
GEN Mixer Plant 2	Stack - Yearly	point	GENMIX	-	-	4.0	715	-	-	-
Dryer Stack at Plant 2	Stack - Yearly	point	DRYER	-	-	15	715	-	-	-
Roof Vent at Main Plant	Stack - Summer - 5 months per year	point	MP_RF_S	-	-	46.3	679	D=2m	T=298 K	v=5.6m/s
Wall Vent South of Main Plant	Stack - Winter - 7 months per year	point	MP_W_S_W	-	-	7.3	679	Deq=7.3m	T=298 K	v=0.1m/s
Wall Vent South of Main Plant	Stack - Summer - 5 months per year	point	MP_W_S_S	-	-	7.3	679	Deq=11.1m	T=298 K	v=0.1m/s
Wall Vent North of Main Plant	Stack - Winter - 7 months per year	point	MP_W_N_W	-	-	7.3	679	Deq=7.3m	T=298 K	v=0.1m/s
Wall Vent North of Main Plant	Stack - Summer - 5 months per year	point	MP_W_N_S	-	-	7.3	679	Deq=11.1m	T=298 K	v=0.1m/s
Vaccum Pumps vent at M.Plant	Stack - Yearly	point	MP_VAC	-	-	7.0	679	Deq=8.0m	T=298 K	v=0.1m/s
Bin vent at Rail Loading	Stack - Yearly	point	RL_BIN	-	-	35	684	Deq=5.2m	T=273 K	v=0.1m/s
Dryer Stack at Main Plant	Stack - Summer - 5 months per year	point	S1_W	-	-	65.7	679	-	-	-
Dryer Stack at Main Plant	Stack - Summer operations	point	S1_S	-	-	65.7	679	-	-	-

IDENTIFICATION	Emission rate TSP	PM10	PM2.5	SO2	NOx	CO	HC	TOTAL Emission rate TSP	PM10	PM2.5	SO2	NOx	CO	HC
	g/s	g/s	g/s	g/s	g/s	g/s	g/s	g/s/m2	g/s/m2	g/s/m2	g/s/m2	g/s/m2	g/s/m2	g/s/m2
R_KIV_01 to 45						Ore from DSO4 + 25% pickups : PM		1.54E-04	4.34E-05	4.34E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00
VMP_SZ1	0.312	0.120	0.021											
VMP_SZ2	0.144	0.061	0.012											
VMP_SIN	0.001791	0.000588	0.000166											
VMP_SUP	0.000873	0.000287	0.000081											
VMP_HDRL	1.941	0.709	0.146	0.00073	0.920	0.805	0.061							
VMP_RAIL	0.001944	0.000639	0.000181											
VP2_PreDry	0.156	0.062	0.011											
VP2_PostDry	0.268	0.092	0.012											
VHOW_PreDry	0.222	0.088	0.016											
VHOW_PostDry	0.393	0.135	0.017											
VQUA	0.018	0.007	0.001											
HOW_Dry	5.066E-01	3.624E-01	2.614E-01	2.324E-02	2.618E+00	5.455E-01	2.749E-02							
HOW_Dry2	5.066E-01	3.624E-01	2.614E-01	2.324E-02	2.618E+00	5.455E-01	2.749E-02							
GENCP_1-2-3	3.07E-03	3.07E-03	3.07E-03	5.57E-04	3.80E-01	2.36E-02	7.171E-03							
GENCP_4	6.71E-03	6.71E-03	6.71E-03	1.89E-03	1.84E+00	4.84E-02	3.73E-03							
GENP2_1	2.42E-02	2.42E-02	2.42E-02	2.75E-03	2.86E+00	2.42E-01	1.91E-01							
GENHOW_1	2.42E-02	2.42E-02	2.42E-02	2.75E-03	2.86E+00	2.42E-01	1.91E-01							
GENQUA	3.07E-03	3.07E-03	3.07E-03	5.57E-04	3.80E-01	2.36E-02	7.171E-03							
GENBATCH	8.75E-03	8.75E-03	8.75E-03	3.48E-04	1.75E-01	1.53E-01	1.17E-02							
GENMIX	8.09E-03	8.09E-03	8.09E-03	2.70E-04	1.62E-01	1.42E-01	1.08E-02							
DRYER	6.33E-01	4.65E-01	3.48E-01	3.17E-02	3.57E+00	7.44E-01	3.75E-02							
MP_RF_S	7.079E-02	7.079E-02	7.079E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00							
MP_W_S_W	4.226E-02	4.226E-02	4.226E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00							
MP_W_S_S	9.752E-02	9.752E-02	9.752E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00							
MP_W_N_W	1.690E-02	1.690E-02	1.690E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00							
MP_W_N_S	3.901E-02	3.901E-02	3.901E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00							
MP_VAC	5.050E-02	5.050E-02	5.050E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00							
RL_BIN	7.867E-02	7.867E-02	7.867E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00							
S1_W	1.53E+00	1.53E+00	1.53E+00	3.95E-02	4.47E+01	2.39E+00	1.08E+00							
S1_S	2.14E-01	2.14E-01	2.14E-01	1.07E-02	2.58E+01	1.12E+00	6.32E-01							

* NOTE: Important when modelling mechanicaly generated emissions (ie: roads), Source AERMOD USER GUIDE, 2006, p 4-8
Exception for storage piles and dumps: These area sources have no Initial vertical dispersion ---> Szo = 0

** Hypothesis: equal source height, wind erosion= pile average height. Excavation and roads= truck height.

Appendix C
General Site Layouts



LEGEND

Infrastructure and Mining Components

Proposed Infrastructures
- Proposed Howse Pit
- Proposed Topsoil/Overburden Stockpile
- Proposed Waste Dump/In-Pit Dump
- Proposed Site Infrastructure
- Proposed Mine Haul Road

Existing Components
- Existing Railroad
- Road to DSO Area 4
- Existing Sedimentation Pond
- DSO Howse - Claim Labrador Iron Mines Limited(49%)/ Howse Minerals Ltd.(51%)
- Other Claim
- Elross Lake Area Iron Ore Mine (ELAIOM) Plant Infrastructure Footprint
- Existing Dump
- Existing Pit
- Deposit
- P2 Plant 2
- MP Main processing Plant
- HMP Howse Mini-Plant
- BP Batch Plant
- FNC First Nations crusher/screener

Sensitives Receptors
- Naskapi
- Innu
- Permanent
- Other/Autre

Air Dispersion Modeling Perimeter
- Administrative Boundaries using Newfoundland Methodology with Receptors on Claim Lines
- Alternative Boundary Limits within Newfoundland to Include Possible sensitive Areas into the Receptors grid
- Administrative Boundaries using a Methodology used by Quebec in a previous Impact Study

Basemap
- Permanent Watercourse
- Intermittent Watercourse
- Storm Runoff
- Disappearing Stream
- Artesian Spring
- Water body
- Contour Line (50 ft)
- Provincial Border
- Existing Road
- Main Access

*Hydronyms are oriented along the direction of water flow

FILE, PROJECT, DATE, AUTHOR:
GH-0673 , PR185-19-14, 2015-10-16, edickoum

N

0 500 1 000 1 500 2 000

UTM 19N NAD 83

Meters

SCALE: 1:31 000

SOURCES:
Basemap
Government of Canada, NTDB, 1:50,000, 1979 Government of NL and government of Quebec, Boundary used for claims
SNC Lavalin, Groupe Hémisphères, Hydrology update, 2013

Infrastructure and Mining Components
New Millennium Capital Corp., Mining sites and roads
TATA Steel Minerals Canada Limited/ MET-CHEM Howse Deposit Design for General Layout, 2013

ENVIRONMENTAL IMPACT ASSESSMENT
HOWSE PROPERTY PROJECT

Air Dispersion Modeling Perimeter

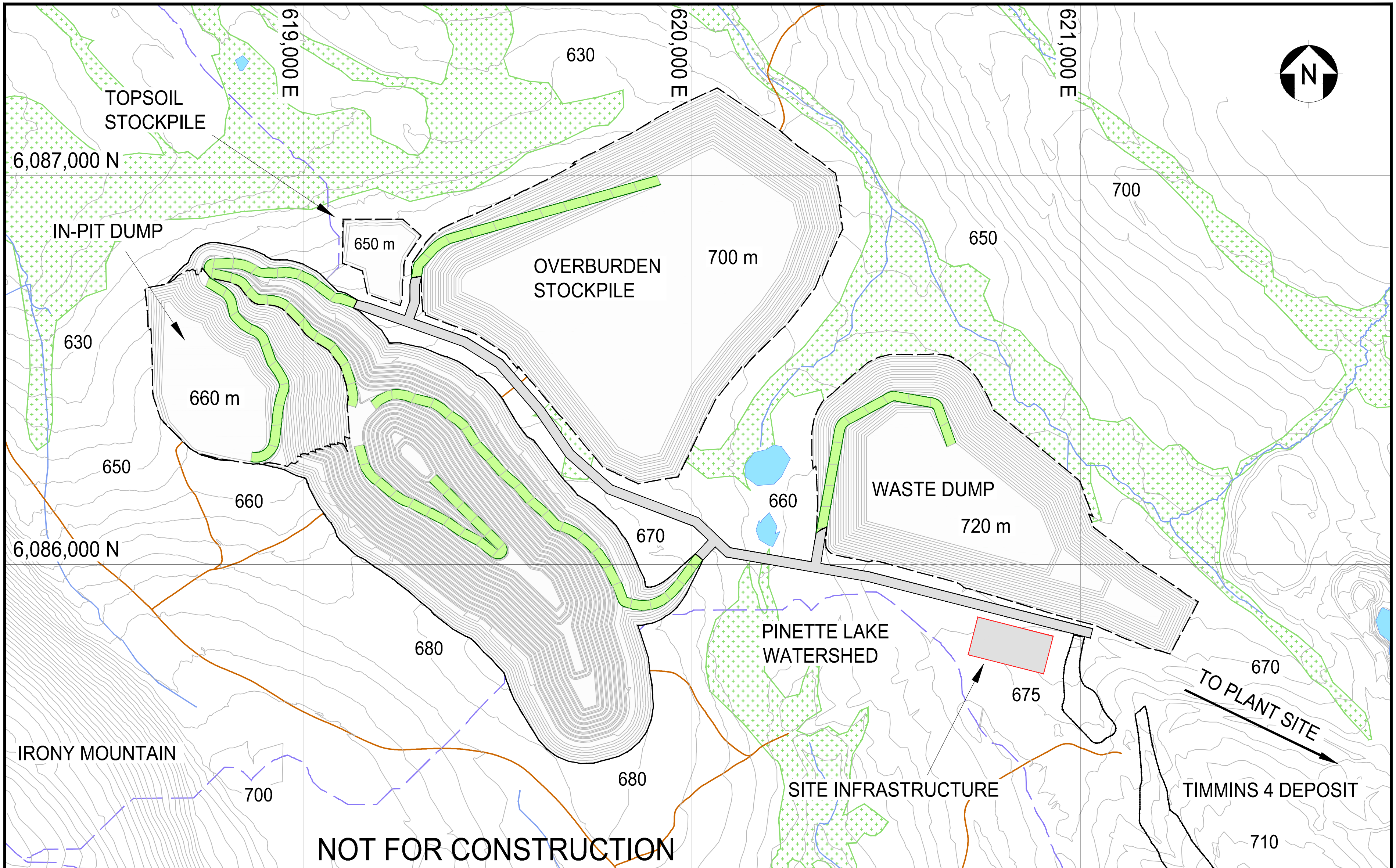
Howse Minerals Limited

GroupeHemispheres

5731, rue Saint-Louis, Bureau 201, Lévis (QC) Canada, G6V 4E2

1453, rue Beaubien est, Bureau 301, Montréal (QC) Canada, H2G 3C6

Figure 2.2



LEGEND

	PIT LIMIT		DUMP / STOCKPILE FOOTPRINT		WETLANDS
	EXISTING ROADS		TOPOGRAPHY CONTOURS (5 m)		CREEKS
	PIT / DUMP RAMP		MINE HAUL ROAD		WATERSHED BOUNDARY

125 250 500

Metres

UTM NAD83 ZONE 19

TATA

MET-CHEM

HOWSE DSO DEPOSIT

NO.	DATE/BY	TITLE / NAME
B	15/07/08 JEFFREY CASSOFF, Eng.	FOR INFORMATION
A	30/06/15 JEFFREY CASSOFF, Eng.	FOR INFORMATION

REVISIONS

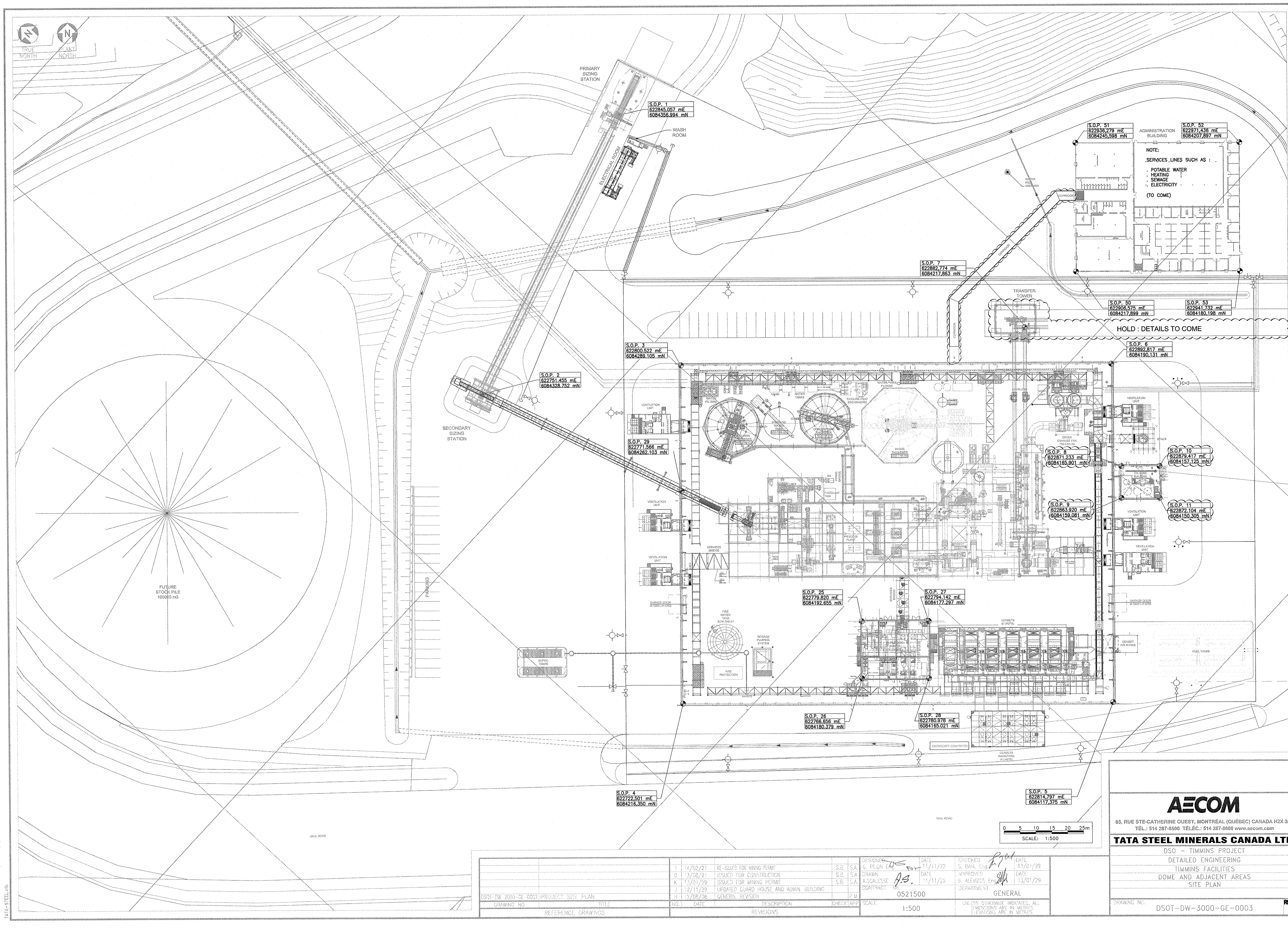
RESPONSIBLE ENGINEER JEFFREY CASSOFF, Eng.	DATE 30/06/15	CHECKED	DATE
DESIGNED JEFFREY CASSOFF, Eng.	DATE 30/06/15	APPROVED	DATE
DRAWN JEFFREY CASSOFF, Eng.	DATE 30/06/15	SCALE n/a	
CLIENT APPROVAL	DATE	DEPARTMENT MINING	

FEASIBILITY STUDY
MINE SITE LAYOUT (Dumps and Stockpiles)

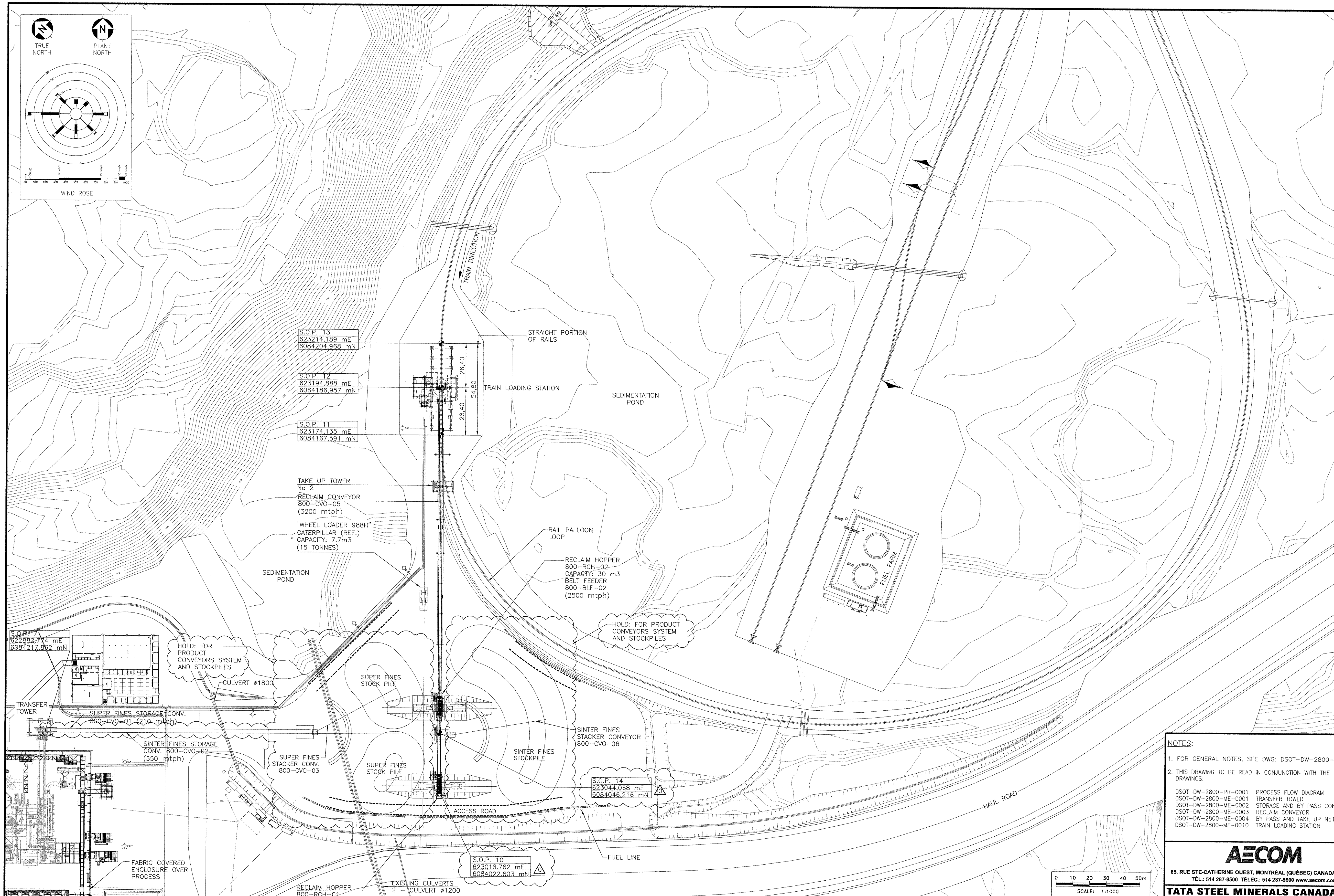
DRAWING NO. A4-2014-049-502-MN
REV. B

File: P:\2014-049\Dessins\Mine-Geologie\Autocad\A4-2014-049-0502-MN.dwg - Jul 08, 2015 - 9:55am

ROM backup
43 Kt
ROM
Stockpile
81.5 Kt
175 m
75 m
Howse Plant
75 m
175 m
Product
Stockpile
137 Kt



TRUE NORTH
PLANT NORTH
PRIMARY SIZING STATION
S.O.P. 1 622845,057 mE 6084356,994 mN
WASH ROOM
ELECTRICAL ROOM
S.O.P. 51 622936,279 mE 6084245,598 mN
ADMINISTRATION BUILDING
S.O.P. 52 622971,436 mE 6084207,897 mN
NOTE:
SERVICES LINES SUCH AS :
. POTABLE WATER
. HEATING
. SEWAGE
. ELECTRICITY
(TO COME)
S.O.P. 7 622882,774 mE 6084217,863 mN
TRANSFER TOWER
S.O.P. 50 622906,575 mE 6084217,899 mN
S.O.P. 53 622941,732 mE 6084180,198 mN
HOLD : DETAILS TO COME
S.O.P. 3 622800,522 mE 6084289,105 mN
S.O.P. 6 622892,817 mE 6084190,131 mN
S.O.P. 2 622751,455 mE 6084328,752 mN
SECONDARY SIZING STATION
S.O.P. 29 622771,566 mE 6084262,103 mN
VENTILATION UNIT
S.O.P. 8 622871,233 mE 6084165,901 mN
S.O.P. 10 622879,417 mE 6084157,125 mN
S.O.P. 9 622863,920 mE 6084159,081 mN
S.O.P. 11 622872,104 mE 6084150,305 mN
STACK
FUTURE STOCK PILE 100000 m3
PARKING
SERVICES BRIDGE
S.O.P. 25 622779,820 mE 6084192,655 mN
S.O.P. 27 622794,142 mE 6084177,297 mN
FIRE WATER TANK
SEWAGE PUMPING SYSTEM
FIRE PROTECTION
SEPTIC TANKS
GARAGE DOOR
GENSET AIR INTAKE
FUEL TANKS
S.O.P. 26 622766,656 mE 6084180,379 mN
S.O.P. 28 622780,978 mE 6084165,021 mN
EMERGENCY GENERATOR
GENSETS RADIATORS (6 UNITS)
S.O.P. 4 622722,501 mE 6084216,350 mN
S.O.P. 5 622814,797 mE 6084117,375 mN
HAUL ROAD
0 5 10 15 20 25m
SCALE: 1:500
AECOM
85, RUE STE-CATHERINE OUEST, MONTRÉAL (QUÉBEC) CANADA H2X 3P4
TÉL.: 514 287-8500 TÉLÉC.: 514 287-8600 www.aecom.com
TATA STEEL MINERALS CANADA LTD.
DSO - TIMMINS PROJECT
DETAILED ENGINEERING
TIMMINS FACILITIES
DOME AND ADJACENT AREAS
SITE PLAN
DRAWING NO. DSOT-DW-3000-GE-0003
REV. 1
1 14/02/21 RE-ISSUED FOR MINING PERMIT S.B. S.A.
0 13/08/21 ISSUED FOR CONSTRUCTION S.B. S.A.
K 13/01/29 ISSUED FOR MINING PERMIT S.B. S.A.
J 12/11/29 UPDATED GUARD HOUSE AND ADMIN. BUILDING
H 12/08/08 GENERAL REVISION P.M.
NO. DATE DESCRIPTION CHECK APP
REVISIONS
DSOT-DW-2000-GE-0002 PROJECT SITE PLAN
DRAWING NO TITLE
REFERENCE DRAWINGS
DESIGNED G. PILON Eng. DATE 11/11/22
DRAWN A.SCALESSE A.S. DATE 11/11/22
CHECKED S. BAHL Eng. DATE 13/01/29
APPROVED S. ALEVIZOS Eng. DATE 13/01/29
CONTRACT No. 0521500
DEPARTMENT GENERAL
SCALE 1:500
UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN METRES ELEVATIONS ARE IN METRES.
File No. DSOT-DW-3000-GE-0003_1_recover.dwg



NOTES:

1. FOR GENERAL NOTES, SEE DWG: DSOT-DW-2800-ME-0001.
2. THIS DRAWING TO BE READ IN CONJUNCTION WITH THE FOLLOWING DRAWINGS:

DSOT-DW-2800-PR-0001	PROCESS FLOW DIAGRAM
DSOT-DW-2800-ME-0001	TRANSFER TOWER
DSOT-DW-2800-ME-0002	STORAGE AND BY PASS CONVEYORS
DSOT-DW-2800-ME-0003	RECLAIM CONVEYOR
DSOT-DW-2800-ME-0004	BY PASS AND TAKE UP No1 TOWERS
DSOT-DW-2800-ME-0010	TRAIN LOADING STATION

REFERENCE DRAWINGS

DRAWING NO	TITLE
DSOT-DW-2800-GE-0002	TIMMINS FACILITIES - GENERAL LAYOUT

REVISIONS

NO.	DATE	DESCRIPTION	ISSUED BY	APP
O	14/02/21	ISSUED FOR MINING PERMIT	S.B.	S.A.
H	13/11/12	TRAIN LOADING AND RECLAIM CONVEYOR UPDATED	S.B.	S.A.
G	13/04/25	IN PROGRESS	S.B.	S.A.

DESIGNED H. LA Eng.	DATE 12/03/07	CHECKED S. BAHL	DATE 14/02/21
DRAWN A.SCALESSE	DATE 12/03/07	APPROVED P. McILVENNA Eng.	DATE 12/08/06
CONTRACT No. 0521500		DEPARTMENT MECHANICAL	
SCALE 1:1000		UNLESS OTHERWISE INDICATED, ALL DIMENSIONS ARE IN METRES ELEVATIONS ARE IN METRES.	

AECOM

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TÉL.: 514 287-8500 TÉLÉC.: 514 287-8600 www.aecom.com

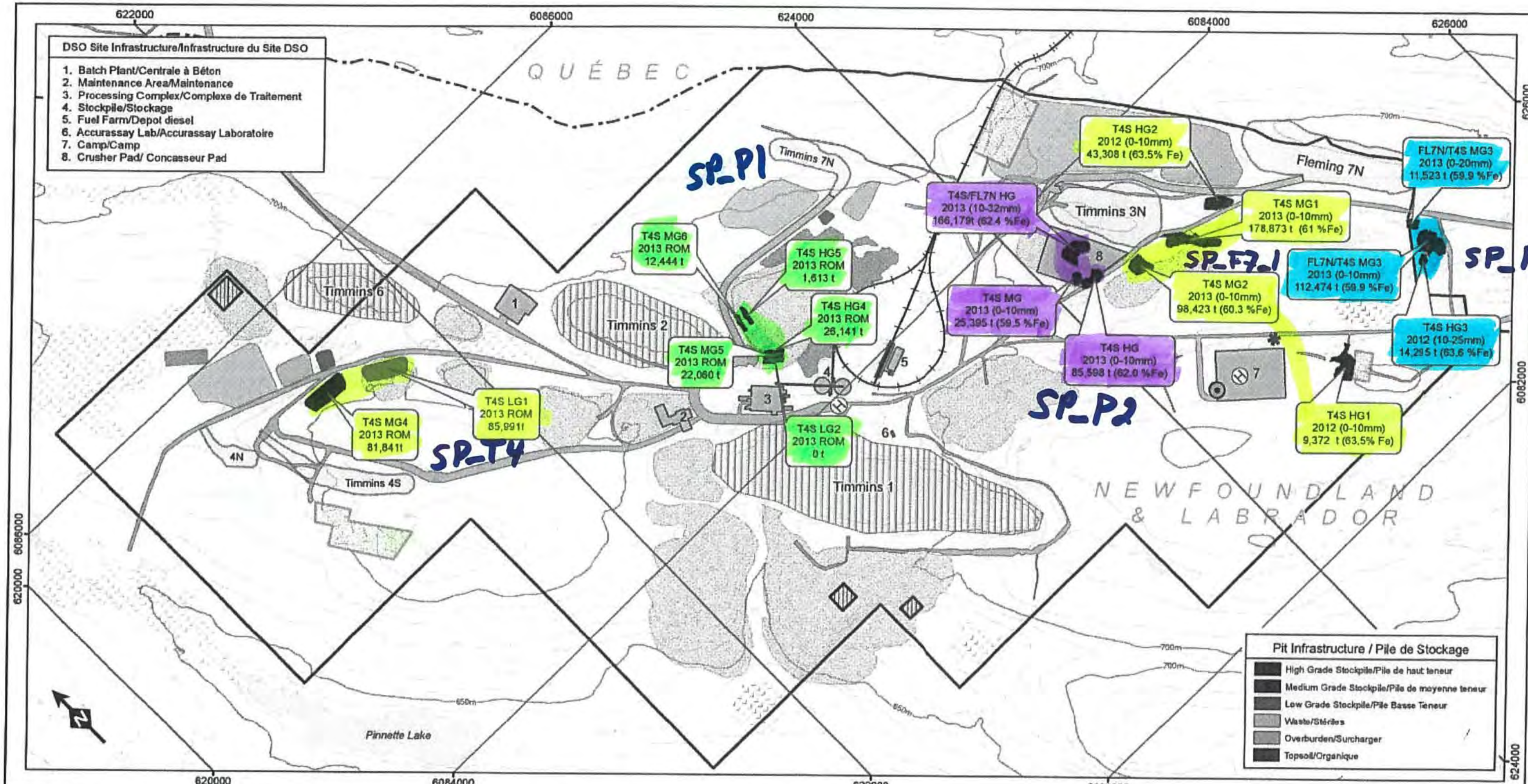
TATA STEEL MINERALS CANADA LTD.

DSO - TIMMINS PROJECT
DETAILED ENGINEERING
TIMMINS FACILITIES
PRODUCT STORAGE, TRAIN LOADING AND FUEL FARM
GENERAL LAYOUT

DRAWING NO. DSOT-DW-2800-GE-0001 REV. 0

File No. DSOT-DW-2800-GE-0001_0_recover.dwg
path: K:\05\21\500\0521500_DSO Project\07_Plans\Dessins courants\Mécanique de procédé\LOAD OUT CONVEYORS AND TRAIN LOADING STATION - ACTIVE\ACTIVE DWGS ONLY (others will be erased)

A1
TATA-STEEL-A2.ctb



Surface lease/Droit de surface
Ultimate pit limit/Limite ultime de la fosse
Mined-out deposit/Gisement exploité
Infrastructure Footprint/Empreinte de l'infrastructure
Mine Haul Roads/Chemin Minier
Surveyed Roads/Chemin arpentée
Communication Tower/Tour de communication
Security/Sûreté
Helipad/Hélisurface
Proposed Quarry/Projet de carrière
Drill & Blast Infrastructure/Infrastructure de Forage Dynamitage
Landfill/Enfouissement
Existing waste dump/Halde de stériles existante
Infrastructure Footprint/Empreinte de l'infrastructure
Sedimentation pond/bassin de sédimentation
Wetland/Terre humide
Timmins rail spur/Embranchement de voie ferrée Timmins
Border/Frontière: Québec - Labrador

DSO 3 Project Layout/
Présentation de projet DSO 3

General Information/
Information génerales

0 300 600
Meters

SCALE:
1:16,500

UTM 19N NAD 83

FILE, VERSION, DATE, AUTHOR/
FICHIER, VERSION, DATE, AUTEUR:
GIS-ML-20-18-01, 2013-6-11, E.F.

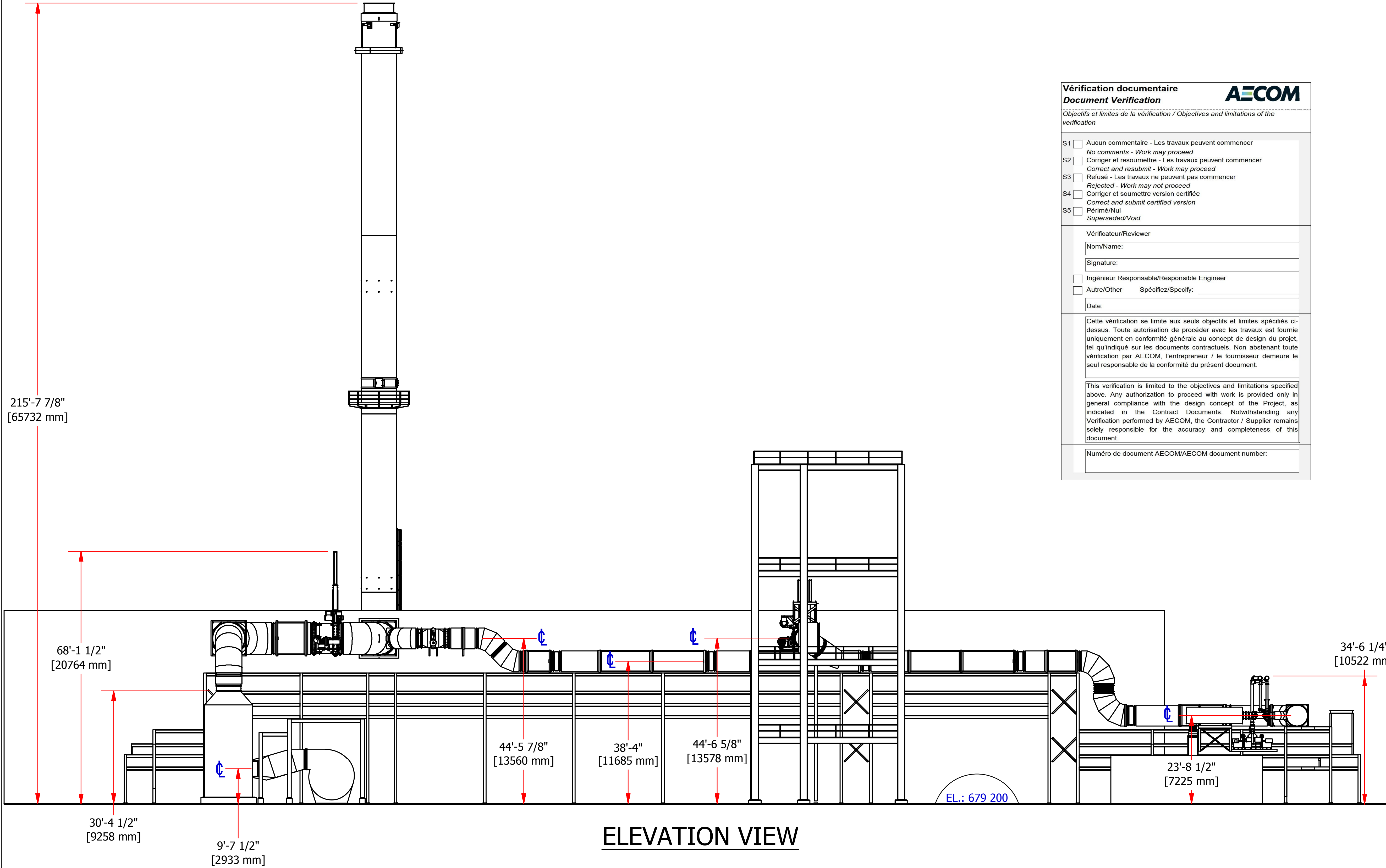
SOURCES:

TATA

TATA STEEL MINERALS CANADA

CONFIDENTIAL & COMMERCIALLY PROTECTED
CONFIDENTIEL & PROTÉGÉ COMMERCIALEMENT

LOCATION/LOCALISATION:
QC
NL



ELEVATION VIEW

Vérification documentaire
Document Verification AECOM

Objectifs et limites de la vérification / Objectives and limitations of the verification

- S1 ☐ Aucun commentaire - Les travaux peuvent commencer / *No comments - Work may proceed*
- S2 ☐ Corriger et resoumettre - Les travaux peuvent commencer / *Correct and resubmit - Work may proceed*
- S3 ☐ Refusé - Les travaux ne peuvent pas commencer / *Rejected - Work may not proceed*
- S4 ☐ Corriger et soumettre version certifiée / *Correct and submit certified version*
- S5 ☐ Périmé/Nul / *Superseded/Void*

Vérificateur/Reviewer

Nom/Name:

Signature:

☐ Ingénieur Responsable/Responsible Engineer

☐ Autre/Other Spécifiez/Specify:

Date:

Cette vérification se limite aux seuls objectifs et limites spécifiés ci-dessus. Toute autorisation de procéder avec les travaux est fournie uniquement en conformité générale au concept de design du projet, tel qu'indiqué sur les documents contractuels. Non abstenant toute vérification par AECOM, l'entrepreneur / le fournisseur demeure le seul responsable de la conformité du présent document.

This verification is limited to the objectives and limitations specified above. Any authorization to proceed with work is provided only in general compliance with the design concept of the Project, as indicated in the Contract Documents. Notwithstanding any Verification performed by AECOM, the Contractor / Supplier remains solely responsible for the accuracy and completeness of this document.

Numéro de document AECOM/AECOM document number:

GENERAL NOTES:

STACK SHELL AND BASE PLATE TO BE CONSTRUCTED FROM CORTEN STEEL ASTM-A588/G40.21-50A PLATE

STRUCTURAL STEEL TO BE IN ACCORDANCE WITH G40.21-300W OR EQUAL

STRUTURAL SHELL - 112"Ø A588
LINER - 96"Ø : 20% G40.21-300W & 80% ANSI-SST316L
LINER INSULATION - 2" CERAMIC FIBER

BREECHING INSULATION - 2" CERAMIC FIBER & 2" RW80 MINERAL FIBER
BREECHING CLADDING - ALUMINIUM

HIGH STRENGTH BOLTS AND NUTS TO CONFORM TO ASTM A325

HIGH STRENGTH ANCHORS TO CONFORM TO ASTM A307 (INSTALLED BY OTHERS)

ALL BOLTS, NUTS AND WASHER FOR FIELD ASSEMBLY TO BE GALVANISED AND SUPPLIED BY VENDOR INCLUDES SPARES (ANCHOR BOLTS BY OTHERS)

WELDING

CONFORM TO ASME Section IX AN CSA-W59.1
FULL PENETRATION WELD REQ'D AT ALL SEAMS ON STACK

GRADE

GRADE ELEVATION = 0'-0"

DESIGN

IN ACCORDANCE WITH ASME STS-1-2011 Steel Stacks
FLUE DESIGN TEMPERATURE = GENERATOR - 1000ºF
CORROSION ALLOWANCE = 1/16"
LOCATION = SHEFFERVILLE
WIND LOAD = 1/50 years - 0.42 kPa (EXPOSURE = A)
SEISMIC LOAD = S(2.0) = 0.10
S(0.5) = 0.16
S(1.0) = 0.0191
S(2.0) = 0.014
LOAD AT BASE: W = 888 kN, M = 7104 kNm, V = 205 kN

STACK PAINT
PREPARATION IN ACCORDANCE WITH SSPC-SP6
PRIMER: CARBOZINC 11 (2 - 3) DFT
TOPCOAT: CARBOLINE 133 HB (3 - 5) DFT - LIGHT GRAY #25630

LADDER & PLATFORM
HOT DIPPED GALVANISED

SELF CLOSING GATES
INTREPID MODEL DG-27

TEST PORTS
ALL TEST PORTS TO BE IN ACCORDANCE WITH ANSI B16.5. WELDING IN ACCORDANCE WITH ASME

AIRCRAFT LIGHT
FAA MED-W360 TECHNO STROBE

No.	Date of rev.	Revision	By
5	13/03/26	CERTIFIED	G.D.
4	13/01/24	FOR APPROVAL	G.D.
3	12/12/20	FOR CONSTRUCTION	G.D.
1	12/10/26	FOR APPROVAL	G.D.

Chimney	Minimum opening

CHEMINÉE Lining
545 Fernand-Poitras, Terrebonne, QC J6Y 1Y5
Tél.: (450) 625-6060 / 1-866-625-6060 • Téléc.: (450) 625-8170
www.chemineelining.com • info@chemineelining.com

Project name: DSO TIMMINS

Client: TATA STEEL MINERAL CANADA

Tel. number: Fax number:

Project manager: BENOIT PERRON

Draw by:	Verif. by:	Appr. by:	Scale:	Creation date:
G.D.	B.P.	B.P.	NTS	2012-05-04

Title: FREESTANDING STS3 112" O.D. & 96" I.D.
GENERAL ELEVATION VIEW

No. project:	No. drawing:	Sheet:	Rev:
26170	26170-GAW	2 /5	5

NOTE:
The item(s) contained in this bill of material will be built solely for this job; your PO number:
This document must be field verified and/or approved before the order will be entered for manufacturing.
Any additional parts not shown on this document will need to be ordered with a different purchase order.

Approval signature: ______________________ Approval date: ______________

Appendix D
MM5 Meteorological Data Explanatory Document

MM5 Meteorological Data for CALPUFF
CALMET Ready Data

Ordered by: Emmanuelle Becaert, Tecsult Inc.
Location: Shefferville, Québec
Latitude, Longitude of Center: 54.859701 N, 67.005833 W

Period: 2004-01-01 00:00 Z to 2008-12-31 23:00 Z
Vertical Levels: 18 (lowest level at 15 m above ground level (AGL)
Spatial Resolution: 12 km

UTM Zone: 19
Time Zone: Divided between UTC -5 (Eastern) / UTC -4 (Atlantic)

Domain Extents:

Centre: 54.859701 N, 67.005833 W (degrees)
Area: 40 km (X) x 40 km (Y)

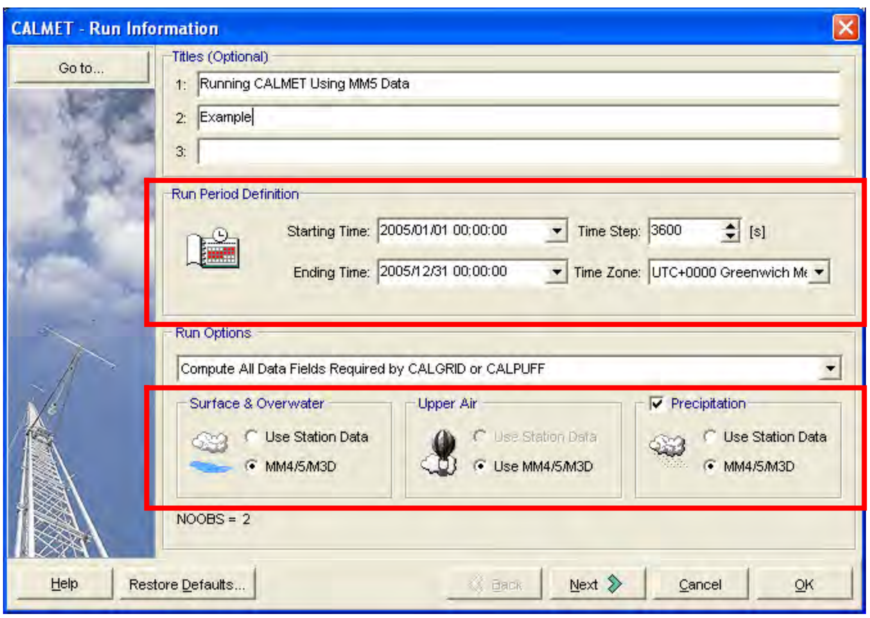
Using MM5 Data to Run CALMET Using the CALPUFF View Interface

See below instructions on how to setup CALMET to run MM5 data. Please note that these instructions are based on CALMET Model Version 6 options.

CALMET – Run Information Screen

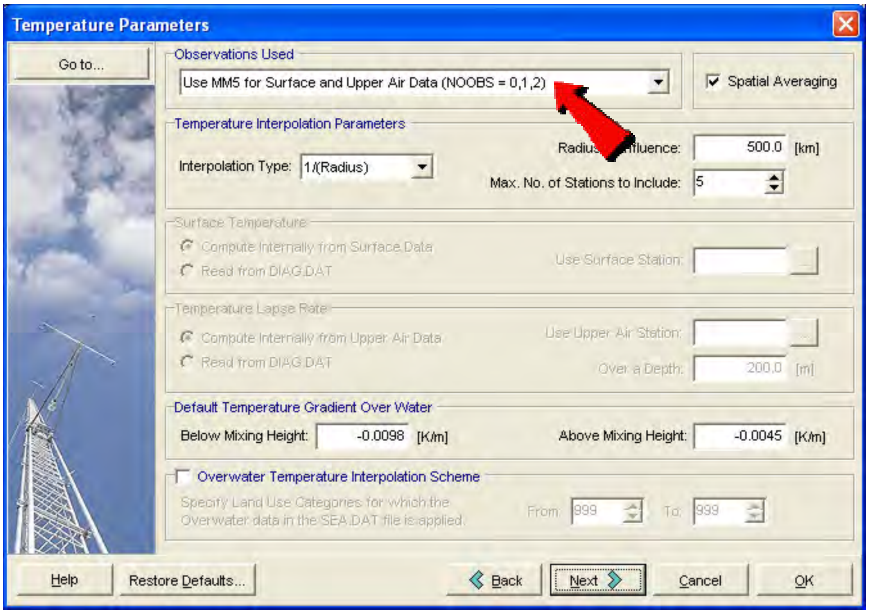
Starting Time: Specify the start time for the MM5 data you want to run
Ending Time: Specify the end time for the MM5 data you want to run
Time Zone: specify the time zone for your modeling area

Select the option **MM4/5M3D** for Surface & Overwater, Upper Air, and Precipitation options.



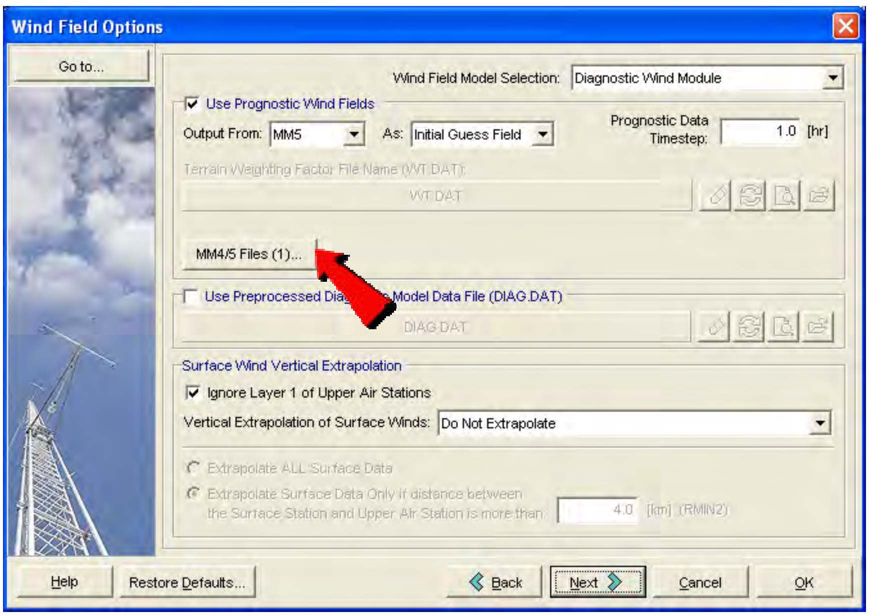
CALMET – Temperature Parameters Screen

Observations Used: Select Use "MM5 for Surface and Upper Air Data (NOOBS = 0,1,2) "



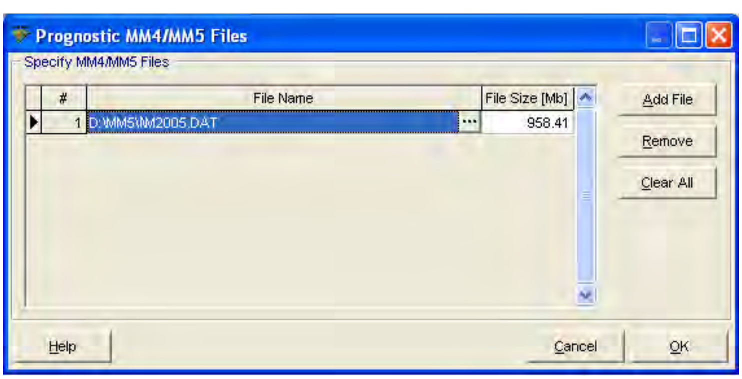
CALMET – Wind Field Options Screen

Wind Field Model Selection: select "Diagnostic Wind Module"
Use Prognostic Wind Fields: check this option
Output From: select "MM5"
As: select "Initial Guess Field"
Ignore Layer 1 of Upper Air Stations: Check this option
Vertical Extrapolation of Surface Winds: select "Do Not Extrapolate"



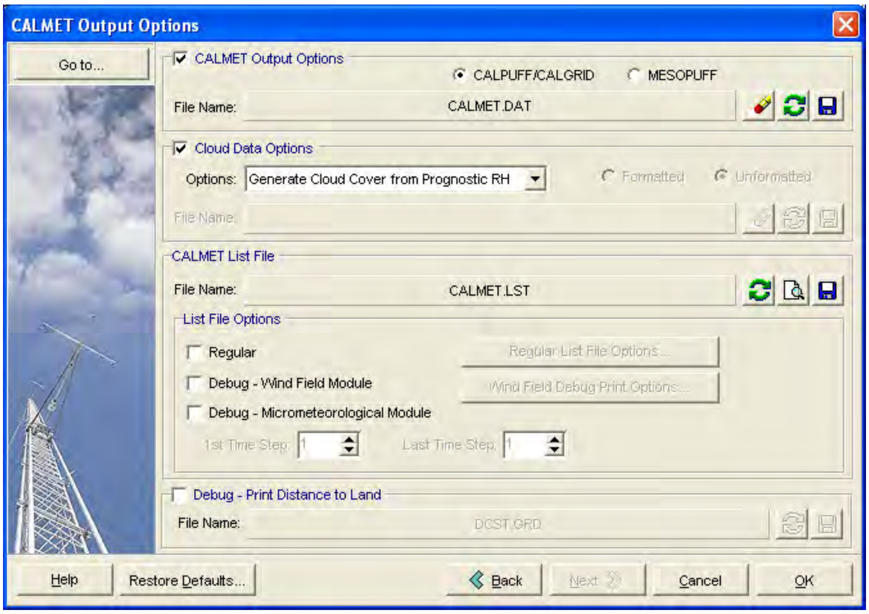
Press the **MM4/5 Files** button (

) and specify in this screen your MM5 data file(s).



CALMET – CALMET Output Options Screen

Cloud Data Options: select this option
Options: select "Generate Cloud Cover from Prognostic RH". RH stands for relative humidity.



MM5 INFORMATION

Tecsult - Shefferville, Quebec

1 Scope

1.1 Overview

This document is intended to provide some additional detail about the MM5 run for Shefferville, Québec ordered by Tecsult Inc.

2 Referenced Documents

AERMET_MM5_Shefferville_Quebec_2004-2008_Readme.pdf

3 Document History

DATE	VERSION	AUTHOR	DESCRIPTION
26-Mar-2009	0.1	Ryan Freedman	Initial Draft

4 MM5 Information

4.1 Global Reanalysis Data and Met Stations

MM5 cannot directly use conventional meteorological data from airport reports. Instead, the model uses objective analysis of global weather reports. Objective analysis is a process of analyzing the observed data and outputting them into a regular grid. The meteorological field is "balanced" to take account of the energy and momentum equations of the atmosphere. These objective analyses are products of global models, which are maintained by national weather centers or federal agencies such as UKMO (United Kingdom Meteorological Office) or NCEP (National Center for Environmental Protection).

MM5 runs at Lakes Environmental use NCEP Global Reanalysis as initialization input to MM5, with available data covering 1999 to 2008. The NCEP reanalysis has a resolution of 2.5 degrees by 2.5 degrees for the entire globe, given at every 6 hour interval. For further details, please refer to the website: http://dss.ucar.edu/datasets/ds090.0/.

Figure 1 on the following page displays the MM5 stations used for the Tecsult Inc. *Shefferville, Québec* run.

Note that the final model output is not the direct data from these stations. The global reanalysis data is used as a first guess in the modeling and to guide the model. Any model requires input data of some sort to initialize the model, but the output which comes out of the MM5 run is modeled data and not observational. This distinction is important.

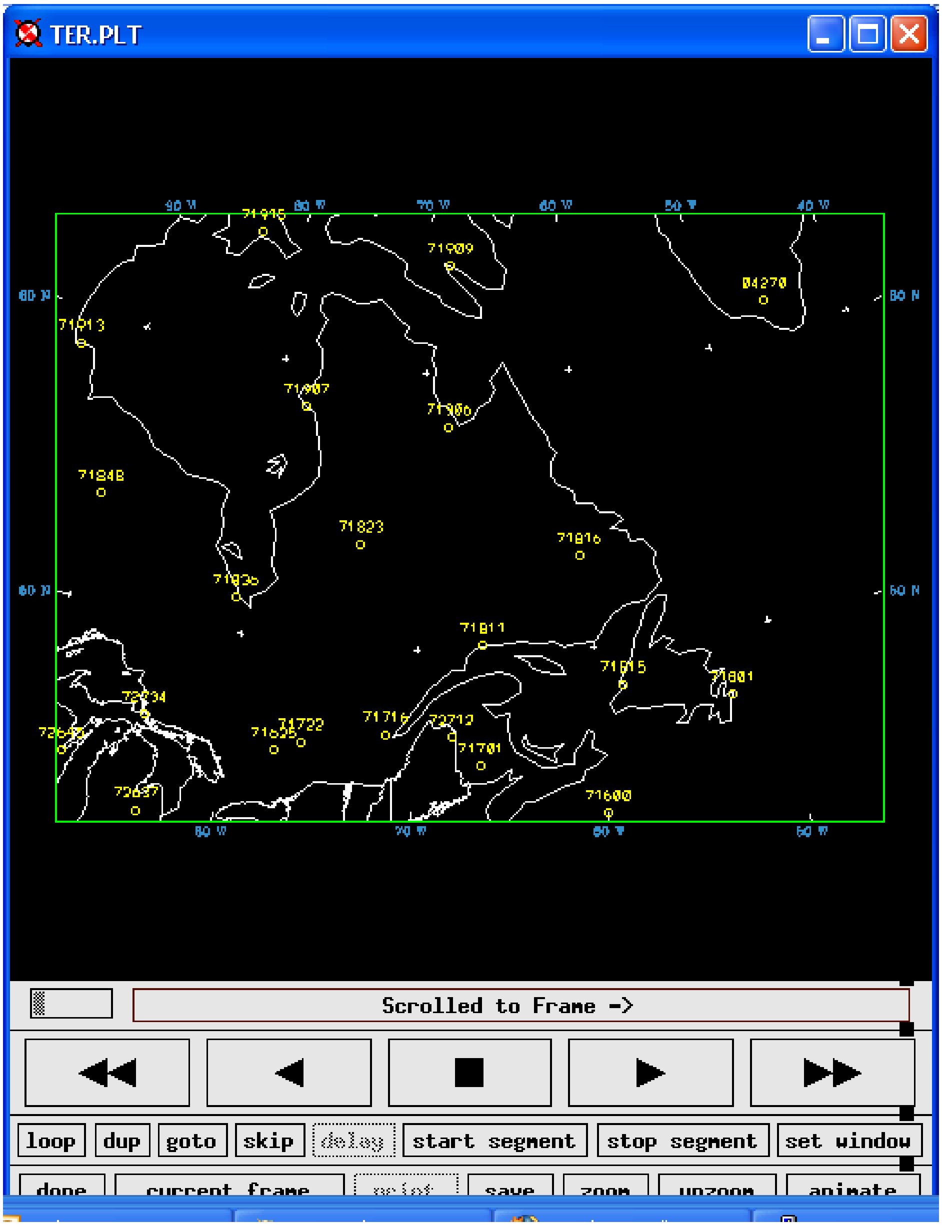


Figure 1: Global Reanalysis Met Stations Used for the Shefferville, Québec MM5 Run.

4.2 Modeling Domain

Figure 2 displays the modeling domains used for the Shefferville, Québec MM5 run. The processing uses a three-domain nested grid. The three domains used are shown in the figure. The data point in each grid become more densely packed as the domain size decreases from the outer, coarse grid to the denser, final grid in the center.

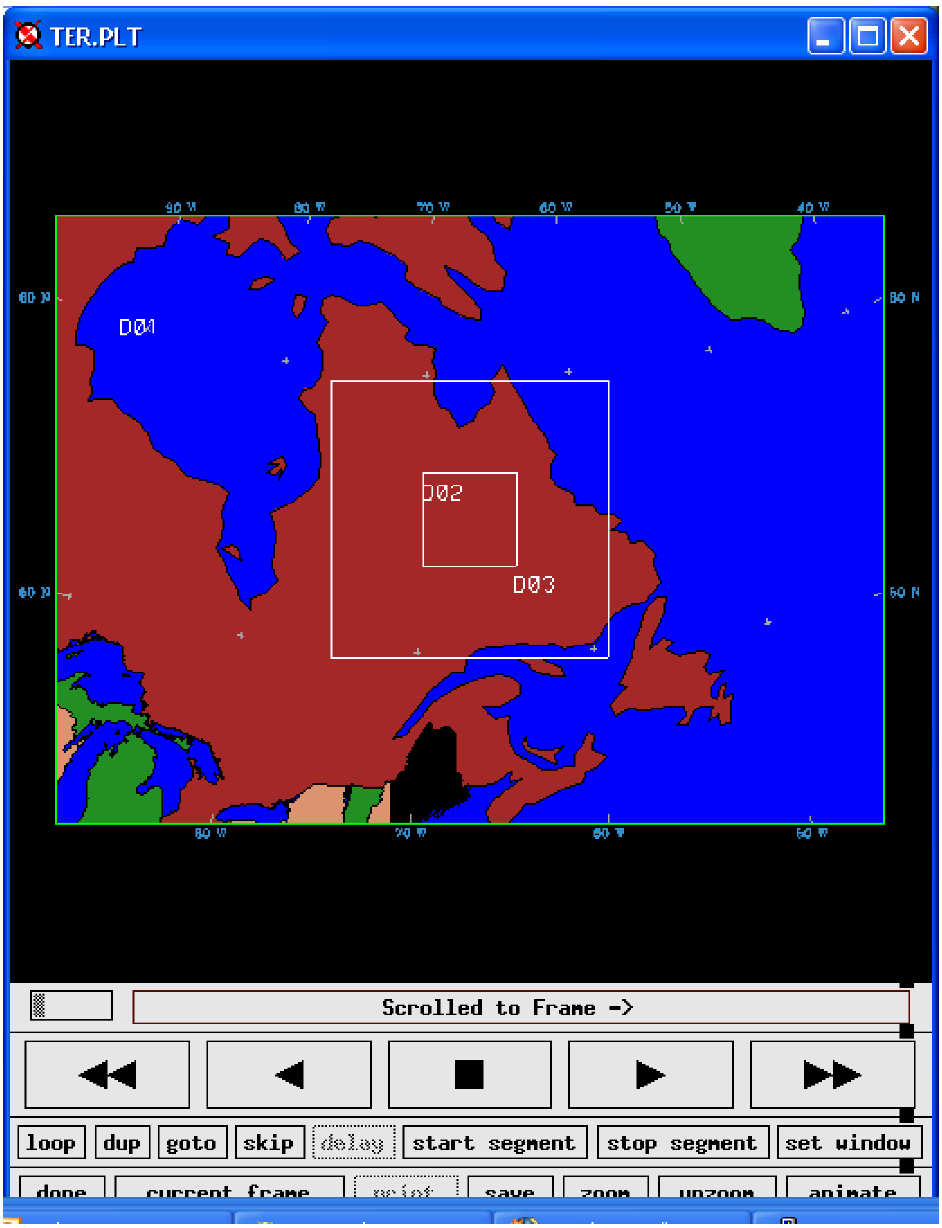


Figure 2: Modeling Domains Used for the Shefferville, Québec MM5 Run

4.3 Terrain Elevations

Figure 3 displays the terrain elevations for the innermost domain used in the Shefferville, Québec MM5 run. The central point of the MM5 run is at the center of this image.

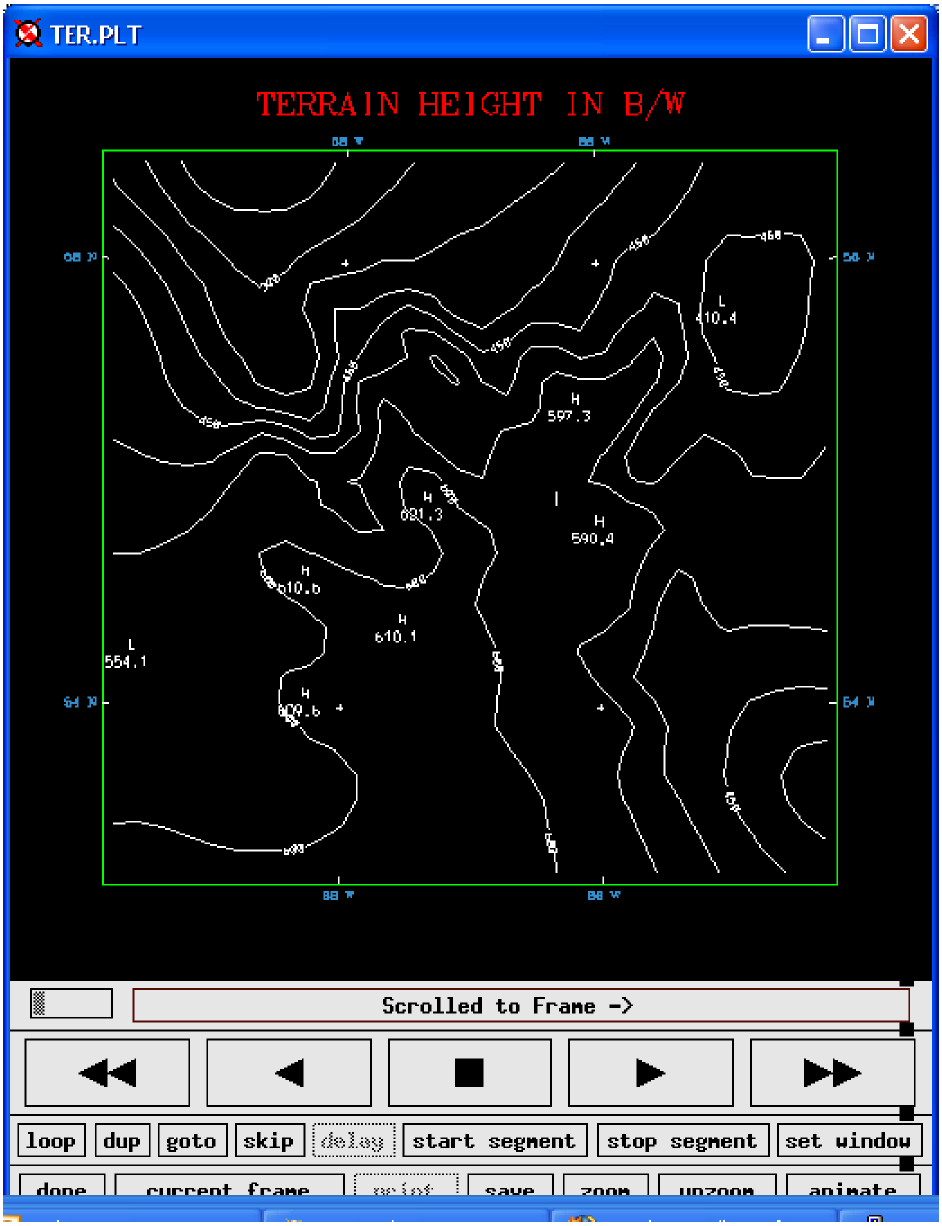


Figure 3: Terrain Elevations for the Shefferville, Québec MM5 Run

Appendix E
CALMET Land Use Grid
(ZIP file available electronically)

Appendix F
CALPUFF Input Files and CALPOST Input-Output Files (ZIP file available electronically)

Appendix G
Copy of Memo to CEAA on background ambient air concentrations

1 INTRODUCTION

a) This memo provides additional information on available in-situ ambient air monitoring data in the Labrador region

b) This information covers some aspects raised in CEAA IR# 70, 71, 74 and 77 which refer to background air concentrations, generic vs in-situ monitoring data.

c) This information complements a recent phone discussion (May 22, 2015) with CEAA/EC/HC on background air concentrations, generic vs in-situ monitoring data.

2 AVAILABLE DATA

Three tables were prepared for discussion and are appended to this memo. Each table contents is described below:

Table 1: Ambient air quality standards for NL and QC

Background concentrations used in the draft Howse EIS report submitted to CEAA

Provincial "Generic" background concentrations

Selected background concentrations for the Howse EIS report

Table 2: In-situ monitoring data in the Labrador region

i. Howells River, NL. 2006. For LabMag Iron Ore Project (New Millenium Corp.).
ii. Emeril, NL. 2006. For LabMag Iron Ore Project (New Millenium Corp.).
iii. Silver Yards, NL. 2008. For Labrador Iron Mines Ltd.
iv. Wabush, NL. 2011. For Kami Alderon.

Documents i) and ii) are not publicly available and are attached to this memo (separate email). The documents iii) and iv) are available on the web and the related websites are listed below the table.

Table 3: Background concentrations used in Air Quality Modeling sections of the Environmental Impact Assessments in the Labrador region

Table 4: Comparison of weighted average in-situ monitoring data to QC Nordic default concentrations

3 DISCUSSION OF DATA

a) (Ref. Table 1) After the draft Howse EIS was submitted in January 2015, QC published guidelines for air dispersion modeling studies for Mining Projects. These guidelines contained a “default” background concentrations list specifically for mining projects in Nordic regions, away from other industrial sources. These “default” Nordic background concentrations are typically lower than those used in southern Quebec.

b) (Ref. Table 1, Table 2 and table 4) Maximum in-situ monitoring data is generally in good agreement with QC Nordic “default” data.

c) (Ref. Table 2) Air dispersion modeling of metals was not conducted in any of the EIS we reviewed for Projects in the Labrador region.

d) A Google Map showing the locations of the four (4) monitoring studies listed in Table 2 is available here: https://www.google.com/maps/d/edit?mid=zGkcy5Zu18Go.kwt-FHitDrqY&usp=sharing

e) (Ref. Table 2) Two studies were conducted in 2006 by New Millenium Corp. (TSMC owns a part of this company). The Howells River monitoring site is located in close proximity to the TSMC DSO3 area, while the Emeril monitoring site is located closer to Labrador City. These two studies were conducted using the same methodologies and equipment and are good representation of background concentrations in the region. Consequently, they were retained for further analysis.

f) (Ref. Table 2) For the Schefferville Iron Ore Mine project by Labrador Iron Mines Ltd., in-situ air monitoring was conducted from September to November 2008 and the summary results are presented in Table 2 under the Silver Yards header. However, the monitored concentration values were not used in the air dispersion modeling study conducted for the EIS report; instead default background concentrations provided by the province of NL were used. In addition, the reported min, max and avg monitoring data for Sb and As are identical. This indicates results were below detection limit. We also note that the detection limits were high. Consequently we did not retain the metals data from this site for further review.

g) (Ref. Table 2) For the Kami Alderon Project, in-situ ambient air monitoring was conducted in July 2011 for $PM_{2.5}$ and TPM at three (3) sites (Fermont, Wabush and Duley Lake). The Fermont and Wabush sites were located at residential properties and therefore not considered further in this memo. The Duley Lake monitoring site is located away from the towns and approximately 200 km from Schefferville. This site was located in the vicinity of iron mining towns, but far enough from the towns that it is reasonable to expect that resident activities did not affect the results. Due to similarities with the Schefferville region, results from the Duley site were retained for further analysis.

h) For the Kami Alderon Project, two air dispersion modeling studies were prepared: one for NL and another for QC. Each study covered the CACs emissions only (TSP, PM_{10}, $PM_{2.5}$, SO_2, NO_2, CO). For the NL study, background concentrations were not added to the modelled concentrations (which is typical of air modeling studies conducted for regulatory purposes in NL). However, for the QC study, default background concentrations provided by the Government of QC were added to the modelled concentrations; in-situ air monitoring data was not used.

4 APPLICABILITY TO HOWSE'S EIS AND CONCLUSIONS

a) Air modeling results in the draft version of Howse EIS report indicate that dust (TPM, PM_{10} and $PM_{2.5}$) and NO_2 are the predominant air pollutants from the mining activities at the TSMC's DSO Complex.

b) Available in-situ air monitoring data in the region indicates low background concentrations of pollutants.

c) The Nordic default background concentrations recently issued by the government of QC are in good agreement with the available in-situ monitoring data. Table 4 provides a comparison of the weighted average in-situ results to the Nordic default values. As can be seen, there is good agreement between the 2 sets of data.

d) Conducting in-situ air monitoring in summer 2015 for the purpose of the Howse EIS is of limited value for the following reasons:

- Timing constraints
- Various parameters such as wind speed, rain, seasonal changes, sampler location, accessibility, equipment problems, etc. can affect ambient air monitoring results. For the data to be meaningful and representative, longer term monitoring is required.
- Available in-situ air monitoring data in the region is in good agreement with the Nordic generic background concentrations data published by the government of QC. Consequently, QC Nordic default background concentrations can be considered as reasonable values to use in the Howse EIS.

e) By way of the modeling approach used in the Howse EIS study and described in a memo provided prior to the phone discussion with the CEAA on May 22, 2015 , we believe the effects of the project will be adequately captured and analyzed, while meeting the Howse Property EIS Guidelines objectives. A summary of the modeling approach is presented in the box next page:

To conservatively predict the resulting ambient air concentrations in the region once the Howse Project is in operation, inputs to the air model included:

	Background concentrations (as described in this memo)	(1)
+	Concentrations due to Emissions from DSO3 operations (see list of sources in ADMR Section 2.4.1)	(2)
+	Concentrations due to Emissions from ore hauling from the DSO4 (on the section of Goodwood road within the air quality modeling perimeter)	(3)
+	Concentrations due to emissions from Other Projects in operation in the LSA	(4)
+	Concentrations due to Emissions from Howse operations	(5)
=	Total ambient air concentrations reported in the EIS : (1) + (2) + (3) + (4) + (5)	

Using the same elements of the equation, existing conditions prior to the start of Howse construction = (1) + (2) + (3) + (4).

From a technical dispersion modeling standpoint, elements (2) and (3) have always been combined.

f) TSMC has committed to implement an Air Quality Monitoring Program (AQMP) covering the whole DSO complex area during the summer of 2015. This AQMP is currently under discussion/review by the governments of QC and NL.

g) For the Howse dispersion modeling study to be submitted to the CEAA, replace the background concentrations used in the draft EIS report by the values shown in the table next page.

Background Concentrations for Howse EIS

Pollutant	Averaging Period	Air Quality Standards		Background Concentrations to be used in Howse EIS	
		NL	QC		
		($\mu g/m^3$)	($\mu g/m^3$)	($\mu g/m^3$)	Source
TPM	1 yr	60	70	8	(b)
	24 hr	120	120	40	(a)
	1 hr	--	--	97	(b)
PM_{10}	24 hr	50	--	20	(c)
	1 hr	--	--	49	(b)
$PM_{2.5}$	24 hr	25	30	15	(a)
	1 hr	--	--	37	(b)
SO_2	1 yr	60	52	2	(a)
	24 hr	300	288	10	(a)
	3 hr	600	--	18	(b)
	1 hr	900	--	24	(b)
NO_2	1 yr	100	103	10	(a)
	24 hr	200	207	30	(a)
	1 hr	400	414	50	(a)
CO	8 hr	15 000	15 000	400	(a)
	1 hr	35 000	34 000	600	(a)
Metals					
Antimony (Sb)	1 yr	--	0.17	0.001	(a)
Arsenic (As)	1 yr	--	0.003	0.002	(a)
	24 hr	0.3	--	0.0004	(b)
Barium (Ba)	1 yr	--	0.05	0.02	(a)
Beryllium (Be)	1 yr	--	0.0004	0	(a)
Cadmium (Cd)	1 yr	--	0.0036	0.0005	(a)
	24 hr	2	--	0.0001	(b)
Chromium (Cr)	1 yr		0.004	0.002	(a)
Copper (Cu)	24 hr	50	2.5	0.2	(a)
Lead (Pb)	1 yr	--	0.1	0.004	(a)
	30 days	0.7	--	0.0081	(b)
	24 hr	2	--	0.0008	(b)
Mercury (Hg)	1 yr	--	0.005	0.002	(a)
	24 hr	2	--	0.0004	(b)
Nickel (Ni)	24 hr	2	0.014	0.002	(a)
Silver (Ag)	1 yr	--	0.23	0.005	(a)
Thallium (Tl)	1 yr	--	0.25	0.005	(a)
Vanadium (V)	1 yr	--	1	0.01	(a)
	24 hr	2	--	0.002	(b)
Zinc	24 hr	120	2.5	0.1	(a)

(a) Quebec Nordic background concentrations: http://www.mddelcc.gouv.qc.ca/air/criteres/instructions-secteur-minier.pdf
(b) Conversion to other averaging times based on Ontario MOE formula: $C1 = C2 \times (t2/t1)^p$, where p = 0.28. Examples: $C_{1yr} = C_{24hr} \times 0.2$; $C_{1hr} = C_{24hr} \times 2.43$; $C_{3hrs} = C_{24hr} \times 1.79$; etc…
(c) Estimation based on background concentrations for TPM and $PM_{2.5}$

Table 1

Air Quality Standards & "Generic" Background Concentrations in Howse EIS and Provided by Provinces

Pollutant	Averaging Period	Air quality standards		Background Concentrations Used in draft Howse EIS January 2015		Background Concentrations provided by provinces			Selected for Howse EIS
		NL(9)	QC(10)	NL Receptors	QC Receptors	NL(1)	QC(2) RAA	QC(5) Nordique	
		(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)
TPM	1 yr	60	--	15	15	15	--	--	8
	24 hr	120	120	15	90	15	90	40	40
	1 hr	--	--	15	15	15	--	--	97
PM_{10}	24 hr	50	--	10	10	10	--	--	20
	1 hr	--	--	10	10	10	--	--	49
$PM_{2.5}$	24 hr	25	30	5	5	5	20	15	15
	1 hr	--	--	5	5	5	--	--	37
SO_2	1 yr	60	52	5	20	5	20	2	2
	24 hr	300	288	5	50	5	50	10	10
	3 hr	600	--	5	5	5	--	--	18
	1 hr	900	--	5	5	5	--	--	24
NO_2	1 yr	100	103	3.8	30	3.8	30	10	10
	24 hr	200	207	3.8	100	3.8	100	30	30
	1 hr	400	414	3.8	150	3.8	150	50	50
CO	8 hr	15 000	15 000	114	1 750	114	1 750	400	400
	1 hr	35 000	34 000	114	2 650	114	2 650	600	600

Pollutant	Averaging Period	Air quality standards		Background Concentrations Used in draft Howse EIS January 2015		Background Concentrations provided by provinces			Selected for Howse EIS
		NL(9)	QC(10)	NL Receptors	QC Receptors	NL(1)	QC(2) RAA	QC(5) Nordique	
		(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)
Antimony (Sb)	1 yr	--	0.17	Not Included in Draft Howse EIS			0.007	0.001	0.001
Arsenic (As)	1 yr	--	0.003				0.002	0.002	0.002
	24 hr	0.3	--				--	--	0.0004
Barium (Ba)	1 yr	--	0.05				0.025	0.02	0.02
Beryllium (Be)	1 yr	--	0.0004				0	0	0
Cadmium (Cd)	1 yr	--	0.0036				0.003	0.0005	0.0005
	24 hr	2	--				--	--	0.0001
Chromium (Cr)	1 yr		0.004				0.002	0.002	0.002
Copper (Cu)	24 hr	50	2.5				0.2	0.2	0.2
Lead (Pb)	1 yr	--	0.1				0.025	0.004	0.004
	30 days	0.7	--				--	--	0.0081
	24 hr	2	--				--	--	0.0008
Mercury (Hg)	1 yr	--	0.005				0.002	0.002	0.002
	24 hr	2	--				--	--	0.0004
Nickel (Ni)	24 hr	2	0.014				0.002	0.002	0.002
Silver (Ag)	1 yr	--	0.23				0.005	0.005	0.005
Thallium (Tl)	1 yr	--	0.25				0.05	0.005	0.005
Vanadium (V)	1 yr	--	1				0.01	0.01	0.01
	24 hr	2	--				--	--	0.002
Zinc	24 hr	120	2.5				0.1	0.1	0.1

(1) Reference: GNL, 2009 - To be confirmed

(2) http://www.mddelcc.gouv.qc.ca/air/atmosphere/raa.htm

(3) Table 4.15, DSO Project 2A (Goodwood, Leroy, Sunny 1 and Kivivik 3S Deposits), Impact Statement submitted to Government of Québec, August 2010

(4) Section 3.3.1 of the Howse project description document, in-situ air monitoring conducted in 2006. Monitoring reports not public but available upon request

(5) http://www.mddelcc.gouv.qc.ca/air/criteres/instructions-secteur-minier.pdf

(6) http://www.env.gov.nl.ca/env/env_assessment/projects/Y2010/1379/1379_revised_eis.pdf

Note: For LIM, Ambent air monitroing conducted at Silver Yards, but generic NL background concentrations used

(7) http://www.env.gov.nl.ca/env/env_assessment/projects/Y2013/1711/1711_a4%20_w3_air_qual_clim.pdf

(8) http://www.env.gov.nl.ca/env/env_assessment/projects/Y2011/1611/Kami_EIS_Volume_1_Appendix_F.pdf

(9) http://www.env.gov.nl.ca/env/env_protection/science/gd_ppd_009_4.pdf

(10) http://www.mddelcc.gouv.qc.ca/air/criteres/

(11) http://www.env.gov.nl.ca/env/env_assessment/projects/Y2010/1380/

Table 2
In-Situ Air Monitoring Data in the Labrador Region

Pollutant	Averaging Period	In-situ monitoring[4] New Millenium Corp. Howells River, NL - 2006			In-situ monitoring[4] New Millenium Corp. Emeril, NL - 2006			In-situ monitoring[6] Labrador Iron Mine Ltd Silver Yards, NL - 2008			In-situ monitoring [8] Kami Alderon Wabush, NL - 2011			In-situ monitoring [7] IOC Wabush / Labrador City
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	
		$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$
TPM	1 yr													IOC and Wabush Mines operate an ambient air quality monitoring programs with monitoring stations located in residential areas in Labrador City and Wabush. A total of nine monitoring sites. Monitored parameters and frequency vary depending on site and include: TPM, PM2.5, SO2 and NO2. Monitoring locations are located in the towns and data are not representative of TSMC DSO site and therefore, cannot be used in the Howse EIS.
	24 hr	7.90	0.6	35.9	8.28	0.5	51.1	21.00	10.0	42.0				
	1 hr													
PM_{10}	24 hr										7.0	0.0	33.0	
	1 hr													
$PM_{2.5}$	24 hr	4	1	7	4	2	10				4.3	0.0	13.0	
	1 hr	4	0	26	4	0	20							
SO_2	1 yr													
	24 hr													
	3 hr													
	1 hr													
NO_2	1 yr													
	24 hr													
	1 hr													
CO	8 hr													
	1 hr													
	# of samples	10			18			8			Dudley Lake site only. 12 summer samples.			

PM2.5 was continuous monitoring (TEOM). 2 months at Howells River and 5 months at Emeril.

Pollutant	Averaging Period	In-situ monitoring[4] New Millenium Corp. Howells River, NL - 2006			In-situ monitoring[4] New Millenium Corp. Emeril, NL - 2006			In-situ monitoring[6] Labrador Iron Mine Ltd Silver Yards, NL - 2008			In-situ monitoring [8] Kami Alderon Wabush, NL - 2011			In-situ monitoring [7] IOC Wabush / Labrador City
		Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	
		$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$	$(\mu g/m^3)$
Antimony (Sb)	1 yr							0.03	0.03	0.03	In EIS documents, no metals included in air monitoring nor air modeling			In EIS documents, no metals included in air monitoring nor air modeling
Arsenic (As)	1 yr													
	24 hr	0.000229	0.000105	0.00083	0.00012	0.00011	0.00013	0.02	0.02	0.02				
Barium (Ba)	1 yr													
Beryllium (Be)	1 yr	0.000017	0.0000105	0.0000335	0.000012	0.000011	0.000013							
Cadmium (Cd)	1 yr													
	24 hr	0.000082	0.000055	0.00014	0.00007	0.00006	0.00020							
Chromium (Cr)	1 yr	0.0027	0.0016	0.0053	0.0029	0.0013	0.014							
Copper (Cu)	24 hr													
Lead (Pb)	1 yr													
	30 days													
	24 hr	0.001705	0.00055	0.0034	0.0009	0.0006	0.0016							
Mercury (Hg)	1 yr													
	24 hr	0.000093	0.000007	0.00016	0.00008	0.00001	0.00053							
Nickel (Ni)	24 hr	0.034543	0.00074	0.32	0.00280	0.00095	0.00750							
Silver (Ag)	1 yr													
Thallium (Tl)	1 yr													
Vanadium (V)	1 yr													
	24 hr	0.000735	0.00055	0.00115	0.0006	0.0006	0.0007							
Zinc	24 hr	0.01996	0.0064	0.057	0.009	0.0055	0.014							

All are 24-hr averages. Half detection limits used in the calculations.

Other metals analyzed, but not in our list

(1) Reference: GNL, 2009
(2) http://www.mddelcc.gouv.qc.ca/air/atmosphere/raa.htm
(3) Table 4.15, DSO Project 2A (Goodwood, Leroy, Sunny 1 and Kivivik 3S Deposits), Impact Statement submitted to Government of Québec, August 2010
(4) Section 3.3.1 of the Howse project description document, in-situ air monitoring conducted in 2006. Monitoring reports not public but available upon request
(5) http://www.mddelcc.gouv.qc.ca/air/criteres/instructions-secteur-minier.pdf
(6) http://www.env.gov.nl.ca/env/env_assessment/projects/Y2010/1379/1379_revised_eis.pdf
Note: For LIM, Ambient air monitroing conducted at Silver Yards, but generic NL background concentrations used
(7) http://www.env.gov.nl.ca/env/env_assessment/projects/Y2013/1711/1711_a4%20_w3_air_qual_clim.pdf
(8) http://www.env.gov.nl.ca/env/env_assessment/projects/Y2011/1611/Kami_EIS_Volume_1_Appendix_F.pdf
(9) http://www.env.gov.nl.ca/env/env_protection/science/gd_ppd_009_4.pdf
(10) http://www.mddelcc.gouv.qc.ca/air/criteres/
(11) http://www.env.gov.nl.ca/env/env_assessment/projects/Y2010/1380/

Table 3
Background Concentrations used in Envrionmental Impact Assessments in the Labrador Region

Pollutant	Averaging Period	New Millenium Corp. DSO Project 2A[3] 2010 Goodwood / Sunny, QC	New Millenium Corp. Elross Lake Area IOM[11] 2009 Elross Lake, NL	Labrador Iron Mine Ltd Schefferville Area LIM 2009 [6]	In-situ monitoring [8] Kami Alderon Wabush, NL - 2011	
					QC side	NL Side
		(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)
TPM	1 yr	15	15	15	--	0
	24 hr	49	15	15	90	0
	1 hr	--	15	15	--	0
PM_{10}	24 hr	--	10	10	--	0
	1 hr	--	10	10	--	0
$PM_{2.5}$	24 hr	16	5	5	20	0
	1 hr	--	5	5	--	0
SO_2	1 yr	5	5	5	50	0
	24 hr	16	5	5	20	0
	3 hr	--	5	5	--	0
	1 hr	31	5	5	--	0
NO_2	1 yr	3.8	3.8	3.8	30	0
	24 hr	12	3.8	3.8	100	0
	1 hr	23	3.8	3.8	150	0
CO	8 hr	700	114	114	1750	0
	1 hr	462	114	114	2650	0
	EIA Submitted to	**QC Government**	**NL Government**	**NL Government**	**QC Government**	**NL Government**
					Under CEAA umbrella	

Pollutant	Averaging Period	New Millenium Corp. DSO Project 2A[3] Goodwood / Sunny, QC	New Millenium Corp. Elross Lake Area IOM[11] 2009 Elross Lake, NL	Labrador Iron Mine Ltd Schefferville Area LIM 2009 [6]	In-situ monitoring [8] Kami Alderon Wabush, NL - 2011	
					QC side	NL Side
		(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)	(µg/m³)
Antimony (Sb)	1 yr	**In EIS documents, no metals included in air modeling**	**In EIS documents, no metals included in air modeling**	**In EIS documents, no metals included in air modeling**	**In EIS documents, no metals included in air modeling**	**In EIS documents, no metals included in air modeling**
Arsenic (As)	1 yr					
	24 hr					
Barium (Ba)	1 yr					
Beryllium (Be)	1 yr					
Cadmium (Cd)	1 yr					
	24 hr					
Chromium (Cr)	1 yr					
Copper (Cu)	24 hr					
Lead (Pb)	1 yr					
	30 days					
	24 hr					
Mercury (Hg)	1 yr					
	24 hr					
Nickel (Ni)	24 hr					
Silver (Ag)	1 yr					
Thallium (Tl)	1 yr					
Vanadium (V)	1 yr					
	24 hr					
Zinc	24 hr					

(1) Reference: GNL, 2009
(2) http://www.mddelcc.gouv.qc.ca/air/atmosphere/raa.htm
(3) Table 4.15, DSO Project 2A (Goodwood, Leroy, Sunny 1 and Kivivik 3S Deposits), Impact Statement submitted to Government of Québec, August 2010
(4) Section 3.3.1 of the Howse project description document, in-situ air monitoring conducted in 2006. Monitoring reports not public but available upon request
(5) http://www.mddelcc.gouv.qc.ca/air/criteres/instructions-secteur-minier.pdf
(6) http://www.env.gov.nl.ca/env/env_assessment/projects/Y2010/1379/1379_revised_eis.pdf
Note: For LIM, Ambient air monitroing conducted at Silver Yards, but generic NL background concentrations used
(7) http://www.env.gov.nl.ca/env/env_assessment/projects/Y2013/1711/1711_a4%20_w3_air_qual_clim.pdf
(8) http://www.env.gov.nl.ca/env/env_assessment/projects/Y2011/1611/Kami_EIS_Volume_1_Appendix_F.pdf
(9) http://www.env.gov.nl.ca/env/env_protection/science/gd_ppd_009_4.pdf
(10) http://www.mddelcc.gouv.qc.ca/air/criteres/
(11) http://www.env.gov.nl.ca/env/env_assessment/projects/Y2010/1380/

Table 4

Comparison : In-Situ Air Monitoring Data to Quebec Default Background Concentrations for Nordic Regions

Pollutant	Averaging Period	QC(5) Nordic Default	Weighted average - In-situ monitoring data			Selected for Howse EIS*
			Avg	Min	Max	
		(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)
TPM	1 yr	--				8
	24 hr	40	11.0	2.6	44.9	40
	1 hr	--				97
PM_{10}	24 hr	--	7.0	0.0	33.0	20
	1 hr	--				49
$PM_{2.5}$	24 hr	15	4.1	1.2	10.2	15
	1 hr	--	4.0	0.0	21.7	37
SO_2	1 yr	2				2
	24 hr	10				10
	3 hr	--				18
	1 hr	--				24
NO_2	1 yr	10				10
	24 hr	30				30
	1 hr	50				50
CO	8 hr	400				400
	1 hr	600				600

Pollutant	Averaging Period	QC(5) Nordic Default	Weighted average - In-situ monitoring data			Selected for Howse EIS*
			Avg	Min	Max	
		(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)	(µg/m^3)
Antimony (Sb)	1 yr	0.001				0.001
Arsenic (As)	1 yr	0.002				0.002
	24 hr	--	0.00015	0.00011	0.00033	0.0004
Barium (Ba)	1 yr	0.02				0.02
Beryllium (Be)	1 yr	0				0
	24 hr	--	0.00001	0.00001	0.00002	0
Cadmium (Cd)	1 yr	0.0005				0.0005
	24 hr	--	0.00008	0.00006	0.00018	0.0001
Chromium (Cr)	1 yr	0.002				0.002
	24 hr	--	0.00288	0.00139	0.01151	0.0004
Copper (Cu)	24 hr	0.2				0.2
Lead (Pb)	1 yr	0.004				0.004
	30 days	--				0.0081
	24 hr	--	0.00112	0.00059	0.00211	0.0008
Mercury (Hg)	1 yr	0.002				0.002
	24 hr	--	0.00008	0.00001	0.00042	0.0004
Nickel (Ni)	24 hr	0.002	0.01187	0.00089	0.09679	0.002
Silver (Ag)	1 yr	0.005				0.005
Thallium (Tl)	1 yr	0.005				0.005
Vanadium (V)	1 yr	0.01				0.01
	24 hr	--	0.00064	0.00055	0.00079	0.002
Zinc	24 hr	0.1	0.01213	0.00576	0.02629	0.1

(5) http://www.mddelcc.gouv.qc.ca/air/criteres/instructions-secteur-minier.pdf

* Conversion to other averaging times based on Ontario MOE formula: $C1 = C2 \times (t2/t1)^p$, where p = 0.28. Examples: $C_{1yr} = C_{24hr} \times 0.2$; $C_{1hr} = C_{24hr} \times 2.43$, etc…

Appendix H
Soil Metal Analyses and calculations of ratios to apply to particulate modelling results

Report Number: A14-08392
Report Date: 10/12/2014

	Analyte Symbol	Litho Type /Texture	Type	Sb	Sb	As	As	Ba	Ba	Be	Be	Cd	Cd
	Unit Symbol			ppm	ppm	ppm	ppm	ppm	ppm	ppm	**ppm**	ppm	ppm
	Detection Limit			0.1	0.1	0.1	0.1	1	1	0.1	**0.1**	0.1	0.1
	Analysis Method			TD-MS	TD-MS	TD-MS	TD-MS	TD-MS	TD-MS	TD-MS	**TD-MS**	TD-MS	TD-MS
	HW-DD14-19 34.5 -	Blue/Sand	Ore	0.3	0.3	11.4	11.4	16	16	0.8	**0.8**	< 0.1	0.1
1	HW-DD14-19 52.5 -	Blue/Gravel-Sand	Ore	0.4	0.4	20.1	20.1	17	17	0.8	**0.8**	< 0.1	0.1
2	HW-DD14-21 157.5	Red-Blue/Gravel-Sand	Ore	0.2	0.2	12.1	12.1	12	12	1	**1**	< 0.1	0.1
3	HW-DD14-23 69.41	Blue/Sand-Gravel	Ore	0.3	0.3	49.6	49.6	28	28	4.6	**4.6**	< 0.1	0.1
4	HW-DD14-24 53.8 -	Red-Blue/Sand-Gravel	Ore	0.2	0.2	13.7	13.7	11	11	0.9	**0.9**	< 0.1	0.1
5	HW-DD14-24 81 - 8	Yellow/Gravel-Clay	Ore	0.2	0.2	35.6	35.6	8	8	1.6	**1.6**	< 0.1	0.1
6	HW-DD14-25 30.6 -	Blue/Gravel-Sand	Ore	0.4	0.4	41.3	41.3	21	21	1.5	**1.5**	< 0.1	0.1
7	HW-DD14-25 78.8 -	Blue/Sand-Gravel	Ore	0.2	0.2	23.1	23.1	13	13	1.1	**1.1**	< 0.1	0.1
8	HW-DD14-25 81.9 -	Yellow/Sand-Gravel	Ore	0.2	0.2	11.7	11.7	24	24	0.8	**0.8**	< 0.1	0.1
9	HW-DD14-26 43.8 -	Yellow-Red/Gravel-Clay	Ore	0.3	0.3	29.8	29.8	143	143	1.3	**1.3**	< 0.1	0.1
10	HW-DD14-26 57.1 -	Red/Clay	Ore	0.6	0.6	16.6	16.6	125	125	1	**1**	< 0.1	0.1
11	HW-DD14-27B 114.	Red/Clay	Ore	0.4	0.4	29.2	29.2	33	33	1.6	**1.6**	< 0.1	0.1
12	HW-DD14-28 35.28	Yellow-Red/Gravel-Clay	Ore	0.2	0.2	35.1	35.1	13	13	3.6	**3.6**	< 0.1	0.1
13	HW-DD14-28 67.5 -	Blue-Red/Gravel-Sand	Ore	0.1	0.1	23.7	23.7	96	96	1.4	**1.4**	< 0.1	0.1
14	HW-DD14-29 22.5 -	Blue-Yellow/Sand-Gravel	Ore	0.6	0.6	24.7	24.7	14	14	1.9	**1.9**	< 0.1	0.1
15	HW-DD14-29 35.5 -	Yellow/Sand-Gravel	Ore	0.2	0.2	13.4	13.4	10	10	2	**2**	< 0.1	0.1
16	HW-DD14-29 45 - 4	Red-Blue/Gravel-Sand	Ore	0.3	0.3	21.8	21.8	43	43	1.7	**1.7**	< 0.1	0.1
17	HW-DD14-29 69 - 7	Yellow-Red/Gravel-Clay	Ore	0.1	0.1	17.8	17.8	31	31	0.8	**0.8**	< 0.1	0.1
18	HW-DD14-29 81 - 8	Yellow-/Gravel-Clay	Ore	0.1	0.1	27.3	27.3	15	15	3	**3**	< 0.1	0.1
19	HW-DD14-29 84 - 8	Blue/Gravel-Sand	Ore	0.5	0.5	49.3	49.3	62	62	2	**2**	< 0.1	0.1
20	HW-DD14-29 106.5	Red-Blue/Gravel-Sand	Ore	0.3	0.3	30.6	30.6	19	19	1.3	**1.3**	< 0.1	0.1
21	HW-DD14-29 118.5	yellow	Ore	0.2	0.2	37.9	37.9	32	32	2.3	**2.3**	< 0.1	0.1
22	HW-DD14-30 31.6 -	Blue/Sand-Gravel	Ore	0.3	0.3	13.9	13.9	32	32	2.2	**2.2**	< 0.1	0.1
23	HW-DD14-30 50.2 -	Blue-Red/Gravel-Clay	Ore	0.4	0.4	38	38	17	17	1.4	**1.4**	< 0.1	0.1
24	HW-DD14-31 28.5 -	Red-Blue/Gravel-Sand	Ore	0.2	0.2	16.3	16.3	17	17	1.4	**1.4**	< 0.1	0.1
25	HW-DD14-31 66 - 6	B/R	Ore	< 0.1	0.1	7.1	7.1	3	3	0.9	**0.9**	< 0.1	0.1
26	HW-DD14-31 70.5 -	Red/Gravel-Sand	Ore	0.4	0.4	60.1	60.1	51	51	3.1	**3.1**	< 0.1	0.1
27	HW-DD14-32 52.5 -	R/Y	Ore	0.3	0.3	108	108	47	47	2.5	**2.5**	< 0.1	0.1
28	HW-DD14-32 84 - 8	B/Y/R	Ore	0.4	0.4	22.3	22.3	59	59	2.3	**2.3**	< 0.1	0.1
29	HW-DD14-33 33 - 3	Red/Gravel-Sand	Ore	0.2	0.2	27.6	27.6	10	10	1.1	**1.1**	< 0.1	0.1
30	HW-DD14-34 64.5 -	B/R GRAVEL CLAY	Ore	0.2	0.2	19.2	19.2	8	8	0.6	**0.6**	< 0.1	0.1
	HW-DD14-19 70.5 -	Waste/Gravel(solid core)	Waste	0.1	0.1	17.4	17.4	10	10	1.8	**1.8**	< 0.1	0.1
	HW-DD14-34 18.3 -	OB	OB	0.3	0.3	20.4	20.4	166	166	1.3	**1.3**	< 0.1	0.1
	HW-DD14-29 12 - 1	OB	OB	0.5	0.5	8.3	8.3	427	427	1.7	**1.7**	0.2	0.2
	HW-DD14-31 15 - 1	OB	OB	0.9	0.9	14.5	14.5	455	455	0.74	**0.74**	0.2	0.2

Analyte Symbol	Cr	Cr	Cu	Cu	Pb	Pb	Hg	Hg	Ni	Ni	Ag	Ag	Tl	Tl	V	V	Zn	Zn
Unit Symbol	ppm	ppm	ppm	ppm	ppm	ppm	ppb	ppb	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
Detection Limit	0.5	0.5	0.2	0.2	0.5	0.5	10	10	0.5	0.5	0.05	0.05	0.05	0.05	1	1	0.2	0.2
Analysis Method	TD-MS	TD-MS	TD-MS	TD-MS	TD-MS	TD-MS	TD-MS	TD-MS	TD-MS	TD-MS	TD-MS	TD-MS	TD-MS	TD-MS	TD-MS	TD-MS	TD-MS	TD-MS
HW-DD14-19 34.5 -	86.8	86.8	5.8	5.8	1.7	1.7	40	40	36.6	36.6	0.35	0.35	< 0.05	0.05	8	8	3.2	3.2
HW-DD14-19 52.5 -	15.8	15.8	2.9	2.9	2.9	2.9	50	50	3.9	3.9	0.16	0.16	< 0.05	0.05	4	4	5.8	5.8
HW-DD14-21 157.5	5.2	5.2	3	3	5.3	5.3	40	40	2.4	2.4	0.74	0.74	< 0.05	0.05	2	2	3.9	3.9
HW-DD14-23 69.41	42.5	42.5	2.5	2.5	5.1	5.1	100	100	8.3	8.3	0.38	0.38	< 0.05	0.05	13	13	7.7	7.7
HW-DD14-24 53.8 -	6.1	6.1	2.1	2.1	2.2	2.2	70	70	3.7	3.7	0.14	0.14	< 0.05	0.05	8	8	8	8
HW-DD14-24 81 - 8	32	32	3.6	3.6	2.3	2.3	50	50	16.6	16.6	0.3	0.3	< 0.05	0.05	25	25	27.5	27.5
HW-DD14-25 30.6 -	14.3	14.3	4.6	4.6	11.5	11.5	40	40	17.3	17.3	0.17	0.17	< 0.05	0.05	16	16	7.7	7.7
HW-DD14-25 78.8 -	43.2	43.2	2.7	2.7	1.5	1.5	20	20	2.3	2.3	0.24	0.24	< 0.05	0.05	24	24	4.4	4.4
HW-DD14-25 81.9 -	6.9	6.9	3.3	3.3	5.8	5.8	30	30	2.3	2.3	0.33	0.33	< 0.05	0.05	22	22	4.5	4.5
HW-DD14-26 43.8 -	21.1	21.1	6.3	6.3	287	287	30	30	7.4	7.4	1.08	1.08	0.06	0.06	68	68	11.7	11.7
HW-DD14-26 57.1 -	60.8	60.8	3.7	3.7	99.7	99.7	10	10	4.9	4.9	0.38	0.38	0.07	0.07	106	106	12.1	12.1
HW-DD14-27B 114.	25.9	25.9	3.3	3.3	8.6	8.6	40	40	4.5	4.5	0.49	0.49	0.12	0.12	51	51	17.5	17.5
HW-DD14-28 35.28	13.8	13.8	4.5	4.5	5	5	< 10	10	24.3	24.3	0.19	0.19	< 0.05	0.05	35	35	103	103
HW-DD14-28 67.5 -	17.4	17.4	8.2	8.2	11.5	11.5	20	20	9	9	0.47	0.47	< 0.05	0.05	18	18	6	6
HW-DD14-29 22.5 -	18.5	18.5	4.7	4.7	45.6	45.6	< 10	10	12.4	12.4	0.41	0.41	< 0.05	0.05	18	18	13.6	13.6
HW-DD14-29 35.5 -	8.9	8.9	3.2	3.2	17.3	17.3	< 10	10	14	14	0.31	0.31	< 0.05	0.05	24	24	35.8	35.8
HW-DD14-29 45 - 4	49.9	49.9	2.7	2.7	7	7	< 10	10	4.1	4.1	0.41	0.41	< 0.05	0.05	33	33	11.7	11.7
HW-DD14-29 69 - 7	5.6	5.6	2.4	2.4	7.1	7.1	< 10	10	2	2	0.4	0.4	< 0.05	0.05	27	27	4.2	4.2
HW-DD14-29 81 - 8	5	5	3.5	3.5	2.2	2.2	< 10	10	7.7	7.7	0.29	0.29	< 0.05	0.05	22	22	28.3	28.3
HW-DD14-29 84 - 8	28.4	28.4	3.5	3.5	11	11	< 10	10	6.1	6.1	0.87	0.87	0.1	0.1	95	95	11.8	11.8
HW-DD14-29 106.5	26.4	26.4	4	4	3.4	3.4	10	10	13	13	0.62	0.62	< 0.05	0.05	50	50	13	13
HW-DD14-29 118.5	9.5	9.5	3.9	3.9	2.7	2.7	< 10	10	6	6	0.4	0.4	< 0.05	0.05	40	40	21.1	21.1
HW-DD14-30 31.6 -	17.6	17.6	4.8	4.8	3.3	3.3	< 10	10	33.1	33.1	0.57	0.57	0.06	0.06	20	20	9.4	9.4
HW-DD14-30 50.2 -	8.6	8.6	3.9	3.9	5.1	5.1	< 10	10	4	4	0.73	0.73	0.06	0.06	64	64	7.9	7.9
HW-DD14-31 28.5 -	22.5	22.5	2.9	2.9	15.9	15.9	< 10	10	10.4	10.4	0.24	0.24	< 0.05	0.05	29	29	4.6	4.6
HW-DD14-31 66 - 6	10.3	10.3	3	3	0.8	0.8	< 10	10	8.7	8.7	0.16	0.16	< 0.05	0.05	8	8	2.9	2.9
HW-DD14-31 70.5 -	67.3	67.3	16.9	16.9	14.9	14.9	70	70	7.8	7.8	0.44	0.44	0.08	0.08	52	52	26.9	26.9
HW-DD14-32 52.5 -	21	21	3.7	3.7	16.2	16.2	< 10	10	4.3	4.3	0.46	0.46	0.12	0.12	99	99	8	8
HW-DD14-32 84 - 8	9.3	9.3	4.4	4.4	36	36	20	20	2.6	2.6	0.85	0.85	0.05	0.05	61	61	11.5	11.5
HW-DD14-33 33 - 3	12.7	12.7	5.4	5.4	21.1	21.1	< 10	10	2.3	2.3	0.25	0.25	< 0.05	0.05	24	24	22.9	22.9
HW-DD14-34 64.5 -	13	13	2.6	2.6	7.1	7.1	< 10	10	2.2	2.2	0.69	0.69	< 0.05	0.05	36	36	4.5	4.5
HW-DD14-19 70.5 -	46.7	46.7	5.9	5.9	3.2	3.2	60	60	14	14	0.23	0.23	< 0.05	0.05	24	24	19	19
HW-DD14-34 18.3 -	54.8	54.8	18.4	18.4	8	8	70	70	16.6	16.6	0.92	0.92	0.17	0.17	40	40	39.6	39.6
HW-DD14-29 12 - 1	149	149	25.6	25.6	10.9	10.9	< 10	10	34.9	34.9	0.38	0.38	0.38	0.38	58	58	47.6	47.6
HW-DD14-31 15 - 1	63.5	63.5	33.1	33.1	15.5	15.5	40	40	455	455	0.47	0.47	0.59	0.59	88	88	66.6	66.6

#REF!

	Sb (ppm)	As (ppm)	Ba (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Cu (ppm)	Pb (ppm)	Hg (ppb)	Ni (ppm)	Ag (ppm)	Tl (ppm)	V (ppm)	Zn (ppm)
Ore (Mean)	**0.28**	**28.7**	**33.23**	**1.7**	**0.1**	**23.4**	**4.3**	**21.5**	**25.5**	**9.2**	**0.4**	**0.1**	**35.5**	**14.9**
Ore(Standard deviation)	**0.13**	**19.4**	**33.56**	**0.9**	**0.0**	**20.0**	**2.7**	**52.8**	**22.9**	**8.7**	**0.2**	**0.0**	**27.6**	**18.5**
Waste (Mean)	**0.1**	**17.4**	**10.00**	**1.8**	**0.1**	**46.7**	**5.9**	**3.2**	**60.0**	**14.0**	**0.2**	**0.1**	**24.0**	**19.0**
Waste (Standard deviation)	**0**	**0.0**	**0.00**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**
OB (Mean)	**0.57**	**14.4**	**349.33**	**1.2**	**0.2**	**89.1**	**25.7**	**11.5**	**40.0**	**168.8**	**0.6**	**0.4**	**62.0**	**51.3**
OB (Standard deviation)	**0.31**	**6.1**	**159.39**	**0.5**	**0.1**	**52.1**	**7.4**	**3.8**	**30.0**	**248.0**	**0.3**	**0.2**	**24.2**	**13.9**

	Sb (ppm)	As (ppm)	Ba (ppm)	Be (ppm)	Cd (ppm)	Cr (ppm)	Cu (ppm)	Pb (ppb)	Hg (ppb)	Ni (ppm)	Ag (ppm)	Tl (ppm)	V (ppm)	Zn (ppm)
Ore (Mean)	**0.28**	**28.65**	**33.23**	**1.69**	**0.10**	**23.43**	**4.26**	**21.51**	**25.48**	**9.17**	**0.44**	**0.06**	**35.55**	**14.87**
Ore (Mean+std dev)	**0.42**	**48.08**	**66.79**	**2.62**	**0.10**	**43.45**	**6.94**	**74.31**	**48.41**	**17.84**	**0.67**	**0.08**	**63.19**	**33.34**
Waste (Mean)	**0.10**	**17.40**	**10.00**	**1.80**	**0.10**	**46.70**	**5.90**	**3.20**	**60.00**	**14.00**	**0.23**	**0.05**	**24.00**	**19.00**
Waste (Mean+std dev)	**0.10**	**17.40**	**10.00**	**1.80**	**0.10**	**46.70**	**5.90**	**3.20**	**60.00**	**14.00**	**0.23**	**0.05**	**24.00**	**19.00**
OB (Mean)	**0.57**	**14.40**	**349.33**	**1.25**	**0.17**	**89.10**	**25.70**	**11.47**	**40.00**	**168.83**	**0.59**	**0.38**	**62.00**	**51.27**
OB (Mean+std dev)	**0.87**	**20.45**	**508.72**	**1.73**	**0.22**	**141.16**	**33.05**	**15.25**	**70.00**	**416.83**	**0.88**	**0.59**	**86.25**	**65.14**

Metal Fraction within TPM

	Sb	As	Ba	Be	Cd	Cr	Cu	Pb	Hg	Ni	Ag	Tl	V	Zn
Ore (Mean)	**2.84E-07**	**2.87E-05**	**3.32E-05**	**1.69E-06**	**1.00E-07**	**2.34E-05**	**4.26E-06**	**2.15E-08**	**2.55E-08**	**9.17E-06**	**4.36E-07**	**5.87E-08**	**3.55E-05**	**1.49E-05**
Ore (Mean+std dev)	**4.18E-07**	**4.81E-05**	**6.68E-05**	**2.62E-06**	**1.00E-07**	**4.35E-05**	**6.94E-06**	**7.43E-08**	**4.84E-08**	**1.78E-05**	**6.70E-07**	**7.83E-08**	**6.32E-05**	**3.33E-05**
Waste (Mean)	**1.00E-07**	**1.74E-05**	**1.00E-05**	**1.80E-06**	**1.00E-07**	**4.67E-05**	**5.90E-06**	**3.20E-09**	**6.00E-08**	**1.40E-05**	**2.30E-07**	**5.00E-08**	**2.40E-05**	**1.90E-05**
Waste (Mean+std dev)	**1.00E-07**	**1.74E-05**	**1.00E-05**	**1.80E-06**	**1.00E-07**	**4.67E-05**	**5.90E-06**	**3.20E-09**	**6.00E-08**	**1.40E-05**	**2.30E-07**	**5.00E-08**	**2.40E-05**	**1.90E-05**
OB (Mean)	**5.67E-07**	**1.44E-05**	**3.49E-04**	**1.25E-06**	**1.67E-07**	**8.91E-05**	**2.57E-05**	**1.15E-08**	**4.00E-08**	**1.69E-04**	**5.90E-07**	**3.80E-07**	**6.20E-05**	**5.13E-05**
OB (Mean+std dev)	**8.72E-07**	**2.05E-05**	**5.09E-04**	**1.73E-06**	**2.24E-07**	**1.41E-04**	**3.31E-05**	**1.52E-08**	**7.00E-08**	**4.17E-04**	**8.79E-07**	**5.90E-07**	**8.62E-05**	**6.51E-05**

Appendix I
Specific VOC Fractions applied to Hydrocarbons (HC) modelling results

Specific VOC - Fractions applied to the Total HC concentrations output from CALPUFF model

Benzene	**1.68%**
Formaldehyde	**28.39%**
Acetaldehyde	**9.05%**
1,3-Butadiene	**0.10%**
Acrolein	**1.31%**

*Highest Ratio reported in EPA MOVES2014 Short-haul Trucks- (model year 2012)

http://www3.epa.gov/otaq/cleaner-nonroad/r03008d.pdf

3.1.1.4 Estimation of VOC Emissions

Appendix J
Annual Air Emissions Inventory - Detailed Tables of Results

AIR EMISSIONS INVENTORY - TSMC DSO3 / DSO4 / HOWSE

Source ID used for modeling (blank if not modeled)	Source Type	Description of Source	Schedule of operation for modeling	TPM			PM10			PM2.5		
				g/s	tonnes/yr	Contribution to the annual emission total (%)	g/s	tonnes/yr	Contribution to the annual emission total (%)	g/s	tonnes/yr	Contribution to the annual emission total (%)
DSO3												
SP_F7_1	Surface	Stockpiles near F7 - 1: Wind erosion	24H/24h-12 months per year	0.04	0.45	0.2%	0.02	0.2	0.2%	0.00	0.0	0.1%
SP_F7_2	Surface	Stockpiles near F7 - 2: Wind erosion	24H/24h-12 months per year	0.02	0.25	0.1%	0.01	0.1	0.1%	0.00	0.0	0.0%
SP_P2	Surface	Stockpiles near Plant 2: Wind erosion	24H/24h-12 months per year	0.04	0.45	0.2%	0.02	0.2	0.2%	0.00	0.0	0.1%
SP_T4	Surface	Stockpiles near T4: Wind erosion	24H/24h-12 months per year	0.02	0.29	0.1%	0.01	0.1	0.1%	0.00	0.0	0.0%
SP_P1	Surface	Stockpiles west of Main Plant: Wind erosion	24H/24h-12 months per year	0.02	0.20	0.1%	0.01	0.1	0.1%	0.00	0.0	0.0%
SP_NP1	Surface	Stockpiles north of Main Plant: Wind erosion	24H/24h-12 months per year	0.01	0.15	0.1%	0.01	0.1	0.1%	0.00	0.0	0.0%
SP_SIN	Surface	Stockpile of final product: Sinterfines: Wind erosion	24H/24h-12 months per year	0.14	1.70	0.7%	0.07	0.8	0.7%	0.01	0.1	0.2%
SP_SUP	Surface	Stockpiles of final product: Superfines: Wind erosion	24H/24h-12 months per year	0.85	10.04	4.3%	0.42	5.0	4.1%	0.06	0.8	1.2%
F7N	Surface	F7 pit: Drilling/Excavation/Loading/Engines (Truck+Excav+Loader+Drill)	24H/24h-12 months per year	0.19	6.12	2.6%	0.10	3.1	2.6%	0.06	2.0	3.1%
F7_WST	Surface	F7 Waste/OB dump: Unloading/Erosion	24H/24h-12 months per year	1.29	16.28	7.0%	0.64	8.1	6.6%	0.10	1.2	1.9%
T7_WST	Surface	T7 Waste/OB dump: Erosion	24H/24h-12 months per year	0.36	4.28	1.9%	0.18	2.1	1.8%	0.03	0.3	0.5%
VBLAST_F7N	Volume	F7 pit blast	12 months- 1 blast/week in summer and 1 blast/month winter (Total 30 blasts/yr)	40.19	4.28	1.8%	20.90	2.5	2.0%	1.21	0.1	0.2%
GENCP_1	Point	Generator 1 at Workers' Camp : CAT 275ekW	24H/24h-12 months per year	0.00	0.10	0.0%	0.00	0.1	0.1%	0.00	0.1	0.2%
GENCP_2	Point	Generator 2 at Workers' Camp : CAT 275ekW	24H/24h-12 months per year	0.00	0.10	0.0%	0.00	0.1	0.1%	0.00	0.1	0.2%
GENCP_3	Point	Generator 3 at Workers' Camp : CAT 275ekW	24H/24h-12 months per year	0.00	0.10	0.0%	0.00	0.1	0.1%	0.00	0.1	0.2%
GENCP_4	Point	Generator 4 at Workers' Camp : CAT C32 1000eKW	24H/24h-12 months per year	0.01	0.21	0.1%	0.01	0.2	0.2%	0.01	0.2	0.3%
GENP2_1	Point	Generator at Plant 2 : MTU DP1935D6SRW 2MW	24H/24h-12 months per year	0.02	0.76	0.3%	0.02	0.8	0.6%	0.02	0.8	1.2%
GENBATCH	Point	Generator at Batch Plant : CAT 157.5 ekW	24H/24h-12 months per year	0.01	0.28	0.1%	0.01	0.3	0.2%	0.01	0.3	0.4%
GENMIX	Point	Mixer generator at Plant 2: 146 ekW	24H/24h-12 months per year	0.01	0.26	0.1%	0.01	0.3	0.2%	0.01	0.3	0.4%
RF7WST_xx	Surface	Roads between F7 and F7_WST (0.8 Km): Unpaved road + Engine	24h/24h - 12 months per year	0.43	7.07	3.1%	0.12	2.0	1.7%	0.01	0.2	0.4%
RF7_xx	Surface	Roads between F7 and Plant 2 (1 Km): Unpaved road + Engine	24h/24h - 12 months per year	0.21	3.45	1.5%	0.07	1.2	1.0%	0.01	0.1	0.2%
RP2_xx	Surface	Roads between Plant 2 and Rail loading (1.2 Km) : Unpaved road + Engine	24h/24h - 12 months per year	0.98	16.34	7.1%	0.28	4.7	3.8%	0.03	0.5	0.8%
RPK_xx	Surface	Road to main gate, pick-up travels (3.6 Km)	24h/24h - 12 months per year	0.83	9.98	4.3%	0.24	2.8	2.3%	0.02	0.3	0.4%
DRYER	Point	Dryer located at Plant 2	24h/24h - 12 months per year	0.63	19.98	8.6%	0.47	14.7	12.0%	0.35	11.0	17.1%
VP2_PREDRY	Volume	Plant 2 operations before dryer: Unloading/Crushing/Conveyors	24h/24h - 12 months per year	0.16	4.92	2.1%	0.06	1.9	1.6%	0.01	0.4	0.6%
VP2_POSTDRY	Volume	Plant 2 operations after dryer: Conveyors/Screening/Crushing/Loading	24h/24h - 12 months per year	0.27	8.45	3.7%	0.09	2.9	2.4%	0.01	0.4	0.6%
VMP_SZ1	Volume	Primary sizer before Main Plant: Unloading/Conveyors/Crushing	24h/24h - 12 months per year	0.31	9.85	4.3%	0.12	3.8	3.1%	0.02	0.7	1.0%
VMP_SZ2	Volume	Secondary sizer before Main Plant: Conveyors/Crushing	24h/24h - 12 months per year	0.14	4.54	2.0%	0.06	1.9	1.6%	0.01	0.4	0.6%
VMP_SIN	Volume	Rail loop activities: Conveyor's chute on Sinterfines stockpile	24h/24h - 12 months per year	0.00	0.06	0.0%	0.00	0.0	0.0%	0.00	0.0	0.0%
VMP_SUP	Volume	Rail loop activities: Conveyor's chute on Superfines stockpiles	24h/24h - 12 months per year	0.00	0.03	0.0%	0.00	0.0	0.0%	0.00	0.0	0.0%
VMP_HDRL	Volume	Rail loop activities: Handling of product to the loading conveyor	24h/24h - 12 months per year	1.94	61.22	26.5%	0.71	22.4	18.3%	0.15	4.6	7.2%
VMP_RAIL	Volume	Rail loop activities: Conveyor's chute into rail cars	24h/24h - 12 months per year	0.00	0.06	0.0%	0.00	0.0	0.0%	0.00	0.0	0.0%
S1_W & S1_S	Point	Stack at Main Plant: Winter. Drying Mode, 5 generators @ 75% load + 1 flash dryer + 1 rotary dryer Stack at Main Plant: Summer. No Drying Mode, 3 generators @ 75% load	24h/24h - Oct. to April - Drying Mode 24h/24h - May to Sept. - No Drying Mode	0.98	30.90	13.4%	1.75	30.9	25.3%	1.75	30.9	48.1%
MP_W_S_W & MP_W_S_S	Point	10 South Wall Vents - Exhaust flow rates different Winter vs Summer	24h/24h - 12 months per year	0.07	2.06	0.9%	0.07	2.1	1.7%	0.07	2.1	3.2%
MP_W_N_W & MP_W_N_S	Point	4 North Wall Vents - Exhaust flow rates different Winter vs Summer	24h/24h - 12 months per year	0.03	0.83	0.4%	0.03	0.8	0.7%	0.03	0.8	1.3%
MP_RF_S	Point	4 Roof Exhausts	24h/24h - 5 months/year (winter)	0.07	0.94	0.4%	0.07	0.9	0.8%	0.07	0.9	1.5%
MP_VAC	Point	2 drum filter vacuum pumps vents and one pan filter suction blower vent	24h/24h - 12 months per year	0.05	1.59	0.7%	0.05	1.6	1.3%	0.05	1.6	2.5%
RL_BIN	Point	Dust Collector - Bin vent	24h/24h - 12 months per year	0.08	2.48	1.1%	0.08	2.5	2.0%	0.08	2.5	3.9%
		Lighting Plants: Magnum MLT3060	24h/24h - 12 months per year	0.00	0.04	0.0%	0.00	0.0	0.0%	0.00	0.0	0.1%
		6" Dewatering Pumps: Godwin Dri-Prime CD150M	24h/24h - 12 months per year	0.00	0.14	0.1%	0.00	0.1	0.1%	0.00	0.1	0.2%
		Locomotives at rail loop	7 ore train/wk (16h/tr.) 2 freight trains/wk (estim. at 4hrs/wk)	0.01	0.14	0.1%	0.01	0.14	0.1%	0.01	0.14	0.2%
		Accurassay Laboratory	24h/24h - 12 months per year	0.000638	0.020120	0.0087%	0.000172	0.00542	0.0044%	0.00042	0.01337	0.0208%
		TOTAL ANNUAL EMISSIONS - DSO3		--	231.4	100%	--	121.9	100%	--	64.2	100%

AIR EMISSIONS INVENTORY - TSMC DSO3 / DSO4 / HOWSE

Source ID used for modeling (blank if not modeled)	Source Type	Description of Source	Schedule of operation for modeling	TPM			PM10			PM2.5		
				g/s	tonnes/yr	Contribution to the annual emission total (%)	g/s	tonnes/yr	Contribution to the annual emission total (%)	g/s	tonnes/yr	Contribution to the annual emission total (%)
HOWSE												
VHOW_PreDry	Volume	Howse Mini Plant operations before dryer: Unloading/Crushing/Conveyors	24h/24h - 7 months/year (summer)	0.22	4.11	1.4%	0.09	1.6	1.6%	0.02	0.3	1.3%
VHOW_PostDry	Volume	Howse Mini Plant operations after dryer: Conveyors/Screening/Crushing/Loading	24h/24h - 7 months/year (summer)	0.39	7.27	2.4%	0.14	2.5	2.5%	0.02	0.3	1.4%
VQUA	Volume	FN Quarry crushing facility	24h/24h - 7 months/year (summer)	0.02	0.34	0.1%	0.01	0.1	0.1%	0.00	0.0	0.1%
HOW_Dry	Point	Dryer 1 located at HOWSE Mini Plant	24h/24h - 7 months/year (summer)	0.51	9.37	3.1%	0.36	6.7	6.8%	0.26	4.8	21.2%
HOW_Dry2	Point	Dryer 2 located at HOWSE Mini Plant	24h/24h - 7 months/year (summer)	0.51	9.37	3.1%	0.36	6.7	6.8%	0.26	4.8	21.2%
RH_OB_xx	Surface	Roads between Howse pit to OB (2 Km)	24h/24h - 5 months/year (winter)	2.22	24.27	8.0%	0.63	6.9	7.0%	0.07	0.8	3.5%
RH_WST_xx	Surface	Roads between Howse pit to waste (0.6 Km)	24h/24h - 7 months/year (summer)	0.92	12.25	4.1%	0.26	3.5	3.5%	0.03	0.4	1.7%
RH_00A, 01 to 11	Surface	Road for Howse Ore/Waste transport from Howse Pit to Howse waste dump (2.4 Km)	24h/24h - 7 months/year (summer)	6.50	87.02	28.8%	1.86	24.8	25.1%	0.21	2.8	12.4%
RH_12 to 25	Surface	Road for Howse Ore/FN Quarry sand transport (2.8 Km)	24h/24h - 7 months/year (summer)	3.66	48.47	16.1%	1.04	13.8	13.9%	0.12	1.6	6.8%
RH_26 to 29	Surface	Roads between Howse Pit to Howse MiniPlant (Ore transport) (0.8 Km)-In	24h/24h - 7 months/year (summer)	0.95	12.67	4.2%	0.27	3.6	3.6%	0.03	0.4	1.8%
RH_30 to 35	Surface	Roads between Howse Pit to Howse MiniPlant (Ore transport) (1.2 Km)-In and Out	24h/24h - 7 months/year (summer)	2.84	38.00	12.6%	0.54	7.2	7.3%	0.06	0.8	3.6%
RQUA_xx	Surface	First Nations Quarry to main road (10 wheeler) (0.6 Km)	24h/24h - 7 months/year (summer)	0.07	0.86	0.3%	0.02	0.2	0.2%	0.00	0.0	0.1%
RFN_xx	Surface	First Nations Quarry to site main gate (10 wheeler) (3.6 Km)	24h/24h - 7 months/year (summer)	0.44	5.13	1.7%	0.12	1.4	1.5%	0.01	0.1	0.6%
GENHOW_1	Point	Generator at Howse Mini Plant-2 MW	24H/24h-7 months per year	0.02	0.45	0.1%	0.02	0.4	0.5%	0.02	0.4	2.0%
GENQUA	Point	Generator at FN quarry crushing facility : CAT 275ekW	24H/24h-7 months per year	0.00	0.06	0.0%	0.00	0.1	0.1%	0.00	0.1	0.2%
VBLAST_H	Volume	HOWSE pit blast	12 months- 1 blast/week in summer and 1 blast/month winter (Total 33 blasts/yr)	40.19	4.77	1.6%	20.90	2.1	2.1%	1.21	0.1	0.5%
HOW_WST	Surface	HOWSE OB/Waste dump: Unloading/Erosion	24H/24h-12 months per year	1.30	20.59	6.8%	0.63	9.9	10.0%	0.09	1.5	6.5%
SP_HOW	Surface	Stockpiles of final product, near Howse Mini Plant	24H/24h-12 months per year	0.03	0.39	0.1%	0.02	0.2	0.2%	0.00	0.0	0.1%
HOWSE	Surface	Howse pit: Drilling/Excavation/Loading/Engines (Truck+2 Excavators +Loader+Drill)	24H/24h-7 months per year	0.52	16.54	5.5%	0.23	7.1	7.2%	0.11	3.4	14.8%
		TOTAL ANNUAL EMISSIONS - HOWSE		**--**	**301.9**	**100%**	**--**	**99.1**	**100%**	**--**	**22.8**	**100%**
DSO4 *												
R_KIV_xx	Surface	Ore from DSO4 (hauling trucks) + pickups (9.6 Km)	24h/24h - 12 months per year	15.50	259.2	100%	4.42	73.9	100%	0.50	8.4	100%
		TOTAL ANNUAL EMISSIONS - DSO4 *		**--**	**259.2**	**100%**	**--**	**73.9**	**100%**	**--**	**8.4**	**100%**

* Includes only portion of Goodwood road located within the air quality modeling perimeter for the Howse EIS

AIR EMISSIONS INVENTORY - TSMC DSO3 / DSO4 / HOWSE

Source ID used for modeling (blank if not modeled)	Source Type	Description of Source	Schedule of operation for modeling	NOx		
				g/s	tonnes/yr	Contribution to the yearly emission total (%)
DSO3						
	Surface	Stockpiles near F7 - 1: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles near F7 - 2: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles near Plant 2: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles near T4: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles west of Main Plant: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles north of Main Plant: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpile of final product: Sinterfines: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles of final product: Superfines: Wind erosion	24H/24h-12 months per year			
F7N	Surface	F7 pit: Drilling/Excavation/Loading/Engines (Truck+Excav+Loader+Drill)	24H/24h-12 months per year	0.95	30.09	1.9%
	Surface	F7 Waste/OB dump: Unloading/Erosion	24H/24h-12 months per year			
	Surface	T7 Waste/OB dump: Erosion	24H/24h-12 months per year			
VBLAST_F7N	Volume	F7 pit blast	12 months- 1 blast/week in summer and 1 blast/month winter (Total 30 blasts/yr)	75.63	8.0	0.5%
GENCP_1	Point	Generator 1 at Workers' Camp : CAT 275ekW	24H/24h-12 months per year	0.38	12.0	0.8%
GENCP_2	Point	Generator 2 at Workers' Camp : CAT 275ekW	24H/24h-12 months per year	0.38	12.0	0.8%
GENCP_3	Point	Generator 3 at Workers' Camp : CAT 275ekW	24H/24h-12 months per year	0.38	12.0	0.8%
GENCP_4	Point	Generator 4 at Workers' Camp : CAT C32 1000eKW	24H/24h-12 months per year	1.84	57.9	3.7%
GENP2_1	Point	Generator at Plant 2 : MTU DP1935D6SRW 2MW	24H/24h-12 months per year	2.86	90.3	5.8%
GENBATCH	Point	Generator at Batch Plant : CAT 157.5 ekW	24H/24h-12 months per year	0.18	5.5	0.4%
GENMIX	Point	Mixer generator at Plant 2: 146 ekW	24H/24h-12 months per year	0.16	5.1	0.3%
RF7WST_xx	Surface	Roads between F7 and F7_WST (0.8 Km): Unpaved road + Engine	24h/24h - 12 months per year	0.07	2.1	0.1%
RF7_xx	Surface	Roads between F7 and Plant 2 (1 Km): Unpaved road + Engine	24h/24h - 12 months per year	0.04	1.3	0.1%
RP2_xx	Surface	Roads between Plant 2 and Rail loading (1.2 Km) : Unpaved road + Engine	24h/24h - 12 months per year	0.15	4.8	0.3%
RPK_xx	Surface	road to site main gateby pick-up (3.6 Km)	24h/24h - 12 months per year	0.00098	0.031	0.002%
DRYER	Point	Dryer located at Plant 2	24h/24h - 12 months per year	3.57	112.6	7.3%
	Volume	Plant 2 operations before dryer: Unloading/Crushing/Conveyors	24h/24h - 12 months per year			
	Volume	Plant 2 operations after dryer: Conveyors/Screening/Crushing/Loading	24h/24h - 12 months per year			
	Volume	Primary sizer before Main Plant: Unloading/Conveyors/Crushing	24h/24h - 12 months per year			
	Volume	Secondary sizer before Main Plant: Conveyors/Crushing	24h/24h - 12 months per year			
	Volume	Rail loop activities: Conveyor's chute on Sinterfines stockpile	24h/24h - 12 months per year			
	Volume	Rail loop activities: Conveyor's chute on Superfines stockpiles	24h/24h - 12 months per year			
VMP_HDRL	Volume	Rail loop activities: Handling of product to the loading conveyor	24h/24h - 12 months per year	0.92	29.0	1.9%
	Volume	Rail loop activities: Conveyor's chute into rail cars	24h/24h - 12 months per year			
S1_W & S1_S	Point	Stack at Main Plant: Winter. Drying Mode, 5 generators @ 75% load + 1 flash dryer + 1 rotary dryer Stack at Main Plant: Summer. No Drying Mode, 3 generators @ 75% load	24h/24h - Oct. to April - Drying Mode 24h/24h - May to Sept. - No Drying Mode	36.84	1160.2	74.8%
	Point	10 South Wall Vents - Exhaust flow rates different Winter vs Summer	24h/24h - 12 months per year			
	Point	4 North Wall Vents - Exhaust flow rates different Winter vs Summer	24h/24h - 12 months per year			
	Point	4 Roof Exhausts	24h/24h - 5 months/year (winter)			
	Point	2 drum filter vacuum pumps vents and one pan filter suction blower vent	24h/24h - 12 months per year			
	Point	Dust Collector - Bin vent	24h/24h - 12 months per year			
	Mobile	Lighting Plants: Magnum MLT3060	24h/24h - 12 months per year	0.02	0.7	0.0%
	Point	6" Dewatering Pumps: Godwin Dri-Prime CD150M	24h/24h - 12 months per year	0.07	2.3	0.1%
	Mobile	Locomotives at rail loop	7 ore train/wk (16h/tr.) 2 freight trains/wk	0.23	4.9	0.3%
	Point	Accurassay Laboratory	24h/24h - 12 months per year	0.00	0.0	0.0%
			TOTAL ANNUAL EMISSIONS - DSO3	**--**	**1550.7**	**100%**

AIR EMISSIONS INVENTORY - TSMC DSO3 / DSO4 / HOWSE

Source ID used for modeling (blank if not modeled)	Source Type	Description of Source	Schedule of operation for modeling	NOx		
				g/s	tonnes/yr	Contribution to the yearly emission total (%)
HOWSE						
	Volume	Howse Mini Plant operations before dryer: Unloading/Crushing/Conveyors	24h/24h - 7 months/year (summer)			
	Volume	Howse Mini Plant operations after dryer: Conveyors/Screening/Crushing/Loading	24h/24h - 7 months/year (summer)			
	Volume	FN Quarry crushing facility	24h/24h - 7 months/year (summer)			
HOW_Dry	Point	Dryer 1 located at HOWSE Mini Plant	24h/24h - 7 months/year (summer)	2.62	48.4	17.1%
HOW_Dry2	Point	Dryer 2 located at HOWSE Mini Plant	24h/24h - 7 months/year (summer)	2.62	48.4	17.1%
RH_OB_xx	Surface	Roads between Howse pit to OB (2 Km)	24h/24h - 5 months/year (winter)	1.84	24.0	8.5%
RH_WST_xx	Surface	Roads between Howse pit to waste (0.6 Km)	24h/24h - 7 months/year (summer)	0.24	4.5	1.6%
RH_00A, 01 to 11	Surface	Road for Howse Ore/Waste transport from Howse Pit to Howse waste dump (2.4 Km)	24h/24h - 7 months/year (summer)	1.72	31.8	11.2%
RH_12 to 25	Surface	Road for Howse Ore/FN Quarry sand transport (2.8 Km)	24h/24h - 7 months/year (summer)	0.88	16.2	5.7%
RH_26 to 29	Surface	Roads between Howse Pit to Howse MiniPlant (Ore transport) (0.8 Km)-In	24h/24h - 7 months/year (summer)	0.25	4.6	1.6%
RH_30 to 35	Surface	Roads between Howse Pit to Howse MiniPlant (Ore transport) (1.2 Km)-In and Out	24h/24h - 7 months/year (summer)	0.75	13.9	4.9%
RQUA_xx	Surface	First Nations Quarry to main road (10 wheeler) (0.6 Km)	24h/24h - 7 months/year (summer)	0.00057	0.0	0.0%
RFN_xx	Surface	First Nations Quarry to site main gate (10 wheeler) (3.6 Km)	24h/24h - 7 months/year (summer)	0.00343	0.1	0.0%
GENHOW_1	Point	Generator at Howse Mini Plant-2 MW	24H/24h-7 months per year	2.86	52.9	18.7%
GENQUA	Point	Generator at FN quarry crushing facility : CAT 275ekW	24H/24h-7 months per year	0.38	7.0	2.5%
	Volume	HOWSE pit blast	12 months- 1 blast/week in summer and 1 blast/month winter (Total 33 blasts/yr)	75.63	9.0	3.2%
	Surface	HOWSE OB/Waste dump: Unloading/Erosion	24H/24h-12 months per year			
SP_HOW	Surface	Stockpiles of final product, near Howse Mini Plant	24H/24h-12 months per year			
HOWSE	Surface	Howse pit: Drilling/Excavation/Loading/Engines (Truck+2 Excavators +Loader+Drill)	24H/24h-7 months per year	1.21	22.3	7.9%
			TOTAL ANNUAL EMISSIONS - HOWSE	**--**	**283.2**	**100%**
DSO4 *						
R_KIV_xx	Surface	Ore from DSO4 (hauling trucks) + pickups (9.6 Km)	24h/24h - 12 months per year	3.95	124.6	100%
			TOTAL ANNUAL EMISSIONS - DSO4 *	**--**	**124.6**	**100%**

* Includes only portion of Goodwood road located within the air quality modeling perimeter for the Howse EIS

AIR EMISSIONS INVENTORY - TSMC DSO3 / DSO4 / HOWSE

Source ID used for modeling (blank if not modeled)	Source Type	Description of Source	Schedule of operation for modeling	CO		
				g/s	tonnes/yr	Contribution to the yearly emission total (%)
DSO3						
	Surface	Stockpiles near F7 - 1: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles near F7 - 2: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles near Plant 2: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles near T4: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles west of Main Plant: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles north of Main Plant: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpile of final product: Sinterfines: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles of final product: Superfines: Wind erosion	24H/24h-12 months per year			
F7N	Surface	F7 pit: Drilling/Excavation/Loading/Engines (Truck+Excav+Loader+Drill)	24H/24h-12 months per year	0.80	25.21	12.6%
	Surface	F7 Waste/OB dump: Unloading/Erosion	24H/24h-12 months per year			
	Surface	T7 Waste/OB dump: Erosion	24H/24h-12 months per year			
VBLAST_F7N	Volume	F7 pit blast	12 months- 1 blast/week in summer and 1 blast/month winter (Total 30 blasts/yr)	321.41	34.2	17.1%
GENCP_1	Point	Generator 1 at Workers' Camp : CAT 275ekW	24H/24h-12 months per year	0.02	0.7	0.4%
GENCP_2	Point	Generator 2 at Workers' Camp : CAT 275ekW	24H/24h-12 months per year	0.02	0.7	0.4%
GENCP_3	Point	Generator 3 at Workers' Camp : CAT 275ekW	24H/24h-12 months per year	0.02	0.7	0.4%
GENCP_4	Point	Generator 4 at Workers' Camp : CAT C32 1000eKW	24H/24h-12 months per year	0.05	1.5	0.8%
GENP2_1	Point	Generator at Plant 2 : MTU DP1935D6SRW 2MW	24H/24h-12 months per year	0.24	7.6	3.8%
GENBATCH	Point	Generator at Batch Plant : CAT 157.5 ekW	24H/24h-12 months per year	0.15	4.8	2.4%
GENMIX	Point	Mixer generator at Plant 2: 146 ekW	24H/24h-12 months per year	0.14	4.5	2.2%
RF7WST_xx	Surface	Roads between F7 and F7_WST (0.8 Km): Unpaved road + Engine	24h/24h - 12 months per year	0.06	1.8	0.9%
RF7_xx	Surface	Roads between F7 and Plant 2 (1 Km): Unpaved road + Engine	24h/24h - 12 months per year	0.04	1.1	0.6%
RP2_xx	Surface	Roads between Plant 2 and Rail loading (1.2 Km) : Unpaved road + Engine	24h/24h - 12 months per year	0.13	4.2	2.1%
RPK_xx	Surface	road to site main gateby pick-up (3.6 Km)	24h/24h - 12 months per year	0.02879	0.908	0.454%
DRYER	Point	Dryer located at Plant 2	24h/24h - 12 months per year	0.74	23.5	11.7%
	Volume	Plant 2 operations before dryer: Unloading/Crushing/Conveyors	24h/24h - 12 months per year			
	Volume	Plant 2 operations after dryer: Conveyors/Screening/Crushing/Loading	24h/24h - 12 months per year			
	Volume	Primary sizer before Main Plant: Unloading/Conveyors/Crushing	24h/24h - 12 months per year			
	Volume	Secondary sizer before Main Plant: Conveyors/Crushing	24h/24h - 12 months per year			
	Volume	Rail loop activities: Conveyor's chute on Sinterfines stockpile	24h/24h - 12 months per year			
	Volume	Rail loop activities: Conveyor's chute on Superfines stockpiles	24h/24h - 12 months per year			
VMP_HDRL	Volume	Rail loop activities: Handling of product to the loading conveyor	24h/24h - 12 months per year	0.81	25.4	12.7%
	Volume	Rail loop activities: Conveyor's chute into rail cars	24h/24h - 12 months per year			
S1_W & S1_S	Point	Stack at Main Plant: Winter. Drying Mode, 5 generators @ 75% load + 1 flash dryer + 1 rotary dryer Stack at Main Plant: Summer. No Drying Mode, 3 generators @ 75% load	24h/24h - Oct. to April - Drying Mode 24h/24h - May to Sept. - No Drying Mode	1.86	58.7	29.3%
	Point	10 South Wall Vents - Exhaust flow rates different Winter vs Summer	24h/24h - 12 months per year			
	Point	4 North Wall Vents - Exhaust flow rates different Winter vs Summer	24h/24h - 12 months per year			
	Point	4 Roof Exhausts	24h/24h - 5 months/year (winter)			
	Point	2 drum filter vacuum pumps vents and one pan filter suction blower vent	24h/24h - 12 months per year			
	Point	Dust Collector - Bin vent	24h/24h - 12 months per year			
		Lighting Plants: Magnum MLT3060	24h/24h - 12 months per year	0.02	0.6	0.3%
		6" Dewatering Pumps: Godwin Dri-Prime CD150M	24h/24h - 12 months per year	0.08	2.4	1.2%
		Locomotives at rail loop	7 ore train/wk (16h/tr.) 2 freight trains/wk	0.07	1.4	0.7%
		Accurassay Laboratory	24h/24h - 12 months per year	0.00	0.0	0.0%

TOTAL ANNUAL EMISSIONS - DSO3	**--**	**200.1**	**100%**

AIR EMISSIONS INVENTORY - TSMC DSO3 / DSO4 / HOWSE

Source ID used for modeling (blank if not modeled)	Source Type	Description of Source	Schedule of operation for modeling	CO		
				g/s	tonnes/yr	Contribution to the yearly emission total (%)
HOWSE						
	Volume	Howse Mini Plant operations before dryer: Unloading/Crushing/Conveyors	24h/24h - 7 months/year (summer)			
	Volume	Howse Mini Plant operations after dryer: Conveyors/Screening/Crushing/Loading	24h/24h - 7 months/year (summer)			
	Volume	FN Quarry crushing facility	24h/24h - 7 months/year (summer)			
HOW_Dry	Point	Dryer 1 located at HOWSE Mini Plant	24h/24h - 7 months/year (summer)	0.55	10.1	6.9%
HOW_Dry2	Point	Dryer 2 located at HOWSE Mini Plant	24h/24h - 7 months/year (summer)	0.55	10.1	6.9%
RH_OB_xx	Surface	Roads between Howse pit to OB (2 Km)	24h/24h - 5 months/year (winter)	1.01	13.1	9.0%
RH_WST_xx	Surface	Roads between Howse pit to waste (0.6 Km)	24h/24h - 7 months/year (summer)	0.13	2.4	1.7%
RH_00A, 01 to 11	Surface	Road for Howse Ore/Waste transport from Howse Pit to Howse waste dump (2.4 Km)	24h/24h - 7 months/year (summer)	0.94	17.4	11.9%
RH_12 to 25	Surface	Road for Howse Ore/FN Quarry sand transport (2.8 Km)	24h/24h - 7 months/year (summer)	0.48	8.9	6.1%
RH_26 to 29	Surface	Roads between Howse Pit to Howse MiniPlant (Ore transport) (0.8 Km)-In	24h/24h - 7 months/year (summer)	0.14	2.5	1.7%
RH_30 to 35	Surface	Roads between Howse Pit to Howse MiniPlant (Ore transport) (1.2 Km)-In and Out	24h/24h - 7 months/year (summer)	0.41	7.6	5.2%
RQUA_xx	Surface	First Nations Quarry to main road (10 wheeler) (0.6 Km)	24h/24h - 7 months/year (summer)	0.00018	0.0	0.0%
RFN_xx	Surface	First Nations Quarry to site main gate (10 wheeler) (3.6 Km)	24h/24h - 7 months/year (summer)	0.00107	0.0	0.0%
GENHOW_1	Point	Generator at Howse Mini Plant-2 MW	24H/24h-7 months per year	0.24	4.5	3.1%
GENQUA	Point	Generator at FN quarry crushing facility : CAT 275ekW	24H/24h-7 months per year	0.02	0.4	0.3%
	Volume	HOWSE pit blast	12 months- 1 blast/week in summer and 1 blast/month winter (Total 33 blasts/yr)	321.41	38.2	26.1%
	Surface	HOWSE OB/Waste dump: Unloading/Erosion	24H/24h-12 months per year			
SP_HOW	Surface	Stockpiles of final product, near Howse Mini Plant	24H/24h-12 months per year			
HOWSE	Surface	Howse pit: Drilling/Excavation/Loading/Engines (Truck+2 Excavators +Loader+Drill)	24H/24h-12 months per year	0.99	31.1	21.3%
			TOTAL ANNUAL EMISSIONS - HOWSE	**--**	**146.3**	**100%**
DSO4 *						
R_KIV_xx	Surface	Ore from DSO4 (hauling trucks) + pickups (9.6 Km)	24h/24h - 12 months per year	2.18	68.7	100%
			TOTAL ANNUAL EMISSIONS - DSO4 *	**--**	**68.7**	**100%**

* Includes only portion of Goodwood road located within the air quality modeling perimeter for the Howse EIS

AIR EMISSIONS INVENTORY - TSMC DSO3 / DSO4 / HOWSE

Source ID used for modeling (blank if not modeled)	Source Type	Description of Source	Schedule of operation for modeling	SO2 g/s	SO2 tonnes/yr	SO2 Contribution to the yearly emission total (%)
DSO3						
	Surface	Stockpiles near F7 - 1: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles near F7 - 2: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles near Plant 2: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles near T4: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles west of Main Plant: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles north of Main Plant: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpile of final product: Sinterfines: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles of final product: Superfines: Wind erosion	24H/24h-12 months per year			
F7N	Surface	F7 pit: Drilling/Excavation/Loading/Engines (Truck+Excav+Loader+Drill)	24H/24h-12 months per year	0.0007	0.02	0.7%
	Surface	F7 Waste/OB dump: Unloading/Erosion	24H/24h-12 months per year			
	Surface	T7 Waste/OB dump: Erosion	24H/24h-12 months per year			
VBLAST_F7N	Volume	F7 pit blast	12 months- 1 blast/week in summer and 1 blast/month winter (Total 30 blasts/yr)	9.45	1.0	31.8%
GENCP_1	Point	Generator 1 at Workers' Camp : CAT 275ekW	24H/24h-12 months per year	0.0006	0.02	0.6%
GENCP_2	Point	Generator 2 at Workers' Camp : CAT 275ekW	24H/24h-12 months per year	0.0006	0.02	0.6%
GENCP_3	Point	Generator 3 at Workers' Camp : CAT 275ekW	24H/24h-12 months per year	0.0006	0.02	0.6%
GENCP_4	Point	Generator 4 at Workers' Camp : CAT C32 1000eKW	24H/24h-12 months per year	0.0019	0.1	1.9%
GENP2_1	Point	Generator at Plant 2 : MTU DP1935D6SRW 2MW	24H/24h-12 months per year	0.0028	0.087	2.7%
GENBATCH	Point	Generator at Batch Plant : CAT 157.5 ekW	24H/24h-12 months per year	0.0003	0.011	0.3%
GENMIX	Point	Mixer generator at Plant 2: 146 ekW	24H/24h-12 months per year	0.0003	0.009	0.3%
RF7WST_xx	Surface	Roads between F7 and F7_WST (0.8 Km): Unpaved road + Engine	24h/24h - 12 months per year	0.0001	0.003	0.1%
RF7_xx	Surface	Roads between F7 and Plant 2 (1 Km): Unpaved road + Engine	24h/24h - 12 months per year	0.0001	0.002	0.1%
RP2_xx	Surface	Roads between Plant 2 and Rail loading (1.2 Km) : Unpaved road + Engine	24h/24h - 12 months per year	0.0002	0.008	0.2%
RPK_xx	Surface	road to site main gateby pick-up (3.6 Km)	24h/24h - 12 months per year	3.30874E-06	1.043E-04	0.003%
DRYER	Point	Dryer located at Plant 2	24h/24h - 12 months per year	0.03	1.0	31.6%
	Volume	Plant 2 operations before dryer: Unloading/Crushing/Conveyors	24h/24h - 12 months per year			
	Volume	Plant 2 operations after dryer: Conveyors/Screening/Crushing/Loading	24h/24h - 12 months per year			
	Volume	Primary sizer before Main Plant: Unloading/Conveyors/Crushing	24h/24h - 12 months per year			
	Volume	Secondary sizer before Main Plant: Conveyors/Crushing	24h/24h - 12 months per year			
	Volume	Rail loop activities: Conveyor's chute on Sinterfines stockpile	24h/24h - 12 months per year			
	Volume	Rail loop activities: Conveyor's chute on Superfines stockpiles	24h/24h - 12 months per year			
VMP_HDRL	Volume	Rail loop activities: Handling of product to the loading conveyor	24h/24h - 12 months per year	0.0007	0.02	0.7%
	Volume	Rail loop activities: Conveyor's chute into rail cars	24h/24h - 12 months per year			
S1_W & S1_S	Point	Stack at Main Plant: Winter. Drying Mode, 5 generators @ 75% load + 1 flash dryer + 1 rotary dryer Stack at Main Plant: Summer. No Drying Mode, 3 generators @ 75% load	24h/24h - Oct. to April - Drying Mode 24h/24h - May to Sept. - No Drying Mode	0.03	0.9	27.4%
	Point	10 South Wall Vents - Exhaust flow rates different Winter vs Summer	24h/24h - 12 months per year			
	Point	4 North Wall Vents - Exhaust flow rates different Winter vs Summer	24h/24h - 12 months per year			
	Point	4 Roof Exhausts	24h/24h - 5 months/year (winter)			
	Point	2 drum filter vacuum pumps vents and one pan filter suction blower vent	24h/24h - 12 months per year			
	Point	Dust Collector - Bin vent	24h/24h - 12 months per year			
		Lighting Plants: Magnum MLT3060	24h/24h - 12 months per year	0.000015	0.0005	0.01%
		6" Dewatering Pumps: Godwin Dri-Prime CD150M	24h/24h - 12 months per year	0.000076	0.0024	0.08%
		Locomotives at rail loop	7 ore train/wk (16h/tr.) 2 freight trains/wk	0.00036	0.0076	0.24%
		Accurassay Laboratory	24h/24h - 12 months per year	0.00	0.0	0.0%

TOTAL ANNUAL EMISSIONS - DSO3	**--**	**3.2**	**100%**

AIR EMISSIONS INVENTORY - TSMC DSO3 / DSO4 / HOWSE

Source ID used for modeling (blank if not modeled)	Source Type	Description of Source	Schedule of operation for modeling	SO2		
				g/s	tonnes/yr	Contribution to the yearly emission total (%)
HOWSE						
	Volume	Howse Mini Plant operations before dryer: Unloading/Crushing/Conveyors	24h/24h - 7 months/year (summer)			
	Volume	Howse Mini Plant operations after dryer: Conveyors/Screening/Crushing/Loading	24h/24h - 7 months/year (summer)			
	Volume	FN Quarry crushing facility	24h/24h - 7 months/year (summer)			
HOW_Dry	Point	Dryer 1 located at HOWSE Mini Plant	24h/24h - 7 months/year (summer)	0.02	0.4	19.8%
HOW_Dry2	Point	Dryer 2 located at HOWSE Mini Plant	24h/24h - 7 months/year (summer)	0.02	0.4	19.8%
RH_OB_xx	Surface	Roads between Howse pit to OB (2 Km)	24h/24h - 5 months/year (winter)	0.00	0.0	1.1%
RH_WST_xx	Surface	Roads between Howse pit to waste (0.6 Km)	24h/24h - 7 months/year (summer)	0.00	0.0	0.2%
RH_00A, 01 to 11	Surface	Road for Howse Ore/Waste transport from Howse Pit to Howse waste dump (2.4 Km)	24h/24h - 7 months/year (summer)	0.00	0.0	1.5%
RH_12 to 25	Surface	Road for Howse Ore/FN Quarry sand transport (2.8 Km)	24h/24h - 7 months/year (summer)	0.00	0.0	0.8%
RH_26 to 29	Surface	Roads between Howse Pit to Howse MiniPlant (Ore transport) (0.8 Km)-In	24h/24h - 7 months/year (summer)	0.00	0.0	0.2%
RH_30 to 35	Surface	Roads between Howse Pit to Howse MiniPlant (Ore transport) (1.2 Km)-In and Out	24h/24h - 7 months/year (summer)	0.00	0.0	0.6%
RQUA_xx	Surface	First Nations Quarry to main road (10 wheeler) (0.6 Km)	24h/24h - 7 months/year (summer)	0.00002	0.0	0.0%
RFN_xx	Surface	First Nations Quarry to site main gate (10 wheeler) (3.6 Km)	24h/24h - 7 months/year (summer)	0.00014	0.0	0.1%
GENHOW_1	Point	Generator at Howse Mini Plant-2 MW	24H/24h-7 months per year	0.0028	0.1	2.3%
GENQUA	Point	Generator at FN quarry crushing facility : CAT 275ekW	24H/24h-7 months per year	0.00	0.0	0.5%
	Volume	HOWSE pit blast	12 months- 1 blast/week in summer and 1 blast/month winter (Total 33 blasts/yr)	9.45	1.1	51.7%
	Surface	HOWSE OB/Waste dump: Unloading/Erosion	24H/24h-12 months per year			
SP_HOW	Surface	Stockpiles of final product, near Howse Mini Plant	24H/24h-12 months per year			
HOWSE	Surface	Howse pit: Drilling/Excavation/Loading/Engines (Truck+2 Excavators +Loader+Drill)	24H/24h-12 months per year	0.0009	0.0	1.3%
		TOTAL ANNUAL EMISSIONS - HOWSE		**--**	**2.2**	**100%**
DSO4 *						
R_KIV_xx	Surface	Ore from DSO4 (hauling trucks) + pickups (9.6 Km)	24h/24h - 12 months per year	0.004	0.1	100%
		TOTAL ANNUAL EMISSIONS - DSO4 *		**--**	**0.1**	**100%**

* Includes only portion of Goodwood road located within the air quality modeling perimeter for the Howse EIS

AIR EMISSIONS INVENTORY - TSMC DSO3 / DSO4 / HOWSE

Source ID used for modeling (blank if not modeled)	Source Type	Description of Source	Schedule of operation for modeling	Hydrocarbons		
				g/s	tonnes/yr	Contribution to the yearly emission total (%)
DSO3						
	Surface	Stockpiles near F7 - 1: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles near F7 - 2: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles near Plant 2: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles near T4: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles west of Main Plant: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles north of Main Plant: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpile of final product: Sinterfines: Wind erosion	24H/24h-12 months per year			
	Surface	Stockpiles of final product: Superfines: Wind erosion	24H/24h-12 months per year			
F7N	Surface	F7 pit: Drilling/Excavation/Loading/Engines (Truck+Excav+Loader+Drill)	24H/24h-12 months per year	0.06	1.99	4.8%
	Surface	F7 Waste/OB dump: Unloading/Erosion	24H/24h-12 months per year			
	Surface	T7 Waste/OB dump: Erosion	24H/24h-12 months per year			
VBLAST_F7N	Volume	F7 pit blast	12 months- 1 blast/week in summer and 1 blast/month winter (Total 30 blasts/yr)	0.00	0.0	0.0%
GENCP_1	Point	Generator 1 at Workers' Camp : CAT 275ekW	24H/24h-12 months per year	0.01	0.2	0.5%
GENCP_2	Point	Generator 2 at Workers' Camp : CAT 275ekW	24H/24h-12 months per year	0.01	0.2	0.5%
GENCP_3	Point	Generator 3 at Workers' Camp : CAT 275ekW	24H/24h-12 months per year	0.01	0.2	0.5%
GENCP_4	Point	Generator 4 at Workers' Camp : CAT C32 1000eKW	24H/24h-12 months per year	0.0037	0.1	0.3%
GENP2_1	Point	Generator at Plant 2 : MTU DP1935D6SRW 2MW	24H/24h-12 months per year	0.19	6.0	14.4%
GENBATCH	Point	Generator at Batch Plant : CAT 157.5 ekW	24H/24h-12 months per year	0.01	0.4	0.9%
GENMIX	Point	Mixer generator at Plant 2: 146 ekW	24H/24h-12 months per year	0.01	0.3	0.8%
RF7WST_xx	Surface	Roads between F7 and F7_WST (0.8 Km): Unpaved road + Engine	24h/24h - 12 months per year	0.0044	0.1	0.3%
RF7_xx	Surface	Roads between F7 and Plant 2 (1 Km): Unpaved road + Engine	24h/24h - 12 months per year	0.0027	0.1	0.2%
RP2_xx	Surface	Roads between Plant 2 and Rail loading (1.2 Km) : Unpaved road + Engine	24h/24h - 12 months per year	0.010	0.3	0.8%
RPK_xx	Surface	road to site main gate by pick-up (3.6 Km)	24h/24h - 12 months per year	0.00014	0.004	0.011%
DRYER	Point	Dryer located at Plant 2	24h/24h - 12 months per year	0.04	1.2	2.8%
	Volume	Plant 2 operations before dryer: Unloading/Crushing/Conveyors	24h/24h - 12 months per year			
	Volume	Plant 2 operations after dryer: Conveyors/Screening/Crushing/Loading	24h/24h - 12 months per year			
	Volume	Primary sizer before Main Plant: Unloading/Conveyors/Crushing	24h/24h - 12 months per year			
	Volume	Secondary sizer before Main Plant: Conveyors/Crushing	24h/24h - 12 months per year			
	Volume	Rail loop activities: Conveyor's chute on Sinterfines stockpile	24h/24h - 12 months per year			
	Volume	Rail loop activities: Conveyor's chute on Superfines stockpiles	24h/24h - 12 months per year			
VMP_HDRL	Volume	Rail loop activities: Handling of product to the loading conveyor	24h/24h - 12 months per year	0.06	1.9	4.6%
	Volume	Rail loop activities: Conveyor's chute into rail cars	24h/24h - 12 months per year			
S1_W & S1_S	Point	Stack at Main Plant: Winter. Drying Mode, 5 generators @ 75% load + 1 flash dryer + 1 rotary dryer Stack at Main Plant: Summer. No Drying Mode, 3 generators @ 75% load	24h/24h - Oct. to April - Drying Mode 24h/24h - May to Sept. - No Drying Mode	0.89	28.1	67.2%
	Point	10 South Wall Vents - Exhaust flow rates different Winter vs Summer	24h/24h - 12 months per year			
	Point	4 North Wall Vents - Exhaust flow rates different Winter vs Summer	24h/24h - 12 months per year			
	Point	4 Roof Exhausts	24h/24h - 5 months/year (winter)			
	Point	2 drum filter vacuum pumps vents and one pan filter suction blower vent	24h/24h - 12 months per year			
	Point	Dust Collector - Bin vent	24h/24h - 12 months per year			
		Lighting Plants: Magnum MLT3060	24h/24h - 12 months per year	0.002	0.1	0.2%
		6" Dewatering Pumps: Godwin Dri-Prime CD150M	24h/24h - 12 months per year	0.004	0.1	0.3%
		Locomotives at rail loop	7 ore train/wk (16h/tr.) 2 freight trains/wk	0.02	0.4	0.86%
		Accurassay Laboratory	24h/24h - 12 months per year	0.00	0.0	0.0%

TOTAL ANNUAL EMISSIONS - DSO3	**--**	**41.9**	**100%**

AIR EMISSIONS INVENTORY - TSMC DSO3 / DSO4 / HOWSE

Source ID used for modeling (blank if not modeled)	Source Type	Description of Source	Schedule of operation for modeling	Hydrocarbons		
				g/s	tonnes/yr	Contribution to the yearly emission total (%)
HOWSE						
	Volume	Howse Mini Plant operations before dryer: Unloading/Crushing/Conveyors	24h/24h - 7 months/year (summer)			
	Volume	Howse Mini Plant operations after dryer: Conveyors/Screening/Crushing/Loading	24h/24h - 7 months/year (summer)			
	Volume	FN Quarry crushing facility	24h/24h - 7 months/year (summer)			
HOW_Dry	Point	Dryer 1 located at HOWSE Mini Plant	24h/24h - 7 months/year (summer)	0.03	0.5	3.9%
HOW_Dry2	Point	Dryer 2 located at HOWSE Mini Plant	24h/24h - 7 months/year (summer)	0.03	0.5	3.9%
RH_OB_xx	Surface	Roads between Howse pit to OB (2 Km)	24h/24h - 5 months/year (winter)	0.11	1.5	11.4%
RH_WST_xx	Surface	Roads between Howse pit to waste (0.6 Km)	24h/24h - 7 months/year (summer)	0.02	0.3	2.1%
RH_00A, 01 to 11	Surface	Road for Howse Ore/Waste transport from Howse Pit to Howse waste dump (2.4 Km)	24h/24h - 7 months/year (summer)	0.11	2.0	15.1%
RH_12 to 25	Surface	Road for Howse Ore/FN Quarry sand transport (2.8 Km)	24h/24h - 7 months/year (summer)	0.05	1.0	7.7%
RH_26 to 29	Surface	Roads between Howse Pit to Howse MiniPlant (Ore transport) (0.8 Km)-In	24h/24h - 7 months/year (summer)	0.02	0.3	2.2%
RH_30 to 35	Surface	Roads between Howse Pit to Howse MiniPlant (Ore transport) (1.2 Km)-In and Out	24h/24h - 7 months/year (summer)	0.05	0.9	6.6%
RQUA_xx	Surface	First Nations Quarry to main road (10 wheeler) (0.6 Km)	24h/24h - 7 months/year (summer)	0.00005	0.0	0.0%
RFN_xx	Surface	First Nations Quarry to site main gate (10 wheeler) (3.6 Km)	24h/24h - 7 months/year (summer)	0.00029	0.0	0.0%
GENHOW_1	Point	Generator at Howse Mini Plant-2 MW	24H/24h-7 months per year	0.19	3.5	26.9%
GENQUA	Point	Generator at FN quarry crushing facility : CAT 275ekW	24H/24h-7 months per year	0.01	0.1	1.0%
	Volume	HOWSE pit blast	12 months- 1 blast/week in summer and 1 blast/month winter (Total 33 blasts/yr)	0.00	0.0	0.0%
	Surface	HOWSE OB/Waste dump: Unloading/Erosion	24H/24h-12 months per year			
SP_HOW	Surface	Stockpiles of final product, near Howse Mini Plant	24H/24h-12 months per year			
HOWSE	Surface	Howse pit: Drilling/Excavation/Loading/Engines (Truck+2 Excavators +Loader+Drill)	24H/24h-12 months per year	0.08	2.5	19.1%
			TOTAL ANNUAL EMISSIONS - HOWSE	**--**	**13.1**	**100%**
DSO4 *						
R_KIV_xx	Surface	Ore from DSO4 (hauling trucks) + pickups (9.6 Km)	24h/24h - 12 months per year	0.25	7.8	100%
			TOTAL ANNUAL EMISSIONS - DSO4 *	**--**	**7.8**	**100%**

* Includes only portion of Goodwood road located within the air quality modeling perimeter for the Howse EIS

Appendix K
Annual Fuel Usage Inventory - Detailed Tables of Results

ANNUAL FUEL USAGE - DSO3 / HOWSE / DSO4

For sources located within the Air Quality Modelling Perimeter as part of the Howse Environmental Impact Statement for the CEAA

SUMMARY

Total Diesel Usage (L/year)						
HOWSE	**L/yr**	**DSO3**	**L/yr**	**DSO4 and FN Quarry**	**L/yr**	
Howse Mini Plant	21,033,917	MAIN PLANT	26,072,640	Goodwood Road from/to DSO4 (Kivivic Pits) - Hauling trucks and Pickups *	5,012,539	
HOWSE Hauling trucks	3,261,224	Workers' Camp	4,493,880	Diesel Generator at FN Quarry	703,428	
HOWSE Pit Mining Activities	1,151,064	Plant 2	25,973,172	FN Quarry Hauling Trucks (10 wheelers only)	794,128	
		DSO3 Hauling trucks and pickups travels for field personnel	585,143			
		Diesel Generator (157.5 ekW) Batch Plant	439,752			
		Fleming 7N Pit - Mining Activities	920,851			**Total**
SUM HOWSE=	**25,446,205**	**SUM DSO3=**	**58,485,438**	**SUM DSO4 and FN Quarry**	**6,510,095**	**90,441,738**

A- HOWSE ACTIVITIES

Howse Mini Plant							
Emission Source ID	Description	Unit	Operation schedule	L/HR	HR/YR	L/YR	Notes
GENHOW_1	2MW Diesel Generator - HOWSE Mini Plant	1	24h/24h - 7 months per year	397	5110	2,028,670	Assumes continuous operation at 100% generator load
How_Dry	Diesel burner for ore dryer (125 MMBtu/hr)	1	24h/24h - 7 months per year	3719	5110	9,502,624	Assumes an average burner firing rate of 50% over the operating period
How_Dry2	Diesel burner for ore dryer (125 MMBtu/hr)	1	24h/24h - 7 months per year	3719	5110	9,502,624	Assumes an average burner firing rate of 50% over the operating period
					SUM=	21,033,917	

HOWSE Hauling trucks								
Emission Source ID	Description **	Trips/yr	Speed (km/h)	L/HR	Length of each trip (km)	Time/trip (hr)	Hours for all trips/year	L/YR
RH_OB_xx	Hauling Trucks - Howse Main road to Howse O.B	211,802	35	78.55	2	0.057	12103	950,688
RH_WST_xx	Hauling Trucks - Howse Main road to Howse Waste	124,016	35	78.55	0.6	0.017	2126	166,996
RH_00A, 01 to 11	Hauling Trucks - Howse pit to Howse Main road & Portion of Howse Main road	124016 (Howse pit to waste) 211802 (Howse pit to O.B)	35	78.55	2.4	0.069	10805	848,759
RH_12 to 25	Howse Main Road (close to Howse Waste) to Main Plant	96,154	35	78.55	2.8	0.08	7692	604,231
RH_26 to 29	Hauling Trucks - Main Plant to Rail loop	96,154	35	78.55	0.8	0.023	2198	172,637
RH_30 to 35	Hauling Trucks - Rail loop to Howse Mini Plant	192,308	35	78.55	1.2	0.034	6593	517,912
							SUM=	3,261,224

** Corresponds to road segments used in the air modeling study for the Howse EIS

Howse Pit Mining Equipment Group						
Emission Source ID	Description	Units in group	Operation schedule	L/HR/Unit	HR/YR	L/YR
HOWSE	HOWSE Pit Mining Activities	Truck+Excav+Excav+Loader+Drill (5 units)	24h/24h - 12 months per year	26.28	8760	1,151,064
					SUM=	1,151,064

B- DSO3 ACTIVITIES

MAIN PLANT							
Source of Emission	Description	Unit	Operation schedule	L/HR	HR/YR	L/YR	Notes
	Gen Set in Drying Mode (2825 ekW each)	5	24h/24h - 7 months/year (Oct. to April)	517	5040	13,023,360	Drying Mode = 5 generators at 75% load
S1_W	Rotary Dryer (61 MMBtu/hr)	1	24h/24h - 7 months/year (Oct. to April)	1710	3600	6,156,000	Assumes continuous operation with the burner at 61 MMBtu/hr (70% of max capacity)
	Flash Dryer (50 MMBtu/hr)	1	24h/24h - 7 months/year (Oct. to April)	1398	3600	5,032,800	Assumes continuous operation with the burner at 50 MMBtu/hr (68% of max capacity)
S1_S	Gen Set in No Drying Mode (2825 ekW each)	3	24h/24h - 5 months/year (May to Sept.)	517	3600	1,860,480	No Drying Mode = 3 generators at 75% load
					SUM=	26,072,640	

Workers' Camp							
Emission Source ID	Description	Unit	Operation schedule	L/HR	HR/YR	L/YR	Notes
GENCP_1-2-3	Diesel Generators #1, 2, 3 (275 ekW each)	3	24h/24h - 12 months per year	80.3	8760	2,110,284	Conservatively assumes 100% generator load and all 4 generators operating continuously.
GENCP_4	Diesel Generator #4 (1000 ekW)	1	24h/24h - 12 months per year	272.1	8760	2,383,596	
					SUM=	4,493,880	

Plant 2							
Emission Source ID	Description	Unit	Operation schedule	L/HR	HR/YR	L/YR	Notes
GENP2_1	2MW Diesel Generator - Plant 2	1	24h/24h - 12 months per year	397	8760	3,477,720	Assumes operation at 75% generator load
GENMIX	Diesel Generator (182 ekW) Mixer	1	24h/24h - 12 months per year	38.90	8760	340,764	Assumes operation at 80% generator load
Dryer	Diesel burner for ore dryer (170 MMBtu/hr)	1	24h/24h - 12 months per year	5058	8760	22,154,688	Assumes an average burner firing rate of 50% over the operating period
					SUM=	25,973,172	

B- DSO3 ACTIVITIES (CONT'D)

DSO3 Hauling trucks and pickups travels for field personnel								
Emission Source ID	Description **	Trips/yr	Speed (km/h)	L/HR	Length of each trip (km)	Time/trip (hr)	Hours for all trips/year	L/YR
RF7WST_xx	Hauling Trucks - F7 to O.B/WST	82,682	35	70.66	0.8	0.023	1890	133,539
RF7_xx	Hauling Trucks - F7 to Plant 2	40,331	35	70.66	1	0.029	1152	81,423
RP2_xx	Hauling Trucks - Plant 2 to Rail loop	127,418	35	70.66	1.2	0.034	4369	308,686
Emission Source ID	Description	No of trip/yr	Speed (km/h)	L/Km	Length of each trip (km)	km/year		L/YR
RPK_xx	Main Plant to site main gate (travelled by pick-ups)	109,500	50	0.156	3.6	394200		61,495
							SUM=	585,143

** Corresponds to road segments used in the air modeling study for the Howse EIS

BATCH PLANT							
Emission Source ID	Description	Unit	Operation schedule	L/HR	HR/YR	L/YR	Notes
GENBATCH	Diesel Generator (157.5 ekW) Batch Plant	1	24h/24h - 12 months per year	50.2	8760	439,752	Assumes operation at 100% load
					SUM=	439,752	

Fleming 7N Pit Mining Equipment Group						
Emission Source ID	Description	Units in group	Operation schedule	L/HR/Unit	HR/YR	L/YR
F7N	Fleming 7N Pit - Mining Activities	Truck+Excav+Loader+Drill (4 units)	24h/24h - 12 months per year	26.28	8760	920,851
					SUM=	920,851

C- DSO4* AND FIRST NATION QUARRY

Goodwood Road from/to DSO4 (Kivivic Pits) - Hauling trucks and Pickups *										
Emission Source ID	Description	Vehicle Type	Speed (km/h)	L/HR	Length of each trip (km)	No of trip/yr	Time/trip (hr)	Hours for all trips/year	km/year	L/YR
R_KIV_xx	Goodwood Road from DSO4 (Kivivic)*	Kivivic Ore Hauling trucks	35	78.55	9.6	230,750	0.274	63291	---	4,971,542
		Pickups	50	0.156 (L/km)	9.6	27375	0.192	---	262800	40,997
									SUM=	5,012,539

** Considers transport on the section of the Goodwood Road located within the air quality modeling perimeter only ,which corresponds to a length of 9.6 km. Excludes the additional 11 km (approx) of road to reach DSO4 deposits and excludes DSO4 mining activities*

FN Quarry Diesel Generator							
Emission Source ID	Description	Unit	Operation schedule	L/HR	HR/YR	L/YR	Notes
GENQUA	Diesel Generator (275 ekW) at FN Quarry	1	24h/24h - 7 months per year	80.3	8760	703,428	Assumes operation at 100% load
					SUM=	703,428	

FN Quarry Hauling Trucks (10 wheelers only)								
Emission Source ID	Description	Speed (km/h)	L/HR	Length of each trip (km)	No of trip/yr	Time/trip (hr)	Hours for all trips/year	L/YR
RH_12 to 25	Howse Waste to Main Plant	35	45.35	2.8	10,000	0.08	800	36280
RQUA_xx	FN Quarry to Howse Main road	35	45.35	0.6	10,000	0.017	171	7774
RFN_xx	Main Plant to site main gate	35	45	4	10,000	0.1029	1,029	46,646
							SUM=	794,128

Appendix L
Complete Tables of Results
“WITH Blasts” Scenario

WITH BLASTS

	TPM	TPM	TPM	PM10	PM10	PM10	PM2.5	PM2.5	PM2.5	SO2	SO2	SO2	SO2	NO2	NO2	NO2	CO	CO
Pollutant	TPM	TPM	TPM	PM10	PM10	PM10	PM2.5	PM2.5	PM2.5	SO2	SO2	SO2	SO2	NO2	NO2	NO2	CO	CO
Averaging Period	1-yr	24-hr	1-hr	1-yr	24-hr	1-hr	1-yr	24-hr	1-hr	1-yr	24-hr	3-hr	1-hr	1-yr	24-hr	1-hr	8-hr	1-hr
Selected Air Quality Assessement Criteria for Howse	**60**	**120**	**--**	**--**	**50**	**--**	**8.8**	**25**	**--**	**52**	**288**	**600**	**900**	**100**	**200**	**400**	**12700**	**34000**
BACKGROUND CONCENTRATIONS - PRE-DSO3	**8**	**40**	**97**	**4**	**20**	**49**	**3**	**15**	**37**	**2**	**10**	**18**	**24**	**10**	**30**	**50**	**400**	**600**

DSO3 + DSO4 ONLY

ID	Description	UTM Coordinates	Distance From Howse	TPM 1-yr	TPM 24-hr	TPM 1-hr	PM10 1-yr	PM10 24-hr	PM10 1-hr	PM2.5 1-yr	PM2.5 24-hr	PM2.5 1-hr	SO2 1-yr	SO2 24-hr	SO2 3-hr	SO2 1-hr	NO2 1-yr	NO2 24-hr	NO2 1-hr	CO 8-hr	CO 1-hr
			Assessment Criteria	60	120	--	--	50	--	8.8	25	--	52	288	600	900	100	200	400	12700	34000
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	0.1	1.2	6.0	0.0	0.6	4.4	0.0	0.4	1.6	0.0	0.2	1.1	1.8	0.2	9.0	37.5	35.6	141.8
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	0.1	1.2	6.9	0.0	0.6	4.3	0.0	0.4	1.5	0.0	0.1	1.1	1.8	0.2	9.3	36.5	35.3	141.9
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	0.1	1.1	5.4	0.0	0.6	4.7	0.0	0.4	1.6	0.0	0.2	1.2	1.9	0.2	9.3	37.0	36.6	142.3
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	0.1	1.2	6.7	0.0	0.5	4.6	0.0	0.4	1.4	0.0	0.2	1.2	1.9	0.2	9.1	26.8	36.2	142.7
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	0.1	1.5	7.8	0.0	0.5	4.1	0.0	0.3	1.4	0.0	0.1	1.1	1.8	0.2	7.9	31.8	33.3	138.7
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	0.1	1.6	9.8	0.0	0.6	4.2	0.0	0.4	1.7	0.0	0.1	1.0	1.6	0.3	9.4	43.3	33.2	139.3
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	0.1	1.4	15.8	0.0	0.9	13.0	0.0	0.5	2.3	0.0	0.3	2.3	6.0	0.4	10.6	56.0	43.6	259.6
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	0.1	1.1	8.0	0.0	0.7	7.2	0.0	0.5	1.9	0.0	0.1	0.8	2.4	0.3	12.6	50.5	24.5	111.4
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	0.4	6.2	73.5	0.2	4.1	64.2	0.1	2.6	7.2	0.0	1.7	12.8	28.5	1.5	63.2	191.9	207.7	1138.9
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	0.3	3.6	19.1	0.1	1.4	17.9	0.0	0.9	2.5	0.0	0.6	4.6	7.9	0.7	20.0	61.4	72.0	350.1
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	0.2	2.5	25.2	0.1	1.6	22.5	0.0	0.9	2.4	0.0	0.7	5.2	9.9	0.6	20.0	74.8	83.7	517.7
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	0.2	3.0	39.0	0.1	2.5	32.3	0.1	1.3	5.3	0.0	1.0	4.9	14.7	1.2	28.4	115.9	121.1	549.4
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	0.3	5.1	24.4	0.1	1.9	18.7	0.0	0.8	2.4	0.0	0.5	4.1	8.2	0.7	19.8	64.1	74.6	364.9
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	0.0	0.9	5.0	0.0	0.4	3.2	0.0	0.3	1.2	0.0	0.1	0.7	1.4	0.2	6.6	31.5	22.0	101.4
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	0.1	1.1	11.9	0.0	0.7	9.8	0.0	0.3	1.5	0.0	0.3	1.8	4.3	0.4	8.5	34.5	34.0	170.6
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	0.9	7.1	28.0	0.4	2.6	18.1	0.1	1.1	3.8	0.0	0.6	3.9	8.2	1.7	24.5	83.7	81.0	293.2
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	0.1	1.4	14.6	0.0	1.0	13.8	0.0	0.3	1.3	0.0	0.4	3.0	6.0	0.3	7.2	46.8	62.6	285.4
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	1.7	36.6	634.3	1.1	26.3	455.2	0.4	5.5	29.4	0.1	11.6	68.3	205.0	8.8	119.0	1428.5	1260.4	7378.7
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	0.1	2.0	34.6	0.1	1.7	30.2	0.0	0.4	2.4	0.0	0.7	5.0	13.2	0.3	10.5	101.9	91.1	550.7
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	0.1	1.8	30.2	0.1	1.5	26.1	0.0	0.4	2.0	0.0	0.6	4.2	11.6	0.4	9.9	86.8	76.9	457.4
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	0.0	0.8	5.0	0.0	0.4	4.9	0.0	0.1	0.5	0.0	0.1	0.9	2.2	0.1	3.1	17.2	18.1	97.6
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	0.1	1.3	6.2	0.0	0.7	5.1	0.0	0.4	1.8	0.0	0.2	1.3	2.1	0.3	9.2	46.2	37.3	141.1
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	0.5	4.2	24.1	0.2	1.9	11.5	0.1	0.6	2.2	0.0	0.3	2.0	4.0	0.9	15.0	43.5	35.9	164.0
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	0.4	4.7	30.9	0.2	2.6	22.2	0.1	1.5	6.9	0.0	0.7	5.1	9.4	1.5	39.5	183.6	88.9	413.3
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	0.1	0.9	13.5	0.0	0.7	10.5	0.0	0.3	1.3	0.0	0.3	2.2	4.4	0.3	6.0	50.3	35.5	166.4
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	0.1	0.8	13.2	0.0	0.6	10.8	0.0	0.2	1.1	0.0	0.3	1.8	4.7	0.3	4.7	41.9	29.4	178.2
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	0.1	0.8	15.3	0.0	0.6	12.6	0.0	0.2	1.2	0.0	0.3	1.8	5.5	0.3	4.5	45.5	31.6	208.3
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	0.0	0.7	14.4	0.0	0.6	11.9	0.0	0.1	1.0	0.0	0.2	1.7	5.2	0.2	3.6	43.6	28.4	197.4
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	0.0	0.7	12.8	0.0	0.6	10.3	0.0	0.1	0.9	0.0	0.2	1.5	4.5	0.2	3.4	38.4	25.8	171.0
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	0.0	0.9	18.0	0.0	0.8	14.6	0.0	0.2	1.1	0.0	0.3	2.2	6.4	0.2	4.1	48.1	35.8	242.2
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	0.1	1.5	27.3	0.0	1.3	21.8	0.0	0.2	1.7	0.0	0.5	4.1	9.5	0.3	5.7	72.1	75.3	405.9
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	0.1	0.7	12.7	0.0	0.6	10.0	0.0	0.2	0.9	0.0	0.2	1.8	4.4	0.2	4.8	34.1	26.3	166.0
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	0.1	1.1	7.8	0.0	0.7	7.1	0.0	0.5	2.5	0.0	0.1	0.9	2.2	0.3	13.0	56.8	26.9	103.7
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	0.1	1.0	6.7	0.0	0.7	5.1	0.0	0.5	1.9	0.0	0.1	1.2	2.7	0.3	11.4	47.5	29.2	115.6
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	0.1	1.1	11.0	0.0	1.0	9.4	0.0	0.7	2.9	0.0	0.2	1.3	4.0	0.4	16.9	73.0	25.9	162.2
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	0.0	0.2	3.3	0.0	0.1	2.4	0.0	0.1	0.2	0.0	0.0	0.3	1.0	0.1	1.8	10.4	5.3	38.0
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	0.0	0.4	3.4	0.0	0.2	2.8	0.0	0.1	0.4	0.0	0.1	0.6	1.2	0.1	3.1	10.0	20.7	76.8
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	0.0	0.5	6.0	0.0	0.3	4.9	0.0	0.2	0.4	0.0	0.1	0.9	2.1	0.2	4.3	18.2	26.2	101.2
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	0.0	0.6	7.3	0.0	0.4	6.0	0.0	0.2	0.5	0.0	0.1	1.1	2.6	0.2	4.6	22.0	28.7	112.8
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	3.7	97.1	1869.6	2.1	70.6	1349.1	0.7	7.7	87.9	0.4	31.3	202.9	608.5	19.3	283.3	2961.1	3422.5	21957.0
--	"Off-Property Limit" Maximum - Quebec	625.62 , 6083.39	--	11.0	211.3	4238.1	6.4	137.1	2674.8	1.1	14.2	170.6	2.3	58.1	402.0	1206.0	21.3	333.7	5339.8	6291.5	42341.0
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	619.00 , 6090.50	--	9.8	105.8	1468.6	3.6	44.9	927.6	0.9	8.2	59.6	0.3	19.5	139.1	417.1	14.2	175.9	2161.0	2101.6	14721.0

- all values in µg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

WITH BLASTS

HOWSE ONLY

ID	Name	UTM Coordinates	Distance From Howse	TPM	TPM	TPM	PM10	PM10	PM10	PM2.5	PM2.5	PM2.5	SO2	SO2	SO2	SO2	NO2	NO2	NO2	CO	CO
			Averaging Period	1-yr	24-hr	1-hr	1-yr	24-hr	1-hr	1-yr	24-hr	1-hr	1-yr	24-hr	3-hr	1-hr	1-yr	24-hr	1-hr	8-hr	1-hr
			Assessment Criteria	60	120	--	--	50	--	8.8	25	--	52	288	600	900	100	200	400	12700	34000
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	0.1	3.8	68.9	0.1	3.4	62.8	0.0	0.3	5.2	0.0	1.4	11.3	25.6	0.2	11.6	204.0	218.7	1397.6
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	0.1	3.3	61.3	0.1	3.0	56.1	0.0	0.3	4.8	0.0	1.2	9.9	22.7	0.2	10.3	182.2	197.4	1279.1
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	0.1	4.2	72.1	0.1	3.8	65.3	0.0	0.3	5.2	0.0	1.6	12.5	27.0	0.2	12.7	213.7	228.2	1390.7
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	0.1	3.3	70.7	0.1	3.0	64.9	0.0	0.2	4.4	0.0	1.2	9.8	27.5	0.2	9.9	213.9	161.5	1174.0
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	0.1	3.6	77.9	0.1	3.3	72.1	0.0	0.2	5.0	0.0	1.4	10.6	30.4	0.1	11.1	240.1	182.8	1335.4
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	0.1	2.3	50.4	0.1	2.2	46.6	0.0	0.2	3.7	0.0	0.9	6.8	19.6	0.2	7.3	154.9	143.0	979.2
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	0.1	2.6	54.1	0.1	2.4	50.6	0.0	0.2	3.7	0.0	1.0	7.5	21.9	0.2	8.4	173.6	161.1	990.7
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	0.1	1.7	15.8	0.0	1.1	14.5	0.0	0.2	1.4	0.0	0.4	2.5	5.8	0.1	3.2	45.1	69.6	380.3
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	1.4	41.0	750.0	0.8	29.2	529.1	0.1	1.9	32.9	0.2	13.1	104.4	237.4	2.2	90.7	1586.9	1419.2	8569.9
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	0.9	33.4	622.4	0.5	25.9	452.8	0.1	1.8	28.3	0.1	11.2	89.7	197.1	1.5	72.2	1293.3	1285.2	7386.2
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	0.7	17.7	276.0	0.4	14.2	186.8	0.1	1.0	12.1	0.1	6.2	49.5	81.8	1.2	44.1	608.4	713.4	3139.3
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	0.2	5.0	96.5	0.1	4.0	77.4	0.0	0.3	4.9	0.0	1.7	13.8	34.2	0.4	14.1	257.6	196.7	1296.6
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	0.8	45.6	709.0	0.5	36.1	564.0	0.1	2.6	36.2	0.1	15.5	124.0	247.6	1.6	101.3	1523.6	1774.0	9409.3
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	0.0	1.3	29.2	0.0	1.2	26.0	0.0	0.1	1.9	0.0	0.5	3.8	10.8	0.1	4.2	85.7	74.6	507.1
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	0.1	1.0	21.0	0.0	0.9	18.0	0.0	0.1	1.2	0.0	0.4	2.7	7.7	0.1	3.1	60.3	47.7	319.6
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	0.5	14.7	263.9	0.3	10.3	185.4	0.1	0.6	11.5	0.1	4.6	36.5	82.6	0.9	35.5	635.8	496.9	3000.1
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	0.2	13.8	230.8	0.1	12.1	203.0	0.0	0.8	13.2	0.0	5.2	41.6	87.5	0.4	37.6	625.6	631.1	3539.2
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	1.4	12.1	190.9	0.7	10.5	174.0	0.2	3.4	11.8	0.0	4.4	35.3	78.7	2.2	52.2	609.2	522.6	3092.7
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	0.1	1.3	20.2	0.0	0.9	16.2	0.0	0.2	1.1	0.0	0.4	3.1	7.0	0.1	3.4	55.7	58.3	272.3
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	0.1	1.7	19.6	0.0	1.0	18.1	0.0	0.2	1.2	0.0	0.4	3.0	7.9	0.1	3.3	63.6	59.2	323.9
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	0.0	1.4	29.5	0.0	1.2	26.4	0.0	0.1	1.8	0.0	0.5	3.9	10.9	0.1	4.2	87.1	68.9	485.2
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	0.1	4.9	89.1	0.1	4.4	81.0	0.0	0.4	6.5	0.0	1.8	14.6	33.2	0.2	14.8	261.0	276.7	1772.3
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	0.2	8.1	101.7	0.1	6.5	82.8	0.0	0.5	5.3	0.0	2.8	22.7	36.8	0.4	21.4	252.5	322.1	1390.8
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	1.0	33.8	694.4	0.6	20.3	420.2	0.1	1.8	24.8	0.1	8.9	71.4	188.1	1.8	56.6	1181.2	939.4	6599.8
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	0.1	1.0	14.4	0.0	0.7	12.5	0.0	0.1	1.0	0.0	0.3	1.9	5.4	0.1	2.5	42.9	40.7	278.2
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	0.0	1.0	13.6	0.0	0.7	11.8	0.0	0.1	1.0	0.0	0.3	1.7	5.1	0.1	2.5	40.7	37.1	261.8
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	0.0	1.0	12.5	0.0	0.7	10.9	0.0	0.1	0.9	0.0	0.3	1.6	4.7	0.1	2.4	37.7	36.2	232.6
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	0.0	0.8	10.9	0.0	0.6	9.3	0.0	0.1	0.8	0.0	0.3	1.4	4.1	0.1	2.1	33.3	31.4	201.3
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	0.0	0.8	9.9	0.0	0.6	8.5	0.0	0.1	0.7	0.0	0.2	1.3	3.8	0.1	2.0	30.3	29.3	177.7
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	0.0	0.6	11.3	0.0	0.5	10.0	0.0	0.1	0.8	0.0	0.2	1.5	4.4	0.1	1.9	35.8	31.3	203.7
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	0.0	1.0	17.9	0.0	0.8	15.3	0.0	0.1	1.0	0.0	0.4	2.3	6.8	0.1	2.9	54.7	45.9	267.2
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	0.0	0.5	10.4	0.0	0.5	8.3	0.0	0.1	0.5	0.0	0.2	1.7	3.6	0.1	1.9	28.9	23.3	136.9
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	0.1	2.8	32.8	0.1	2.1	29.6	0.0	0.3	2.1	0.0	0.9	4.8	12.7	0.1	6.8	100.0	128.6	529.8
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	0.1	7.5	97.2	0.1	6.6	86.4	0.0	0.5	5.9	0.0	2.8	21.0	37.4	0.2	21.8	286.4	370.2	1564.0
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	0.1	2.6	42.7	0.1	2.5	40.9	0.0	0.3	4.5	0.0	0.8	5.4	13.7	0.2	6.9	108.6	217.6	1257.2
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	0.0	0.2	3.2	0.0	0.2	2.7	0.0	0.0	0.2	0.0	0.1	0.5	1.2	0.0	0.7	9.6	15.6	54.5
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	0.0	0.3	4.3	0.0	0.2	3.7	0.0	0.1	0.3	0.0	0.1	0.5	1.6	0.0	0.8	13.2	11.3	70.1
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	0.0	0.4	5.8	0.0	0.3	5.0	0.0	0.1	0.3	0.0	0.1	0.7	2.1	0.0	1.1	17.5	13.5	85.1
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	0.0	0.6	6.7	0.0	0.4	5.7	0.0	0.1	0.4	0.0	0.1	0.8	2.5	0.0	1.2	20.0	14.9	94.6
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	1.7	17.9	136.9	0.8	8.4	120.8	0.2	2.7	12.3	0.0	3.3	26.3	52.6	2.3	43.2	413.9	388.4	2068.5
--	"Off-Property Limit" Maximum - Quebec	624.33 , 6084.64	--	3.3	54.8	609.4	1.5	27.0	430.0	0.3	5.8	26.3	0.1	10.4	83.2	191.9	4.3	83.8	1459.8	1135.8	6955.0
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	618.55 , 6086.66	--	5.3	123.6	2552.2	2.8	83.4	1714.1	0.5	10.7	103.9	0.7	37.0	295.5	769.4	7.6	196.3	3525.5	3975.8	27484.0

HOWSE ONLY

- all values in $\mu g/m^3$, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

WITH BLASTS

DSO3 + DSO4 + HOWSE

ID	Name	UTM Coordinates	Distance From Howse	TPM	TPM	TPM	PM10	PM10	PM10	PM2.5	PM2.5	PM2.5	SO2	SO2	SO2	SO2	NO2	NO2	NO2	CO	CO
			Averaging Period	1-yr	24-hr	1-hr	1-yr	24-hr	1-hr	1-yr	24-hr	1-hr	1-yr	24-hr	3-hr	1-hr	1-yr	24-hr	1-hr	8-hr	1-hr
			Assessment Criteria	60	120	--	--	50	--	8.8	25	--	52	288	600	900	100	200	400	12700	34000
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	0.1	3.9	69.9	0.1	3.6	63.8	0.0	0.5	5.6	0.0	1.4	11.4	25.8	0.4	12.8	208.5	226.8	1423.6
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	0.1	3.5	62.3	0.1	3.2	57.1	0.0	0.5	5.1	0.0	1.3	10.0	22.9	0.4	11.5	186.7	205.4	1305.0
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	0.1	4.3	73.1	0.1	3.9	66.2	0.0	0.4	5.5	0.0	1.6	12.6	27.2	0.4	13.9	217.8	236.4	1416.0
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	0.1	3.8	75.0	0.1	3.5	69.2	0.0	0.5	5.1	0.0	1.4	11.0	29.0	0.4	12.4	227.7	197.6	1316.6
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	0.1	4.1	82.1	0.1	3.8	76.2	0.0	0.5	5.7	0.0	1.5	11.7	31.9	0.4	13.6	253.5	216.2	1474.1
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	0.1	2.9	54.5	0.1	2.6	50.7	0.0	0.5	4.1	0.0	1.0	7.9	21.1	0.4	11.2	168.2	151.3	1004.5
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	0.2	2.6	54.1	0.1	2.4	50.6	0.0	0.5	3.7	0.0	1.0	7.5	21.9	0.5	10.6	174.0	161.5	991.9
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	0.1	2.8	17.2	0.1	1.8	16.0	0.0	0.6	2.4	0.0	0.4	2.8	6.0	0.4	13.0	54.2	78.3	381.9
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	1.8	41.0	750.0	1.0	29.2	529.1	0.2	2.6	32.9	0.2	13.1	104.4	237.4	3.7	91.0	1586.9	1419.2	8569.9
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	1.1	34.8	636.4	0.6	27.2	466.2	0.1	1.9	29.9	0.1	11.7	93.7	203.0	2.2	77.6	1341.3	1356.9	7700.6
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	1.0	18.2	276.0	0.5	14.6	189.1	0.1	1.2	12.4	0.1	6.3	50.3	82.8	1.8	48.3	608.7	730.1	3191.8
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	0.4	5.0	96.6	0.2	4.0	77.5	0.1	1.3	5.4	0.0	1.7	13.8	34.2	1.5	28.9	258.3	197.1	1297.0
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	1.1	47.3	728.9	0.6	37.5	582.7	0.1	2.8	37.8	0.1	16.0	128.1	255.7	2.3	106.9	1587.7	1848.6	9774.2
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	0.1	1.6	30.1	0.0	1.5	28.4	0.0	0.4	2.4	0.0	0.6	4.4	11.7	0.3	8.6	95.1	96.6	608.4
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	0.1	1.9	21.0	0.1	1.1	18.0	0.0	0.4	1.6	0.0	0.4	2.7	7.7	0.5	9.0	60.8	49.6	322.0
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	1.5	14.8	263.9	0.7	10.4	185.5	0.1	1.1	11.6	0.0	4.6	36.5	82.6	2.5	39.6	637.9	499.4	3001.4
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	0.3	14.8	236.4	0.2	13.1	208.5	0.0	0.9	14.1	0.0	5.6	44.6	89.5	0.7	41.2	643.9	693.7	3693.1
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	3.1	36.8	634.3	1.7	26.5	455.2	0.6	5.5	29.4	0.1	11.6	68.3	205.0	10.9	119.1	1428.5	1260.4	7378.7
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	0.1	2.4	34.7	0.1	2.1	30.3	0.0	0.4	2.4	0.0	0.9	5.1	13.2	0.5	10.7	102.5	120.4	551.4
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	0.2	3.0	30.3	0.1	2.0	26.2	0.0	0.4	2.0	0.0	0.8	4.4	11.6	0.5	10.0	87.5	115.4	458.0
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	0.1	1.9	30.2	0.0	1.5	27.1	0.0	0.2	1.9	0.0	0.6	4.8	11.2	0.2	6.2	89.6	84.9	504.4
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	0.2	5.0	90.2	0.1	4.6	82.0	0.0	0.5	6.9	0.0	1.9	14.8	33.5	0.4	16.3	266.0	285.8	1799.6
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	0.7	8.2	101.8	0.3	6.6	82.8	0.1	0.6	5.3	0.0	2.8	22.7	36.8	1.2	21.8	252.9	322.6	1391.0
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	1.3	33.8	694.5	0.8	20.4	420.2	0.2	2.6	24.8	0.1	8.9	71.4	188.1	3.2	57.4	1182.0	940.0	6600.3
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	0.1	1.6	14.6	0.1	1.1	12.7	0.0	0.3	1.4	0.0	0.4	2.2	5.4	0.4	7.4	50.6	53.0	279.1
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	0.1	1.4	13.7	0.1	0.8	11.9	0.0	0.2	1.3	0.0	0.3	1.9	5.1	0.3	5.2	42.0	50.0	262.8
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	0.1	1.5	15.4	0.1	1.1	12.7	0.0	0.2	1.2	0.0	0.5	2.7	5.5	0.3	5.5	46.0	55.2	233.8
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	0.1	1.3	14.4	0.1	1.1	12.0	0.0	0.2	1.1	0.0	0.5	2.6	5.2	0.3	4.8	44.0	54.5	202.6
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	0.1	1.3	12.8	0.1	1.1	10.4	0.0	0.2	1.0	0.0	0.4	2.4	4.5	0.3	4.5	38.7	51.7	179.1
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	0.1	1.5	18.1	0.0	1.3	14.6	0.0	0.2	1.1	0.0	0.5	3.0	6.4	0.3	4.9	48.4	60.8	242.4
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	0.1	2.3	27.3	0.1	1.9	21.8	0.0	0.3	1.8	0.0	0.8	4.7	9.5	0.4	7.4	72.5	104.0	406.5
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	0.1	1.0	12.7	0.1	0.7	10.0	0.0	0.2	0.9	0.0	0.3	1.8	4.4	0.3	4.8	34.1	32.9	166.0
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	0.1	3.8	33.2	0.1	2.5	29.9	0.0	0.7	2.9	0.0	0.9	4.8	12.7	0.5	16.1	101.5	129.5	532.2
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	0.2	7.6	97.4	0.1	6.7	86.6	0.0	0.5	6.0	0.0	2.8	21.0	37.4	0.5	22.4	287.3	370.8	1565.5
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	0.2	3.0	43.0	0.1	2.6	41.2	0.0	0.7	4.7	0.0	0.8	5.4	13.7	0.6	17.0	109.6	218.4	1259.0
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	0.0	0.3	3.3	0.0	0.2	2.7	0.0	0.1	0.3	0.0	0.1	0.5	1.2	0.1	2.1	10.4	15.8	54.9
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	0.0	0.6	4.4	0.0	0.4	3.8	0.0	0.1	0.4	0.0	0.1	0.7	1.6	0.2	3.4	15.8	21.9	77.0
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	0.0	0.9	6.0	0.0	0.6	5.1	0.0	0.2	0.5	0.0	0.2	1.0	2.1	0.2	4.5	23.0	28.0	101.4
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	0.0	1.2	7.4	0.0	0.7	6.0	0.0	0.2	0.6	0.0	0.2	1.1	2.6	0.2	4.7	24.3	31.3	113.0
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	5.1	97.1	1869.6	2.7	70.6	1349.1	0.8	7.7	87.9	0.4	31.3	202.9	608.5	20.7	285.8	2961.1	3422.5	21957.0
--	"Off-Property Limit" Maximum - Quebec	625.62 , 6083.39	--	11.5	211.4	4238.3	6.6	137.2	2675.0	1.2	14.2	170.7	2.3	58.2	402.0	1206.0	22.1	334.2	5341.0	6296.3	42342.0
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	622.24 , 6085.73	--	13.0	144.9	2552.7	5.1	83.7	1714.4	1.1	11.0	104.0	0.7	37.0	295.5	769.4	17.2	202.1	3527.3	3976.7	27485.0

DSO3 + DSO4 + HOWSE

- all values in μg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

WITH BLASTS

ALL: Background + DSO3 + DSO4 + HOWSE

ID	Name	UTM Coordinates	Distance From Howse	TPM	TPM	TPM	PM10	PM10	PM10	PM2.5	PM2.5	PM2.5	SO2	SO2	SO2	SO2	NO2	NO2	NO2	CO	CO
	Averaging Period			1-yr	24-hr	1-hr	1-yr	24-hr	1-hr	1-yr	24-hr	1-hr	1-yr	24-hr	3-hr	1-hr	1-yr	24-hr	1-hr	8-hr	1-hr
	Assessment Criteria			60	120	--	--	50	--	8.8	25	--	52	288	600	900	100	200	400	12700	34000
	Background concentration (Pre-DSO3)			8	40	97	4	20	49	3	15	37	2	10	18	24	10	30	50	400	600
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	8.1	43.9	167.3	4.1	23.6	112.5	3.0	15.5	42.1	2.0	11.4	29.3	50.2	10.4	42.8	258.5	626.8	2023.6
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	8.1	43.5	159.6	4.1	23.2	105.8	3.0	15.5	41.7	2.0	11.3	27.9	47.2	10.4	41.5	236.7	605.4	1905.0
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	8.1	44.3	170.5	4.1	23.9	114.9	3.0	15.4	42.0	2.0	11.6	30.5	51.6	10.4	43.9	267.8	636.4	2016.0
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	8.1	43.8	172.4	4.1	23.5	117.9	3.0	15.5	41.6	2.0	11.4	28.9	53.3	10.4	42.4	277.7	597.6	1916.6
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	8.1	44.1	179.5	4.1	23.8	124.9	3.0	15.5	42.2	2.0	11.5	29.6	56.2	10.4	43.6	303.5	616.2	2074.1
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	8.1	42.9	151.9	4.1	22.6	99.4	3.0	15.5	40.6	2.0	11.0	25.8	45.4	10.4	41.2	218.2	551.3	1604.5
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	8.2	42.6	151.5	4.1	22.4	99.3	3.0	15.5	40.2	2.0	11.0	25.4	46.2	10.5	40.6	224.0	561.5	1591.9
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	8.1	42.8	114.6	4.1	21.8	64.7	3.0	15.6	38.9	2.0	10.4	20.7	30.4	10.4	43.0	104.2	478.3	981.9
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	9.8	81.0	847.4	5.0	49.2	577.8	3.2	17.6	69.4	2.2	23.1	122.3	261.7	13.7	121.0	1636.9	1819.2	9169.9
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	9.1	74.8	733.8	4.6	47.2	514.9	3.1	16.9	66.4	2.1	21.7	111.6	227.4	12.2	107.6	1391.3	1756.9	8300.6
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	9.0	58.2	373.4	4.5	34.6	237.8	3.1	16.2	48.9	2.1	16.3	68.2	107.2	11.8	78.3	658.7	1130.1	3791.8
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	8.4	45.0	193.9	4.2	24.0	126.2	3.1	16.3	42.0	2.0	11.7	31.7	58.5	11.5	58.9	308.3	597.1	1897.0
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	9.1	87.3	826.3	4.6	57.5	631.4	3.1	17.8	74.3	2.1	26.0	146.0	280.1	12.3	136.9	1637.7	2248.6	10374.2
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	8.1	41.6	127.5	4.0	21.5	77.1	3.0	15.4	38.9	2.0	10.6	22.3	36.0	10.3	38.6	145.1	496.6	1208.4
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	8.1	41.9	118.4	4.1	21.1	66.7	3.0	15.4	38.1	2.0	10.4	20.6	32.0	10.5	39.0	110.8	449.6	922.0
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	9.5	54.8	361.3	4.7	30.4	234.2	3.1	16.1	48.1	2.1	14.6	54.4	107.0	12.5	69.6	687.9	899.4	3601.4
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	8.3	54.8	333.8	4.2	33.1	257.2	3.0	15.9	50.6	2.0	15.6	62.5	113.9	10.7	71.2	693.9	1093.7	4293.1
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	11.1	76.8	731.7	5.7	46.5	503.9	3.6	20.5	65.9	2.1	21.6	86.2	229.4	20.9	149.1	1478.5	1660.4	7978.7
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	8.1	42.4	132.0	4.1	22.1	79.0	3.0	15.4	38.9	2.0	10.9	23.0	37.6	10.5	40.7	152.5	520.4	1151.4
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	8.2	43.0	127.6	4.1	22.0	74.9	3.0	15.4	38.6	2.0	10.8	22.3	35.9	10.5	40.0	137.5	515.4	1058.0
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	8.1	41.9	127.6	4.0	21.5	75.8	3.0	15.2	38.5	2.0	10.6	22.7	35.5	10.2	36.2	139.6	484.9	1104.4
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	8.2	45.0	187.5	4.1	24.6	130.7	3.0	15.5	43.5	2.0	11.9	32.7	57.8	10.4	46.3	316.0	685.8	2399.6
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	8.7	48.2	199.2	4.3	26.6	131.5	3.1	15.6	41.8	2.0	12.8	40.6	61.2	11.2	51.8	302.9	722.6	1991.0
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	9.3	73.8	791.8	4.8	40.4	468.9	3.2	17.6	61.3	2.1	18.9	89.3	212.4	13.2	87.4	1232.0	1340.0	7200.3
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	8.1	41.6	112.0	4.1	21.1	61.4	3.0	15.3	37.9	2.0	10.4	20.1	29.8	10.4	37.4	100.6	453.0	879.1
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	8.1	41.4	111.1	4.1	20.8	60.5	3.0	15.2	37.8	2.0	10.3	19.8	29.4	10.3	35.2	92.0	450.0	862.8
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	8.1	41.5	112.7	4.1	21.1	61.4	3.0	15.2	37.7	2.0	10.5	20.6	29.9	10.3	35.5	96.0	455.2	833.8
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	8.1	41.3	111.8	4.1	21.1	60.7	3.0	15.2	37.6	2.0	10.5	20.5	29.5	10.3	34.8	94.0	454.5	802.6
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	8.1	41.3	110.2	4.1	21.1	59.1	3.0	15.2	37.5	2.0	10.4	20.3	28.9	10.3	34.5	88.7	451.7	779.1
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	8.1	41.5	115.5	4.0	21.3	63.3	3.0	15.2	37.6	2.0	10.5	20.9	30.7	10.3	34.9	98.4	460.8	842.4
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	8.1	42.3	124.7	4.1	21.9	70.5	3.0	15.3	38.3	2.0	10.8	22.6	33.9	10.4	37.4	122.5	504.0	1006.5
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	8.1	41.0	110.0	4.1	20.7	58.7	3.0	15.2	37.5	2.0	10.3	19.7	28.8	10.3	34.8	84.1	432.9	766.0
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	8.1	43.8	130.6	4.1	22.5	78.6	3.0	15.7	39.4	2.0	10.9	22.7	37.1	10.5	46.1	151.5	529.5	1132.2
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	8.2	47.6	194.8	4.1	26.7	135.3	3.0	15.5	42.5	2.0	12.8	38.9	61.8	10.5	52.4	337.3	770.8	2165.5
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	8.2	43.0	140.4	4.1	22.6	89.9	3.0	15.7	41.2	2.0	10.8	23.3	38.0	10.6	47.0	159.6	618.4	1859.0
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	8.0	40.3	100.7	4.0	20.2	51.4	3.0	15.1	36.8	2.0	10.1	18.4	25.5	10.1	32.1	60.4	415.8	654.9
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	8.0	40.6	101.8	4.0	20.4	52.5	3.0	15.1	36.9	2.0	10.1	18.6	26.0	10.2	33.4	65.8	421.9	677.0
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	8.0	40.9	103.4	4.0	20.6	53.8	3.0	15.2	37.1	2.0	10.2	18.9	26.5	10.2	34.5	73.0	428.0	701.4
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	8.0	41.2	104.8	4.0	20.7	54.7	3.0	15.2	37.1	2.0	10.2	19.0	26.9	10.2	34.7	74.3	431.3	713.0
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	13.1	137.1	1967.0	6.7	90.6	1397.8	3.8	22.7	124.4	2.4	41.3	220.8	632.9	30.7	315.8	3011.1	3822.5	22557.0
--	"Off-Property Limit" Maximum - Quebec	625.62 , 6083.39	--	19.5	251.4	4335.7	10.6	157.2	2723.7	4.2	29.2	207.2	4.3	68.2	419.9	1230.3	32.1	364.2	5391.0	6696.3	42942.0
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	622.24 , 6085.73	--	21.0	184.9	2650.1	9.1	103.7	1763.1	4.1	26.0	140.5	2.7	47.0	313.4	793.8	27.2	232.1	3577.3	4376.7	28085.0

ALL: Background + DSO3 + DSO4 + HOWSE

- all values in µg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

WITH BLASTS

Pollutant	DEPO-TPM	DEPO-TPM	HC	HC	HC
Averaging Period	1-yr	30-day	1-yr	24-hr	1-hr
Selected Air Quality Assessement Criteria for Howse	**4.6**	**7**	**--**	**--**	**--**

BACKGROUND CONCENTRATIONS - PRE-DSO3	**1.7**	**2.6**			

DSO3 + DSO4 ONLY

			Pollutant	DEPO-TPM	DEPO-TPM	HC	HC	HC
			Averaging Period	1-yr	30-day	1-yr	24-hr	1-hr
			Assessment Criteria	4.6	7	--	--	--
ID	**Description**	**UTM Coordinates**	**Distance From Howse**					
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	0.00	0.02	0.0	0.3	1.2
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	0.00	0.01	0.0	0.3	1.2
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	0.00	0.02	0.0	0.3	1.2
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	0.00	0.02	0.0	0.3	1.0
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	0.00	0.02	0.0	0.2	1.1
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	0.00	0.01	0.0	0.3	1.2
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	0.01	0.02	0.0	0.3	1.6
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	0.00	0.01	0.0	0.4	1.5
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	0.02	0.08	0.1	1.8	4.5
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	0.02	0.06	0.0	0.6	1.9
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	0.02	0.06	0.0	0.6	1.4
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	0.02	0.06	0.0	0.8	3.4
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	0.02	0.05	0.0	0.6	1.8
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	0.00	0.01	0.0	0.2	0.8
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	0.01	0.02	0.0	0.2	1.1
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	0.07	0.23	0.1	0.7	2.3
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	0.01	0.03	0.0	0.2	1.3
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	0.06	0.15	0.4	4.5	10.7
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	0.00	0.01	0.0	0.3	1.0
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	0.01	0.02	0.0	0.3	0.9
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	0.00	0.01	0.0	0.1	0.4
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	0.00	0.02	0.0	0.3	1.4
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	0.07	0.21	0.0	0.5	1.5
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	0.01	0.04	0.1	1.5	5.4
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	0.00	0.01	0.0	0.2	0.9
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	0.00	0.01	0.0	0.2	1.0
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	0.00	0.01	0.0	0.1	0.9
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	0.00	0.01	0.0	0.1	0.8
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	0.00	0.01	0.0	0.1	0.6
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	0.00	0.01	0.0	0.1	0.6
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	0.00	0.01	0.0	0.2	0.8
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	0.00	0.01	0.0	0.1	0.5
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	0.00	0.01	0.0	0.4	1.9
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	0.01	0.02	0.0	0.3	1.4
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	0.00	0.01	0.0	0.5	2.0
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	0.00	0.00	0.0	0.1	0.2
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	0.00	0.00	0.0	0.1	0.3
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	0.00	0.00	0.0	0.1	0.3
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	0.00	0.00	0.0	0.1	0.4
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	0.11	0.27	0.9	8.5	12.6
--	"Off-Property Limit" Maximum - Quebec	625.62 , 6083.39	--	0.35	1.08	0.8	10.1	25.6
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	619.00 , 6090.50	--	0.43	1.17	1.0	7.5	14.0

- all values in µg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

WITH BLASTS

HOWSE ONLY

ID	Name	UTM Coordinates	Distance From Howse	DEPO-TPM	DEPO-TPM	HC	HC	HC
			Pollutant	DEPO-TPM	DEPO-TPM	HC	HC	HC
			Averaging Period	1-yr	30-day	1-yr	24-hr	1-hr
			Assessment Criteria	4.6	7	--	--	--
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	0.01	0.03	0.0	0.2	1.0
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	0.01	0.03	0.0	0.2	1.0
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	0.01	0.03	0.0	0.2	1.0
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	0.01	0.03	0.0	0.2	0.8
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	0.01	0.02	0.0	0.2	0.8
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	0.01	0.02	0.0	0.1	0.8
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	0.01	0.04	0.0	0.1	0.4
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	0.00	0.01	0.0	0.2	0.9
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	0.07	0.18	0.1	1.0	5.5
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	0.06	0.17	0.1	0.9	6.7
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	0.04	0.15	0.0	0.7	4.0
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	0.02	0.07	0.0	0.2	1.0
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	0.04	0.14	0.1	1.4	8.2
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	0.00	0.01	0.0	0.1	0.5
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	0.01	0.02	0.0	0.1	0.4
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	0.03	0.08	0.0	0.4	2.8
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	0.02	0.07	0.0	0.5	2.3
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	0.06	0.16	0.1	2.2	7.0
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	0.00	0.01	0.0	0.1	0.5
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	0.00	0.02	0.0	0.1	0.5
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	0.00	0.01	0.0	0.1	0.4
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	0.01	0.03	0.0	0.2	1.2
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	0.02	0.06	0.0	0.2	0.9
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	0.03	0.10	0.1	1.3	6.9
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	0.00	0.01	0.0	0.1	0.3
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	0.00	0.01	0.0	0.1	0.4
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	0.00	0.01	0.0	0.1	0.4
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	0.00	0.01	0.0	0.1	0.4
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	0.00	0.01	0.0	0.1	0.4
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	0.00	0.01	0.0	0.1	0.4
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	0.00	0.01	0.0	0.1	0.4
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	0.00	0.01	0.0	0.0	0.3
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	0.00	0.02	0.0	0.3	1.1
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	0.01	0.03	0.0	0.2	0.9
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	0.01	0.02	0.0	0.2	1.1
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	0.00	0.00	0.0	0.0	0.1
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	0.00	0.00	0.0	0.0	0.2
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	0.00	0.00	0.0	0.0	0.2
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	0.00	0.00	0.0	0.1	0.2
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	0.08	0.22	0.1	1.6	7.9
--	"Off-Property Limit" Maximum - Quebec	624.33 , 6084.64	--	0.13	0.42	0.2	4.5	11.5
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	618.55 , 6086.66	--	0.26	0.89	0.4	8.9	22.5

HOWSE ONLY

- all values in µg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

WITH BLASTS

DSO3 + DSO4 + HOWSE

ID	Name	UTM Coordinates	Distance From Howse	DEPO-TPM	DEPO-TPM	HC	HC	HC
			Pollutant	DEPO-TPM	DEPO-TPM	HC	HC	HC
			Averaging Period	1-yr	30-day	1-yr	24-hr	1-hr
			Assessment Criteria	4.6	7	--	--	--
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	0.01	0.04	0.0	0.4	1.8
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	0.01	0.04	0.0	0.4	1.8
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	0.01	0.05	0.0	0.4	1.7
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	0.01	0.05	0.0	0.4	1.5
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	0.01	0.04	0.0	0.4	1.7
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	0.01	0.04	0.0	0.4	1.9
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	0.01	0.06	0.0	0.4	1.7
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	0.01	0.02	0.0	0.5	2.1
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	0.09	0.26	0.1	1.8	6.1
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	0.07	0.20	0.1	1.4	6.9
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	0.06	0.18	0.1	1.0	4.1
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	0.04	0.12	0.1	0.8	3.6
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	0.06	0.18	0.1	1.5	8.5
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	0.00	0.02	0.0	0.3	1.2
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	0.01	0.04	0.0	0.3	1.3
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	0.10	0.30	0.1	0.7	2.9
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	0.02	0.09	0.0	0.6	2.7
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	0.11	0.29	0.5	4.5	10.7
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	0.01	0.03	0.0	0.3	1.1
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	0.01	0.03	0.0	0.3	1.2
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	0.01	0.02	0.0	0.1	0.6
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	0.01	0.04	0.0	0.5	2.0
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	0.09	0.27	0.1	0.5	1.6
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	0.04	0.14	0.1	1.9	7.1
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	0.01	0.02	0.0	0.2	1.0
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	0.01	0.02	0.0	0.2	1.0
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	0.01	0.02	0.0	0.2	1.0
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	0.01	0.01	0.0	0.2	0.9
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	0.01	0.01	0.0	0.2	0.9
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	0.01	0.01	0.0	0.1	0.9
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	0.01	0.02	0.0	0.2	0.9
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	0.00	0.01	0.0	0.1	0.6
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	0.01	0.02	0.0	0.5	2.4
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	0.01	0.05	0.0	0.4	1.8
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	0.01	0.04	0.0	0.5	2.2
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	0.00	0.00	0.0	0.1	0.3
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	0.00	0.01	0.0	0.1	0.5
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	0.00	0.01	0.0	0.2	0.5
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	0.00	0.01	0.0	0.2	0.6
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	0.19	0.44	1.0	8.7	13.5
--	"Off-Property Limit" Maximum - Quebec	625.62 , 6083.39	--	0.41	1.20	0.9	10.2	26.5
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	622.24 , 6085.73	--	0.57	1.52	1.1	9.2	22.8

DSO3 + DSO4 + HOWSE

- all values in $\mu g/m^3$, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

WITH BLASTS

ALL: Background + DSO3 + DSO4 + HOWSE

ID	Name	UTM Coordinates	Distance From Howse	DEPO-TPM	DEPO-TPM	HC	HC	HC
			Averaging Period	1-yr	30-day	1-yr	24-hr	1-hr
			Assessment Criteria	4.6	7	--	--	--
			Background concentration (Pre-DSO3)	1.7	2.6			
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	1.71	2.59	0.0	0.4	1.8
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	1.71	2.59	0.0	0.4	1.8
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	1.71	2.60	0.0	0.4	1.7
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	1.71	2.60	0.0	0.4	1.5
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	1.71	2.59	0.0	0.4	1.7
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	1.71	2.59	0.0	0.4	1.9
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	1.71	2.61	0.0	0.4	1.7
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	1.71	2.57	0.0	0.5	2.1
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	1.79	2.81	0.1	1.8	6.1
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	1.77	2.75	0.1	1.4	6.9
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	1.76	2.73	0.1	1.0	4.1
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	1.74	2.67	0.1	0.8	3.6
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	1.76	2.73	0.1	1.5	8.5
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	1.70	2.57	0.0	0.3	1.2
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	1.71	2.59	0.0	0.3	1.3
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	1.80	2.85	0.1	0.7	2.9
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	1.72	2.64	0.0	0.6	2.7
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	1.81	2.84	0.5	4.5	10.7
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	1.71	2.58	0.0	0.3	1.1
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	1.71	2.58	0.0	0.3	1.2
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	1.71	2.57	0.0	0.1	0.6
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	1.71	2.59	0.0	0.5	2.0
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	1.79	2.82	0.1	0.5	1.6
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	1.74	2.69	0.1	1.9	7.1
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	1.71	2.57	0.0	0.2	1.0
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	1.71	2.57	0.0	0.2	1.0
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	1.71	2.57	0.0	0.2	1.0
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	1.71	2.56	0.0	0.2	0.9
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	1.71	2.56	0.0	0.2	0.9
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	1.71	2.56	0.0	0.1	0.9
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	1.71	2.57	0.0	0.2	0.9
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	1.70	2.56	0.0	0.1	0.6
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	1.71	2.57	0.0	0.5	2.4
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	1.71	2.60	0.0	0.4	1.8
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	1.71	2.59	0.0	0.5	2.2
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	1.70	2.55	0.0	0.1	0.3
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	1.70	2.56	0.0	0.1	0.5
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	1.70	2.56	0.0	0.2	0.5
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	1.70	2.56	0.0	0.2	0.6
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	1.89	2.99	1.0	8.7	13.5
--	"Off-Property Limit" Maximum - Quebec	625.62 , 6083.39	--	2.11	3.75	0.9	10.2	26.5
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	622.24 , 6085.73	--	2.27	4.07	1.1	9.2	22.8

- all values in μg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

WITH BLASTS

AIR QUALITY - METALS FRACTION IN TPM

Pollutant	Antimony (Sb)	Arsenic (As)		Barium (Ba)	Beryllium (Be)	Cadmium (Cd)		Chromium (Cr)	Copper (Cu)	Lead (Pb)			Mercury (Hg)		Nickel (Ni)	Silver (Ag)	Thallium (Tl)	Vanadium (V)		Zinc (Zn)
Averaging Period	1-yr	1-yr	24-hr	1-yr	1-yr	1-yr	24-hr	1-yr	24-hr	1-yr	30-day	24-hr	1-yr	24-hr	24-hr	1-yr	1-yr	1-yr	24-hr	24-hr
Selected Air Quality Assessement Criteria for Howse	**0.17**	**0.003**	**0.3**	**0.05**	**0.0004**	**0.0036**	**0.025**	**0.004**	**2.5**	**0.1**	**0.2**	**0.5**	**0.005**	**2**	**0.014**	**0.23**	**0.25**	**1**	**2**	**2.5**
BACKGROUND CONCENTRATIONS - PRE-DSO3	**0.001**	**0.002**	**0.01**	**0.02**	**0**	**0.0005**	**0.0025**	**0.002**	**0.2**	**0.004**	**0.0081**	**0.02**	**0.002**	**0.01**	**0.002**	**0.005**	**0.005**	**0.01**	**0.05**	**0.1**

DSO3 + DSO4 ONLY

ID	Description	UTM Coordinates	Distance From Howse	Antimony (Sb)	Arsenic (As)		Barium (Ba)	Beryllium (Be)	Cadmium (Cd)		Chromium (Cr)	Copper (Cu)	Lead (Pb)			Mercury (Hg)		Nickel (Ni)	Silver (Ag)	Thallium (Tl)	Vanadium (V)		Zinc (Zn)
			Averaging Period	1-yr	1-yr	24-hr	1-yr	1-yr	1-yr	24-hr	1-yr	24-hr	1-yr	30-day	24-hr	1-yr	24-hr	24-hr	1-yr	1-yr	1-yr	24-hr	24-hr
			Assessment Criteria	0.17	0.003	0.3	0.05	0.0004	0.0036	0.025	0.004	2.5	0.1	0.2	0.5	0.005	2	0.014	0.23	0.25	1	2	2.5
				Obtained metal concentrations in ambient air by multiplying TPM concentrations by metal fraction obtained from soil material analyses. See Appendix H of Air Quality Report for metal fractions.																			
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	5.4E-08	3.0E-06	5.6E-05	3.2E-05	1.6E-07	1.4E-08	2.6E-07	8.8E-06	3.9E-05	4.6E-06	9.3E-06	8.7E-05	4.3E-09	8.2E-08	4.4E-05	5.5E-08	3.7E-08	5.4E-06	1.0E-04	7.6E-05
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	5.4E-08	3.0E-06	5.6E-05	3.2E-05	1.6E-07	1.4E-08	2.6E-07	8.8E-06	3.8E-05	4.6E-06	9.3E-06	8.6E-05	4.4E-09	8.1E-08	4.4E-05	5.5E-08	3.7E-08	5.4E-06	1.0E-04	7.5E-05
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	5.4E-08	3.0E-06	5.5E-05	3.2E-05	1.6E-07	1.4E-08	2.6E-07	8.8E-06	3.8E-05	4.6E-06	9.3E-06	8.5E-05	4.4E-09	8.0E-08	4.3E-05	5.5E-08	3.7E-08	5.4E-06	9.9E-05	7.5E-05
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	5.4E-08	3.0E-06	6.0E-05	3.2E-05	1.6E-07	1.4E-08	2.8E-07	8.8E-06	4.1E-05	4.6E-06	9.3E-06	9.2E-05	4.4E-09	8.7E-08	4.7E-05	5.5E-08	3.7E-08	5.4E-06	1.1E-04	8.1E-05
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	5.5E-08	3.1E-06	7.3E-05	3.2E-05	1.7E-07	1.4E-08	3.4E-07	9.0E-06	5.0E-05	4.7E-06	9.5E-06	1.1E-04	4.4E-09	1.1E-07	5.7E-05	5.6E-08	3.7E-08	5.5E-06	1.3E-04	9.8E-05
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	5.6E-08	3.1E-06	7.6E-05	3.3E-05	1.7E-07	1.4E-08	3.5E-07	9.0E-06	5.2E-05	4.8E-06	9.6E-06	1.2E-04	4.5E-09	1.1E-07	6.0E-05	5.6E-08	3.8E-08	5.5E-06	1.4E-04	1.0E-04
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	6.2E-08	3.4E-06	6.9E-05	3.6E-05	1.9E-07	1.6E-08	3.2E-07	1.0E-05	4.8E-05	5.3E-06	1.1E-05	1.1E-04	5.0E-09	1.0E-07	5.4E-05	6.3E-08	4.2E-08	6.1E-06	1.2E-04	9.4E-05
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	4.8E-08	2.7E-06	5.2E-05	2.8E-05	1.4E-07	1.2E-08	2.4E-07	7.8E-06	3.6E-05	4.1E-06	8.3E-06	8.1E-05	3.9E-09	7.6E-08	4.1E-05	4.9E-08	3.3E-08	4.8E-06	9.4E-05	7.1E-05
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	3.6E-07	2.0E-05	3.0E-04	2.1E-04	1.1E-06	9.2E-08	1.4E-06	5.8E-05	2.1E-04	3.1E-05	6.1E-05	4.6E-04	2.9E-08	4.3E-07	2.3E-04	3.6E-07	2.4E-07	3.5E-05	5.4E-04	4.0E-04
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	2.2E-07	1.2E-05	1.7E-04	1.3E-04	6.7E-07	5.7E-08	8.1E-07	3.6E-05	1.2E-04	1.9E-05	3.8E-05	2.7E-04	1.8E-08	2.5E-07	1.4E-04	2.2E-07	1.5E-07	2.2E-05	3.1E-04	2.4E-04
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	2.0E-07	1.1E-05	1.2E-04	1.2E-04	6.0E-07	5.2E-08	5.6E-07	3.2E-05	8.2E-05	1.7E-05	3.4E-05	1.9E-04	1.6E-08	1.7E-07	9.4E-05	2.0E-07	1.4E-07	2.0E-05	2.2E-04	1.6E-04
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	1.7E-07	9.3E-06	1.4E-04	9.8E-05	5.1E-07	4.3E-08	6.7E-07	2.7E-05	9.9E-05	1.4E-05	2.9E-05	2.2E-04	1.4E-08	2.1E-07	1.1E-04	1.7E-07	1.1E-07	1.7E-05	2.6E-04	1.9E-04
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	2.3E-07	1.3E-05	2.5E-04	1.3E-04	6.9E-07	5.9E-08	1.2E-06	3.7E-05	1.7E-04	2.0E-05	4.0E-05	3.8E-04	1.9E-08	3.6E-07	1.9E-04	2.3E-07	1.6E-07	2.3E-05	4.4E-04	3.3E-04
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	3.3E-08	1.8E-06	4.4E-05	1.9E-05	1.0E-07	8.5E-09	2.0E-07	5.4E-06	3.0E-05	2.8E-06	5.7E-06	6.7E-05	2.7E-09	6.3E-08	3.4E-05	3.3E-08	2.2E-08	3.3E-06	7.8E-05	5.9E-05
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	6.2E-08	3.4E-06	5.2E-05	3.6E-05	1.9E-07	1.6E-08	2.4E-07	1.0E-05	3.6E-05	5.3E-06	1.1E-05	8.1E-05	5.0E-09	7.6E-08	4.1E-05	6.3E-08	4.2E-08	6.1E-06	9.4E-05	7.1E-05
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	8.2E-07	4.5E-05	3.4E-04	4.8E-04	2.5E-06	2.1E-07	1.6E-06	1.3E-04	2.3E-04	7.0E-05	1.4E-04	5.3E-04	6.6E-08	5.0E-07	2.7E-04	8.3E-07	5.5E-07	8.1E-05	6.1E-04	4.6E-04
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	8.5E-08	4.7E-06	6.7E-05	5.0E-05	2.5E-07	2.2E-08	3.1E-07	1.4E-05	4.6E-05	7.2E-06	1.5E-05	1.0E-04	6.8E-09	9.8E-08	5.3E-05	8.6E-08	5.7E-08	8.4E-06	1.2E-04	9.1E-05
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	1.5E-06	8.4E-05	1.8E-03	8.9E-04	4.6E-06	3.9E-07	8.2E-06	2.5E-04	1.2E-03	1.3E-04	2.6E-04	2.7E-03	1.2E-07	2.6E-06	1.4E-03	1.5E-06	1.0E-06	1.5E-04	3.2E-03	2.4E-03
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	7.0E-08	3.8E-06	9.5E-05	4.1E-05	2.1E-07	1.8E-08	4.4E-07	1.1E-05	6.5E-05	5.9E-06	1.2E-05	1.5E-04	5.6E-09	1.4E-07	7.5E-05	7.0E-08	4.7E-08	6.9E-06	1.7E-04	1.3E-04
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	7.6E-08	4.2E-06	8.4E-05	4.4E-05	2.3E-07	2.0E-08	3.9E-07	1.2E-05	5.8E-05	6.5E-06	1.3E-05	1.3E-04	6.1E-09	1.2E-07	6.6E-05	7.7E-08	5.1E-08	7.5E-06	1.5E-04	1.1E-04
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	2.8E-08	1.6E-06	4.0E-05	1.6E-05	8.5E-08	7.3E-09	1.9E-07	4.6E-06	2.8E-05	2.4E-06	4.8E-06	6.2E-05	2.3E-09	5.9E-08	3.2E-05	2.8E-08	1.9E-08	2.8E-06	7.2E-05	5.5E-05
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	5.7E-08	3.1E-06	6.4E-05	3.3E-05	1.7E-07	1.5E-08	3.0E-07	9.2E-06	4.4E-05	4.9E-06	9.8E-06	9.9E-05	4.6E-09	9.4E-08	5.1E-05	5.8E-08	3.9E-08	5.6E-06	1.2E-04	8.7E-05
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	4.4E-07	2.4E-05	2.0E-04	2.6E-04	1.3E-06	1.1E-07	9.4E-07	7.2E-05	1.4E-04	3.8E-05	7.6E-05	3.1E-04	3.6E-08	2.9E-07	1.6E-04	4.5E-07	3.0E-07	4.4E-05	3.6E-04	2.7E-04
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	3.1E-07	1.7E-05	2.3E-04	1.8E-04	9.4E-07	8.1E-08	1.1E-06	5.1E-05	1.5E-04	2.7E-05	5.4E-05	3.5E-04	2.5E-08	3.3E-07	1.8E-04	3.2E-07	2.1E-07	3.1E-05	4.0E-04	3.1E-04
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	5.6E-08	3.1E-06	4.3E-05	3.2E-05	1.7E-07	1.4E-08	2.0E-07	9.0E-06	2.9E-05	4.7E-06	9.6E-06	6.6E-05	4.5E-09	6.2E-08	3.4E-05	5.6E-08	3.8E-08	5.5E-06	7.6E-05	5.8E-05
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	4.9E-08	2.7E-06	3.9E-05	2.9E-05	1.5E-07	1.3E-08	1.8E-07	8.0E-06	2.7E-05	4.2E-06	8.5E-06	6.0E-05	4.0E-09	5.7E-08	3.1E-05	5.0E-08	3.3E-08	4.9E-06	7.0E-05	5.3E-05
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	4.7E-08	2.6E-06	3.8E-05	2.7E-05	1.4E-07	1.2E-08	1.8E-07	7.6E-06	2.6E-05	4.0E-06	8.1E-06	5.8E-05	3.8E-09	5.5E-08	3.0E-05	4.7E-08	3.2E-08	4.7E-06	6.8E-05	5.1E-05
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	4.0E-08	2.2E-06	3.4E-05	2.3E-05	1.2E-07	1.0E-08	1.6E-07	6.5E-06	2.3E-05	3.4E-06	6.9E-06	5.3E-05	3.2E-09	5.0E-08	2.7E-05	4.0E-08	2.7E-08	4.0E-06	6.1E-05	4.6E-05
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	3.7E-08	2.0E-06	3.3E-05	2.2E-05	1.1E-07	9.5E-09	1.6E-07	6.0E-06	2.3E-05	3.2E-06	6.3E-06	5.2E-05	3.0E-09	4.9E-08	2.6E-05	3.7E-08	2.5E-08	3.7E-06	6.0E-05	4.5E-05
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	3.6E-08	2.0E-06	4.5E-05	2.1E-05	1.1E-07	9.2E-09	2.1E-07	5.8E-06	3.1E-05	3.1E-06	6.1E-06	7.0E-05	2.9E-09	6.6E-08	3.6E-05	3.6E-08	2.4E-08	3.5E-06	8.1E-05	6.1E-05
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	5.4E-08	3.0E-06	7.2E-05	3.2E-05	1.6E-07	1.4E-08	3.3E-07	8.7E-06	4.9E-05	4.6E-06	9.3E-06	1.1E-04	4.3E-09	1.0E-07	5.6E-05	5.4E-08	3.7E-08	5.3E-06	1.3E-04	9.7E-05
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	4.4E-08	2.4E-06	3.5E-05	2.6E-05	1.3E-07	1.1E-08	1.6E-07	7.1E-06	2.4E-05	3.7E-06	7.5E-06	5.4E-05	3.5E-09	5.1E-08	2.7E-05	4.4E-08	3.0E-08	4.3E-06	6.2E-05	4.7E-05
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	5.5E-08	3.0E-06	5.2E-05	3.2E-05	1.6E-07	1.4E-08	2.4E-07	8.8E-06	3.6E-05	4.6E-06	9.4E-06	8.0E-05	4.4E-09	7.5E-08	4.1E-05	5.5E-08	3.7E-08	5.4E-06	9.3E-05	7.0E-05
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	5.6E-08	3.1E-06	4.8E-05	3.3E-05	1.7E-07	1.4E-08	2.3E-07	9.1E-06	3.3E-05	4.8E-06	9.6E-06	7.5E-05	4.5E-09	7.0E-08	3.8E-05	5.7E-08	3.8E-08	5.6E-06	8.6E-05	6.5E-05
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	6.1E-08	3.3E-06	5.4E-05	3.5E-05	1.8E-07	1.6E-08	2.5E-07	9.8E-06	3.7E-05	5.2E-06	1.0E-05	8.4E-05	4.9E-09	7.9E-08	4.3E-05	6.1E-08	4.1E-08	6.0E-06	9.7E-05	7.3E-05
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	1.2E-08	6.3E-07	8.4E-06	6.7E-06	3.5E-08	3.0E-09	3.9E-08	1.9E-06	5.8E-06	9.8E-07	2.0E-06	1.3E-05	9.2E-10	1.2E-08	6.6E-06	1.2E-08	7.8E-09	1.1E-06	1.5E-05	1.1E-05
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	1.8E-08	1.0E-06	1.8E-05	1.1E-05	5.5E-08	4.8E-09	8.3E-08	3.0E-06	1.2E-05	1.6E-06	3.2E-06	2.7E-05	1.5E-09	2.6E-08	1.4E-05	1.9E-08	1.3E-08	1.8E-06	3.2E-05	2.4E-05
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	2.3E-08	1.3E-06	2.5E-05	1.3E-05	6.9E-08	5.9E-09	1.2E-07	3.7E-06	1.7E-05	2.0E-06	4.0E-06	3.9E-05	1.9E-09	3.7E-08	2.0E-05	2.3E-08	1.6E-08	2.3E-06	4.5E-05	3.4E-05
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	2.4E-08	1.3E-06	2.8E-05	1.4E-05	7.3E-08	6.3E-09	1.3E-07	3.9E-06	1.9E-05	2.1E-06	4.2E-06	4.3E-05	2.0E-09	4.0E-08	2.2E-05	2.5E-08	1.6E-08	2.4E-06	4.9E-05	3.7E-05
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	3.2E-06	1.8E-04	4.7E-03	1.9E-03	9.7E-06	8.3E-07	2.2E-05	5.2E-04	3.2E-03	2.8E-04	5.5E-04	7.2E-03	2.6E-07	6.8E-06	3.7E-03	3.3E-06	2.2E-06	3.2E-04	8.4E-03	6.3E-03
--	"Off-Property Limit" Maximum - Quebec	625.62 , 6083.39	--	9.6E-06	5.3E-04	1.0E-02	5.6E-03	2.9E-05	2.5E-06	4.7E-05	1.6E-03	7.0E-03	8.2E-04	1.6E-03	1.6E-02	7.7E-07	1.5E-05	8.0E-03	9.7E-06	6.5E-06	9.5E-04	1.8E-02	1.4E-02
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	619.00 , 6090.50	--	8.5E-06	4.7E-04	5.1E-03	5.0E-03	2.6E-05	2.2E-06	2.4E-05	1.4E-03	3.5E-03	7.3E-04	1.5E-03	7.9E-03	6.8E-07	7.4E-06	4.0E-03	8.6E-06	5.8E-06	8.4E-04	9.1E-03	6.9E-03

- all values in μg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

WITH BLASTS

AIR QUALITY - METALS FRACTION IN TPM

HOWSE ONLY

ID	Name	UTM Coordinates	Distance From Howse	Antimony (Sb)	Arsenic (As)		Barium (Ba)	Beryllium (Be)	Cadmium (Cd)		Chromium (Cr)	Copper (Cu)	Lead (Pb)			Mercury (Hg)		Nickel (Ni)	Silver (Ag)	Thallium (Tl)	Vanadium (V)		Zinc (Zn)
			Averaging Period	1-yr	1-yr	24-hr	1-yr	1-yr	1-yr	24-hr	1-yr	24-hr	1-yr	30-day	24-hr	1-yr	24-hr	24-hr	1-yr	1-yr	1-yr	24-hr	24-hr
			Assessment Criteria	0.17	0.003	0.3	0.05	0.0004	0.0036	0.025	0.004	2.5	0.1	0.2	0.5	0.005	2	0.014	0.23	0.25	1	2	2.5
				Obtained metal concentrations in ambient air by multiplying TPM concentrations by metal fraction obtained from soil material analyses. See Appendix H of Air Quality Report for metal fractions.																			
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	8.0E-08	4.4E-06	1.8E-04	4.6E-05	2.4E-07	2.0E-08	8.5E-07	1.3E-05	1.3E-04	6.8E-06	1.4E-05	2.8E-04	6.4E-09	2.7E-07	1.4E-04	8.0E-08	5.4E-08	7.9E-06	3.3E-04	2.5E-04
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	7.7E-08	4.2E-06	1.6E-04	4.5E-05	2.3E-07	2.0E-08	7.5E-07	1.2E-05	1.1E-04	6.6E-06	1.3E-05	2.5E-04	6.2E-09	2.3E-07	1.3E-04	7.8E-08	5.2E-08	7.6E-06	2.9E-04	2.2E-04
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	8.2E-08	4.5E-06	2.0E-04	4.8E-05	2.5E-07	2.1E-08	9.3E-07	1.3E-05	1.4E-04	7.0E-06	1.4E-05	3.1E-04	6.6E-09	2.9E-07	1.6E-04	8.3E-08	5.6E-08	8.1E-06	3.6E-04	2.7E-04
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	7.5E-08	4.2E-06	1.6E-04	4.4E-05	2.3E-07	1.9E-08	7.4E-07	1.2E-05	1.1E-04	6.4E-06	1.3E-05	2.4E-04	6.1E-09	2.3E-07	1.2E-04	7.6E-08	5.1E-08	7.5E-06	2.8E-04	2.1E-04
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	7.4E-08	4.1E-06	1.7E-04	4.3E-05	2.2E-07	1.9E-08	8.1E-07	1.2E-05	1.2E-04	6.3E-06	1.3E-05	2.7E-04	5.9E-09	2.5E-07	1.4E-04	7.5E-08	5.0E-08	7.3E-06	3.1E-04	2.3E-04
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	7.1E-08	3.9E-06	1.1E-04	4.1E-05	2.1E-07	1.8E-08	5.3E-07	1.1E-05	7.8E-05	6.0E-06	1.2E-05	1.7E-04	5.7E-09	1.6E-07	8.9E-05	7.1E-08	4.8E-08	7.0E-06	2.0E-04	1.5E-04
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	8.5E-08	4.7E-06	1.2E-04	4.9E-05	2.5E-07	2.2E-08	5.7E-07	1.4E-05	8.5E-05	7.2E-06	1.5E-05	1.9E-04	6.8E-09	1.8E-07	9.7E-05	8.5E-08	5.7E-08	8.4E-06	2.2E-04	1.7E-04
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	5.9E-08	3.2E-06	8.2E-05	3.4E-05	1.8E-07	1.5E-08	3.8E-07	9.5E-06	5.6E-05	5.0E-06	1.0E-05	1.3E-04	4.7E-09	1.2E-07	6.4E-05	5.9E-08	4.0E-08	5.8E-06	1.5E-04	1.1E-04
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	1.2E-06	6.7E-05	2.0E-03	7.1E-04	3.7E-06	3.1E-07	9.2E-06	2.0E-04	1.4E-03	1.0E-04	2.1E-04	3.0E-03	9.8E-08	2.9E-06	1.6E-03	1.2E-06	8.2E-07	1.2E-04	3.5E-03	2.7E-03
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	7.6E-07	4.2E-05	1.6E-03	4.4E-04	2.3E-06	1.9E-07	7.5E-06	1.2E-04	1.1E-03	6.4E-05	1.3E-04	2.5E-03	6.1E-08	2.3E-06	1.3E-03	7.6E-07	5.1E-07	7.5E-05	2.9E-03	2.2E-03
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	6.4E-07	3.5E-05	8.5E-04	3.7E-04	1.9E-06	1.6E-07	4.0E-06	1.0E-04	5.9E-04	5.5E-05	1.1E-04	1.3E-03	5.1E-08	1.2E-06	6.7E-04	6.5E-07	4.3E-07	6.3E-05	1.5E-03	1.2E-03
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	2.1E-07	1.1E-05	2.4E-04	1.2E-04	6.2E-07	5.3E-08	1.1E-06	3.3E-05	1.7E-04	1.7E-05	3.5E-05	3.7E-04	1.6E-08	3.5E-07	1.9E-04	2.1E-07	1.4E-07	2.0E-05	4.3E-04	3.3E-04
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	7.3E-07	4.0E-05	2.2E-03	4.2E-04	2.2E-06	1.9E-07	1.0E-05	1.2E-04	1.5E-03	6.2E-05	1.2E-04	3.4E-03	5.8E-08	3.2E-06	1.7E-03	7.3E-07	4.9E-07	7.2E-05	3.9E-03	3.0E-03
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	3.7E-08	2.0E-06	6.4E-05	2.2E-05	1.1E-07	9.6E-09	3.0E-07	6.0E-06	4.4E-05	3.2E-06	6.4E-06	9.9E-05	3.0E-09	9.3E-08	5.0E-05	3.7E-08	2.5E-08	3.7E-06	1.1E-04	8.7E-05
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	5.6E-08	3.1E-06	4.8E-05	3.2E-05	1.7E-07	1.4E-08	2.2E-07	9.0E-06	3.3E-05	4.7E-06	9.5E-06	7.4E-05	4.5E-09	7.0E-08	3.8E-05	5.6E-08	3.8E-08	5.5E-06	8.6E-05	6.5E-05
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	4.5E-07	2.5E-05	7.1E-04	2.7E-04	1.4E-06	1.2E-07	3.3E-06	7.4E-05	4.8E-04	3.9E-05	7.8E-05	1.1E-03	3.6E-08	1.0E-06	5.5E-04	4.6E-07	3.1E-07	4.5E-05	1.3E-03	9.6E-04
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	1.8E-07	9.7E-06	6.6E-04	1.0E-04	5.3E-07	4.5E-08	3.1E-06	2.9E-05	4.5E-04	1.5E-05	3.0E-05	1.0E-03	1.4E-08	9.6E-07	5.2E-04	1.8E-07	1.2E-07	1.7E-05	1.2E-03	9.0E-04
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	1.2E-06	6.7E-05	5.8E-04	7.1E-04	3.7E-06	3.1E-07	2.7E-06	2.0E-04	4.0E-04	1.0E-04	2.1E-04	9.0E-04	9.8E-08	8.4E-07	4.6E-04	1.2E-06	8.3E-07	1.2E-04	1.0E-03	7.9E-04
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	5.0E-08	2.7E-06	6.3E-05	2.9E-05	1.5E-07	1.3E-08	2.9E-07	8.0E-06	4.3E-05	4.2E-06	8.5E-06	9.8E-05	4.0E-09	9.2E-08	5.0E-05	5.0E-08	3.3E-08	4.9E-06	1.1E-04	8.6E-05
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	5.6E-08	3.1E-06	8.2E-05	3.3E-05	1.7E-07	1.5E-08	3.8E-07	9.1E-06	5.6E-05	4.8E-06	9.7E-06	1.3E-04	4.5E-09	1.2E-07	6.4E-05	5.7E-08	3.8E-08	5.6E-06	1.5E-04	1.1E-04
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	3.3E-08	1.8E-06	6.6E-05	2.0E-05	1.0E-07	8.6E-09	3.1E-07	5.4E-06	4.6E-05	2.9E-06	5.7E-06	1.0E-04	2.7E-09	9.6E-08	5.2E-05	3.4E-08	2.3E-08	3.3E-06	1.2E-04	9.0E-05
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	8.9E-08	4.9E-06	2.3E-04	5.2E-05	2.7E-07	2.3E-08	1.1E-06	1.4E-05	1.6E-04	7.6E-06	1.5E-05	3.6E-04	7.2E-09	3.4E-07	1.8E-04	9.0E-08	6.0E-08	8.8E-06	4.2E-04	3.2E-04
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	1.9E-07	1.0E-05	3.9E-04	1.1E-04	5.6E-07	4.8E-08	1.8E-06	3.0E-05	2.7E-04	1.6E-05	3.2E-05	6.0E-04	1.5E-08	5.6E-07	3.0E-04	1.9E-07	1.3E-07	1.8E-05	6.9E-04	5.2E-04
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	8.6E-07	4.7E-05	1.6E-03	5.0E-04	2.6E-06	2.2E-07	7.6E-06	1.4E-04	1.1E-03	7.3E-05	1.5E-04	2.5E-03	6.9E-08	2.4E-06	1.3E-03	8.7E-07	5.8E-07	8.5E-05	2.9E-03	2.2E-03
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	4.5E-08	2.5E-06	4.8E-05	2.6E-05	1.4E-07	1.2E-08	2.2E-07	7.3E-06	3.3E-05	3.9E-06	7.8E-06	7.4E-05	3.6E-09	6.9E-08	3.7E-05	4.6E-08	3.1E-08	4.5E-06	8.5E-05	6.4E-05
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	4.0E-08	2.2E-06	4.6E-05	2.3E-05	1.2E-07	1.0E-08	2.2E-07	6.5E-06	3.2E-05	3.4E-06	6.8E-06	7.1E-05	3.2E-09	6.7E-08	3.6E-05	4.0E-08	2.7E-08	3.9E-06	8.3E-05	6.2E-05
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	3.8E-08	2.1E-06	4.7E-05	2.2E-05	1.1E-07	9.7E-09	2.2E-07	6.1E-06	3.2E-05	3.2E-06	6.5E-06	7.2E-05	3.0E-09	6.8E-08	3.7E-05	3.8E-08	2.6E-08	3.7E-06	8.4E-05	6.3E-05
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	3.3E-08	1.8E-06	4.0E-05	1.9E-05	9.8E-08	8.4E-09	1.9E-07	5.3E-06	2.7E-05	2.8E-06	5.6E-06	6.1E-05	2.6E-09	5.8E-08	3.1E-05	3.3E-08	2.2E-08	3.2E-06	7.1E-05	5.4E-05
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	3.1E-08	1.7E-06	3.9E-05	1.8E-05	9.2E-08	7.9E-09	1.8E-07	5.0E-06	2.7E-05	2.6E-06	5.3E-06	6.0E-05	2.5E-09	5.7E-08	3.1E-05	3.1E-08	2.1E-08	3.0E-06	7.0E-05	5.3E-05
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	2.8E-08	1.5E-06	3.1E-05	1.6E-05	8.4E-08	7.2E-09	1.4E-07	4.5E-06	2.1E-05	2.4E-06	4.8E-06	4.8E-05	2.2E-09	4.5E-08	2.4E-05	2.8E-08	1.9E-08	2.8E-06	5.6E-05	4.2E-05
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	3.8E-08	2.1E-06	4.6E-05	2.2E-05	1.2E-07	9.9E-09	2.2E-07	6.2E-06	3.2E-05	3.3E-06	6.6E-06	7.2E-05	3.1E-09	6.8E-08	3.7E-05	3.9E-08	2.6E-08	3.8E-06	8.3E-05	6.3E-05
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	3.4E-08	1.9E-06	2.6E-05	2.0E-05	1.0E-07	8.8E-09	1.2E-07	5.5E-06	1.8E-05	2.9E-06	5.9E-06	4.0E-05	2.7E-09	3.7E-08	2.0E-05	3.4E-08	2.3E-08	3.4E-06	4.6E-05	3.5E-05
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	7.4E-08	4.1E-06	1.3E-04	4.3E-05	2.2E-07	1.9E-08	6.2E-07	1.2E-05	9.1E-05	6.3E-06	1.3E-05	2.1E-04	5.9E-09	1.9E-07	1.0E-04	7.5E-08	5.0E-08	7.3E-06	2.4E-04	1.8E-04
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	9.7E-08	5.4E-06	3.6E-04	5.7E-05	2.9E-07	2.5E-08	1.7E-06	1.6E-05	2.5E-04	8.3E-06	1.7E-05	5.6E-04	7.8E-09	5.2E-07	2.8E-04	9.8E-08	6.6E-08	9.6E-06	6.5E-04	4.9E-04
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	7.9E-08	4.4E-06	1.3E-04	4.6E-05	2.4E-07	2.0E-08	5.9E-07	1.3E-05	8.6E-05	6.8E-06	1.4E-05	1.9E-04	6.4E-09	1.8E-07	9.9E-05	8.0E-08	5.4E-08	7.9E-06	2.3E-04	1.7E-04
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	9.4E-09	5.2E-07	9.6E-06	5.5E-06	2.8E-08	2.4E-09	4.5E-08	1.5E-06	6.6E-06	8.0E-07	1.6E-06	1.5E-05	7.5E-10	1.4E-08	7.6E-06	9.5E-09	6.4E-09	9.3E-07	1.7E-05	1.3E-05
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	1.2E-08	6.9E-07	1.5E-05	7.3E-06	3.7E-08	3.2E-09	7.1E-08	2.0E-06	1.0E-05	1.1E-06	2.1E-06	2.4E-05	1.0E-09	2.2E-08	1.2E-05	1.3E-08	8.5E-09	1.2E-06	2.7E-05	2.1E-05
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	1.7E-08	9.3E-07	2.0E-05	9.9E-06	5.1E-08	4.4E-09	9.1E-08	2.7E-06	1.3E-05	1.4E-06	2.9E-06	3.0E-05	1.4E-09	2.9E-08	1.5E-05	1.7E-08	1.1E-08	1.7E-06	3.5E-05	2.7E-05
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	1.9E-08	1.1E-06	2.9E-05	1.1E-05	5.8E-08	5.0E-09	1.3E-07	3.1E-06	2.0E-05	1.6E-06	3.3E-06	4.4E-05	1.6E-09	4.2E-08	2.2E-05	1.9E-08	1.3E-08	1.9E-06	5.1E-05	3.9E-05
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	1.5E-06	8.4E-05	8.6E-04	8.9E-04	4.6E-06	3.9E-07	4.0E-06	2.5E-04	5.9E-04	1.3E-04	2.6E-04	1.3E-03	1.2E-07	1.3E-06	6.8E-04	1.5E-06	1.0E-06	1.5E-04	1.5E-03	1.2E-03
--	"Off-Property Limit" Maximum - Quebec	624.33 , 6084.64	--	2.9E-06	1.6E-04	2.6E-03	1.7E-03	8.6E-06	7.4E-07	1.2E-05	4.7E-04	1.8E-03	2.4E-04	4.9E-04	4.1E-03	2.3E-07	3.8E-06	2.1E-03	2.9E-06	1.9E-06	2.8E-04	4.7E-03	3.6E-03
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	618.55 , 6086.66	--	4.6E-06	2.5E-04	5.9E-03	2.7E-03	1.4E-05	1.2E-06	2.8E-05	7.4E-04	4.1E-03	3.9E-04	7.9E-04	9.2E-03	3.7E-07	8.7E-06	4.7E-03	4.6E-06	3.1E-06	4.5E-04	1.1E-02	8.1E-03

HOWSE ONLY

- all values in µg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

WITH BLASTS

AIR QUALITY - METALS FRACTION IN TPM

DSO3 + DSO4 + HOWSE

ID	Name	UTM Coordinates	Distance From Howse	Antimony (Sb)	Arsenic (As)		Barium (Ba)	Beryllium (Be)	Cadmium (Cd)		Chromium (Cr)	Copper (Cu)	Lead (Pb)			Mercury (Hg)		Nickel (Ni)	Silver (Ag)	Thallium (Tl)	Vanadium (V)		Zinc (Zn)
			Averaging Period	1-yr	1-yr	24-hr	1-yr	1-yr	1-yr	24-hr	1-yr	24-hr	1-yr	30-day	24-hr	1-yr	24-hr	24-hr	1-yr	1-yr	1-yr	24-hr	24-hr
			Assessment Criteria	0.17	0.003	0.3	0.05	0.0004	0.0036	0.025	0.004	2.5	0.1	0.2	0.5	0.005	2	0.014	0.23	0.25	1	2	2.5
				Obtained metal concentrations in ambient air by multiplying TPM concentrations by metal fraction obtained from soil material analyses. See Appendix H of Air Quality Report for metal fractions.																			
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	1.3E-07	6.9E-06	1.9E-04	7.3E-05	3.8E-07	3.2E-08	8.8E-07	2.0E-05	1.3E-04	1.1E-05	2.2E-05	2.9E-04	1.0E-08	2.8E-07	1.5E-04	1.3E-07	8.5E-08	1.2E-05	3.4E-04	2.6E-04
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	1.2E-07	6.8E-06	1.7E-04	7.2E-05	3.7E-07	3.2E-08	7.8E-07	2.0E-05	1.2E-04	1.1E-05	2.1E-05	2.6E-04	9.9E-09	2.4E-07	1.3E-04	1.2E-07	8.3E-08	1.2E-05	3.0E-04	2.3E-04
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	1.3E-07	7.1E-06	2.1E-04	7.5E-05	3.8E-07	3.3E-08	9.6E-07	2.1E-05	1.4E-04	1.1E-05	2.2E-05	3.2E-04	1.0E-08	3.0E-07	1.6E-04	1.3E-07	8.7E-08	1.3E-05	3.7E-04	2.8E-04
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	1.2E-07	6.9E-06	1.8E-04	7.3E-05	3.8E-07	3.2E-08	8.5E-07	2.0E-05	1.3E-04	1.1E-05	2.1E-05	2.8E-04	1.0E-08	2.7E-07	1.4E-04	1.3E-07	8.5E-08	1.2E-05	3.3E-04	2.5E-04
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	1.2E-07	6.8E-06	2.0E-04	7.2E-05	3.7E-07	3.2E-08	9.2E-07	2.0E-05	1.4E-04	1.1E-05	2.1E-05	3.0E-04	1.0E-08	2.9E-07	1.5E-04	1.3E-07	8.4E-08	1.2E-05	3.5E-04	2.7E-04
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	1.2E-07	6.7E-06	1.4E-04	7.0E-05	3.6E-07	3.1E-08	6.4E-07	2.0E-05	9.4E-05	1.0E-05	2.1E-05	2.1E-04	9.7E-09	2.0E-07	1.1E-04	1.2E-07	8.2E-08	1.2E-05	2.5E-04	1.9E-04
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	1.4E-07	7.9E-06	1.2E-04	8.4E-05	4.3E-07	3.7E-08	5.8E-07	2.3E-05	8.5E-05	1.2E-05	2.5E-05	1.9E-04	1.2E-08	1.8E-07	9.8E-05	1.4E-07	9.7E-08	1.4E-05	2.2E-04	1.7E-04
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	1.1E-07	5.9E-06	1.3E-04	6.2E-05	3.2E-07	2.8E-08	6.2E-07	1.7E-05	9.2E-05	9.1E-06	1.8E-05	2.1E-04	8.6E-09	1.9E-07	1.1E-04	1.1E-07	7.2E-08	1.1E-05	2.4E-04	1.8E-04
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	1.5E-06	8.5E-05	2.0E-03	9.0E-04	4.6E-06	4.0E-07	9.2E-06	2.5E-04	1.4E-03	1.3E-04	2.6E-04	3.0E-03	1.2E-07	2.9E-06	1.6E-03	1.6E-06	1.0E-06	1.5E-04	3.5E-03	2.7E-03
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	9.4E-07	5.2E-05	1.7E-03	5.5E-04	2.8E-06	2.4E-07	7.8E-06	1.5E-04	1.2E-03	8.0E-05	1.6E-04	2.6E-03	7.5E-08	2.4E-06	1.3E-03	9.5E-07	6.3E-07	9.3E-05	3.0E-03	2.3E-03
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	8.4E-07	4.6E-05	8.7E-04	4.9E-04	2.5E-06	2.2E-07	4.1E-06	1.4E-04	6.0E-04	7.1E-05	1.4E-04	1.4E-03	6.7E-08	1.3E-06	6.9E-04	8.5E-07	5.7E-07	8.3E-05	1.6E-03	1.2E-03
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	3.6E-07	2.0E-05	2.4E-04	2.1E-04	1.1E-06	9.4E-08	1.1E-06	5.9E-05	1.7E-04	3.1E-05	6.3E-05	3.7E-04	2.9E-08	3.5E-07	1.9E-04	3.7E-07	2.5E-07	3.6E-05	4.3E-04	3.3E-04
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	9.2E-07	5.1E-05	2.3E-03	5.3E-04	2.8E-06	2.4E-07	1.1E-05	1.5E-04	1.6E-03	7.8E-05	1.6E-04	3.5E-03	7.4E-08	3.3E-06	1.8E-03	9.2E-07	6.2E-07	9.1E-05	4.1E-03	3.1E-03
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	6.8E-08	3.8E-06	7.9E-05	4.0E-05	2.1E-07	1.8E-08	3.7E-07	1.1E-05	5.4E-05	5.8E-06	1.2E-05	1.2E-04	5.5E-09	1.2E-07	6.2E-05	6.9E-08	4.6E-08	6.8E-06	1.4E-04	1.1E-04
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	1.2E-07	6.5E-06	9.1E-05	6.9E-05	3.5E-07	3.0E-08	4.2E-07	1.9E-05	6.2E-05	1.0E-05	2.0E-05	1.4E-04	9.4E-09	1.3E-07	7.2E-05	1.2E-07	8.0E-08	1.2E-05	1.6E-04	1.2E-04
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	1.3E-06	7.0E-05	7.1E-04	7.4E-04	3.8E-06	3.3E-07	3.3E-06	2.0E-04	4.9E-04	1.1E-04	2.2E-04	1.1E-03	1.0E-07	1.0E-06	5.6E-04	1.3E-06	8.6E-07	1.3E-04	1.3E-03	9.7E-04
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	2.5E-07	1.4E-05	7.1E-04	1.5E-04	7.5E-07	6.4E-08	3.3E-06	4.0E-05	4.9E-04	2.1E-05	4.3E-05	1.1E-03	2.0E-08	1.0E-06	5.6E-04	2.5E-07	1.7E-07	2.5E-05	1.3E-03	9.7E-04
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	2.7E-06	1.5E-04	1.8E-03	1.6E-03	8.0E-06	6.9E-07	8.3E-06	4.3E-04	1.2E-03	2.3E-04	4.6E-04	2.7E-03	2.1E-07	2.6E-06	1.4E-03	2.7E-06	1.8E-06	2.6E-04	3.2E-03	2.4E-03
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	1.2E-07	6.6E-06	1.2E-04	7.0E-05	3.6E-07	3.1E-08	5.4E-07	1.9E-05	8.0E-05	1.0E-05	2.0E-05	1.8E-04	9.6E-09	1.7E-07	9.1E-05	1.2E-07	8.1E-08	1.2E-05	2.1E-04	1.6E-04
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	1.3E-07	7.3E-06	1.4E-04	7.7E-05	4.0E-07	3.4E-08	6.7E-07	2.1E-05	9.9E-05	1.1E-05	2.3E-05	2.2E-04	1.1E-08	2.1E-07	1.1E-04	1.3E-07	9.0E-08	1.3E-05	2.6E-04	1.9E-04
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	6.0E-08	3.3E-06	9.0E-05	3.5E-05	1.8E-07	1.6E-08	4.2E-07	9.8E-06	6.2E-05	5.1E-06	1.0E-05	1.4E-04	4.8E-09	1.3E-07	7.1E-05	6.1E-08	4.1E-08	6.0E-06	1.6E-04	1.2E-04
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	1.4E-07	7.6E-06	2.4E-04	8.1E-05	4.2E-07	3.6E-08	1.1E-06	2.2E-05	1.7E-04	1.2E-05	2.4E-05	3.8E-04	1.1E-08	3.5E-07	1.9E-04	1.4E-07	9.4E-08	1.4E-05	4.4E-04	3.3E-04
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	6.2E-07	3.4E-05	3.9E-04	3.6E-04	1.9E-06	1.6E-07	1.8E-06	1.0E-04	2.7E-04	5.3E-05	1.1E-04	6.1E-04	5.0E-08	5.7E-07	3.1E-04	6.3E-07	4.2E-07	6.2E-05	7.0E-04	5.3E-04
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	1.2E-06	6.5E-05	1.6E-03	6.8E-04	3.5E-06	3.0E-07	7.6E-06	1.9E-04	1.1E-03	1.0E-04	2.0E-04	2.5E-03	9.4E-08	2.4E-06	1.3E-03	1.2E-06	7.9E-07	1.2E-04	2.9E-03	2.2E-03
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	1.0E-07	5.5E-06	7.9E-05	5.8E-05	3.0E-07	2.6E-08	3.7E-07	1.6E-05	5.4E-05	8.5E-06	1.7E-05	1.2E-04	8.0E-09	1.1E-07	6.2E-05	1.0E-07	6.8E-08	9.9E-06	1.4E-04	1.1E-04
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	8.9E-08	4.9E-06	6.9E-05	5.2E-05	2.7E-07	2.3E-08	3.2E-07	1.4E-05	4.8E-05	7.6E-06	1.5E-05	1.1E-04	7.2E-09	1.0E-07	5.5E-05	9.0E-08	6.0E-08	8.8E-06	1.2E-04	9.4E-05
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	8.5E-08	4.7E-06	7.4E-05	4.9E-05	2.5E-07	2.2E-08	3.5E-07	1.4E-05	5.1E-05	7.2E-06	1.5E-05	1.1E-04	6.8E-09	1.1E-07	5.8E-05	8.6E-08	5.7E-08	8.4E-06	1.3E-04	1.0E-04
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	7.3E-08	4.0E-06	6.4E-05	4.2E-05	2.2E-07	1.9E-08	3.0E-07	1.2E-05	4.4E-05	6.2E-06	1.2E-05	1.0E-04	5.8E-09	9.4E-08	5.1E-05	7.3E-08	4.9E-08	7.2E-06	1.2E-04	8.7E-05
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	6.8E-08	3.7E-06	6.3E-05	4.0E-05	2.0E-07	1.7E-08	3.0E-07	1.1E-05	4.3E-05	5.8E-06	1.2E-05	9.8E-05	5.4E-09	9.2E-08	5.0E-05	6.8E-08	4.6E-08	6.7E-06	1.1E-04	8.6E-05
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	6.3E-08	3.5E-06	7.2E-05	3.7E-05	1.9E-07	1.6E-08	3.4E-07	1.0E-05	4.9E-05	5.4E-06	1.1E-05	1.1E-04	5.1E-09	1.0E-07	5.7E-05	6.4E-08	4.3E-08	6.3E-06	1.3E-04	9.7E-05
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	9.0E-08	5.0E-06	1.1E-04	5.3E-05	2.7E-07	2.3E-08	5.2E-07	1.5E-05	7.7E-05	7.7E-06	1.6E-05	1.7E-04	7.3E-09	1.6E-07	8.8E-05	9.1E-08	6.1E-08	8.9E-06	2.0E-04	1.5E-04
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	7.8E-08	4.3E-06	4.8E-05	4.6E-05	2.3E-07	2.0E-08	2.2E-07	1.3E-05	3.3E-05	6.7E-06	1.3E-05	7.4E-05	6.3E-09	7.0E-08	3.8E-05	7.9E-08	5.3E-08	7.7E-06	8.6E-05	6.5E-05
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	1.3E-07	7.1E-06	1.8E-04	7.5E-05	3.9E-07	3.3E-08	8.6E-07	2.1E-05	1.3E-04	1.1E-05	2.2E-05	2.9E-04	1.0E-08	2.7E-07	1.5E-04	1.3E-07	8.7E-08	1.3E-05	3.3E-04	2.5E-04
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	1.5E-07	8.1E-06	3.6E-04	8.6E-05	4.4E-07	3.8E-08	1.7E-06	2.4E-05	2.5E-04	1.3E-05	2.5E-05	5.6E-04	1.2E-08	5.3E-07	2.9E-04	1.5E-07	1.0E-07	1.5E-05	6.5E-04	4.9E-04
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	1.4E-07	7.7E-06	1.4E-04	8.2E-05	4.2E-07	3.6E-08	6.6E-07	2.3E-05	9.8E-05	1.2E-05	2.4E-05	2.2E-04	1.1E-08	2.1E-07	1.1E-04	1.4E-07	9.5E-08	1.4E-05	2.5E-04	1.9E-04
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	2.1E-08	1.2E-06	1.6E-05	1.2E-05	6.3E-08	5.4E-09	7.6E-08	3.4E-06	1.1E-05	1.8E-06	3.6E-06	2.5E-05	1.7E-09	2.4E-08	1.3E-05	2.1E-08	1.4E-08	2.1E-06	2.9E-05	2.2E-05
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	3.1E-08	1.7E-06	2.9E-05	1.8E-05	9.3E-08	7.9E-09	1.3E-07	5.0E-06	2.0E-05	2.6E-06	5.3E-06	4.4E-05	2.5E-09	4.2E-08	2.3E-05	3.1E-08	2.1E-08	3.1E-06	5.1E-05	3.9E-05
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	4.0E-08	2.2E-06	4.5E-05	2.3E-05	1.2E-07	1.0E-08	2.1E-07	6.5E-06	3.1E-05	3.4E-06	6.9E-06	6.9E-05	3.2E-09	6.5E-08	3.5E-05	4.0E-08	2.7E-08	4.0E-06	8.0E-05	6.1E-05
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	4.3E-08	2.4E-06	5.6E-05	2.5E-05	1.3E-07	1.1E-08	2.6E-07	7.0E-06	3.8E-05	3.7E-06	7.4E-06	8.6E-05	3.4E-09	8.1E-08	4.4E-05	4.3E-08	2.9E-08	4.3E-06	1.0E-04	7.5E-05
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	4.5E-06	2.5E-04	4.7E-03	2.6E-03	1.3E-05	1.1E-06	2.2E-05	7.2E-04	3.2E-03	3.8E-04	7.7E-04	7.2E-03	3.6E-07	6.8E-06	3.7E-03	4.5E-06	3.0E-06	4.4E-04	8.4E-03	6.3E-03
--	"Off-Property Limit" Maximum - Quebec	625.62 , 6083.39	--	1.0E-05	5.5E-04	1.0E-02	5.9E-03	3.0E-05	2.6E-06	4.7E-05	1.6E-03	7.0E-03	8.6E-04	1.7E-03	1.6E-02	8.1E-07	1.5E-05	8.0E-03	1.0E-05	6.8E-06	1.0E-03	1.8E-02	1.4E-02
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	622.24 , 6085.73	--	1.1E-05	6.3E-04	7.0E-03	6.6E-03	3.4E-05	2.9E-06	3.3E-05	1.8E-03	4.8E-03	9.7E-04	1.9E-03	1.1E-02	9.1E-07	1.0E-05	5.5E-03	1.1E-05	7.7E-06	1.1E-03	1.3E-02	9.4E-03

- all values in µg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

WITH BLASTS

AIR QUALITY - METALS FRACTION IN TPM

ALL: Background + DSO3 + DSO4 + HOWSE

			Pollutant	Antimony (Sb)	Arsenic (As)		Barium (Ba)	Beryllium (Be)	Cadmium (Cd)		Chromium (Cr)	Copper (Cu)	Lead (Pb)			Mercury (Hg)		Nickel (Ni)	Silver (Ag)	Thallium (Tl)	Vanadium (V)		Zinc (Zn)
			Averaging Period	1-yr	1-yr	24-hr	1-yr	1-yr	1-yr	24-hr	1-yr	24-hr	1-yr	30-day	24-hr	1-yr	24-hr	24-hr	1-yr	1-yr	1-yr	24-hr	24-hr
			Assessment Criteria	0.17	0.003	0.3	0.05	0.0004	0.0036	0.025	0.004	2.5	0.1	0.2	0.5	0.005	2	0.014	0.23	0.25	1	2	2.5
			Background concentration (Pre-DSO3)	0.001	0.002	0.01	0.02	0	0.0005	0.0025	0.002	0.2	0.004	0.0081	0.02	0.002	0.01	0.002	0.005	0.005	0.01	0.05	0.1
ID	**Name**	**UTM Coordinates**	**Distance From Howse**	Obtained metal concentrations in ambient air by multiplying TPM concentrations by metal fraction obtained from soil material analyses. See Appendix H of Air Quality Report for metal fractions.																			
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.8E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.7E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.8E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.2E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.8E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.7E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.2E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.6E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	1.0E-03	2.0E-03	1.0E-02	2.0E-02	4.3E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.2E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	1.0E-03	2.1E-03	1.2E-02	2.1E-02	4.6E-06	5.0E-04	2.5E-03	2.2E-03	2.0E-01	4.1E-03	8.3E-03	2.3E-02	2.0E-03	1.0E-02	3.6E-03	5.0E-03	5.0E-03	1.0E-02	5.4E-02	1.0E-01
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	1.0E-03	2.1E-03	1.2E-02	2.1E-02	2.8E-06	5.0E-04	2.5E-03	2.2E-03	2.0E-01	4.1E-03	8.2E-03	2.3E-02	2.0E-03	1.0E-02	3.3E-03	5.0E-03	5.0E-03	1.0E-02	5.3E-02	1.0E-01
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	1.0E-03	2.0E-03	1.1E-02	2.0E-02	2.5E-06	5.0E-04	2.5E-03	2.1E-03	2.0E-01	4.1E-03	8.2E-03	2.1E-02	2.0E-03	1.0E-02	2.7E-03	5.0E-03	5.0E-03	1.0E-02	5.2E-02	1.0E-01
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	1.1E-06	5.0E-04	2.5E-03	2.1E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.2E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	1.0E-03	2.1E-03	1.2E-02	2.1E-02	2.8E-06	5.0E-04	2.5E-03	2.1E-03	2.0E-01	4.1E-03	8.2E-03	2.4E-02	2.0E-03	1.0E-02	3.8E-03	5.0E-03	5.0E-03	1.0E-02	5.4E-02	1.0E-01
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	1.0E-03	2.0E-03	1.0E-02	2.0E-02	2.1E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.5E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	1.0E-03	2.1E-03	1.1E-02	2.1E-02	3.8E-06	5.0E-04	2.5E-03	2.2E-03	2.0E-01	4.1E-03	8.3E-03	2.1E-02	2.0E-03	1.0E-02	2.6E-03	5.0E-03	5.0E-03	1.0E-02	5.1E-02	1.0E-01
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	1.0E-03	2.0E-03	1.1E-02	2.0E-02	7.5E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.1E-02	2.0E-03	1.0E-02	2.6E-03	5.0E-03	5.0E-03	1.0E-02	5.1E-02	1.0E-01
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	1.0E-03	2.1E-03	1.2E-02	2.2E-02	8.0E-06	5.0E-04	2.5E-03	2.4E-03	2.0E-01	4.2E-03	8.5E-03	2.3E-02	2.0E-03	1.0E-02	3.4E-03	5.0E-03	5.0E-03	1.0E-02	5.3E-02	1.0E-01
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.6E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	4.0E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	1.0E-03	2.0E-03	1.0E-02	2.0E-02	1.8E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	1.0E-03	2.0E-03	1.0E-02	2.0E-02	4.2E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.2E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	1.0E-03	2.0E-03	1.0E-02	2.0E-02	1.9E-06	5.0E-04	2.5E-03	2.1E-03	2.0E-01	4.1E-03	8.2E-03	2.1E-02	2.0E-03	1.0E-02	2.3E-03	5.0E-03	5.0E-03	1.0E-02	5.1E-02	1.0E-01
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	1.0E-03	2.1E-03	1.2E-02	2.1E-02	3.5E-06	5.0E-04	2.5E-03	2.2E-03	2.0E-01	4.1E-03	8.3E-03	2.3E-02	2.0E-03	1.0E-02	3.3E-03	5.0E-03	5.0E-03	1.0E-02	5.3E-02	1.0E-01
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.0E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	2.7E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	2.5E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	2.2E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	2.0E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.0E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	1.9E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	2.7E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	1.0E-03	2.0E-03	1.0E-02	2.0E-02	2.3E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.0E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.9E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	1.0E-03	2.0E-03	1.0E-02	2.0E-02	4.4E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.1E-02	2.0E-03	1.0E-02	2.3E-03	5.0E-03	5.0E-03	1.0E-02	5.1E-02	1.0E-01
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	1.0E-03	2.0E-03	1.0E-02	2.0E-02	4.2E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	1.0E-03	2.0E-03	1.0E-02	2.0E-02	6.3E-08	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.0E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	9.3E-08	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.0E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	1.2E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.0E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	1.3E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.0E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	1.0E-03	2.2E-03	1.5E-02	2.3E-02	1.3E-05	5.0E-04	2.5E-03	2.7E-03	2.0E-01	4.4E-03	8.8E-03	2.7E-02	2.0E-03	1.0E-02	5.7E-03	5.0E-03	5.0E-03	1.0E-02	5.8E-02	1.1E-01
--	"Off-Property Limit" Maximum - Quebec	625.62 , 6083.39	--	1.0E-03	2.6E-03	2.0E-02	2.6E-02	3.0E-05	5.0E-04	2.5E-03	3.6E-03	2.1E-01	4.9E-03	9.8E-03	3.6E-02	2.0E-03	1.0E-02	1.0E-02	5.0E-03	5.0E-03	1.1E-02	6.8E-02	1.1E-01
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	622.24 , 6085.73	--	1.0E-03	2.6E-03	1.7E-02	2.7E-02	3.4E-05	5.0E-04	2.5E-03	3.8E-03	2.0E-01	5.0E-03	1.0E-02	3.1E-02	2.0E-03	1.0E-02	7.5E-03	5.0E-03	5.0E-03	1.1E-02	6.3E-02	1.1E-01

- all values in $\mu g/m^3$, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

WITH BLASTS

	VOLATIL ORGANIC COUMPOUNDS					
Pollutant	Benzene	1,3-Butadiene		Formaldehyde	Acetaldehyde	Acrolein
Averaging Period	24-hr	1-yr	24-hr	24-hr	24-hr	24-hr
Selected Air Quality Assessement Criteria for Howse	**2.3**	**0.3**	**10**	**6.5**	**500**	**0.4**
BACKGROUND CONCENTRATIONS - PRE-DSO3	**0**	**0.27**	**1.4**	**0.5**	**0**	**0**

DSO3 + DSO4 ONLY

			Pollutant	Benzene	1,3-Butadiene		Formaldehyde	Acetaldehyde	Acrolein
			Averaging Period	24-hr	1-yr	24-hr	24-hr	24-hr	24-hr
			Assessment Criteria	2.3	0.3	10	6.5	500	0.4
ID	**Description**	**UTM Coordinates**	**Distance From Howse**	Obtained VOC concentrations in ambient air by multiplying HC concentrations by specific COV fraction obtained from EPA MOVES					
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	4.6E-03	1.1E-05	2.7E-04	7.8E-02	2.5E-02	8.5E-03
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	4.6E-03	1.1E-05	2.7E-04	7.8E-02	2.5E-02	8.5E-03
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	4.6E-03	1.1E-05	2.7E-04	7.8E-02	2.5E-02	8.5E-03
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	4.3E-03	1.0E-05	2.6E-04	7.3E-02	2.3E-02	7.9E-03
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	3.8E-03	1.0E-05	2.2E-04	6.4E-02	2.0E-02	6.9E-03
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	4.7E-03	1.1E-05	2.8E-04	7.9E-02	2.5E-02	8.6E-03
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	5.8E-03	1.4E-05	3.4E-04	9.8E-02	3.1E-02	1.1E-02
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	6.2E-03	1.3E-05	3.7E-04	1.0E-01	3.3E-02	1.1E-02
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	3.0E-02	6.6E-05	1.8E-03	5.1E-01	1.6E-01	5.5E-02
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	1.0E-02	2.7E-05	6.0E-04	1.7E-01	5.4E-02	1.9E-02
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	1.0E-02	2.5E-05	6.1E-04	1.7E-01	5.5E-02	1.9E-02
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	1.3E-02	4.0E-05	7.8E-04	2.2E-01	7.0E-02	2.4E-02
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	1.0E-02	3.0E-05	6.1E-04	1.7E-01	5.5E-02	1.9E-02
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	3.3E-03	7.7E-06	2.0E-04	5.6E-02	1.8E-02	6.1E-03
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	4.1E-03	1.6E-05	2.5E-04	7.0E-02	2.2E-02	7.6E-03
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	1.3E-02	8.6E-05	7.5E-04	2.1E-01	6.7E-02	2.3E-02
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	3.5E-03	1.3E-05	2.1E-04	5.9E-02	1.9E-02	6.4E-03
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	7.5E-02	3.8E-04	4.5E-03	1.3E+00	4.0E-01	1.4E-01
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	5.4E-03	1.4E-05	3.2E-04	9.2E-02	2.9E-02	1.0E-02
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	4.5E-03	1.6E-05	2.7E-04	7.6E-02	2.4E-02	8.3E-03
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	1.8E-03	5.1E-06	1.0E-04	3.0E-02	9.4E-03	3.2E-03
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	5.2E-03	1.2E-05	3.1E-04	8.9E-02	2.8E-02	9.7E-03
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	8.1E-03	4.5E-05	4.8E-04	1.4E-01	4.4E-02	1.5E-02
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	2.5E-02	6.3E-05	1.5E-03	4.2E-01	1.3E-01	4.6E-02
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	3.3E-03	1.2E-05	1.9E-04	5.5E-02	1.8E-02	6.0E-03
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	2.6E-03	1.0E-05	1.5E-04	4.4E-02	1.4E-02	4.8E-03
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	2.5E-03	1.0E-05	1.5E-04	4.1E-02	1.3E-02	4.5E-03
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	2.1E-03	8.8E-06	1.2E-04	3.5E-02	1.1E-02	3.8E-03
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	2.1E-03	8.5E-06	1.3E-04	3.6E-02	1.1E-02	3.9E-03
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	2.1E-03	8.3E-06	1.2E-04	3.5E-02	1.1E-02	3.8E-03
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	3.0E-03	1.2E-05	1.8E-04	5.2E-02	1.6E-02	5.6E-03
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	2.4E-03	9.4E-06	1.4E-04	4.0E-02	1.3E-02	4.4E-03
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	6.5E-03	1.4E-05	3.9E-04	1.1E-01	3.5E-02	1.2E-02
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	5.7E-03	1.3E-05	3.4E-04	9.7E-02	3.1E-02	1.1E-02
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	8.1E-03	1.5E-05	4.8E-04	1.4E-01	4.4E-02	1.5E-02
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	9.4E-04	3.2E-06	5.6E-05	1.6E-02	5.1E-03	1.7E-03
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	1.8E-03	5.7E-06	1.1E-04	3.1E-02	9.7E-03	3.3E-03
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	2.4E-03	6.4E-06	1.4E-04	4.1E-02	1.3E-02	4.4E-03
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	2.4E-03	6.6E-06	1.4E-04	4.1E-02	1.3E-02	4.5E-03
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	1.4E-01	8.9E-04	8.5E-03	2.4E+00	7.7E-01	2.6E-01
--	"Off-Property Limit" Maximum - Quebec	625.62 , 6083.39	--	1.7E-01	8.1E-04	1.0E-02	2.9E+00	9.1E-01	3.1E-01
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	619.00 , 6090.50	--	1.3E-01	9.6E-04	7.5E-03	2.1E+00	6.7E-01	2.3E-01

DSO3 + DSO4 ONLY

- all values in µg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

WITH BLASTS

HOWSE ONLY

			Pollutant	Benzene	1,3-Butadiene		Formaldehyde	Acetaldehyde	Acrolein
			Averaging Period	24-hr	1-yr	24-hr	24-hr	24-hr	24-hr
			Assessment Criteria	2.3	0.3	10	6.5	500	0.4
ID	**Name**	**UTM Coordinates**	**Distance From Howse**	**VOLATIL ORGANIC COUMPOUNDS** Obtained VOC concentrations in ambient air by multiplying HC concentrations by specific COV fraction obtained from EPA MOVES					
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	2.8E-03	7.2E-06	1.7E-04	4.8E-02	1.5E-02	5.2E-03
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	2.6E-03	7.0E-06	1.6E-04	4.5E-02	1.4E-02	4.9E-03
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	2.8E-03	7.2E-06	1.6E-04	4.6E-02	1.5E-02	5.1E-03
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	2.6E-03	6.7E-06	1.6E-04	4.4E-02	1.4E-02	4.8E-03
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	3.0E-03	6.8E-06	1.8E-04	5.1E-02	1.6E-02	5.6E-03
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	2.5E-03	6.7E-06	1.5E-04	4.2E-02	1.3E-02	4.5E-03
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	1.7E-03	6.7E-06	9.9E-05	2.8E-02	8.9E-03	3.1E-03
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	3.3E-03	6.7E-06	2.0E-04	5.6E-02	1.8E-02	6.1E-03
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	1.7E-02	8.1E-05	1.0E-03	2.9E-01	9.3E-02	3.2E-02
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	1.5E-02	5.9E-05	8.7E-04	2.5E-01	7.8E-02	2.7E-02
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	1.2E-02	3.6E-05	6.9E-04	2.0E-01	6.3E-02	2.2E-02
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	3.5E-03	1.8E-05	2.1E-04	5.9E-02	1.9E-02	6.5E-03
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	2.4E-02	7.3E-05	1.4E-03	4.1E-01	1.3E-01	4.4E-02
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	1.5E-03	4.2E-06	9.1E-05	2.6E-02	8.2E-03	2.8E-03
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	1.4E-03	5.5E-06	8.2E-05	2.3E-02	7.4E-03	2.6E-03
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	7.4E-03	3.7E-05	4.4E-04	1.2E-01	4.0E-02	1.4E-02
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	7.8E-03	1.8E-05	4.7E-04	1.3E-01	4.2E-02	1.4E-02
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	3.7E-02	1.1E-04	2.2E-03	6.2E-01	2.0E-01	6.8E-02
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	1.4E-03	5.1E-06	8.6E-05	2.4E-02	7.8E-03	2.7E-03
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	2.0E-03	5.6E-06	1.2E-04	3.4E-02	1.1E-02	3.7E-03
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	1.1E-03	3.5E-06	6.3E-05	1.8E-02	5.7E-03	2.0E-03
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	3.5E-03	8.2E-06	2.1E-04	5.9E-02	1.9E-02	6.4E-03
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	2.7E-03	1.6E-05	1.6E-04	4.5E-02	1.4E-02	4.9E-03
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	2.2E-02	8.1E-05	1.3E-03	3.7E-01	1.2E-01	4.0E-02
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	1.3E-03	4.2E-06	7.7E-05	2.2E-02	6.9E-03	2.4E-03
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	1.2E-03	3.7E-06	7.1E-05	2.0E-02	6.4E-03	2.2E-03
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	1.2E-03	3.6E-06	7.2E-05	2.0E-02	6.4E-03	2.2E-03
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	1.0E-03	3.2E-06	6.2E-05	1.8E-02	5.6E-03	1.9E-03
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	1.0E-03	3.0E-06	6.2E-05	1.8E-02	5.6E-03	1.9E-03
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	9.0E-04	2.9E-06	5.4E-05	1.5E-02	4.8E-03	1.7E-03
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	1.2E-03	4.0E-06	7.2E-05	2.0E-02	6.5E-03	2.2E-03
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	8.1E-04	3.1E-06	4.8E-05	1.4E-02	4.3E-03	1.5E-03
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	4.4E-03	7.9E-06	2.6E-04	7.4E-02	2.3E-02	8.1E-03
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	2.9E-03	7.3E-06	1.7E-04	5.0E-02	1.6E-02	5.4E-03
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	2.8E-03	7.5E-06	1.7E-04	4.7E-02	1.5E-02	5.2E-03
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	3.0E-04	1.0E-06	1.8E-05	5.1E-03	1.6E-03	5.6E-04
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	5.3E-04	1.6E-06	3.2E-05	9.0E-03	2.9E-03	9.9E-04
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	6.2E-04	2.1E-06	3.7E-05	1.1E-02	3.3E-03	1.2E-03
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	9.1E-04	2.2E-06	5.4E-05	1.5E-02	4.9E-03	1.7E-03
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	2.8E-02	1.1E-04	1.6E-03	4.7E-01	1.5E-01	5.1E-02
--	"Off-Property Limit" Maximum - Quebec	624.33 , 6084.64	--	7.6E-02	2.4E-04	4.5E-03	1.3E+00	4.1E-01	1.4E-01
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	618.55 , 6086.66	--	1.5E-01	4.5E-04	8.9E-03	2.5E+00	8.0E-01	2.8E-01

- all values in μg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

WITH BLASTS

DSO3 + DSO4 + HOWSE

ID	Name	UTM Coordinates	Distance From Howse	Benzene	1,3-Butadiene		Formaldehyde	Acetaldehyde	Acrolein
				VOLATIL ORGANIC COUMPOUNDS					
			Pollutant	Benzene	1,3-Butadiene		Formaldehyde	Acetaldehyde	Acrolein
			Averaging Period	24-hr	1-yr	24-hr	24-hr	24-hr	24-hr
			Assessment Criteria	2.3	0.3	10	6.5	500	0.4
				Obtained VOC concentrations in ambient air by multiplying HC concentrations by specific COV fraction obtained from EPA MOVES					
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	6.9E-03	1.8E-05	4.1E-04	1.2E-01	3.7E-02	1.3E-02
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	6.8E-03	1.8E-05	4.0E-04	1.1E-01	3.6E-02	1.3E-02
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	6.8E-03	1.8E-05	4.1E-04	1.2E-01	3.7E-02	1.3E-02
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	6.6E-03	1.7E-05	3.9E-04	1.1E-01	3.5E-02	1.2E-02
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	6.8E-03	1.7E-05	4.0E-04	1.1E-01	3.6E-02	1.3E-02
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	6.6E-03	1.8E-05	3.9E-04	1.1E-01	3.5E-02	1.2E-02
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	5.9E-03	2.0E-05	3.5E-04	1.0E-01	3.2E-02	1.1E-02
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	7.7E-03	2.0E-05	4.6E-04	1.3E-01	4.1E-02	1.4E-02
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	3.0E-02	1.5E-04	1.8E-03	5.1E-01	1.6E-01	5.5E-02
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	2.3E-02	8.7E-05	1.4E-03	3.9E-01	1.2E-01	4.2E-02
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	1.6E-02	6.1E-05	9.6E-04	2.7E-01	8.7E-02	3.0E-02
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	1.4E-02	5.5E-05	8.2E-04	2.3E-01	7.3E-02	2.5E-02
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	2.6E-02	1.0E-04	1.5E-03	4.4E-01	1.4E-01	4.8E-02
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	4.8E-03	1.2E-05	2.9E-04	8.2E-02	2.6E-02	8.9E-03
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	4.5E-03	2.1E-05	2.7E-04	7.6E-02	2.4E-02	8.3E-03
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	1.3E-02	1.2E-04	7.5E-04	2.1E-01	6.7E-02	2.3E-02
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	9.3E-03	3.1E-05	5.6E-04	1.6E-01	5.0E-02	1.7E-02
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	7.5E-02	5.0E-04	4.5E-03	1.3E+00	4.0E-01	1.4E-01
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	5.6E-03	1.9E-05	3.3E-04	9.5E-02	3.0E-02	1.0E-02
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	4.9E-03	2.1E-05	2.9E-04	8.3E-02	2.6E-02	9.0E-03
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	2.3E-03	8.6E-06	1.4E-04	3.9E-02	1.2E-02	4.3E-03
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	8.0E-03	2.0E-05	4.8E-04	1.4E-01	4.3E-02	1.5E-02
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	8.1E-03	6.0E-05	4.8E-04	1.4E-01	4.4E-02	1.5E-02
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	3.2E-02	1.4E-04	1.9E-03	5.5E-01	1.7E-01	6.0E-02
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	3.5E-03	1.6E-05	2.1E-04	5.9E-02	1.9E-02	6.4E-03
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	3.4E-03	1.4E-05	2.0E-04	5.8E-02	1.8E-02	6.3E-03
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	3.3E-03	1.4E-05	2.0E-04	5.6E-02	1.8E-02	6.1E-03
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	2.8E-03	1.2E-05	1.7E-04	4.8E-02	1.5E-02	5.2E-03
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	2.7E-03	1.2E-05	1.6E-04	4.5E-02	1.4E-02	4.9E-03
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	2.4E-03	1.1E-05	1.4E-04	4.0E-02	1.3E-02	4.4E-03
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	3.5E-03	1.6E-05	2.1E-04	6.0E-02	1.9E-02	6.5E-03
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	2.4E-03	1.2E-05	1.4E-04	4.1E-02	1.3E-02	4.4E-03
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	8.7E-03	2.2E-05	5.2E-04	1.5E-01	4.7E-02	1.6E-02
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	7.1E-03	2.0E-05	4.2E-04	1.2E-01	3.8E-02	1.3E-02
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	8.4E-03	2.2E-05	5.0E-04	1.4E-01	4.5E-02	1.6E-02
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	1.2E-03	4.1E-06	7.3E-05	2.1E-02	6.5E-03	2.3E-03
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	2.0E-03	7.3E-06	1.2E-04	3.4E-02	1.1E-02	3.7E-03
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	2.5E-03	8.5E-06	1.5E-04	4.3E-02	1.4E-02	4.7E-03
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	2.6E-03	8.7E-06	1.5E-04	4.3E-02	1.4E-02	4.7E-03
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	1.5E-01	9.8E-04	8.7E-03	2.5E+00	7.8E-01	2.7E-01
--	"Off-Property Limit" Maximum - Quebec	625.62 , 6083.39	--	1.7E-01	8.5E-04	1.0E-02	2.9E+00	9.1E-01	3.1E-01
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	622.24 , 6085.73	--	1.5E-01	1.1E-03	9.2E-03	2.6E+00	8.2E-01	2.8E-01

- all values in μg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

WITH BLASTS

VOLATIL ORGANIC COUMPOUNDS

ALL: Background + DSO3 + DSO4 + HOWSE

			Pollutant	Benzene	1,3-Butadiene		Formaldehyde	Acetaldehyde	Acrolein
			Averaging Period	24-hr	1-yr	24-hr	24-hr	24-hr	24-hr
			Assessment Criteria	2.3	0.3	10	6.5	500	0.4
			Background concentration (Pre-DSO3)	0	0.27	1.4	0.5	0	0
ID	**Name**	**UTM Coordinates**	**Distance From Howse**	Obtained VOC concentrations in ambient air by multiplying HC concentrations by specific COV fraction obtained from EPA MOVES					
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	6.9E-03	2.7E-01	1.4E+00	6.2E-01	3.7E-02	1.3E-02
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	6.8E-03	2.7E-01	1.4E+00	6.1E-01	3.6E-02	1.3E-02
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	6.8E-03	2.7E-01	1.4E+00	6.2E-01	3.7E-02	1.3E-02
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	6.6E-03	2.7E-01	1.4E+00	6.1E-01	3.5E-02	1.2E-02
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	6.8E-03	2.7E-01	1.4E+00	6.1E-01	3.6E-02	1.3E-02
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	6.6E-03	2.7E-01	1.4E+00	6.1E-01	3.5E-02	1.2E-02
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	5.9E-03	2.7E-01	1.4E+00	6.0E-01	3.2E-02	1.1E-02
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	7.7E-03	2.7E-01	1.4E+00	6.3E-01	4.1E-02	1.4E-02
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	3.0E-02	2.7E-01	1.4E+00	1.0E+00	1.6E-01	5.5E-02
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	2.3E-02	2.7E-01	1.4E+00	8.9E-01	1.2E-01	4.2E-02
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	1.6E-02	2.7E-01	1.4E+00	7.7E-01	8.7E-02	3.0E-02
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	1.4E-02	2.7E-01	1.4E+00	7.3E-01	7.3E-02	2.5E-02
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	2.6E-02	2.7E-01	1.4E+00	9.4E-01	1.4E-01	4.8E-02
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	4.8E-03	2.7E-01	1.4E+00	5.8E-01	2.6E-02	8.9E-03
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	4.5E-03	2.7E-01	1.4E+00	5.8E-01	2.4E-02	8.3E-03
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	1.3E-02	2.7E-01	1.4E+00	7.1E-01	6.7E-02	2.3E-02
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	9.3E-03	2.7E-01	1.4E+00	6.6E-01	5.0E-02	1.7E-02
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	7.5E-02	2.7E-01	1.4E+00	1.8E+00	4.0E-01	1.4E-01
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	5.6E-03	2.7E-01	1.4E+00	6.0E-01	3.0E-02	1.0E-02
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	4.9E-03	2.7E-01	1.4E+00	5.8E-01	2.6E-02	9.0E-03
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	2.3E-03	2.7E-01	1.4E+00	5.4E-01	1.2E-02	4.3E-03
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	8.0E-03	2.7E-01	1.4E+00	6.4E-01	4.3E-02	1.5E-02
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	8.1E-03	2.7E-01	1.4E+00	6.4E-01	4.4E-02	1.5E-02
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	3.2E-02	2.7E-01	1.4E+00	1.0E+00	1.7E-01	6.0E-02
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	3.5E-03	2.7E-01	1.4E+00	5.6E-01	1.9E-02	6.4E-03
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	3.4E-03	2.7E-01	1.4E+00	5.6E-01	1.8E-02	6.3E-03
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	3.3E-03	2.7E-01	1.4E+00	5.6E-01	1.8E-02	6.1E-03
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	2.8E-03	2.7E-01	1.4E+00	5.5E-01	1.5E-02	5.2E-03
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	2.7E-03	2.7E-01	1.4E+00	5.5E-01	1.4E-02	4.9E-03
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	2.4E-03	2.7E-01	1.4E+00	5.4E-01	1.3E-02	4.4E-03
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	3.5E-03	2.7E-01	1.4E+00	5.6E-01	1.9E-02	6.5E-03
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	2.4E-03	2.7E-01	1.4E+00	5.4E-01	1.3E-02	4.4E-03
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	8.7E-03	2.7E-01	1.4E+00	6.5E-01	4.7E-02	1.6E-02
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	7.1E-03	2.7E-01	1.4E+00	6.2E-01	3.8E-02	1.3E-02
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	8.4E-03	2.7E-01	1.4E+00	6.4E-01	4.5E-02	1.6E-02
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	1.2E-03	2.7E-01	1.4E+00	5.2E-01	6.5E-03	2.3E-03
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	2.0E-03	2.7E-01	1.4E+00	5.3E-01	1.1E-02	3.7E-03
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	2.5E-03	2.7E-01	1.4E+00	5.4E-01	1.4E-02	4.7E-03
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	2.6E-03	2.7E-01	1.4E+00	5.4E-01	1.4E-02	4.7E-03
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	1.5E-01	2.7E-01	1.4E+00	3.0E+00	7.8E-01	2.7E-01
--	"Off-Property Limit" Maximum - Quebec	625.62 , 6083.39	--	1.7E-01	2.7E-01	1.4E+00	3.4E+00	9.1E-01	3.1E-01
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	622.24 , 6085.73	--	1.5E-01	2.7E-01	1.4E+00	3.1E+00	8.2E-01	2.8E-01

ALL: Background + DSO3 + DSO4 + HOWSE

- all values in $\mu g/m^3$, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

Appendix M
Complete Tables of Results
“NO Blasts” Scenario

NO BLASTS

Pollutant	TPM	TPM	TPM	PM10	PM10	PM10	PM2.5	PM2.5	PM2.5	SO2	SO2	SO2	SO2	NO2	NO2	NO2	CO	CO
Averaging Period	1-yr	24-hr	1-hr	1-yr	24-hr	1-hr	1-yr	24-hr	1-hr	1-yr	24-hr	3-hr	1-hr	1-yr	24-hr	1-hr	8-hr	1-hr
Selected Air Quality Assessement Criteria for Howse	**60**	**120**	**--**	**--**	**50**	**--**	**8.8**	**25**	**--**	**52**	**288**	**600**	**900**	**100**	**200**	**400**	**12700**	**34000**
BACKGROUND CONCENTRATIONS - PRE-DSO3	**8**	**40**	**97**	**4**	**20**	**49**	**3**	**15**	**37**	**2**	**10**	**18**	**24**	**10**	**30**	**50**	**400**	**600**

DSO3 + DSO4 ONLY	Pollutant	TPM	TPM	TPM	PM10	PM10	PM10	PM2.5	PM2.5	PM2.5	SO2	SO2	SO2	SO2	NO2	NO2	NO2	CO	CO
	Averaging Period	1-yr	24-hr	1-hr	1-yr	24-hr	1-hr	1-yr	24-hr	1-hr	1-yr	24-hr	3-hr	1-hr	1-yr	24-hr	1-hr	8-hr	1-hr
	Assessment Criteria	60	120	--	--	50	--	8.8	25	--	52	288	600	900	100	200	400	12700	34000

DSO3 + DSO4 ONLY

ID	Description	UTM Coordinates	Distance From Howse	TPM 1-yr	TPM 24-hr	TPM 1-hr	PM10 1-yr	PM10 24-hr	PM10 1-hr	PM2.5 1-yr	PM2.5 24-hr	PM2.5 1-hr	SO2 1-yr	SO2 24-hr	SO2 3-hr	SO2 1-hr	NO2 1-yr	NO2 24-hr	NO2 1-hr	CO 8-hr	CO 1-hr
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	0.1	1.2	6.0	0.0	0.6	2.8	0.0	0.4	1.6	0.0	0.0	0.0	0.0	0.2	8.9	37.5	2.5	4.3
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	0.1	1.2	6.9	0.0	0.5	3.0	0.0	0.4	1.5	0.0	0.0	0.0	0.0	0.2	9.2	36.5	2.4	4.3
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	0.1	1.1	5.4	0.0	0.5	2.9	0.0	0.4	1.6	0.0	0.0	0.0	0.0	0.2	9.2	37.0	2.4	4.3
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	0.1	1.2	6.7	0.0	0.5	3.2	0.0	0.4	1.4	0.0	0.0	0.0	0.0	0.2	8.9	26.8	1.9	4.3
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	0.1	1.5	7.8	0.0	0.5	3.1	0.0	0.3	1.4	0.0	0.0	0.0	0.0	0.2	7.7	31.8	1.9	4.2
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	0.1	1.6	9.8	0.0	0.6	4.2	0.0	0.4	1.7	0.0	0.0	0.0	0.0	0.3	9.3	43.3	2.3	4.4
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	0.1	1.0	4.3	0.0	0.6	3.0	0.0	0.5	2.3	0.0	0.0	0.0	0.1	0.3	10.6	56.0	1.8	5.0
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	0.1	1.1	4.3	0.0	0.7	2.7	0.0	0.5	1.9	0.0	0.0	0.0	0.0	0.3	12.6	50.5	2.8	4.9
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	0.4	6.2	24.9	0.2	3.1	13.6	0.1	2.6	7.2	0.0	0.1	0.1	0.2	1.5	59.6	180.3	8.7	13.4
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	0.3	3.6	18.5	0.1	1.3	6.9	0.0	0.9	2.3	0.0	0.0	0.0	0.1	0.6	19.9	49.0	4.1	5.7
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	0.2	2.5	15.9	0.1	1.3	8.5	0.0	0.9	1.8	0.0	0.0	0.0	0.0	0.6	19.4	39.4	3.1	9.5
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	0.2	2.0	8.4	0.1	1.5	6.5	0.1	1.3	5.3	0.0	0.0	0.1	0.1	1.1	28.4	109.2	3.2	8.6
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	0.3	5.1	24.4	0.1	1.9	8.7	0.0	0.8	2.3	0.0	0.0	0.0	0.1	0.7	19.7	50.1	3.9	6.4
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	0.0	0.9	5.0	0.0	0.4	2.5	0.0	0.3	1.2	0.0	0.0	0.0	0.0	0.2	6.5	31.5	1.3	2.8
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	0.1	1.0	7.0	0.0	0.6	3.8	0.0	0.3	1.5	0.0	0.0	0.0	0.0	0.4	8.5	34.5	1.7	3.8
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	0.9	7.1	28.0	0.4	2.6	13.4	0.1	1.1	3.8	0.0	0.0	0.1	0.1	1.6	24.5	83.7	6.2	11.3
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	0.1	1.4	7.3	0.0	0.6	4.4	0.0	0.3	1.3	0.0	0.0	0.0	0.0	0.3	6.9	34.4	1.8	3.7
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	1.5	11.7	68.5	0.9	7.3	41.1	0.4	5.5	14.1	0.0	0.1	0.2	0.3	8.5	119.0	269.2	31.9	54.9
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	0.1	0.9	4.5	0.0	0.5	2.7	0.0	0.4	1.2	0.0	0.0	0.0	0.0	0.3	9.7	25.8	1.9	3.9
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	0.1	1.1	4.7	0.0	0.6	2.7	0.0	0.3	1.2	0.0	0.0	0.0	0.0	0.3	9.3	25.8	2.1	3.7
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	0.0	0.8	3.7	0.0	0.4	2.1	0.0	0.1	0.5	0.0	0.0	0.0	0.0	0.1	3.1	11.9	0.8	1.7
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	0.1	1.3	5.9	0.0	0.7	2.6	0.0	0.4	1.8	0.0	0.0	0.0	0.0	0.3	9.2	46.2	2.8	4.2
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	0.5	4.2	24.1	0.2	1.9	11.5	0.1	0.6	2.2	0.0	0.0	0.0	0.0	0.9	15.0	43.5	3.5	7.6
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	0.4	4.7	24.3	0.2	2.6	12.7	0.1	1.4	6.9	0.0	0.0	0.1	0.2	1.5	35.8	183.6	10.5	16.9
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	0.0	0.6	3.7	0.0	0.4	2.6	0.0	0.2	1.0	0.0	0.0	0.0	0.0	0.3	5.9	24.6	1.6	2.8
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	0.0	0.5	3.4	0.0	0.3	2.3	0.0	0.2	1.1	0.0	0.0	0.0	0.0	0.2	4.6	24.4	1.1	2.9
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	0.0	0.6	2.8	0.0	0.3	1.9	0.0	0.2	1.1	0.0	0.0	0.0	0.0	0.2	4.4	28.9	1.1	3.1
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	0.0	0.5	2.3	0.0	0.3	1.6	0.0	0.1	1.0	0.0	0.0	0.0	0.0	0.2	3.4	27.0	1.0	3.0
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	0.0	0.5	2.0	0.0	0.3	1.4	0.0	0.1	0.7	0.0	0.0	0.0	0.0	0.2	3.4	18.0	1.2	3.1
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	0.0	0.6	2.1	0.0	0.3	1.3	0.0	0.1	0.7	0.0	0.0	0.0	0.0	0.2	3.9	17.8	1.0	3.0
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	0.0	0.7	3.1	0.0	0.4	2.0	0.0	0.2	1.0	0.0	0.0	0.0	0.0	0.3	5.5	26.1	1.4	3.3
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	0.0	0.4	2.2	0.0	0.2	1.6	0.0	0.2	0.6	0.0	0.0	0.0	0.0	0.2	4.8	14.2	1.0	2.6
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	0.1	1.1	5.7	0.0	0.7	3.3	0.0	0.5	2.5	0.0	0.0	0.0	0.0	0.3	13.0	56.8	3.2	5.8
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	0.1	0.9	3.9	0.0	0.7	2.8	0.0	0.5	1.9	0.0	0.0	0.0	0.0	0.3	11.1	42.3	2.2	4.7
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	0.1	1.1	4.7	0.0	0.8	3.4	0.0	0.7	2.9	0.0	0.0	0.0	0.1	0.4	16.0	73.0	3.3	5.2
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	0.0	0.2	0.6	0.0	0.1	0.4	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.1	1.8	5.2	0.4	1.1
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	0.0	0.3	1.2	0.0	0.2	0.8	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.1	3.1	9.7	0.6	1.3
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	0.0	0.5	1.6	0.0	0.3	1.1	0.0	0.2	0.3	0.0	0.0	0.0	0.0	0.1	4.3	8.7	0.7	1.4
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	0.0	0.5	1.9	0.0	0.3	1.3	0.0	0.2	0.4	0.0	0.0	0.0	0.0	0.1	4.5	9.4	0.7	1.6
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	2.5	20.2	111.7	1.3	10.7	64.2	0.7	7.7	12.9	0.1	0.6	0.8	0.8	18.5	283.3	423.0	78.8	120.8
--	"Off-Property Limit" Maximum - Quebec	622.02 , 6087.16	--	8.4	82.1	349.5	3.1	35.2	145.5	0.8	10.0	25.6	0.0	0.2	0.3	0.4	11.0	171.5	327.3	193.7	319.0
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	619.00 , 6090.50	--	9.8	105.8	526.5	3.6	35.8	170.2	0.9	8.2	24.2	0.0	0.2	0.4	0.5	13.8	175.9	373.8	82.0	104.7

- all values in μg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

NO BLASTS

HOWSE ONLY

			Pollutant	TPM	TPM	TPM	PM10	PM10	PM10	PM2.5	PM2.5	PM2.5	SO2	SO2	SO2	SO2	NO2	NO2	NO2	CO	CO
	HOWSE ONLY		Averaging Period	1-yr	24-hr	1-hr	1-yr	24-hr	1-hr	1-yr	24-hr	1-hr	1-yr	24-hr	3-hr	1-hr	1-yr	24-hr	1-hr	8-hr	1-hr
			Assessment Criteria	60	120	--	--	50	--	8.8	25	--	52	288	600	900	100	200	400	12700	34000
ID	Name	UTM Coordinates	Distance From Howse																		
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	0.1	1.9	6.8	0.0	0.9	4.7	0.0	0.2	1.2	0.0	0.0	0.0	0.0	0.1	2.2	11.4	4.5	9.6
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	0.1	1.9	6.8	0.0	0.9	4.7	0.0	0.2	1.2	0.0	0.0	0.0	0.0	0.1	2.2	10.9	4.2	9.2
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	0.1	1.9	7.2	0.0	0.9	5.0	0.0	0.2	1.1	0.0	0.0	0.0	0.0	0.1	2.3	11.2	4.4	9.3
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	0.1	1.9	8.4	0.0	0.9	5.7	0.0	0.2	1.1	0.0	0.0	0.0	0.0	0.1	2.6	9.6	3.4	8.8
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	0.1	1.9	9.3	0.0	1.0	5.2	0.0	0.2	1.1	0.0	0.0	0.0	0.0	0.1	3.2	11.3	3.3	8.7
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	0.1	1.7	6.7	0.0	0.9	4.5	0.0	0.2	1.2	0.0	0.0	0.0	0.0	0.1	2.1	10.1	3.4	7.8
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	0.1	1.2	6.0	0.0	0.6	3.0	0.0	0.1	0.6	0.0	0.0	0.0	0.0	0.1	1.5	9.4	2.4	4.5
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	0.1	1.3	5.3	0.0	0.8	4.2	0.0	0.2	1.4	0.0	0.0	0.0	0.0	0.1	2.1	8.5	3.1	9.6
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	1.0	9.2	42.1	0.5	4.4	23.0	0.1	1.3	6.2	0.0	0.0	0.1	0.2	1.2	11.9	67.7	35.5	63.0
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	0.6	10.7	57.2	0.3	5.1	32.4	0.1	1.2	9.7	0.0	0.0	0.0	0.1	0.8	12.9	75.1	27.7	77.2
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	0.4	5.9	27.9	0.2	2.7	17.1	0.0	0.8	5.2	0.0	0.0	0.0	0.0	0.5	9.5	47.2	22.4	48.0
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	0.2	2.3	10.4	0.1	1.2	6.3	0.0	0.3	1.7	0.0	0.0	0.1	0.1	0.3	3.4	20.8	7.2	11.8
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	0.6	14.9	66.5	0.3	7.5	45.6	0.1	1.8	12.1	0.0	0.0	0.1	0.1	1.0	18.2	93.7	48.5	92.0
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	0.0	1.0	4.4	0.0	0.5	2.9	0.0	0.1	0.9	0.0	0.0	0.0	0.0	0.1	1.8	5.7	1.8	4.1
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	0.1	0.9	6.2	0.0	0.5	3.1	0.0	0.1	0.6	0.0	0.0	0.0	0.0	0.1	1.4	7.9	1.9	3.3
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	0.4	4.3	18.6	0.2	2.0	13.3	0.0	0.5	4.0	0.0	0.0	0.1	0.1	0.5	5.7	35.2	13.9	32.4
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	0.1	3.4	14.0	0.1	1.6	9.7	0.0	0.6	3.0	0.0	0.0	0.0	0.0	0.2	5.9	26.8	13.4	27.5
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	1.3	11.8	86.6	0.6	6.5	43.2	0.2	3.4	10.1	0.0	0.2	0.7	0.9	2.0	52.2	160.2	20.2	38.2
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	0.0	1.3	5.2	0.0	0.8	3.2	0.0	0.2	0.7	0.0	0.0	0.0	0.0	0.1	1.8	7.4	1.5	4.6
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	0.1	1.7	6.3	0.0	1.0	3.7	0.0	0.2	0.7	0.0	0.0	0.0	0.0	0.1	2.0	7.7	2.1	4.5
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	0.0	1.0	5.8	0.0	0.6	3.2	0.0	0.1	0.6	0.0	0.0	0.0	0.0	0.0	0.9	4.9	1.8	3.7
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	0.1	1.7	6.9	0.0	0.9	4.6	0.0	0.2	1.4	0.0	0.0	0.0	0.0	0.1	2.4	12.7	5.8	11.2
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	0.2	2.5	10.1	0.1	1.2	6.0	0.0	0.2	1.3	0.0	0.0	0.0	0.0	0.2	3.0	12.2	3.6	10.0
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	0.8	12.5	59.3	0.4	7.8	38.9	0.1	1.7	10.1	0.0	0.0	0.2	0.3	1.2	18.0	91.8	37.7	78.2
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	0.0	1.0	4.2	0.0	0.5	2.7	0.0	0.1	0.5	0.0	0.0	0.0	0.0	0.1	1.4	5.2	1.2	2.6
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	0.0	0.9	4.1	0.0	0.6	2.4	0.0	0.1	0.5	0.0	0.0	0.0	0.0	0.1	1.3	6.4	1.0	3.4
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	0.0	0.9	3.7	0.0	0.6	2.2	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.1	1.3	4.6	1.1	3.5
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	0.0	0.8	3.1	0.0	0.5	1.8	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	1.1	4.8	1.0	3.4
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	0.0	0.8	3.0	0.0	0.5	1.8	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	1.1	5.1	1.0	3.5
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	0.0	0.6	2.7	0.0	0.4	1.6	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	1.1	4.7	1.2	3.3
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	0.0	0.8	4.0	0.0	0.5	2.5	0.0	0.1	0.5	0.0	0.0	0.0	0.0	0.1	1.3	5.5	1.8	4.0
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	0.0	0.5	2.2	0.0	0.3	1.5	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.1	0.9	3.0	0.8	2.6
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	0.1	1.8	7.7	0.0	1.1	4.4	0.0	0.3	1.2	0.0	0.0	0.0	0.0	0.1	3.0	10.6	4.3	11.6
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	0.1	1.6	5.3	0.0	0.8	4.5	0.0	0.2	1.0	0.0	0.0	0.0	0.0	0.1	2.1	9.3	3.6	9.4
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	0.1	1.5	5.3	0.0	0.8	4.3	0.0	0.2	1.3	0.0	0.0	0.0	0.0	0.1	1.7	7.9	3.9	10.9
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	0.0	0.2	0.7	0.0	0.1	0.4	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.4	1.2	0.3	1.0
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	0.0	0.3	1.5	0.0	0.2	0.9	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.6	2.3	0.6	1.4
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	0.0	0.4	1.7	0.0	0.3	1.1	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.7	3.0	0.7	1.5
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	0.0	0.6	2.0	0.0	0.4	1.4	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.0	0.9	3.0	0.9	1.8
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	1.7	17.7	112.9	0.7	8.3	58.1	0.2	2.7	12.3	0.0	0.2	1.0	1.1	2.1	43.2	199.5	20.1	41.1
--	"Off-Property Limit" Maximum - Quebec	624.33 , 6084.64	--	3.2	54.5	220.3	1.4	26.8	108.9	0.3	5.8	16.8	0.0	0.4	1.7	1.8	4.0	80.1	269.6	37.0	67.0
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	618.55 , 6086.66	--	4.7	82.7	381.6	2.1	42.7	193.1	0.5	10.6	35.4	0.0	0.4	1.7	1.8	5.4	89.6	269.6	162.7	227.9

- all values in μg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

NO BLASTS

DSO3 + DSO4 + HOWSE

ID	Name	UTM Coordinates	Distance From Howse	TPM	TPM	TPM	PM10	PM10	PM10	PM2.5	PM2.5	PM2.5	SO2	SO2	SO2	SO2	NO2	NO2	NO2	CO	CO
			Averaging Period	1-yr	24-hr	1-hr	1-yr	24-hr	1-hr	1-yr	24-hr	1-hr	1-yr	24-hr	3-hr	1-hr	1-yr	24-hr	1-hr	8-hr	1-hr
			Assessment Criteria	60	120	--	--	50	--	8.8	25	--	52	288	600	900	100	200	400	12700	34000
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	0.1	2.6	11.3	0.1	1.3	7.5	0.0	0.5	2.2	0.0	0.0	0.1	0.1	0.3	10.1	45.5	6.7	12.9
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	0.1	2.6	11.3	0.1	1.3	7.5	0.0	0.5	2.1	0.0	0.0	0.1	0.1	0.3	10.1	44.6	6.4	12.6
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	0.1	2.7	11.8	0.1	1.3	7.9	0.0	0.4	2.1	0.0	0.0	0.1	0.1	0.3	9.8	45.3	6.6	12.7
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	0.1	2.6	13.7	0.1	1.4	9.0	0.0	0.5	1.8	0.0	0.0	0.0	0.1	0.3	11.4	33.5	5.0	10.5
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	0.1	2.5	12.8	0.1	1.3	8.3	0.0	0.5	2.1	0.0	0.0	0.0	0.0	0.3	10.9	34.5	5.1	10.4
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	0.1	2.5	11.0	0.1	1.3	7.2	0.0	0.5	2.1	0.0	0.0	0.1	0.1	0.3	11.0	49.1	5.3	11.2
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	0.1	2.1	9.4	0.1	1.0	5.8	0.0	0.5	2.3	0.0	0.0	0.0	0.1	0.4	10.6	56.3	3.4	6.8
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	0.1	2.4	8.5	0.1	1.5	6.3	0.0	0.5	2.4	0.0	0.0	0.1	0.1	0.4	12.7	54.2	5.4	11.4
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	1.4	12.4	50.8	0.7	5.7	27.3	0.2	2.6	7.2	0.0	0.1	0.2	0.3	2.7	59.6	181.7	37.3	67.7
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	0.8	12.2	60.5	0.4	5.8	34.6	0.1	1.7	10.2	0.0	0.0	0.1	0.1	1.4	31.8	81.9	28.4	78.9
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	0.6	7.5	37.2	0.3	3.5	22.5	0.1	1.2	5.3	0.0	0.0	0.1	0.1	1.1	23.5	48.6	23.1	48.8
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	0.4	4.1	15.9	0.2	1.8	11.7	0.1	1.3	5.4	0.0	0.0	0.1	0.1	1.3	28.9	111.8	8.0	13.6
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	0.9	16.2	70.1	0.5	8.1	48.3	0.1	1.9	12.7	0.0	0.0	0.1	0.1	1.6	27.6	96.1	49.4	93.8
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	0.1	1.4	7.5	0.0	0.8	4.8	0.0	0.3	1.3	0.0	0.0	0.0	0.0	0.2	8.3	32.2	3.1	6.3
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	0.1	1.8	13.2	0.1	1.1	6.9	0.0	0.4	1.6	0.0	0.0	0.0	0.0	0.5	8.7	37.0	2.9	5.9
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	1.3	8.9	40.1	0.6	3.6	17.8	0.1	1.1	4.1	0.0	0.0	0.1	0.1	2.1	24.5	86.2	16.2	33.0
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	0.2	4.1	21.3	0.1	2.1	14.1	0.0	0.7	3.2	0.0	0.0	0.0	0.1	0.5	12.6	43.5	14.8	30.5
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	2.8	22.2	134.6	1.5	13.8	74.9	0.6	5.5	18.4	0.0	0.2	0.7	0.9	10.5	119.1	279.3	32.2	54.9
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	0.1	2.2	8.4	0.1	1.3	5.5	0.0	0.4	1.3	0.0	0.0	0.0	0.0	0.4	9.8	26.1	2.8	7.5
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	0.1	2.7	9.5	0.1	1.6	6.2	0.0	0.4	1.4	0.0	0.0	0.0	0.1	0.4	9.3	27.7	4.0	7.2
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	0.1	1.9	8.5	0.0	1.0	5.1	0.0	0.2	1.1	0.0	0.0	0.0	0.0	0.2	3.5	14.1	2.6	5.1
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	0.1	2.4	11.6	0.1	1.2	7.0	0.0	0.5	2.5	0.0	0.0	0.1	0.1	0.4	10.7	46.2	8.3	14.2
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	0.7	6.0	27.7	0.3	2.6	14.5	0.1	0.6	2.4	0.0	0.0	0.0	0.1	1.1	15.0	45.5	4.6	10.2
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	1.1	16.3	75.4	0.6	9.7	46.8	0.2	2.5	10.6	0.0	0.1	0.3	0.3	2.6	45.8	184.3	38.8	80.2
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	0.1	1.5	6.7	0.1	0.8	4.5	0.0	0.2	1.0	0.0	0.0	0.0	0.1	0.3	6.0	27.1	1.8	5.0
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	0.1	1.4	6.0	0.0	0.8	3.8	0.0	0.2	1.1	0.0	0.0	0.0	0.1	0.3	4.9	24.5	1.8	6.3
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	0.1	1.5	5.7	0.0	0.9	3.5	0.0	0.2	1.1	0.0	0.0	0.0	0.1	0.3	5.2	33.5	1.8	6.6
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	0.1	1.3	4.9	0.0	0.8	3.1	0.0	0.2	1.1	0.0	0.0	0.0	0.0	0.2	4.4	29.8	1.6	6.3
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	0.1	1.3	4.8	0.0	0.8	3.1	0.0	0.2	1.0	0.0	0.0	0.0	0.0	0.2	4.2	19.3	1.6	6.6
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	0.1	1.1	4.1	0.0	0.6	2.6	0.0	0.2	1.0	0.0	0.0	0.0	0.0	0.2	3.9	19.2	1.9	6.3
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	0.1	1.3	6.6	0.0	0.9	4.2	0.0	0.3	1.2	0.0	0.0	0.0	0.0	0.3	5.7	26.5	3.0	7.3
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	0.1	0.9	3.8	0.0	0.5	2.8	0.0	0.2	0.8	0.0	0.0	0.0	0.0	0.3	4.8	15.2	1.2	5.2
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	0.1	2.9	9.3	0.1	1.8	5.7	0.0	0.6	2.9	0.0	0.0	0.1	0.1	0.4	14.6	60.5	7.0	14.4
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	0.1	2.1	9.3	0.1	1.2	7.3	0.0	0.5	2.3	0.0	0.0	0.0	0.1	0.4	12.8	44.7	5.3	12.0
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	0.1	2.6	9.6	0.1	1.5	5.8	0.0	0.7	3.1	0.0	0.0	0.1	0.1	0.5	16.0	76.7	6.5	12.6
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	0.0	0.3	1.1	0.0	0.2	0.8	0.0	0.1	0.3	0.0	0.0	0.0	0.0	0.1	2.1	6.0	0.5	2.1
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	0.0	0.6	2.4	0.0	0.4	1.6	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.2	3.2	9.8	1.2	2.7
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	0.0	0.9	3.0	0.0	0.6	2.1	0.0	0.2	0.5	0.0	0.0	0.0	0.0	0.2	4.4	10.3	1.3	3.0
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	0.0	1.1	3.8	0.0	0.7	2.7	0.0	0.2	0.6	0.0	0.0	0.0	0.0	0.2	4.6	11.5	1.5	3.4
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	4.2	33.9	224.6	2.1	16.3	122.3	0.8	7.7	19.3	0.1	0.7	1.2	1.3	19.7	285.0	437.3	79.1	121.0
--	"Off-Property Limit" Maximum - Quebec	622.02 , 6087.16	--	9.6	87.8	364.6	3.7	44.5	173.6	0.9	10.0	33.2	0.0	0.4	1.7	1.8	13.3	171.5	338.3	193.7	326.8
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	622.24 , 6085.73	--	12.8	144.1	557.3	4.9	57.1	197.1	1.1	10.8	36.0	0.0	0.4	1.7	1.8	16.4	175.9	381.9	165.0	230.1

- all values in μg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

NO BLASTS

ALL: Background + DSO3 + DSO4 + HOWSE

			Pollutant	TPM	TPM	TPM	PM10	PM10	PM10	PM2.5	PM2.5	PM2.5	SO2	SO2	SO2	SO2	NO2	NO2	NO2	CO	CO
	ALL: Background + DSO3 + DSO4 + HOWSE		Averaging Period	1-yr	24-hr	1-hr	1-yr	24-hr	1-hr	1-yr	24-hr	1-hr	1-yr	24-hr	3-hr	1-hr	1-yr	24-hr	1-hr	8-hr	1-hr
			Assessment Criteria	60	120	--	--	50	--	8.8	25	--	52	288	600	900	100	200	400	12700	34000
			Background concentration (Pre-DSO3)	8	40	97	4	20	49	3	15	37	2	10	18	24	10	30	50	400	600
ID	Name	UTM Coordinates	Distance From Howse																		
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	8.1	42.6	108.7	4.1	21.3	56.2	3.0	15.5	38.7	2.0	10.0	18.0	24.4	10.3	40.1	95.5	406.7	612.9
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	8.1	42.6	108.7	4.1	21.3	56.2	3.0	15.5	38.7	2.0	10.0	18.0	24.4	10.3	40.1	94.6	406.4	612.6
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	8.1	42.7	109.2	4.1	21.3	56.6	3.0	15.4	38.6	2.0	10.0	18.0	24.4	10.3	39.8	95.3	406.6	612.7
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	8.1	42.6	111.1	4.1	21.4	57.6	3.0	15.5	38.3	2.0	10.0	17.9	24.4	10.3	41.4	83.5	405.0	610.5
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	8.1	42.5	110.2	4.1	21.3	57.0	3.0	15.5	38.6	2.0	10.0	17.9	24.4	10.3	40.9	84.5	405.1	610.4
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	8.1	42.5	108.4	4.1	21.3	55.9	3.0	15.5	38.6	2.0	10.0	18.0	24.4	10.3	41.0	99.1	405.3	611.2
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	8.1	42.1	106.8	4.1	21.0	54.4	3.0	15.5	38.8	2.0	10.0	17.9	24.4	10.4	40.6	106.3	403.4	606.8
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	8.1	42.4	105.9	4.1	21.5	55.0	3.0	15.5	38.9	2.0	10.0	18.0	24.4	10.4	42.7	104.2	405.4	611.4
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	9.4	52.4	148.2	4.7	25.7	76.0	3.2	17.6	43.7	2.0	10.1	18.1	24.6	12.7	89.6	231.7	437.3	667.7
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	8.8	52.2	157.9	4.4	25.8	83.3	3.1	16.7	46.7	2.0	10.0	18.0	24.4	11.4	61.8	131.9	428.4	678.9
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	8.6	47.5	134.6	4.3	23.5	71.2	3.1	16.2	41.8	2.0	10.0	18.0	24.4	11.1	53.5	98.6	423.1	648.8
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	8.4	44.1	113.3	4.2	21.8	60.4	3.1	16.3	42.0	2.0	10.0	18.0	24.5	11.3	58.9	161.8	408.0	613.6
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	8.9	56.2	167.5	4.5	28.1	96.9	3.1	16.9	49.2	2.0	10.0	18.0	24.4	11.6	57.6	146.1	449.4	693.8
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	8.1	41.4	104.9	4.0	20.8	53.5	3.0	15.3	37.8	2.0	10.0	17.9	24.4	10.2	38.3	82.2	403.1	606.3
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	8.1	41.8	110.6	4.1	21.1	55.5	3.0	15.4	38.1	2.0	10.0	17.9	24.4	10.5	38.7	87.0	402.9	605.9
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	9.3	48.9	137.5	4.6	23.6	66.5	3.1	16.1	40.6	2.0	10.0	18.0	24.5	12.1	54.5	136.2	416.2	633.0
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	8.2	44.1	118.7	4.1	22.1	62.8	3.0	15.7	39.7	2.0	10.0	17.9	24.4	10.5	42.6	93.5	414.8	630.5
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	10.8	62.2	232.0	5.5	33.8	123.6	3.6	20.5	54.9	2.0	10.2	18.6	25.2	20.5	149.1	329.3	432.2	654.9
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	8.1	42.2	105.8	4.1	21.3	54.2	3.0	15.4	37.9	2.0	10.0	17.9	24.4	10.4	39.8	76.1	402.8	607.5
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	8.1	42.7	106.9	4.1	21.6	54.9	3.0	15.4	37.9	2.0	10.0	17.9	24.4	10.4	39.3	77.7	404.0	607.2
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	8.1	41.9	105.8	4.0	21.0	53.8	3.0	15.2	37.6	2.0	10.0	17.9	24.4	10.2	33.5	64.1	402.6	605.1
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	8.1	42.4	109.0	4.1	21.2	55.7	3.0	15.5	39.0	2.0	10.0	18.0	24.4	10.4	40.7	96.2	408.3	614.2
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	8.7	46.0	125.1	4.3	22.6	63.2	3.1	15.6	39.0	2.0	10.0	17.9	24.4	11.1	45.0	95.5	404.6	610.2
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	9.1	56.3	172.8	4.6	29.7	95.4	3.2	17.5	47.2	2.0	10.1	18.2	24.7	12.6	75.8	234.3	438.8	680.2
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	8.1	41.5	104.1	4.1	20.8	53.2	3.0	15.2	37.6	2.0	10.0	17.9	24.4	10.3	36.0	77.1	401.8	605.0
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	8.1	41.4	103.4	4.0	20.8	52.5	3.0	15.2	37.6	2.0	10.0	17.9	24.4	10.3	34.9	74.5	401.8	606.3
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	8.1	41.5	103.1	4.0	20.9	52.2	3.0	15.2	37.7	2.0	10.0	17.9	24.4	10.3	35.2	83.5	401.8	606.6
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	8.1	41.3	102.3	4.0	20.8	51.8	3.0	15.2	37.6	2.0	10.0	17.9	24.4	10.2	34.4	79.8	401.6	606.3
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	8.1	41.3	102.2	4.0	20.8	51.8	3.0	15.2	37.5	2.0	10.0	17.9	24.4	10.2	34.2	69.3	401.6	606.6
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	8.1	41.1	101.5	4.0	20.6	51.3	3.0	15.2	37.5	2.0	10.0	17.9	24.4	10.2	33.9	69.2	401.9	606.3
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	8.1	41.3	104.0	4.0	20.9	52.9	3.0	15.3	37.7	2.0	10.0	17.9	24.4	10.3	35.7	76.5	403.0	607.3
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	8.1	40.9	101.2	4.0	20.5	51.5	3.0	15.2	37.3	2.0	10.0	17.9	24.4	10.3	34.8	65.2	401.2	605.2
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	8.1	42.9	106.6	4.1	21.8	54.4	3.0	15.6	39.4	2.0	10.0	18.0	24.4	10.4	44.6	110.5	407.0	614.4
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	8.1	42.1	106.6	4.1	21.2	56.0	3.0	15.5	38.8	2.0	10.0	17.9	24.4	10.4	42.8	94.7	405.3	612.0
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	8.1	42.6	107.0	4.1	21.5	54.5	3.0	15.7	39.6	2.0	10.0	18.0	24.4	10.5	46.0	126.7	406.5	612.6
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	8.0	40.3	98.5	4.0	20.2	49.5	3.0	15.1	36.8	2.0	10.0	17.9	24.4	10.1	32.1	56.0	400.5	602.1
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	8.0	40.6	99.8	4.0	20.4	50.3	3.0	15.1	36.9	2.0	10.0	17.9	24.4	10.2	33.2	59.8	401.2	602.7
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	8.0	40.9	100.4	4.0	20.6	50.8	3.0	15.2	37.0	2.0	10.0	17.9	24.4	10.2	34.4	60.3	401.3	603.0
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	8.0	41.1	101.2	4.0	20.7	51.4	3.0	15.2	37.1	2.0	10.0	17.9	24.4	10.2	34.6	61.5	401.5	603.4
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	12.2	73.9	322.0	6.1	36.3	171.0	3.8	22.7	55.8	2.1	10.7	19.1	25.6	29.7	315.0	487.3	479.1	721.0
--	"Off-Property Limit" Maximum - Quebec	622.02 , 6087.16	--	17.6	127.8	462.0	7.7	64.5	222.3	3.9	25.0	69.7	2.0	10.4	19.6	26.1	23.3	201.5	388.3	593.7	926.8
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	622.24 , 6085.73	--	20.8	184.1	654.7	8.9	77.1	245.8	4.1	25.8	72.5	2.0	10.4	19.6	26.1	26.4	205.9	431.9	565.0	830.1

- all values in μg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

NO BLASTS

	DEPO-TPM	DEPO-TPM	HC	HC	HC
Pollutant	DEPO-TPM	DEPO-TPM	HC	HC	HC
Averaging Period	1-yr	30-day	1-yr	24-hr	1-hr
Selected Air Quality Assessement Criteria for Howse	**4.6**	**7**	**--**	**--**	**--**
BACKGROUND CONCENTRATIONS - PRE-DSO3	**1.7**	**2.6**			
					µg/kg ppm

DSO3 + DSO4 ONLY

ID	Description	UTM Coordinates	Distance From Howse	DEPO-TPM	DEPO-TPM	HC	HC	HC
			Pollutant	DEPO-TPM	DEPO-TPM	HC	HC	HC
			Averaging Period	1-yr	30-day	1-yr	24-hr	1-hr
			Assessment Criteria	4.6	7	--	--	--
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	0.01	0.02	0.0	0.3	1.2
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	0.01	0.02	0.0	0.3	1.2
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	0.01	0.03	0.0	0.3	1.2
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	0.01	0.03	0.0	0.3	1.0
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	0.00	0.02	0.0	0.2	1.1
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	0.00	0.02	0.0	0.3	1.2
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	0.01	0.03	0.0	0.3	1.6
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	0.00	0.01	0.0	0.4	1.5
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	0.06	0.17	0.1	1.8	4.5
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	0.04	0.13	0.0	0.6	1.9
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	0.03	0.13	0.0	0.6	1.4
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	0.02	0.07	0.0	0.8	3.4
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	0.03	0.13	0.0	0.6	1.8
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	0.00	0.01	0.0	0.2	0.8
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	0.01	0.02	0.0	0.2	1.1
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	0.02	0.07	0.1	0.7	2.3
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	0.01	0.06	0.0	0.2	1.3
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	0.05	0.15	0.4	4.5	10.7
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	0.00	0.01	0.0	0.3	1.0
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	0.00	0.01	0.0	0.3	0.9
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	0.00	0.01	0.0	0.1	0.4
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	0.01	0.02	0.0	0.3	1.4
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	0.02	0.05	0.0	0.5	1.5
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	0.03	0.09	0.1	1.5	5.4
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	0.00	0.01	0.0	0.2	0.9
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	0.00	0.01	0.0	0.2	1.0
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	0.00	0.01	0.0	0.1	0.9
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	0.00	0.01	0.0	0.1	0.8
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	0.00	0.01	0.0	0.1	0.6
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	0.00	0.01	0.0	0.1	0.6
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	0.00	0.01	0.0	0.2	0.8
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	0.00	0.01	0.0	0.1	0.5
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	0.00	0.01	0.0	0.4	1.9
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	0.01	0.03	0.0	0.3	1.4
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	0.00	0.02	0.0	0.5	2.0
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	0.00	0.00	0.0	0.1	0.2
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	0.00	0.00	0.0	0.1	0.3
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	0.00	0.00	0.0	0.1	0.3
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	0.00	0.00	0.0	0.1	0.4
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	0.08	0.21	0.9	8.5	12.6
--	"Off-Property Limit" Maximum - Quebec	622.02 , 6087.16	--	0.12	0.41	0.8	10.1	25.6
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	619.00 , 6090.50	--	0.23	0.84	1.0	7.5	14.0

DSO3 + DSO4 ONLY

- all values in µg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

NO BLASTS

HOWSE ONLY

ID	Name	UTM Coordinates	Distance From Howse	DEPO-TPM	DEPO-TPM	HC	HC	HC
			Averaging Period	1-yr	30-day	1-yr	24-hr	1-hr
			Assessment Criteria	4.6	7	--	--	--
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	0.01	0.02	0.0	0.2	1.0
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	0.01	0.02	0.0	0.2	1.0
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	0.01	0.03	0.0	0.2	1.0
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	0.01	0.03	0.0	0.2	0.8
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	0.00	0.02	0.0	0.2	0.8
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	0.00	0.02	0.0	0.1	0.8
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	0.01	0.03	0.0	0.1	0.4
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	0.00	0.01	0.0	0.2	0.9
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	0.06	0.17	0.1	1.0	5.5
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	0.04	0.13	0.1	0.9	6.7
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	0.03	0.13	0.0	0.7	4.0
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	0.02	0.07	0.0	0.2	1.0
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	0.03	0.13	0.1	1.4	8.2
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	0.00	0.01	0.0	0.1	0.5
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	0.01	0.02	0.0	0.1	0.4
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	0.02	0.07	0.0	0.4	2.8
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	0.01	0.06	0.0	0.5	2.3
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	0.06	0.15	0.1	2.2	7.0
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	0.00	0.01	0.0	0.1	0.5
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	0.00	0.01	0.0	0.1	0.5
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	0.00	0.01	0.0	0.1	0.4
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	0.01	0.02	0.0	0.2	1.2
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	0.02	0.05	0.0	0.2	0.9
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	0.03	0.09	0.1	1.3	6.9
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	0.00	0.01	0.0	0.1	0.3
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	0.00	0.01	0.0	0.1	0.4
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	0.00	0.01	0.0	0.1	0.4
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	0.00	0.01	0.0	0.1	0.4
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	0.00	0.01	0.0	0.1	0.4
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	0.00	0.01	0.0	0.1	0.4
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	0.00	0.01	0.0	0.1	0.4
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	0.00	0.01	0.0	0.0	0.3
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	0.00	0.01	0.0	0.3	1.1
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	0.01	0.03	0.0	0.2	0.9
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	0.00	0.02	0.0	0.2	1.1
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	0.00	0.00	0.0	0.0	0.1
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	0.00	0.00	0.0	0.0	0.2
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	0.00	0.00	0.0	0.0	0.2
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	0.00	0.00	0.0	0.1	0.2
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	0.08	0.21	0.1	1.6	7.9
--	"Off-Property Limit" Maximum - Quebec	624.33 , 6084.64	--	0.13	0.42	0.2	4.5	11.5
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	618.55 , 6086.66	--	0.23	0.84	0.4	8.9	22.5

HOWSE ONLY

- all values in µg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

NO BLASTS

DSO3 + DSO4 + HOWSE

ID	Name	UTM Coordinates	Distance From Howse	DEPO-TPM	DEPO-TPM	HC	HC	HC
			Pollutant	DEPO-TPM	DEPO-TPM	HC	HC	HC
			Averaging Period	1-yr	30-day	1-yr	24-hr	1-hr
			Assessment Criteria	4.6	7	--	--	--
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	0.01	0.04	0.0	0.4	1.8
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	0.01	0.03	0.0	0.4	1.8
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	0.01	0.04	0.0	0.4	1.7
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	0.01	0.04	0.0	0.4	1.5
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	0.01	0.03	0.0	0.4	1.7
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	0.01	0.03	0.0	0.4	1.9
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	0.01	0.05	0.0	0.4	1.7
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	0.01	0.02	0.0	0.5	2.1
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	0.07	0.24	0.1	1.8	6.1
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	0.06	0.17	0.1	1.4	6.9
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	0.05	0.16	0.1	1.0	4.1
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	0.03	0.12	0.1	0.8	3.6
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	0.05	0.16	0.1	1.5	8.5
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	0.00	0.02	0.0	0.3	1.2
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	0.01	0.04	0.0	0.3	1.3
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	0.10	0.30	0.1	0.7	2.9
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	0.02	0.08	0.0	0.6	2.7
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	0.11	0.29	0.5	4.5	10.7
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	0.01	0.02	0.0	0.3	1.1
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	0.01	0.03	0.0	0.3	1.2
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	0.01	0.02	0.0	0.1	0.6
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	0.01	0.04	0.0	0.5	2.0
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	0.08	0.26	0.1	0.5	1.6
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	0.04	0.13	0.1	1.9	7.1
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	0.01	0.02	0.0	0.2	1.0
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	0.01	0.02	0.0	0.2	1.0
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	0.00	0.01	0.0	0.2	1.0
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	0.00	0.01	0.0	0.2	0.9
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	0.00	0.01	0.0	0.2	0.9
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	0.00	0.01	0.0	0.1	0.9
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	0.00	0.01	0.0	0.2	0.9
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	0.00	0.01	0.0	0.1	0.6
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	0.01	0.02	0.0	0.5	2.4
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	0.01	0.05	0.0	0.4	1.8
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	0.01	0.03	0.0	0.5	2.2
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	0.00	0.00	0.0	0.1	0.3
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	0.00	0.00	0.0	0.1	0.5
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	0.00	0.01	0.0	0.2	0.5
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	0.00	0.01	0.0	0.2	0.6
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	0.18	0.42	1.0	8.7	13.5
--	"Off-Property Limit" Maximum - Quebec	622.02 , 6087.16	--	0.40	1.18	0.9	10.2	26.5
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	622.24 , 6085.73	--	0.56	1.51	1.1	9.2	22.8

DSO3 + DSO4 + HOWSE

- all values in µg/m³, except for Deposition in g/m²/30days. Red cell indicates above criteria.

NO BLASTS

ALL: Background + DSO3 + DSO4 + HOWSE

ID	Name	UTM Coordinates	Distance From Howse	DEPO-TPM	DEPO-TPM	HC	HC	HC
			Pollutant	DEPO-TPM	DEPO-TPM	HC	HC	HC
			Averaging Period	1-yr	30-day	1-yr	24-hr	1-hr
			Assessment Criteria	4.6	7	--	--	--
			Background concentration (Pre-DSO3)	1.7	2.6			
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	1.71	2.59	0.0	0.4	1.8
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	1.71	2.58	0.0	0.4	1.8
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	1.71	2.59	0.0	0.4	1.7
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	1.71	2.59	0.0	0.4	1.5
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	1.71	2.58	0.0	0.4	1.7
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	1.71	2.58	0.0	0.4	1.9
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	1.71	2.60	0.0	0.4	1.7
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	1.71	2.57	0.0	0.5	2.1
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	1.77	2.79	0.1	1.8	6.1
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	1.76	2.72	0.1	1.4	6.9
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	1.75	2.71	0.1	1.0	4.1
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	1.73	2.67	0.1	0.8	3.6
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	1.75	2.71	0.1	1.5	8.5
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	1.70	2.57	0.0	0.3	1.2
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	1.71	2.59	0.0	0.3	1.3
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	1.80	2.85	0.1	0.7	2.9
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	1.72	2.63	0.0	0.6	2.7
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	1.81	2.84	0.5	4.5	10.7
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	1.71	2.57	0.0	0.3	1.1
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	1.71	2.58	0.0	0.3	1.2
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	1.71	2.57	0.0	0.1	0.6
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	1.71	2.59	0.0	0.5	2.0
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	1.78	2.81	0.1	0.5	1.6
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	1.74	2.68	0.1	1.9	7.1
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	1.71	2.57	0.0	0.2	1.0
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	1.71	2.57	0.0	0.2	1.0
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	1.70	2.56	0.0	0.2	1.0
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	1.70	2.56	0.0	0.2	0.9
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	1.70	2.56	0.0	0.2	0.9
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	1.70	2.56	0.0	0.1	0.9
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	1.70	2.56	0.0	0.2	0.9
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	1.70	2.56	0.0	0.1	0.6
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	1.71	2.57	0.0	0.5	2.4
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	1.71	2.60	0.0	0.4	1.8
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	1.71	2.58	0.0	0.5	2.2
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	1.70	2.55	0.0	0.1	0.3
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	1.70	2.55	0.0	0.1	0.5
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	1.70	2.56	0.0	0.2	0.5
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	1.70	2.56	0.0	0.2	0.6
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	1.88	2.97	1.0	8.7	13.5
--	"Off-Property Limit" Maximum - Quebec	622.02 , 6087.16	--	2.10	3.73	0.9	10.2	26.5
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	622.24 , 6085.73	--	2.26	4.06	1.1	9.2	22.8

- all values in µg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

NO BLASTS

AIR QUALITY - METALS FRACTION IN TPM

Pollutant	Antimony (Sb)	Arsenic (As)		Barium (Ba)	Beryllium (Be)	Cadmium (Cd)		Chromium (Cr)	Copper (Cu)	Lead (Pb)			Mercury (Hg)		Nickel (Ni)	Silver (Ag)	Thallium (Tl)	Vanadium (V)		Zinc (Zn)
Averaging Period	1-yr	1-yr	24-hr	1-yr	1-yr	1-yr	24-hr	1-yr	24-hr	1-yr	30-day	24-hr	1-yr	24-hr	24-hr	1-yr	1-yr	1-yr	24-hr	24-hr
Selected Air Quality Assessement Criteria for Howse	**0.17**	**0.003**	**0.3**	**0.05**	**0.0004**	**0.0036**	**0.025**	**0.004**	**2.5**	**0.1**	**0.2**	**0.5**	**0.005**	**2**	**0.014**	**0.23**	**0.25**	**1**	**2**	**2.5**
BACKGROUND CONCENTRATIONS - PRE-DSO3	**0.001**	**0.002**	**0.01**	**0.02**	**0**	**0.0005**	**0.0025**	**0.002**	**0.2**	**0.004**	**0.0081**	**0.02**	**0.002**	**0.01**	**0.002**	**0.005**	**0.005**	**0.01**	**0.05**	**0.1**
	0.87	48.08	48.08	508.72	2.62	0.22	0.22	141.16	33.05	74.31	74.31	74.31	0.07	0.07	37.83	0.88	0.59	86.25	86.25	65.14

DSO3 + DSO4 ONLY

ID	Description	UTM Coordinates	Distance From Howse	Antimony (Sb)	Arsenic (As)		Barium (Ba)	Beryllium (Be)	Cadmium (Cd)		Chromium (Cr)	Copper (Cu)	Lead (Pb)			Mercury (Hg)		Nickel (Ni)	Silver (Ag)	Thallium (Tl)	Vanadium (V)		Zinc (Zn)
			Averaging Period	1-yr	1-yr	24-hr	1-yr	1-yr	1-yr	24-hr	1-yr	24-hr	1-yr	30-day	24-hr	1-yr	24-hr	24-hr	1-yr	1-yr	1-yr	24-hr	24-hr
			Assessment Criteria	0.17	0.003	0.3	0.05	0.0004	0.0036	0.025	0.004	2.5	0.1	0.2	0.5	0.005	2	0.014	0.23	0.25	1	2	2.5
				Obtained metal concentrations in ambient air by multiplying TPM concentrations by metal fraction obtained from soil material analyses. See Appendix H of Air Quality Report for metal fractions.																			
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	5.3E-08	2.9E-06	5.6E-05	3.1E-05	1.6E-07	1.4E-08	2.6E-07	8.5E-06	3.9E-05	4.5E-06	9.0E-06	8.7E-05	4.2E-09	8.2E-08	4.4E-05	5.3E-08	3.6E-08	5.2E-06	1.0E-04	7.6E-05
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	5.3E-08	2.9E-06	5.6E-05	3.1E-05	1.6E-07	1.4E-08	2.6E-07	8.5E-06	3.8E-05	4.5E-06	9.1E-06	8.6E-05	4.2E-09	8.1E-08	4.4E-05	5.3E-08	3.6E-08	5.2E-06	1.0E-04	7.5E-05
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	5.3E-08	2.9E-06	5.5E-05	3.1E-05	1.6E-07	1.4E-08	2.6E-07	8.5E-06	3.8E-05	4.5E-06	9.0E-06	8.5E-05	4.2E-09	8.0E-08	4.3E-05	5.3E-08	3.6E-08	5.2E-06	9.9E-05	7.5E-05
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	5.3E-08	2.9E-06	6.0E-05	3.1E-05	1.6E-07	1.4E-08	2.8E-07	8.6E-06	4.1E-05	4.5E-06	9.1E-06	9.2E-05	4.2E-09	8.7E-08	4.7E-05	5.3E-08	3.6E-08	5.2E-06	1.1E-04	8.1E-05
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	5.4E-08	3.0E-06	7.3E-05	3.2E-05	1.6E-07	1.4E-08	3.4E-07	8.8E-06	5.0E-05	4.6E-06	9.3E-06	1.1E-04	4.3E-09	1.1E-07	5.7E-05	5.5E-08	3.7E-08	5.4E-06	1.3E-04	9.8E-05
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	5.4E-08	3.0E-06	7.6E-05	3.2E-05	1.6E-07	1.4E-08	3.5E-07	8.8E-06	5.2E-05	4.6E-06	9.3E-06	1.2E-04	4.4E-09	1.1E-07	6.0E-05	5.5E-08	3.7E-08	5.4E-06	1.4E-04	1.0E-04
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	5.3E-08	2.9E-06	4.8E-05	3.1E-05	1.6E-07	1.4E-08	2.2E-07	8.6E-06	3.3E-05	4.5E-06	9.1E-06	7.4E-05	4.3E-09	7.0E-08	3.8E-05	5.3E-08	3.6E-08	5.2E-06	8.6E-05	6.5E-05
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	4.6E-08	2.5E-06	5.2E-05	2.7E-05	1.4E-07	1.2E-08	2.4E-07	7.4E-06	3.6E-05	3.9E-06	7.8E-06	8.1E-05	3.7E-09	7.6E-08	4.1E-05	4.6E-08	3.1E-08	4.5E-06	9.4E-05	7.1E-05
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	3.5E-07	1.9E-05	3.0E-04	2.0E-04	1.0E-06	8.9E-08	1.4E-06	5.6E-05	2.1E-04	2.9E-05	5.9E-05	4.6E-04	2.8E-08	4.3E-07	2.3E-04	3.5E-07	2.3E-07	3.4E-05	5.4E-04	4.0E-04
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	2.2E-07	1.2E-05	1.7E-04	1.3E-04	6.6E-07	5.6E-08	8.0E-07	3.5E-05	1.2E-04	1.9E-05	3.8E-05	2.7E-04	1.8E-08	2.5E-07	1.4E-04	2.2E-07	1.5E-07	2.2E-05	3.1E-04	2.3E-04
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	2.0E-07	1.1E-05	1.2E-04	1.1E-04	5.9E-07	5.0E-08	5.6E-07	3.2E-05	8.2E-05	1.7E-05	3.3E-05	1.9E-04	1.6E-08	1.7E-07	9.4E-05	2.0E-07	1.3E-07	1.9E-05	2.2E-04	1.6E-04
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	1.4E-07	7.8E-06	9.6E-05	8.3E-05	4.3E-07	3.7E-08	4.5E-07	2.3E-05	6.6E-05	1.2E-05	2.4E-05	1.5E-04	1.1E-08	1.4E-07	7.6E-05	1.4E-07	9.6E-08	1.4E-05	1.7E-04	1.3E-04
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	2.3E-07	1.3E-05	2.5E-04	1.3E-04	6.8E-07	5.9E-08	1.1E-06	3.7E-05	1.7E-04	1.9E-05	3.9E-05	3.8E-04	1.8E-08	3.6E-07	1.9E-04	2.3E-07	1.5E-07	2.3E-05	4.4E-04	3.3E-04
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	3.3E-08	1.8E-06	4.4E-05	1.9E-05	9.8E-08	8.4E-09	2.0E-07	5.3E-06	3.0E-05	2.8E-06	5.6E-06	6.7E-05	2.6E-09	6.3E-08	3.4E-05	3.3E-08	2.2E-08	3.2E-06	7.8E-05	5.9E-05
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	5.2E-08	2.9E-06	4.7E-05	3.0E-05	1.6E-07	1.3E-08	2.2E-07	8.4E-06	3.2E-05	4.4E-06	8.9E-06	7.2E-05	4.1E-09	6.8E-08	3.7E-05	5.2E-08	3.5E-08	5.1E-06	8.4E-05	6.3E-05
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	8.1E-07	4.5E-05	3.4E-04	4.7E-04	2.4E-06	2.1E-07	1.6E-06	1.3E-04	2.3E-04	6.9E-05	1.4E-04	5.3E-04	6.5E-08	5.0E-07	2.7E-04	8.2E-07	5.5E-07	8.0E-05	6.1E-04	4.6E-04
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	8.3E-08	4.6E-06	6.6E-05	4.8E-05	2.5E-07	2.1E-08	3.1E-07	1.3E-05	4.5E-05	7.1E-06	1.4E-05	1.0E-04	6.7E-09	9.6E-08	5.2E-05	8.4E-08	5.6E-08	8.2E-06	1.2E-04	9.0E-05
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	1.3E-06	7.2E-05	5.6E-04	7.7E-04	3.9E-06	3.4E-07	2.6E-06	2.1E-04	3.9E-04	1.1E-04	2.3E-04	8.7E-04	1.1E-07	8.2E-07	4.4E-04	1.3E-06	8.9E-07	1.3E-04	1.0E-03	7.6E-04
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	4.5E-08	2.5E-06	4.3E-05	2.6E-05	1.3E-07	1.2E-08	2.0E-07	7.2E-06	3.0E-05	3.8E-06	7.7E-06	6.7E-05	3.6E-09	6.3E-08	3.4E-05	4.5E-08	3.0E-08	4.4E-06	7.8E-05	5.9E-05
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	4.9E-08	2.7E-06	5.1E-05	2.9E-05	1.5E-07	1.3E-08	2.4E-07	8.0E-06	3.5E-05	4.2E-06	8.4E-06	7.8E-05	3.9E-09	7.4E-08	4.0E-05	5.0E-08	3.3E-08	4.9E-06	9.1E-05	6.9E-05
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	2.8E-08	1.5E-06	4.0E-05	1.6E-05	8.3E-08	7.1E-09	1.9E-07	4.5E-06	2.8E-05	2.4E-06	4.7E-06	6.2E-05	2.2E-09	5.9E-08	3.2E-05	2.8E-08	1.9E-08	2.7E-06	7.2E-05	5.5E-05
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	5.5E-08	3.0E-06	6.4E-05	3.2E-05	1.7E-07	1.4E-08	3.0E-07	8.9E-06	4.4E-05	4.7E-06	9.5E-06	9.9E-05	4.4E-09	9.4E-08	5.1E-05	5.6E-08	3.7E-08	5.5E-06	1.2E-04	8.7E-05
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	4.3E-07	2.4E-05	2.0E-04	2.5E-04	1.3E-06	1.1E-07	9.4E-07	7.0E-05	1.4E-04	3.7E-05	7.4E-05	3.1E-04	3.5E-08	2.9E-07	1.6E-04	4.3E-07	2.9E-07	4.3E-05	3.6E-04	2.7E-04
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	3.1E-07	1.7E-05	2.3E-04	1.8E-04	9.2E-07	7.9E-08	1.1E-06	5.0E-05	1.5E-04	2.6E-05	5.3E-05	3.5E-04	2.5E-08	3.3E-07	1.8E-04	3.1E-07	2.1E-07	3.0E-05	4.0E-04	3.1E-04
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	4.0E-08	2.2E-06	2.7E-05	2.3E-05	1.2E-07	1.0E-08	1.3E-07	6.4E-06	1.9E-05	3.4E-06	6.8E-06	4.2E-05	3.2E-09	4.0E-08	2.2E-05	4.0E-08	2.7E-08	3.9E-06	4.9E-05	3.7E-05
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	3.5E-08	2.0E-06	2.6E-05	2.1E-05	1.1E-07	9.1E-09	1.2E-07	5.7E-06	1.8E-05	3.0E-06	6.1E-06	4.1E-05	2.8E-09	3.8E-08	2.1E-05	3.6E-08	2.4E-08	3.5E-06	4.7E-05	3.6E-05
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	3.4E-08	1.9E-06	2.7E-05	2.0E-05	1.0E-07	8.8E-09	1.2E-07	5.5E-06	1.8E-05	2.9E-06	5.9E-06	4.1E-05	2.8E-09	3.9E-08	2.1E-05	3.5E-08	2.3E-08	3.4E-06	4.8E-05	3.6E-05
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	2.9E-08	1.6E-06	2.4E-05	1.7E-05	8.8E-08	7.5E-09	1.1E-07	4.7E-06	1.7E-05	2.5E-06	5.0E-06	3.7E-05	2.4E-09	3.5E-08	1.9E-05	3.0E-08	2.0E-08	2.9E-06	4.3E-05	3.3E-05
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	2.8E-08	1.5E-06	2.4E-05	1.6E-05	8.4E-08	7.2E-09	1.1E-07	4.5E-06	1.6E-05	2.4E-06	4.8E-06	3.7E-05	2.3E-09	3.4E-08	1.9E-05	2.8E-08	1.9E-08	2.8E-06	4.2E-05	3.2E-05
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	2.6E-08	1.4E-06	2.7E-05	1.5E-05	7.9E-08	6.7E-09	1.3E-07	4.2E-06	1.9E-05	2.2E-06	4.5E-06	4.2E-05	2.1E-09	3.9E-08	2.1E-05	2.6E-08	1.8E-08	2.6E-06	4.9E-05	3.7E-05
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	3.7E-08	2.0E-06	3.5E-05	2.2E-05	1.1E-07	9.5E-09	1.6E-07	6.0E-06	2.4E-05	3.2E-06	6.4E-06	5.4E-05	3.0E-09	5.1E-08	2.8E-05	3.7E-08	2.5E-08	3.7E-06	6.3E-05	4.7E-05
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	3.5E-08	1.9E-06	2.1E-05	2.0E-05	1.1E-07	9.0E-09	9.7E-08	5.7E-06	1.4E-05	3.0E-06	6.0E-06	3.2E-05	2.8E-09	3.0E-08	1.6E-05	3.5E-08	2.4E-08	3.5E-06	3.7E-05	2.8E-05
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	5.1E-08	2.8E-06	5.2E-05	3.0E-05	1.5E-07	1.3E-08	2.4E-07	8.3E-06	3.6E-05	4.4E-06	8.8E-06	8.0E-05	4.1E-09	7.5E-08	4.1E-05	5.2E-08	3.5E-08	5.1E-06	9.3E-05	7.0E-05
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	5.2E-08	2.9E-06	4.2E-05	3.0E-05	1.6E-07	1.3E-08	2.0E-07	8.4E-06	2.9E-05	4.4E-06	9.0E-06	6.5E-05	4.2E-09	6.1E-08	3.3E-05	5.3E-08	3.5E-08	5.2E-06	7.5E-05	5.7E-05
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	5.7E-08	3.1E-06	5.4E-05	3.3E-05	1.7E-07	1.5E-08	2.5E-07	9.1E-06	3.7E-05	4.8E-06	9.7E-06	8.4E-05	4.5E-09	7.9E-08	4.3E-05	5.7E-08	3.8E-08	5.6E-06	9.7E-05	7.3E-05
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	9.8E-09	5.4E-07	8.0E-06	5.7E-06	2.9E-08	2.5E-09	3.7E-08	1.6E-06	5.5E-06	8.3E-07	1.7E-06	1.2E-05	7.9E-10	1.2E-08	6.3E-06	9.9E-09	6.6E-09	9.7E-07	1.4E-05	1.1E-05
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	1.5E-08	8.0E-07	1.6E-05	8.5E-06	4.4E-08	3.8E-09	7.6E-08	2.4E-06	1.1E-05	1.2E-06	2.5E-06	2.5E-05	1.2E-09	2.4E-08	1.3E-05	1.5E-08	9.9E-09	1.4E-06	2.9E-05	2.2E-05
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	1.8E-08	9.9E-07	2.3E-05	1.0E-05	5.4E-08	4.6E-09	1.1E-07	2.9E-06	1.6E-05	1.5E-06	3.1E-06	3.5E-05	1.4E-09	3.3E-08	1.8E-05	1.8E-08	1.2E-08	1.8E-06	4.1E-05	3.1E-05
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	1.9E-08	1.0E-06	2.5E-05	1.1E-05	5.6E-08	4.8E-09	1.2E-07	3.0E-06	1.7E-05	1.6E-06	3.2E-06	3.9E-05	1.5E-09	3.7E-08	2.0E-05	1.9E-08	1.3E-08	1.8E-06	4.5E-05	3.4E-05
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	2.2E-06	1.2E-04	9.7E-04	1.3E-03	6.5E-06	5.6E-07	4.5E-06	3.5E-04	6.7E-04	1.9E-04	3.7E-04	1.5E-03	1.8E-07	1.4E-06	7.6E-04	2.2E-06	1.5E-06	2.2E-04	1.7E-03	1.3E-03
--	"Off-Property Limit" Maximum - Quebec	622.02 , 6087.16	--	7.3E-06	4.0E-04	3.9E-03	4.3E-03	2.2E-05	1.9E-06	1.8E-05	1.2E-03	2.7E-03	6.3E-04	1.3E-03	6.1E-03	5.9E-07	5.7E-06	3.1E-03	7.4E-06	5.0E-06	7.3E-04	7.1E-03	5.3E-03
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	619.00 , 6090.50	--	8.5E-06	4.7E-04	5.1E-03	5.0E-03	2.6E-05	2.2E-06	2.4E-05	1.4E-03	3.5E-03	7.3E-04	1.5E-03	7.9E-03	6.8E-07	7.4E-06	4.0E-03	8.6E-06	5.8E-06	8.4E-04	9.1E-03	6.9E-03

- all values in μg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

NO BLASTS

AIR QUALITY - METALS FRACTION IN TPM

HOWSE ONLY

ID	Name	UTM Coordinates	Distance From Howse	Antimony (Sb)	Arsenic (As)		Barium (Ba)	Beryllium (Be)	Cadmium (Cd)		Chromium (Cr)	Copper (Cu)	Lead (Pb)			Mercury (Hg)		Nickel (Ni)	Silver (Ag)	Thallium (Tl)	Vanadium (V)		Zinc (Zn)
			Averaging Period	1-yr	1-yr	24-hr	1-yr	1-yr	1-yr	24-hr	1-yr	24-hr	1-yr	30-day	24-hr	1-yr	24-hr	24-hr	1-yr	1-yr	1-yr	24-hr	24-hr
			Assessment Criteria	0.17	0.003	0.3	0.05	0.0004	0.0036	0.025	0.004	2.5	0.1	0.2	0.5	0.005	2	0.014	0.23	0.25	1	2	2.5
				Obtained metal concentrations in ambient air by multiplying TPM concentrations by metal fraction obtained from soil material analyses. See Appendix H of Air Quality Report for metal fractions.																			
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	5.4E-08	3.0E-06	8.9E-05	3.2E-05	1.6E-07	1.4E-08	4.2E-07	8.8E-06	6.1E-05	4.6E-06	9.3E-06	1.4E-04	4.3E-09	1.3E-07	7.0E-05	5.5E-08	3.7E-08	5.4E-06	1.6E-04	1.2E-04
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	5.3E-08	2.9E-06	8.9E-05	3.1E-05	1.6E-07	1.4E-08	4.2E-07	8.6E-06	6.1E-05	4.5E-06	9.1E-06	1.4E-04	4.2E-09	1.3E-07	7.0E-05	5.3E-08	3.6E-08	5.2E-06	1.6E-04	1.2E-04
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	5.5E-08	3.0E-06	9.2E-05	3.2E-05	1.7E-07	1.4E-08	4.3E-07	8.9E-06	6.3E-05	4.7E-06	9.5E-06	1.4E-04	4.4E-09	1.3E-07	7.3E-05	5.6E-08	3.7E-08	5.5E-06	1.7E-04	1.2E-04
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	5.3E-08	2.9E-06	8.9E-05	3.1E-05	1.6E-07	1.4E-08	4.2E-07	8.6E-06	6.1E-05	4.5E-06	9.2E-06	1.4E-04	4.3E-09	1.3E-07	7.0E-05	5.4E-08	3.6E-08	5.3E-06	1.6E-04	1.2E-04
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	5.3E-08	2.9E-06	8.9E-05	3.1E-05	1.6E-07	1.4E-08	4.2E-07	8.6E-06	6.1E-05	4.5E-06	9.1E-06	1.4E-04	4.3E-09	1.3E-07	7.0E-05	5.4E-08	3.6E-08	5.3E-06	1.6E-04	1.2E-04
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	5.0E-08	2.7E-06	8.4E-05	2.9E-05	1.5E-07	1.3E-08	3.9E-07	8.1E-06	5.8E-05	4.2E-06	8.5E-06	1.3E-04	4.0E-09	1.2E-07	6.6E-05	5.0E-08	3.4E-08	4.9E-06	1.5E-04	1.1E-04
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	6.2E-08	3.4E-06	6.0E-05	3.6E-05	1.9E-07	1.6E-08	2.8E-07	1.0E-05	4.1E-05	5.3E-06	1.1E-05	9.3E-05	5.0E-09	8.7E-08	4.7E-05	6.3E-08	4.2E-08	6.2E-06	1.1E-04	8.1E-05
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	4.7E-08	2.6E-06	6.2E-05	2.7E-05	1.4E-07	1.2E-08	2.9E-07	7.6E-06	4.2E-05	4.0E-06	8.0E-06	9.5E-05	3.8E-09	9.0E-08	4.8E-05	4.7E-08	3.2E-08	4.6E-06	1.1E-04	8.3E-05
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	9.0E-07	5.0E-05	4.4E-04	5.2E-04	2.7E-06	2.3E-07	2.1E-06	1.5E-04	3.1E-04	7.7E-05	1.5E-04	6.9E-04	7.2E-08	6.5E-07	3.5E-04	9.1E-07	6.1E-07	8.9E-05	8.0E-04	6.0E-04
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	4.9E-07	2.7E-05	5.2E-04	2.9E-04	1.5E-06	1.3E-07	2.4E-06	7.9E-05	3.5E-04	4.2E-05	8.4E-05	8.0E-04	3.9E-08	7.5E-07	4.1E-04	4.9E-07	3.3E-07	4.8E-05	9.2E-04	7.0E-04
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	3.7E-07	2.0E-05	2.8E-04	2.2E-04	1.1E-06	9.5E-08	1.3E-06	6.0E-05	2.0E-04	3.1E-05	6.3E-05	4.4E-04	3.0E-08	4.1E-07	2.2E-04	3.7E-07	2.5E-07	3.6E-05	5.1E-04	3.9E-04
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	1.9E-07	1.0E-05	1.1E-04	1.1E-04	5.6E-07	4.8E-08	5.2E-07	3.0E-05	7.6E-05	1.6E-05	3.2E-05	1.7E-04	1.5E-08	1.6E-07	8.7E-05	1.9E-07	1.3E-07	1.8E-05	2.0E-04	1.5E-04
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	5.5E-07	3.1E-05	7.2E-04	3.2E-04	1.7E-06	1.4E-07	3.3E-06	9.0E-05	4.9E-04	4.7E-05	9.5E-05	1.1E-03	4.4E-08	1.0E-06	5.6E-04	5.6E-07	3.7E-07	5.5E-05	1.3E-03	9.7E-04
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	2.9E-08	1.6E-06	4.7E-05	1.7E-05	8.6E-08	7.3E-09	2.2E-07	4.6E-06	3.2E-05	2.4E-06	4.9E-06	7.3E-05	2.3E-09	6.9E-08	3.7E-05	2.9E-08	1.9E-08	2.8E-06	8.4E-05	6.4E-05
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	4.9E-08	2.7E-06	4.2E-05	2.9E-05	1.5E-07	1.3E-08	1.9E-07	8.0E-06	2.9E-05	4.2E-06	8.4E-06	6.4E-05	3.9E-09	6.0E-08	3.3E-05	5.0E-08	3.3E-08	4.9E-06	7.4E-05	5.6E-05
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	3.4E-07	1.9E-05	2.1E-04	2.0E-04	1.0E-06	8.7E-08	9.6E-07	5.5E-05	1.4E-04	2.9E-05	5.8E-05	3.2E-04	2.7E-08	3.0E-07	1.6E-04	3.4E-07	2.3E-07	3.4E-05	3.7E-04	2.8E-04
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	1.1E-07	6.3E-06	1.6E-04	6.6E-05	3.4E-07	2.9E-08	7.6E-07	1.8E-05	1.1E-04	9.7E-06	1.9E-05	2.5E-04	9.1E-09	2.4E-07	1.3E-04	1.1E-07	7.7E-08	1.1E-05	2.9E-04	2.2E-04
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	1.2E-06	6.4E-05	5.7E-04	6.8E-04	3.5E-06	3.0E-07	2.7E-06	1.9E-04	3.9E-04	9.9E-05	2.0E-04	8.8E-04	9.3E-08	8.3E-07	4.5E-04	1.2E-06	7.8E-07	1.1E-04	1.0E-03	7.7E-04
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	3.9E-08	2.1E-06	6.2E-05	2.3E-05	1.2E-07	1.0E-08	2.9E-07	6.3E-06	4.2E-05	3.3E-06	6.7E-06	9.5E-05	3.1E-09	9.0E-08	4.9E-05	3.9E-08	2.6E-08	3.8E-06	1.1E-04	8.4E-05
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	4.4E-08	2.4E-06	8.0E-05	2.6E-05	1.3E-07	1.1E-08	3.7E-07	7.1E-06	5.5E-05	3.8E-06	7.6E-06	1.2E-04	3.5E-09	1.2E-07	6.3E-05	4.4E-08	3.0E-08	4.4E-06	1.4E-04	1.1E-04
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	2.7E-08	1.5E-06	5.0E-05	1.6E-05	8.1E-08	7.0E-09	2.3E-07	4.4E-06	3.4E-05	2.3E-06	4.7E-06	7.7E-05	2.2E-09	7.2E-08	3.9E-05	2.7E-08	1.8E-08	2.7E-06	8.9E-05	6.7E-05
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	6.1E-08	3.3E-06	8.0E-05	3.5E-05	1.8E-07	1.6E-08	3.7E-07	9.8E-06	5.5E-05	5.2E-06	1.0E-05	1.2E-04	4.9E-09	1.2E-07	6.3E-05	6.1E-08	4.1E-08	6.0E-06	1.4E-04	1.1E-04
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	1.4E-07	7.9E-06	1.2E-04	8.4E-05	4.3E-07	3.7E-08	5.7E-07	2.3E-05	8.4E-05	1.2E-05	2.5E-05	1.9E-04	1.2E-08	1.8E-07	9.6E-05	1.4E-07	9.7E-08	1.4E-05	2.2E-04	1.7E-04
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	6.8E-07	3.7E-05	6.0E-04	4.0E-04	2.0E-06	1.7E-07	2.8E-06	1.1E-04	4.1E-04	5.8E-05	1.2E-04	9.3E-04	5.5E-08	8.8E-07	4.7E-04	6.9E-07	4.6E-07	6.7E-05	1.1E-03	8.2E-04
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	3.7E-08	2.0E-06	4.6E-05	2.2E-05	1.1E-07	9.5E-09	2.1E-07	6.0E-06	3.2E-05	3.1E-06	6.3E-06	7.1E-05	3.0E-09	6.7E-08	3.6E-05	3.7E-08	2.5E-08	3.7E-06	8.2E-05	6.2E-05
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	3.1E-08	1.7E-06	4.5E-05	1.8E-05	9.3E-08	8.0E-09	2.1E-07	5.0E-06	3.1E-05	2.6E-06	5.3E-06	7.0E-05	2.5E-09	6.6E-08	3.5E-05	3.1E-08	2.1E-08	3.1E-06	8.1E-05	6.1E-05
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	2.9E-08	1.6E-06	4.5E-05	1.7E-05	8.7E-08	7.5E-09	2.1E-07	4.7E-06	3.1E-05	2.5E-06	5.0E-06	7.0E-05	2.3E-09	6.6E-08	3.6E-05	2.9E-08	2.0E-08	2.9E-06	8.1E-05	6.1E-05
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	2.5E-08	1.4E-06	3.8E-05	1.4E-05	7.4E-08	6.3E-09	1.8E-07	4.0E-06	2.6E-05	2.1E-06	4.2E-06	5.9E-05	2.0E-09	5.6E-08	3.0E-05	2.5E-08	1.7E-08	2.4E-06	6.9E-05	5.2E-05
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	2.4E-08	1.3E-06	3.8E-05	1.4E-05	7.1E-08	6.1E-09	1.8E-07	3.8E-06	2.6E-05	2.0E-06	4.1E-06	5.8E-05	1.9E-09	5.5E-08	3.0E-05	2.4E-08	1.6E-08	2.3E-06	6.7E-05	5.1E-05
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	2.1E-08	1.2E-06	2.9E-05	1.2E-05	6.3E-08	5.4E-09	1.4E-07	3.4E-06	2.0E-05	1.8E-06	3.6E-06	4.5E-05	1.7E-09	4.3E-08	2.3E-05	2.1E-08	1.4E-08	2.1E-06	5.3E-05	4.0E-05
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	2.9E-08	1.6E-06	3.9E-05	1.7E-05	8.7E-08	7.5E-09	1.8E-07	4.7E-06	2.7E-05	2.5E-06	5.0E-06	6.0E-05	2.3E-09	5.6E-08	3.0E-05	2.9E-08	2.0E-08	2.9E-06	6.9E-05	5.2E-05
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	2.8E-08	1.5E-06	2.4E-05	1.6E-05	8.3E-08	7.1E-09	1.1E-07	4.5E-06	1.7E-05	2.4E-06	4.7E-06	3.7E-05	2.2E-09	3.5E-08	1.9E-05	2.8E-08	1.9E-08	2.7E-06	4.3E-05	3.3E-05
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	5.5E-08	3.0E-06	8.6E-05	3.2E-05	1.7E-07	1.4E-08	4.0E-07	8.9E-06	5.9E-05	4.7E-06	9.5E-06	1.3E-04	4.4E-09	1.2E-07	6.7E-05	5.6E-08	3.7E-08	5.5E-06	1.5E-04	1.2E-04
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	6.2E-08	3.4E-06	7.6E-05	3.6E-05	1.8E-07	1.6E-08	3.6E-07	1.0E-05	5.2E-05	5.2E-06	1.1E-05	1.2E-04	4.9E-09	1.1E-07	6.0E-05	6.2E-08	4.2E-08	6.1E-06	1.4E-04	1.0E-04
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	6.2E-08	3.4E-06	7.2E-05	3.6E-05	1.9E-07	1.6E-08	3.4E-07	1.0E-05	5.0E-05	5.3E-06	1.1E-05	1.1E-04	5.0E-09	1.1E-07	5.7E-05	6.3E-08	4.2E-08	6.2E-06	1.3E-04	9.8E-05
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	7.9E-09	4.3E-07	9.6E-06	4.6E-06	2.4E-08	2.0E-09	4.5E-08	1.3E-06	6.6E-06	6.7E-07	1.3E-06	1.5E-05	6.3E-10	1.4E-08	7.6E-06	7.9E-09	5.3E-09	7.8E-07	1.7E-05	1.3E-05
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	1.0E-08	5.5E-07	1.4E-05	5.8E-06	3.0E-08	2.6E-09	6.6E-08	1.6E-06	9.7E-06	8.5E-07	1.7E-06	2.2E-05	8.0E-10	2.1E-08	1.1E-05	1.0E-08	6.8E-09	9.9E-07	2.5E-05	1.9E-05
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	1.3E-08	7.4E-07	1.9E-05	7.8E-06	4.0E-08	3.4E-09	8.8E-08	2.2E-06	1.3E-05	1.1E-06	2.3E-06	2.9E-05	1.1E-09	2.8E-08	1.5E-05	1.4E-08	9.1E-09	1.3E-06	3.4E-05	2.6E-05
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	1.5E-08	8.1E-07	2.8E-05	8.5E-06	4.4E-08	3.8E-09	1.3E-07	2.4E-06	1.9E-05	1.2E-06	2.5E-06	4.3E-05	1.2E-09	4.0E-08	2.2E-05	1.5E-08	9.9E-09	1.4E-06	5.0E-05	3.7E-05
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	1.5E-06	8.1E-05	8.5E-04	8.6E-04	4.4E-06	3.8E-07	4.0E-06	2.4E-04	5.9E-04	1.3E-04	2.5E-04	1.3E-03	1.2E-07	1.2E-06	6.7E-04	1.5E-06	1.0E-06	1.5E-04	1.5E-03	1.2E-03
--	"Off-Property Limit" Maximum - Quebec	624.33 , 6084.64	--	2.8E-06	1.5E-04	2.6E-03	1.6E-03	8.3E-06	7.1E-07	1.2E-05	4.5E-04	1.8E-03	2.4E-04	4.8E-04	4.0E-03	2.2E-07	3.8E-06	2.1E-03	2.8E-06	1.9E-06	2.7E-04	4.7E-03	3.5E-03
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	618.55 , 6086.66	--	4.1E-06	2.2E-04	4.0E-03	2.4E-03	1.2E-05	1.0E-06	1.9E-05	6.6E-04	2.7E-03	3.5E-04	7.0E-04	6.1E-03	3.3E-07	5.8E-06	3.1E-03	4.1E-06	2.8E-06	4.0E-04	7.1E-03	5.4E-03

- all values in µg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

NO BLASTS

AIR QUALITY - METALS FRACTION IN TPM

DSO3 + DSO4 + HOWSE

			Pollutant	Antimony (Sb)	Arsenic (As)		Barium (Ba)	Beryllium (Be)	Cadmium (Cd)		Chromium (Cr)	Copper (Cu)	Lead (Pb)			Mercury (Hg)		Nickel (Ni)	Silver (Ag)	Thallium (Tl)	Vanadium (V)		Zinc (Zn)
			Averaging Period	1-yr	1-yr	24-hr	1-yr	1-yr	1-yr	24-hr	1-yr	24-hr	1-yr	30-day	24-hr	1-yr	24-hr	24-hr	1-yr	1-yr	1-yr	24-hr	24-hr
			Assessment Criteria	0.17	0.003	0.3	0.05	0.0004	0.0036	0.025	0.004	2.5	0.1	0.2	0.5	0.005	2	0.014	0.23	0.25	1	2	2.5
ID	**Name**	**UTM Coordinates**	**Distance From Howse**	Obtained metal concentrations in ambient air by multiplying TPM concentrations by metal fraction obtained from soil material analyses. See Appendix H of Air Quality Report for metal fractions.																			
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	1.1E-07	5.9E-06	1.2E-04	6.2E-05	3.2E-07	2.7E-08	5.8E-07	1.7E-05	8.5E-05	9.1E-06	1.8E-05	1.9E-04	8.6E-09	1.8E-07	9.7E-05	1.1E-07	7.2E-08	1.1E-05	2.2E-04	1.7E-04
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	1.1E-07	5.8E-06	1.2E-04	6.2E-05	3.2E-07	2.7E-08	5.8E-07	1.7E-05	8.5E-05	9.0E-06	1.8E-05	1.9E-04	8.5E-09	1.8E-07	9.8E-05	1.1E-07	7.2E-08	1.0E-05	2.2E-04	1.7E-04
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	1.1E-07	6.0E-06	1.3E-04	6.3E-05	3.2E-07	2.8E-08	5.9E-07	1.7E-05	8.8E-05	9.2E-06	1.9E-05	2.0E-04	8.7E-09	1.9E-07	1.0E-04	1.1E-07	7.3E-08	1.1E-05	2.3E-04	1.7E-04
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	1.0E-07	5.8E-06	1.3E-04	6.1E-05	3.1E-07	2.7E-08	5.9E-07	1.7E-05	8.7E-05	8.9E-06	1.8E-05	2.0E-04	8.4E-09	1.8E-07	9.9E-05	1.1E-07	7.1E-08	1.0E-05	2.3E-04	1.7E-04
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	1.1E-07	5.9E-06	1.2E-04	6.2E-05	3.2E-07	2.7E-08	5.7E-07	1.7E-05	8.4E-05	9.1E-06	1.8E-05	1.9E-04	8.5E-09	1.8E-07	9.6E-05	1.1E-07	7.2E-08	1.1E-05	2.2E-04	1.6E-04
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	1.0E-07	5.7E-06	1.2E-04	6.1E-05	3.1E-07	2.7E-08	5.6E-07	1.7E-05	8.2E-05	8.9E-06	1.8E-05	1.8E-04	8.4E-09	1.7E-07	9.4E-05	1.1E-07	7.0E-08	1.0E-05	2.1E-04	1.6E-04
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	1.1E-07	6.3E-06	1.0E-04	6.7E-05	3.4E-07	3.0E-08	4.8E-07	1.9E-05	7.1E-05	9.8E-06	2.0E-05	1.6E-04	9.2E-09	1.5E-07	8.1E-05	1.2E-07	7.8E-08	1.1E-05	1.8E-04	1.4E-04
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	9.3E-08	5.1E-06	1.1E-04	5.4E-05	2.8E-07	2.4E-08	5.3E-07	1.5E-05	7.8E-05	7.9E-06	1.6E-05	1.8E-04	7.4E-09	1.7E-07	9.0E-05	9.3E-08	6.3E-08	9.1E-06	2.0E-04	1.5E-04
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	1.2E-06	6.8E-05	5.9E-04	7.2E-04	3.7E-06	3.2E-07	2.8E-06	2.0E-04	4.1E-04	1.0E-04	2.1E-04	9.2E-04	9.9E-08	8.6E-07	4.7E-04	1.2E-06	8.3E-07	1.2E-04	1.1E-03	8.0E-04
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	7.1E-07	3.9E-05	5.9E-04	4.1E-04	2.1E-06	1.8E-07	2.7E-06	1.1E-04	4.0E-04	6.0E-05	1.2E-04	9.1E-04	5.7E-08	8.6E-07	4.6E-04	7.1E-07	4.8E-07	7.0E-05	1.1E-03	8.0E-04
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	5.5E-07	3.0E-05	3.6E-04	3.2E-04	1.7E-06	1.4E-07	1.7E-06	8.9E-05	2.5E-04	4.7E-05	9.4E-05	5.5E-04	4.4E-08	5.2E-07	2.8E-04	5.5E-07	3.7E-07	5.4E-05	6.4E-04	4.9E-04
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	3.3E-07	1.8E-05	1.9E-04	1.9E-04	9.8E-07	8.4E-08	9.1E-07	5.3E-05	1.3E-04	2.8E-05	5.6E-05	3.0E-04	2.6E-08	2.8E-07	1.5E-04	3.3E-07	2.2E-07	3.2E-05	3.5E-04	2.6E-04
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	7.8E-07	4.3E-05	7.8E-04	4.6E-04	2.3E-06	2.0E-07	3.6E-06	1.3E-04	5.3E-04	6.7E-05	1.3E-04	1.2E-03	6.3E-08	1.1E-06	6.1E-04	7.9E-07	5.3E-07	7.7E-05	1.4E-03	1.1E-03
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	6.1E-08	3.4E-06	6.8E-05	3.6E-05	1.8E-07	1.6E-08	3.2E-07	9.9E-06	4.6E-05	5.2E-06	1.0E-05	1.0E-04	4.9E-09	9.8E-08	5.3E-05	6.2E-08	4.1E-08	6.0E-06	1.2E-04	9.2E-05
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	1.0E-07	5.6E-06	8.6E-05	5.9E-05	3.0E-07	2.6E-08	4.0E-07	1.6E-05	5.9E-05	8.6E-06	1.7E-05	1.3E-04	8.1E-09	1.2E-07	6.7E-05	1.0E-07	6.8E-08	1.0E-05	1.5E-04	1.2E-04
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	1.1E-06	6.3E-05	4.3E-04	6.7E-04	3.4E-06	2.9E-07	2.0E-06	1.8E-04	3.0E-04	9.7E-05	2.0E-04	6.6E-04	9.2E-08	6.3E-07	3.4E-04	1.2E-06	7.7E-07	1.1E-04	7.7E-04	5.8E-04
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	2.0E-07	1.1E-05	2.0E-04	1.1E-04	5.9E-07	5.1E-08	9.2E-07	3.2E-05	1.4E-04	1.7E-05	3.4E-05	3.1E-04	1.6E-08	2.9E-07	1.6E-04	2.0E-07	1.3E-07	1.9E-05	3.6E-04	2.7E-04
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	2.4E-06	1.3E-04	1.1E-03	1.4E-03	7.3E-06	6.3E-07	5.0E-06	4.0E-04	7.4E-04	2.1E-04	4.2E-04	1.7E-03	2.0E-07	1.6E-06	8.4E-04	2.5E-06	1.7E-06	2.4E-04	1.9E-03	1.4E-03
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	8.3E-08	4.6E-06	1.1E-04	4.9E-05	2.5E-07	2.1E-08	4.9E-07	1.3E-05	7.2E-05	7.1E-06	1.4E-05	1.6E-04	6.7E-09	1.5E-07	8.3E-05	8.4E-08	5.6E-08	8.2E-06	1.9E-04	1.4E-04
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	9.3E-08	5.1E-06	1.3E-04	5.4E-05	2.8E-07	2.4E-08	6.1E-07	1.5E-05	9.0E-05	7.9E-06	1.6E-05	2.0E-04	7.5E-09	1.9E-07	1.0E-04	9.4E-08	6.3E-08	9.2E-06	2.3E-04	1.8E-04
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	5.5E-08	3.0E-06	9.0E-05	3.2E-05	1.6E-07	1.4E-08	4.2E-07	8.9E-06	6.2E-05	4.7E-06	9.4E-06	1.4E-04	4.4E-09	1.3E-07	7.1E-05	5.5E-08	3.7E-08	5.4E-06	1.6E-04	1.2E-04
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	1.2E-07	6.4E-06	1.1E-04	6.8E-05	3.5E-07	3.0E-08	5.3E-07	1.9E-05	7.8E-05	9.9E-06	2.0E-05	1.8E-04	9.3E-09	1.7E-07	8.9E-05	1.2E-07	7.8E-08	1.1E-05	2.0E-04	1.5E-04
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	5.7E-07	3.2E-05	2.9E-04	3.4E-04	1.7E-06	1.5E-07	1.3E-06	9.3E-05	2.0E-04	4.9E-05	9.9E-05	4.4E-04	4.6E-08	4.2E-07	2.3E-04	5.8E-07	3.9E-07	5.7E-05	5.2E-04	3.9E-04
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	9.9E-07	5.4E-05	7.8E-04	5.7E-04	3.0E-06	2.5E-07	3.7E-06	1.6E-04	5.4E-04	8.4E-05	1.7E-04	1.2E-03	7.9E-08	1.1E-06	6.2E-04	9.9E-07	6.7E-07	9.7E-05	1.4E-03	1.1E-03
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	7.7E-08	4.2E-06	7.1E-05	4.5E-05	2.3E-07	2.0E-08	3.3E-07	1.2E-05	4.9E-05	6.5E-06	1.3E-05	1.1E-04	6.2E-09	1.0E-07	5.6E-05	7.7E-08	5.2E-08	7.6E-06	1.3E-04	9.6E-05
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	6.7E-08	3.7E-06	6.8E-05	3.9E-05	2.0E-07	1.7E-08	3.2E-07	1.1E-05	4.7E-05	5.7E-06	1.1E-05	1.1E-04	5.3E-09	9.9E-08	5.4E-05	6.7E-08	4.5E-08	6.6E-06	1.2E-04	9.2E-05
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	6.3E-08	3.5E-06	7.2E-05	3.7E-05	1.9E-07	1.6E-08	3.4E-07	1.0E-05	5.0E-05	5.4E-06	1.1E-05	1.1E-04	5.1E-09	1.0E-07	5.7E-05	6.4E-08	4.3E-08	6.3E-06	1.3E-04	9.8E-05
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	5.4E-08	3.0E-06	6.2E-05	3.1E-05	1.6E-07	1.4E-08	2.9E-07	8.7E-06	4.3E-05	4.6E-06	9.3E-06	9.6E-05	4.3E-09	9.1E-08	4.9E-05	5.4E-08	3.6E-08	5.3E-06	1.1E-04	8.4E-05
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	5.2E-08	2.8E-06	6.1E-05	3.0E-05	1.6E-07	1.3E-08	2.9E-07	8.4E-06	4.2E-05	4.4E-06	8.9E-06	9.4E-05	4.1E-09	8.9E-08	4.8E-05	5.2E-08	3.5E-08	5.1E-06	1.1E-04	8.3E-05
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	4.7E-08	2.6E-06	5.1E-05	2.7E-05	1.4E-07	1.2E-08	2.4E-07	7.6E-06	3.5E-05	4.0E-06	8.1E-06	7.9E-05	3.8E-09	7.4E-08	4.0E-05	4.7E-08	3.2E-08	4.7E-06	9.1E-05	6.9E-05
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	6.6E-08	3.6E-06	6.3E-05	3.8E-05	2.0E-07	1.7E-08	3.0E-07	1.1E-05	4.4E-05	5.6E-06	1.1E-05	9.8E-05	5.3E-09	9.2E-08	5.0E-05	6.6E-08	4.5E-08	6.5E-06	1.1E-04	8.6E-05
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	6.3E-08	3.5E-06	4.4E-05	3.7E-05	1.9E-07	1.6E-08	2.1E-07	1.0E-05	3.0E-05	5.3E-06	1.1E-05	6.8E-05	5.0E-09	6.4E-08	3.5E-05	6.3E-08	4.2E-08	6.2E-06	7.9E-05	6.0E-05
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	1.1E-07	5.9E-06	1.4E-04	6.2E-05	3.2E-07	2.7E-08	6.4E-07	1.7E-05	9.5E-05	9.1E-06	1.8E-05	2.1E-04	8.6E-09	2.0E-07	1.1E-04	1.1E-07	7.2E-08	1.1E-05	2.5E-04	1.9E-04
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	1.1E-07	6.3E-06	1.0E-04	6.6E-05	3.4E-07	2.9E-08	4.8E-07	1.8E-05	7.0E-05	9.7E-06	2.0E-05	1.6E-04	9.1E-09	1.5E-07	8.1E-05	1.1E-07	7.7E-08	1.1E-05	1.8E-04	1.4E-04
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	1.2E-07	6.6E-06	1.3E-04	6.9E-05	3.6E-07	3.1E-08	5.9E-07	1.9E-05	8.7E-05	1.0E-05	2.0E-05	2.0E-04	9.5E-09	1.8E-07	1.0E-04	1.2E-07	8.0E-08	1.2E-05	2.3E-04	1.7E-04
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	1.8E-08	9.7E-07	1.6E-05	1.0E-05	5.3E-08	4.5E-09	7.4E-08	2.9E-06	1.1E-05	1.5E-06	3.0E-06	2.4E-05	1.4E-09	2.3E-08	1.2E-05	1.8E-08	1.2E-08	1.7E-06	2.8E-05	2.1E-05
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	2.5E-08	1.4E-06	2.7E-05	1.4E-05	7.4E-08	6.3E-09	1.3E-07	4.0E-06	1.8E-05	2.1E-06	4.2E-06	4.2E-05	2.0E-09	3.9E-08	2.1E-05	2.5E-08	1.7E-08	2.4E-06	4.8E-05	3.6E-05
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	3.1E-08	1.7E-06	4.2E-05	1.8E-05	9.4E-08	8.1E-09	2.0E-07	5.1E-06	2.9E-05	2.7E-06	5.4E-06	6.5E-05	2.5E-09	6.1E-08	3.3E-05	3.2E-08	2.1E-08	3.1E-06	7.5E-05	5.7E-05
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	3.3E-08	1.8E-06	5.2E-05	1.9E-05	9.9E-08	8.5E-09	2.4E-07	5.3E-06	3.6E-05	2.8E-06	5.6E-06	8.1E-05	2.6E-09	7.6E-08	4.1E-05	3.3E-08	2.2E-08	3.3E-06	9.4E-05	7.1E-05
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	3.7E-06	2.0E-04	1.6E-03	2.1E-03	1.1E-05	9.4E-07	7.6E-06	5.9E-04	1.1E-03	3.1E-04	6.3E-04	2.5E-03	2.9E-07	2.4E-06	1.3E-03	3.7E-06	2.5E-06	3.6E-04	2.9E-03	2.2E-03
--	"Off-Property Limit" Maximum - Quebec	622.02 , 6087.16	--	8.4E-06	4.6E-04	4.2E-03	4.9E-03	2.5E-05	2.2E-06	2.0E-05	1.4E-03	2.9E-03	7.2E-04	1.4E-03	6.5E-03	6.8E-07	6.1E-06	3.3E-03	8.5E-06	5.7E-06	8.3E-04	7.6E-03	5.7E-03
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	622.24 , 6085.73	--	1.1E-05	6.2E-04	6.9E-03	6.5E-03	3.3E-05	2.9E-06	3.2E-05	1.8E-03	4.8E-03	9.5E-04	1.9E-03	1.1E-02	9.0E-07	1.0E-05	5.5E-03	1.1E-05	7.5E-06	1.1E-03	1.2E-02	9.4E-03

DSO3 + DSO4 + HOWSE

- all values in μg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

NO BLASTS

AIR QUALITY - METALS FRACTION IN TPM

ALL: Background + DSO3 + DSO4 + HOWSE

			Pollutant	Antimony (Sb)	Arsenic (As)		Barium (Ba)	Beryllium (Be)	Cadmium (Cd)		Chromium (Cr)	Copper (Cu)	Lead (Pb)			Mercury (Hg)		Nickel (Ni)	Silver (Ag)	Thallium (Tl)	Vanadium (V)		Zinc (Zn)
			Averaging Period	1-yr	1-yr	24-hr	1-yr	1-yr	1-yr	24-hr	1-yr	24-hr	1-yr	30-day	24-hr	1-yr	24-hr	24-hr	1-yr	1-yr	1-yr	24-hr	24-hr
			Assessment Criteria	0.17	0.003	0.3	0.05	0.0004	0.0036	0.025	0.004	2.5	0.1	0.2	0.5	0.005	2	0.014	0.23	0.25	1	2	2.5
			Background concentration (Pre-DSO3)	0.001	0.002	0.01	0.02	0	0.0005	0.0025	0.002	0.2	0.004	0.0081	0.02	0.002	0.01	0.002	0.005	0.005	0.01	0.05	0.1
ID	**Name**	**UTM Coordinates**	**Distance From Howse**	Obtained metal concentrations in ambient air by multiplying TPM concentrations by metal fraction obtained from soil material analyses. See Appendix H of Air Quality Report for metal fractions.																			
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.2E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.2E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.2E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.1E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.2E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.1E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.4E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	1.0E-03	2.0E-03	1.0E-02	2.0E-02	2.8E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	1.0E-03	2.1E-03	1.1E-02	2.1E-02	3.7E-06	5.0E-04	2.5E-03	2.2E-03	2.0E-01	4.1E-03	8.3E-03	2.1E-02	2.0E-03	1.0E-02	2.5E-03	5.0E-03	5.0E-03	1.0E-02	5.1E-02	1.0E-01
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	1.0E-03	2.0E-03	1.1E-02	2.0E-02	2.1E-06	5.0E-04	2.5E-03	2.1E-03	2.0E-01	4.1E-03	8.2E-03	2.1E-02	2.0E-03	1.0E-02	2.5E-03	5.0E-03	5.0E-03	1.0E-02	5.1E-02	1.0E-01
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	1.0E-03	2.0E-03	1.0E-02	2.0E-02	1.7E-06	5.0E-04	2.5E-03	2.1E-03	2.0E-01	4.0E-03	8.1E-03	2.1E-02	2.0E-03	1.0E-02	2.3E-03	5.0E-03	5.0E-03	1.0E-02	5.1E-02	1.0E-01
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	9.8E-07	5.0E-04	2.5E-03	2.1E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.2E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	1.0E-03	2.0E-03	1.1E-02	2.0E-02	2.3E-06	5.0E-04	2.5E-03	2.1E-03	2.0E-01	4.1E-03	8.2E-03	2.1E-02	2.0E-03	1.0E-02	2.6E-03	5.0E-03	5.0E-03	1.0E-02	5.1E-02	1.0E-01
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	1.0E-03	2.0E-03	1.0E-02	2.0E-02	1.8E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.0E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	1.0E-03	2.1E-03	1.0E-02	2.1E-02	3.4E-06	5.0E-04	2.5E-03	2.2E-03	2.0E-01	4.1E-03	8.2E-03	2.1E-02	2.0E-03	1.0E-02	2.3E-03	5.0E-03	5.0E-03	1.0E-02	5.1E-02	1.0E-01
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	1.0E-03	2.0E-03	1.0E-02	2.0E-02	5.9E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.2E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	1.0E-03	2.1E-03	1.1E-02	2.1E-02	7.3E-06	5.0E-04	2.5E-03	2.4E-03	2.0E-01	4.2E-03	8.5E-03	2.2E-02	2.0E-03	1.0E-02	2.8E-03	5.0E-03	5.0E-03	1.0E-02	5.2E-02	1.0E-01
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	2.5E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	2.8E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	1.0E-03	2.0E-03	1.0E-02	2.0E-02	1.6E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.5E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	1.0E-03	2.0E-03	1.0E-02	2.0E-02	1.7E-06	5.0E-04	2.5E-03	2.1E-03	2.0E-01	4.0E-03	8.2E-03	2.0E-02	2.0E-03	1.0E-02	2.2E-03	5.0E-03	5.0E-03	1.0E-02	5.1E-02	1.0E-01
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	1.0E-03	2.1E-03	1.1E-02	2.1E-02	3.0E-06	5.0E-04	2.5E-03	2.2E-03	2.0E-01	4.1E-03	8.2E-03	2.1E-02	2.0E-03	1.0E-02	2.6E-03	5.0E-03	5.0E-03	1.0E-02	5.1E-02	1.0E-01
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	2.3E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	2.0E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	1.9E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	1.6E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.0E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	1.6E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.0E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	1.4E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.0E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	2.0E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.0E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	1.0E-03	2.0E-03	1.0E-02	2.0E-02	1.9E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.0E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.2E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.4E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	1.0E-03	2.0E-03	1.0E-02	2.0E-02	3.6E-07	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.1E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	1.0E-03	2.0E-03	1.0E-02	2.0E-02	5.3E-08	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.0E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	7.4E-08	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.0E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	9.4E-08	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.0E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	1.0E-03	2.0E-03	1.0E-02	2.0E-02	9.9E-08	5.0E-04	2.5E-03	2.0E-03	2.0E-01	4.0E-03	8.1E-03	2.0E-02	2.0E-03	1.0E-02	2.0E-03	5.0E-03	5.0E-03	1.0E-02	5.0E-02	1.0E-01
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	1.0E-03	2.2E-03	1.2E-02	2.2E-02	1.1E-05	5.0E-04	2.5E-03	2.6E-03	2.0E-01	4.3E-03	8.7E-03	2.3E-02	2.0E-03	1.0E-02	3.3E-03	5.0E-03	5.0E-03	1.0E-02	5.3E-02	1.0E-01
--	"Off-Property Limit" Maximum - Quebec	622.02 , 6087.16	--	1.0E-03	2.5E-03	1.4E-02	2.5E-02	2.5E-05	5.0E-04	2.5E-03	3.4E-03	2.0E-01	4.7E-03	9.5E-03	2.7E-02	2.0E-03	1.0E-02	5.3E-03	5.0E-03	5.0E-03	1.1E-02	5.8E-02	1.1E-01
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	622.24 , 6085.73	--	1.0E-03	2.6E-03	1.7E-02	2.7E-02	3.3E-05	5.0E-04	2.5E-03	3.8E-03	2.0E-01	5.0E-03	1.0E-02	3.1E-02	2.0E-03	1.0E-02	7.5E-03	5.0E-03	5.0E-03	1.1E-02	6.2E-02	1.1E-01

- all values in µg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

NO BLASTS

	VOLATIL ORGANIC COUMPOUNDS					
Pollutant	Benzene	1,3-Butadiene		Formaldehyde	Acetaldehyde	Acrolein
Averaging Period	24-hr	1-yr	24-hr	24-hr	24-hr	24-hr
Selected Air Quality Assessement Criteria for Howse	**2.3**	**0.3**	**10**	**6.5**	**500**	**0.4**
BACKGROUND CONCENTRATIONS - PRE-DSO3	**0**	**0.27**	**1.4**	**0.5**	**0**	**0**
	1.7%	0.1%	0.1%	28.4%	9.0%	3.1%

DSO3 + DSO4 ONLY

ID	Description	UTM Coordinates	Distance From Howse	Benzene	1,3-Butadiene		Formaldehyde	Acetaldehyde	Acrolein
			Averaging Period	24-hr	1-yr	24-hr	24-hr	24-hr	24-hr
			Assessment Criteria	2.3	0.3	10	6.5	500	0.4
				Obtained VOC concentrations in ambient air by multiplying HC concentrations by specific COV fraction obtained from EPA MOVES					
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	4.6E-03	1.1E-05	2.7E-04	7.8E-02	2.5E-02	8.5E-03
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	4.6E-03	1.1E-05	2.7E-04	7.8E-02	2.5E-02	8.5E-03
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	4.6E-03	1.1E-05	2.7E-04	7.8E-02	2.5E-02	8.5E-03
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	4.3E-03	1.0E-05	2.6E-04	7.3E-02	2.3E-02	7.9E-03
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	3.8E-03	1.0E-05	2.2E-04	6.4E-02	2.0E-02	6.9E-03
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	4.7E-03	1.1E-05	2.8E-04	7.9E-02	2.5E-02	8.6E-03
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	5.8E-03	1.4E-05	3.4E-04	9.8E-02	3.1E-02	1.1E-02
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	6.2E-03	1.3E-05	3.7E-04	1.0E-01	3.3E-02	1.1E-02
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	3.0E-02	6.6E-05	1.8E-03	5.1E-01	1.6E-01	5.5E-02
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	1.0E-02	2.7E-05	6.0E-04	1.7E-01	5.4E-02	1.9E-02
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	1.0E-02	2.5E-05	6.1E-04	1.7E-01	5.5E-02	1.9E-02
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	1.3E-02	4.0E-05	7.8E-04	2.2E-01	7.0E-02	2.4E-02
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	1.0E-02	3.0E-05	6.1E-04	1.7E-01	5.5E-02	1.9E-02
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	3.3E-03	7.7E-06	2.0E-04	5.6E-02	1.8E-02	6.1E-03
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	4.1E-03	1.6E-05	2.5E-04	7.0E-02	2.2E-02	7.6E-03
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	1.3E-02	8.6E-05	7.5E-04	2.1E-01	6.7E-02	2.3E-02
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	3.5E-03	1.3E-05	2.1E-04	5.9E-02	1.9E-02	6.4E-03
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	7.5E-02	3.8E-04	4.5E-03	1.3E+00	4.0E-01	1.4E-01
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	5.4E-03	1.4E-05	3.2E-04	9.2E-02	2.9E-02	1.0E-02
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	4.5E-03	1.6E-05	2.7E-04	7.6E-02	2.4E-02	8.3E-03
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	1.8E-03	5.1E-06	1.0E-04	3.0E-02	9.4E-03	3.2E-03
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	5.2E-03	1.2E-05	3.1E-04	8.9E-02	2.8E-02	9.7E-03
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	8.1E-03	4.5E-05	4.8E-04	1.4E-01	4.4E-02	1.5E-02
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	2.5E-02	6.3E-05	1.5E-03	4.2E-01	1.3E-01	4.6E-02
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	3.3E-03	1.2E-05	1.9E-04	5.5E-02	1.8E-02	6.0E-03
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	2.6E-03	1.0E-05	1.5E-04	4.4E-02	1.4E-02	4.8E-03
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	2.5E-03	1.0E-05	1.5E-04	4.1E-02	1.3E-02	4.5E-03
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	2.1E-03	8.8E-06	1.2E-04	3.5E-02	1.1E-02	3.8E-03
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	2.1E-03	8.5E-06	1.3E-04	3.6E-02	1.1E-02	3.9E-03
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	2.1E-03	8.3E-06	1.2E-04	3.5E-02	1.1E-02	3.8E-03
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	3.0E-03	1.2E-05	1.8E-04	5.2E-02	1.6E-02	5.6E-03
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	2.4E-03	9.4E-06	1.4E-04	4.0E-02	1.3E-02	4.4E-03
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	6.5E-03	1.4E-05	3.9E-04	1.1E-01	3.5E-02	1.2E-02
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	5.7E-03	1.3E-05	3.4E-04	9.7E-02	3.1E-02	1.1E-02
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	8.1E-03	1.5E-05	4.8E-04	1.4E-01	4.4E-02	1.5E-02
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	9.4E-04	3.2E-06	5.6E-05	1.6E-02	5.1E-03	1.7E-03
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	1.8E-03	5.7E-06	1.1E-04	3.1E-02	9.7E-03	3.3E-03
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	2.4E-03	6.4E-06	1.4E-04	4.1E-02	1.3E-02	4.4E-03
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	2.4E-03	6.6E-06	1.4E-04	4.1E-02	1.3E-02	4.5E-03
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	1.4E-01	8.9E-04	8.5E-03	2.4E+00	7.7E-01	2.6E-01
--	"Off-Property Limit" Maximum - Quebec	622.02 , 6087.16	--	1.7E-01	8.1E-04	1.0E-02	2.9E+00	9.1E-01	3.1E-01
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	619.00 , 6090.50	--	1.3E-01	9.6E-04	7.5E-03	2.1E+00	6.7E-01	2.3E-01

- all values in $\mu g/m^3$, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

NO BLASTS

HOWSE ONLY

				VOLATIL ORGANIC COUMPOUNDS					
			Pollutant	Benzene	1,3-Butadiene		Formaldehyde	Acetaldehyde	Acrolein
			Averaging Period	24-hr	1-yr	24-hr	24-hr	24-hr	24-hr
			Assessment Criteria	2.3	0.3	10	6.5	500	0.4
ID	Name	UTM Coordinates	Distance From Howse	Obtained VOC concentrations in ambient air by multiplying HC concentrations by specific COV fraction obtained from EPA MOVES					
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	2.8E-03	7.2E-06	1.7E-04	4.8E-02	1.5E-02	5.2E-03
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	2.6E-03	7.0E-06	1.6E-04	4.5E-02	1.4E-02	4.9E-03
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	2.8E-03	7.2E-06	1.6E-04	4.6E-02	1.5E-02	5.1E-03
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	2.6E-03	6.7E-06	1.6E-04	4.4E-02	1.4E-02	4.8E-03
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	3.0E-03	6.8E-06	1.8E-04	5.1E-02	1.6E-02	5.6E-03
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	2.5E-03	6.7E-06	1.5E-04	4.2E-02	1.3E-02	4.5E-03
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	1.7E-03	6.7E-06	9.9E-05	2.8E-02	8.9E-03	3.1E-03
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	3.3E-03	6.7E-06	2.0E-04	5.6E-02	1.8E-02	6.1E-03
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	1.7E-02	8.1E-05	1.0E-03	2.9E-01	9.3E-02	3.2E-02
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	1.5E-02	5.9E-05	8.7E-04	2.5E-01	7.8E-02	2.7E-02
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	1.2E-02	3.6E-05	6.9E-04	2.0E-01	6.3E-02	2.2E-02
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	3.5E-03	1.8E-05	2.1E-04	5.9E-02	1.9E-02	6.5E-03
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	2.4E-02	7.3E-05	1.4E-03	4.1E-01	1.3E-01	4.4E-02
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	1.5E-03	4.2E-06	9.1E-05	2.6E-02	8.2E-03	2.8E-03
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	1.4E-03	5.5E-06	8.2E-05	2.3E-02	7.4E-03	2.6E-03
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	7.4E-03	3.7E-05	4.4E-04	1.2E-01	4.0E-02	1.4E-02
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	7.8E-03	1.8E-05	4.7E-04	1.3E-01	4.2E-02	1.4E-02
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	3.7E-02	1.1E-04	2.2E-03	6.2E-01	2.0E-01	6.8E-02
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	1.4E-03	5.1E-06	8.6E-05	2.4E-02	7.8E-03	2.7E-03
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	2.0E-03	5.6E-06	1.2E-04	3.4E-02	1.1E-02	3.7E-03
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	1.1E-03	3.5E-06	6.3E-05	1.8E-02	5.7E-03	2.0E-03
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	3.5E-03	8.2E-06	2.1E-04	5.9E-02	1.9E-02	6.4E-03
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	2.7E-03	1.6E-05	1.6E-04	4.5E-02	1.4E-02	4.9E-03
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	2.2E-02	8.1E-05	1.3E-03	3.7E-01	1.2E-01	4.0E-02
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	1.3E-03	4.2E-06	7.7E-05	2.2E-02	6.9E-03	2.4E-03
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	1.2E-03	3.7E-06	7.1E-05	2.0E-02	6.4E-03	2.2E-03
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	1.2E-03	3.6E-06	7.2E-05	2.0E-02	6.4E-03	2.2E-03
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	1.0E-03	3.2E-06	6.2E-05	1.8E-02	5.6E-03	1.9E-03
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	1.0E-03	3.0E-06	6.2E-05	1.8E-02	5.6E-03	1.9E-03
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	9.0E-04	2.9E-06	5.4E-05	1.5E-02	4.8E-03	1.7E-03
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	1.2E-03	4.0E-06	7.2E-05	2.0E-02	6.5E-03	2.2E-03
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	8.1E-04	3.1E-06	4.8E-05	1.4E-02	4.3E-03	1.5E-03
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	4.4E-03	7.9E-06	2.6E-04	7.4E-02	2.3E-02	8.1E-03
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	2.9E-03	7.3E-06	1.7E-04	5.0E-02	1.6E-02	5.4E-03
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	2.8E-03	7.5E-06	1.7E-04	4.7E-02	1.5E-02	5.2E-03
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	3.0E-04	1.0E-06	1.8E-05	5.1E-03	1.6E-03	5.6E-04
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	5.3E-04	1.6E-06	3.2E-05	9.0E-03	2.9E-03	9.9E-04
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	6.2E-04	2.1E-06	3.7E-05	1.1E-02	3.3E-03	1.2E-03
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	9.1E-04	2.2E-06	5.4E-05	1.5E-02	4.9E-03	1.7E-03
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	2.8E-02	1.1E-04	1.6E-03	4.7E-01	1.5E-01	5.1E-02
--	"Off-Property Limit" Maximum - Quebec	624.33 , 6084.64	--	7.6E-02	2.4E-04	4.5E-03	1.3E+00	4.1E-01	1.4E-01
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	618.55 , 6086.66	--	1.5E-01	4.5E-04	8.9E-03	2.5E+00	8.0E-01	2.8E-01

HOWSE ONLY

- all values in μg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

NO BLASTS

DSO3 + DSO4 + HOWSE

				VOLATIL ORGANIC COUMPOUNDS					
	DSO3 + DSO4 + HOWSE		Pollutant	Benzene	1,3-Butadiene		Formaldehyde	Acetaldehyde	Acrolein
			Averaging Period	24-hr	1-yr	24-hr	24-hr	24-hr	24-hr
			Assessment Criteria	2.3	0.3	10	6.5	500	0.4
ID	**Name**	**UTM Coordinates**	**Distance From Howse**	Obtained VOC concentrations in ambient air by multiplying HC concentrations by specific COV fraction obtained from EPA MOVES					
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	6.9E-03	1.8E-05	4.1E-04	1.2E-01	3.7E-02	1.3E-02
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	6.8E-03	1.8E-05	4.0E-04	1.1E-01	3.6E-02	1.3E-02
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	6.8E-03	1.8E-05	4.1E-04	1.2E-01	3.7E-02	1.3E-02
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	6.6E-03	1.7E-05	3.9E-04	1.1E-01	3.5E-02	1.2E-02
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	6.8E-03	1.7E-05	4.0E-04	1.1E-01	3.6E-02	1.3E-02
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	6.6E-03	1.8E-05	3.9E-04	1.1E-01	3.5E-02	1.2E-02
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	5.9E-03	2.0E-05	3.5E-04	1.0E-01	3.2E-02	1.1E-02
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	7.7E-03	2.0E-05	4.6E-04	1.3E-01	4.1E-02	1.4E-02
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	3.0E-02	1.5E-04	1.8E-03	5.1E-01	1.6E-01	5.5E-02
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	2.3E-02	8.7E-05	1.4E-03	3.9E-01	1.2E-01	4.2E-02
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	1.6E-02	6.1E-05	9.6E-04	2.7E-01	8.7E-02	3.0E-02
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	1.4E-02	5.5E-05	8.2E-04	2.3E-01	7.3E-02	2.5E-02
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	2.6E-02	1.0E-04	1.5E-03	4.4E-01	1.4E-01	4.8E-02
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	4.8E-03	1.2E-05	2.9E-04	8.2E-02	2.6E-02	8.9E-03
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	4.5E-03	2.1E-05	2.7E-04	7.6E-02	2.4E-02	8.3E-03
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	1.3E-02	1.2E-04	7.5E-04	2.1E-01	6.7E-02	2.3E-02
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	9.3E-03	3.1E-05	5.6E-04	1.6E-01	5.0E-02	1.7E-02
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	7.5E-02	5.0E-04	4.5E-03	1.3E+00	4.0E-01	1.4E-01
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	5.6E-03	1.9E-05	3.3E-04	9.5E-02	3.0E-02	1.0E-02
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	4.9E-03	2.1E-05	2.9E-04	8.3E-02	2.6E-02	9.0E-03
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	2.3E-03	8.6E-06	1.4E-04	3.9E-02	1.2E-02	4.3E-03
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	8.0E-03	2.0E-05	4.8E-04	1.4E-01	4.3E-02	1.5E-02
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	8.1E-03	6.0E-05	4.8E-04	1.4E-01	4.4E-02	1.5E-02
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	3.2E-02	1.4E-04	1.9E-03	5.5E-01	1.7E-01	6.0E-02
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	3.5E-03	1.6E-05	2.1E-04	5.9E-02	1.9E-02	6.4E-03
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	3.4E-03	1.4E-05	2.0E-04	5.8E-02	1.8E-02	6.3E-03
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	3.3E-03	1.4E-05	2.0E-04	5.6E-02	1.8E-02	6.1E-03
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	2.8E-03	1.2E-05	1.7E-04	4.8E-02	1.5E-02	5.2E-03
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	2.7E-03	1.2E-05	1.6E-04	4.5E-02	1.4E-02	4.9E-03
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	2.4E-03	1.1E-05	1.4E-04	4.0E-02	1.3E-02	4.4E-03
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	3.5E-03	1.6E-05	2.1E-04	6.0E-02	1.9E-02	6.5E-03
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	2.4E-03	1.2E-05	1.4E-04	4.1E-02	1.3E-02	4.4E-03
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	8.7E-03	2.2E-05	5.2E-04	1.5E-01	4.7E-02	1.6E-02
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	7.1E-03	2.0E-05	4.2E-04	1.2E-01	3.8E-02	1.3E-02
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	8.4E-03	2.2E-05	5.0E-04	1.4E-01	4.5E-02	1.6E-02
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	1.2E-03	4.1E-06	7.3E-05	2.1E-02	6.5E-03	2.3E-03
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	2.0E-03	7.3E-06	1.2E-04	3.4E-02	1.1E-02	3.7E-03
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	2.5E-03	8.5E-06	1.5E-04	4.3E-02	1.4E-02	4.7E-03
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	2.6E-03	8.7E-06	1.5E-04	4.3E-02	1.4E-02	4.7E-03
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	1.5E-01	9.8E-04	8.7E-03	2.5E+00	7.8E-01	2.7E-01
--	"Off-Property Limit" Maximum - Quebec	622.02 , 6087.16	--	1.7E-01	8.5E-04	1.0E-02	2.9E+00	9.1E-01	3.1E-01
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	622.24 , 6085.73	--	1.5E-01	1.1E-03	9.2E-03	2.6E+00	8.2E-01	2.8E-01

- all values in µg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.

NO BLASTS

ALL: Background + DSO3 + DSO4 + HOWSE

ID	Name	UTM Coordinates	Distance From Howse	VOLATIL ORGANIC COUMPOUNDS					
			Pollutant	Benzene	1,3-Butadiene		Formaldehyde	Acetaldehyde	Acrolein
			Averaging Period	24-hr	1-yr	24-hr	24-hr	24-hr	24-hr
			Assessment Criteria	2.3	0.3	10	6.5	500	0.4
			Background concentration (Pre-DSO3)	0	0.27	1.4	0.5	0	0
				Obtained VOC concentrations in ambient air by multiplying HC concentrations by specific COV fraction obtained from EPA MOVES					
R1	Young Naskapi Camp 1	615.08 , 6086.33	4.21 km, W	6.9E-03	2.7E-01	1.4E+00	6.2E-01	3.7E-02	1.3E-02
R2	Young Naskapi Camp 2	615.01 , 6086.43	4.29 km, W	6.8E-03	2.7E-01	1.4E+00	6.1E-01	3.6E-02	1.3E-02
R3	Innu Tent 3 (Rosemary Lake)	615.25 , 6086.33	4.05 km, W	6.8E-03	2.7E-01	1.4E+00	6.2E-01	3.7E-02	1.3E-02
R4	Innu Tent 4 (Rosemary Lake)	615.24 , 6086.95	4.11 km, W	6.6E-03	2.7E-01	1.4E+00	6.1E-01	3.5E-02	1.2E-02
R5	Innu Tent 5 (Rosemary Lake)	614.85 , 6087.33	4.56 km, WNW	6.8E-03	2.7E-01	1.4E+00	6.1E-01	3.6E-02	1.3E-02
R6	Innu Tent 6 (Rosemary Lake)	614.69 , 6086.75	4.63 km, W	6.6E-03	2.7E-01	1.4E+00	6.1E-01	3.5E-02	1.2E-02
R7	Innu Tent 1 (Elross Lake)	619.34 , 6080.83	5.44 km, S	5.9E-03	2.7E-01	1.4E+00	6.0E-01	3.2E-02	1.1E-02
R8	Innu Tent 2 (Exact location tbd)	614.50 , 6084.58	5.08 km, WSW	7.7E-03	2.7E-01	1.4E+00	6.3E-01	4.1E-02	1.4E-02
R9	Young Naskapi Camp 7 (Pinette Lake)	620.46 , 6084.82	1.86 km, SE	3.0E-02	2.7E-01	1.4E+00	1.0E+00	1.6E-01	5.5E-02
R10	Young Naskapi Camp 3	617.93 , 6087.36	1.75 km, NW	2.3E-02	2.7E-01	1.4E+00	8.9E-01	1.2E-01	4.2E-02
R11	Young Naskapi Trailer tent (Triangle Lake)	618.09 , 6088.32	2.38 km, NNW	1.6E-02	2.7E-01	1.4E+00	7.7E-01	8.7E-02	3.0E-02
R12	Young Naskapi Camp 5 (Elross Creek)	621.54 , 6082.01	4.81 km, SSE	1.4E-02	2.7E-01	1.4E+00	7.3E-01	7.3E-02	2.5E-02
R13	Naskapi - Uashat people's camp	617.80 , 6087.04	1.68 km, WNW	2.6E-02	2.7E-01	1.4E+00	9.4E-01	1.4E-01	4.8E-02
R14	Young Naskapi Camp 4	613.07 , 6087.51	6.35 km, WNW	4.8E-03	2.7E-01	1.4E+00	5.8E-01	2.6E-02	8.9E-03
R15	Young Naskapi Camp 6 (Howells River)	622.30 , 6077.86	8.92 km, SSE	4.5E-03	2.7E-01	1.4E+00	5.8E-01	2.4E-02	8.3E-03
R16	Innu - Uashat - Mani-Utenam Camp 1	621.16 , 6089.03	3.34 km, NE	1.3E-02	2.7E-01	1.4E+00	7.1E-01	6.7E-02	2.3E-02
R17	Innu - Uashat - Mani-Utenam Camp 2	616.50 , 6086.97	2.88 km, WNW	9.3E-03	2.7E-01	1.4E+00	6.6E-01	5.0E-02	1.7E-02
R18	Innu - Uashat - Mani-Utenam Camp 3 (Inukshuk Lake)	623.97 , 6085.34	4.76 km, E	7.5E-02	2.7E-01	1.4E+00	1.8E+00	4.0E-01	1.4E-01
R19	Innu Cabin 1	631.68 , 6080.09	13.85 km, ESE	5.6E-03	2.7E-01	1.4E+00	6.0E-01	3.0E-02	1.0E-02
R20	Innu Cabin 2	631.11 , 6080.06	13.35 km, ESE	4.9E-03	2.7E-01	1.4E+00	5.8E-01	2.6E-02	9.0E-03
R21	Bustard - Observation and hunting site 1	613.00 , 6089.08	6.89 km, WNW	2.3E-03	2.7E-01	1.4E+00	5.4E-01	1.2E-02	4.3E-03
R22	Bustard - Observation and hunting site 2	615.10 , 6086.01	4.19 km, W	8.0E-03	2.7E-01	1.4E+00	6.4E-01	4.3E-02	1.5E-02
R23	Picking site (berries / tea)	620.05 , 6090.41	4.21 km, N	8.1E-03	2.7E-01	1.4E+00	6.4E-01	4.4E-02	1.5E-02
R24	Irony Mountain	618.24 , 6085.22	1.48 km, SW	3.2E-02	2.7E-01	1.4E+00	1.0E+00	1.7E-01	6.0E-02
R25	Innu Cabin 3	632.46 , 6082.72	13.64 km, ESE	3.5E-03	2.7E-01	1.4E+00	5.6E-01	1.9E-02	6.4E-03
R26	Innu Cabin 4	632.96 , 6081.88	14.35 km, ESE	3.4E-03	2.7E-01	1.4E+00	5.6E-01	1.8E-02	6.3E-03
R27	Innu Cabin 5	633.58 , 6081.32	15.12 km, ESE	3.3E-03	2.7E-01	1.4E+00	5.6E-01	1.8E-02	6.1E-03
R28	Innu Cabin 6	634.26 , 6080.91	15.89 km, ESE	2.8E-03	2.7E-01	1.4E+00	5.5E-01	1.5E-02	5.2E-03
R29	Innu Cabin 7	634.86 , 6080.71	16.53 km, ESE	2.7E-03	2.7E-01	1.4E+00	5.5E-01	1.4E-02	4.9E-03
R30	Innu Cabin 9 (Denault Lake)	635.21 , 6079.78	17.19 km, ESE	2.4E-03	2.7E-01	1.4E+00	5.4E-01	1.3E-02	4.4E-03
R31	Innu Cabin 8	633.13 , 6080.34	15.06 km, ESE	3.5E-03	2.7E-01	1.4E+00	5.6E-01	1.9E-02	6.5E-03
R32	Innu Cabin 10 (Vacher Lake)	636.05 , 6085.95	16.77 km, E	2.4E-03	2.7E-01	1.4E+00	5.4E-01	1.3E-02	4.4E-03
R33	Naskapi Cabin 1	615.34 , 6084.42	4.36 km, WSW	8.7E-03	2.7E-01	1.4E+00	6.5E-01	4.7E-02	1.6E-02
R34	Naskapi Cabin 2 (Elross Lake)	616.69 , 6084.22	3.3 km, SW	7.1E-03	2.7E-01	1.4E+00	6.2E-01	3.8E-02	1.3E-02
R35	Naskapi Cabin 3 (Elross Lake)	616.91 , 6082.67	4.31 km, SSW	8.4E-03	2.7E-01	1.4E+00	6.4E-01	4.5E-02	1.6E-02
R36	Kawawachikamak (Town)	643.50 , 6082.13	24.56 km, E	1.2E-03	2.7E-01	1.4E+00	5.2E-01	6.5E-03	2.3E-03
R37	Lac John (Town)	642.39 , 6076.24	25.18 km, ESE	2.0E-03	2.7E-01	1.4E+00	5.3E-01	1.1E-02	3.7E-03
R38	Matimekush (Town)	640.80 , 6075.60	24.01 km, ESE	2.5E-03	2.7E-01	1.4E+00	5.4E-01	1.4E-02	4.7E-03
R39	Schefferville (Town)	640.60 , 6075.00	24.1 km, ESE	2.6E-03	2.7E-01	1.4E+00	5.4E-01	1.4E-02	4.7E-03
R40	TSMC Workers' Camp	624.47 , 6082.77	6.25 km, SE	1.5E-01	2.7E-01	1.4E+00	3.0E+00	7.8E-01	2.7E-01
--	"Off-Property Limit" Maximum - Quebec	622.02 , 6087.16	--	1.7E-01	2.7E-01	1.4E+00	3.4E+00	9.1E-01	3.1E-01
--	"Off-Property Limit" Maximum - Newfoundland/Labrador	622.24 , 6085.73	--	1.5E-01	2.7E-01	1.4E+00	3.1E+00	8.2E-01	2.8E-01

- all values in µg/m^3, except for Deposition in g/m^2/30days. Red cell indicates above criteria.