HOWSE PROJECT

Dust Management Strategy

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Tata Steel Minerals Canada Limited

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0	Apr 4, 2018	Draft Report
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1. INTRODUCTION

Sources of dust associated with the Howse Project are primarily the result of vehicle traffic during all phases of the Howse project and blasting activities. During the construction phase of a mining and mineral processing project, dust is generated because of the disturbance of soil and rock, and the handling of bulk construction materials such as crushed hard rock aggregate. During construction, the layer of vegetation and stable soil which would normally form a seal against wind dispersion is removed. Consequent environmental effects are usually localized and depend on the size of the dust particles and the strength of distributing factors and usually decrease rapidly with separation from the source. In the immediate vicinity of the source, dust can stress vegetation and reducing light availability and, depending on the type and size of dust particles, can pose a human health risk through inhalation.

Dust was raised as a concern during consultations with Indigenous groups. The following specific issues were raised:

- Dust is considered as an important issue (from mine and roads) and its effects on air quality, water quality and health is a preoccupation;
- Dust from the mining activities and from trucks is a preoccupation;
- Areas around mining sites are avoided for berry harvesting because of dust;
- Dust travels a long way. Travels on lakes. Could be better controlled;
- A lot of dust during the summer (dry period);
- Absence of data on existing air quality in town;
- Cumulative effects of dust from mining operations is a concern;
- Presence of dust in the lakes;
- Rehabilitation is important because community feels open pits can be dangerous and remain a source of dust;
- Dust in Schefferville from trucks; and
- Human health problems related to dust.

The present Dust Management Plan document is in compliance with the Canadian Environmental Agency's condition for the release of the Howse project from further assessment. It responds to the request for a dust management strategy to control dust generated by vehicles associated with the Howse Project using the road to Schefferville and for vehicles entering Schefferville (Section 3.15.7).

The document also presents measures to be put in place to reduce worker's exposure to dust as well as to reduce dust emissions from the Project that could affect air quality at receptors located in its vicinity where local users could be exposed.

1.1 Definitions

Dust – Any particle suspended within the atmosphere. Particles can range in size from as small as a few nanometers to 100 microns (µm) and can become airborne through the action of wind turbulence, by mechanical disturbance of fine materials or through the release of particulate rich gaseous emissions. Dust that will be generated at the Howse mine is chemically inert and contains only very low concentrations of heavy metals, similar to what is observed at other mines in the DSO3 sector. Contaminants of concern such as asbestos or radioactive minerals are not present in the area. Emissions from operating machinery not included as greenhouse gasses can also be classified as dust particulates.

Land Development Site – sites on which the clearing of vegetation and/or topsoil, recontouring (bulk earthworks), trenching and/or road construction is undertaken to develop the land for any use.

Nuisance Dust – describes dust particles ranging in size from 1mm to 50µm, which reduce environmental amenity without necessarily resulting in material environmental harm. This form of dust generally originates from mining processes (among others) and is often the form of dust that affects neighbouring land users.

Fugitive Dust – refers to dust derived from a combination of sources, or a source not easily defined and includes dust generated from vehicular traffic on unpaved roads, materials transport and handling and unvegetated soils and surfaces. Mine dust is commonly derived from such non-point sources.

PM_{10} – a criteria air pollutant consisting of small particles with an aerodynamic diameter less than or equal to 10 microns (about 1/7 the diameter of a single human hair). Their small size allows them to make their way to the air sacs deep within the lungs where they may be deposited and result in adverse health effects. PM_{10} also causes reduced visibility

$PM_{2.5}$ – includes tiny particles with an aerodynamic diameter less than or equal to a nominal 2.5 microns. This fraction of particulate matter penetrates most deeply into the lungs.

1.2 Relevant Legislation and Guidelines

- Certificate of operation for DSO4, DSO3 and Howse projects;
- Howse environmental release conditions;
- Quebec environmental release conditions;
- Air pollution control regulation – NL;

1.3 Purpose

The primary purpose of the Dust Management Plan is to protect the health of people at work by ensuring that exposure to fugitive dust containing respirable silica is as low as reasonably possible. TSMC has extended the plan to minimize the impact of TSMC operations on the health of the local communities in the vicinity of the project.

The Plan is also developed to reduce effects on land and aquatic environments by:

- Incorporating baseline and ongoing monitoring;
- Implementing detailed management measures to minimize dust during construction;
- Being transparent on best practice and details of the methods to be used for all point and fugitive sources;
- Incorporating monitoring to determine the size and composition of particulates;
- Providing for continuous improvements in dust management; and
- Implementing a detailed complaint response procedure.

1.4 Objectives

The objective of this Dust Management Plan is to manage dust emissions generated within the project area, so that the appropriate dust criteria is met during both the construction and operational stages of the project. It also aims at controlling dust generated by vehicles using the road between the main DSO3 site and the Town of Schefferville. This management plan should be read in conjunction with the Environmental Protection Plan, the Environmental Protection Plan guidelines and the Environmental Monitoring Plan.

1.5 Responsibilities

Overall responsibilities related to dust management are shared between three groups within TSMC: Mining, Environment and Health, Safety & Security (HSS). Their collective role is distributed as such:

- all construction and operational personnel, both the proponent's workforce and contract personnel conformance with requirements pursuant to the Dust Management Plan is a shared responsibility between HSS and Environment;
- contractor staff are fully inducted and aware of their environmental responsibilities and obligations; this responsibility is under the HSS and Environment departments;
- monitoring requirements are being met. This key responsibility is held by TSMCs Environment department;
- workers protections policies, which are the responsibilities of the HSS department;
- Operation of dust suppression equipment such as water trucks is under the responsibility of Mining;
- all monitoring will be performed by Environment department.

2. PROCESS

To achieve the above objectives, best practice dust management procedures are implemented. These entail the following:

- A clearing policy will be adopted to ensure that vegetation is cleared only when and where necessary. In instances where the clearing of extensive areas is unavoidable, additional dust suppression techniques will be employed to ensure stabilisation of the cleared surfaces. When clearing:
- topsoil will be removed to the maximum depth that is practical and consistent with best operational practice;
- if the quantity of salvageable topsoil is insufficient for rehabilitation requirements, alternate cover such as detrital/gravel material will be used in site rehabilitation;
- where practical, topsoil will be directly transferred to exposed surfaces requiring rehabilitation and covered with salvaged vegetative material;
- where direct transfer of topsoil is not possible, it will be stockpiled and stabilized with previously salvaged vegetation; and
- topsoil stockpiles will be further stabilized by encouraging native vegetation to establish and, if necessary, appropriate stabilizing emulsion will be applied to supplement these measures.
- When practical and consistent with operational requirements, disturbed areas will be progressively rehabilitated to reduce the potential for windborne dust generation.
- Truck-mounted sprays will water regularly trafficked areas such as access tracks, work areas and haul roads as conditions require.
- Areas involving materials handling will be sprayed with water as conditions require.

Routine housekeeping practices will be employed to ensure that spillages and other materials that could contribute to dust generation do not accumulate within the project site, such as:

- Routine maintenance of machinery will be carried out to ensure efficient operation (to minimize exhaust particulate emissions).
- If dust levels exceed acceptable limits, dust suppression measures will be immediately reviewed, and more stringent measures implemented as appropriate. Such measures could include the cessation of activities in the event of extreme adverse weather conditions.

2.1 Hauling Operation

Trafficable areas that are in regular use during operations will be maintained in a damp condition sufficient to prevent the generation of dust.

Water trucks will always be operational when there is no precipitation. The haul truck supervisor will brief water truck operators on the main areas that will require watering before each shift commences. If it becomes necessary to alter the watering program during a shift, instructions will be provided by radio to the operator.

Water trucks will be ready for operation by May 1st of each year.

2.2 Vehicles

Any persons operating equipment (including haul trucks, mobile equipment, and light vehicles) shall ensure the cab windows are always closed so that the cab air system can operate effectively and reduce the impact of dust infiltration through open windows. Maintenance of cab air systems shall be done at a frequency in accordance with the manufacturer's specifications. Equipment operators shall report defective cab air systems to their supervisors to ensure timely repair.

2.3 Access Road between Camp and Communities

On shift rotation days and on daily morning and evening shift changes, a shuttle is in place to minimize vehicles in town. All vehicles leaving site are inspected by personnel at the Security gate to ensure cleanliness. If deemed too dirty, vehicles are denied exit from site and are required to be washed prior to travelling the road to Schefferville.

2.4 Crushing and Drying

Transfer points of the crushing area and conveyor are equipped with a dust suppression system where required. The ore dryers are equipped with dust control systems.

2.5 Workers Protection

All personnel (including contractors) will be informed of their responsibilities and the importance of minimizing ambient dust levels during site inductions.

2.5.1 Respiratory Protection

If the controls are insufficient to control the ambient dust concentrations, workers will be required to wear respiratory protection. All workers working in specific zones such as the dryer and concentrator that have been identified by the Health and Safety committee must be fit-tested for the appropriate type of respiratory protection.

3. MITIGATION MEASURES

The standard and specific mitigation measures of the dust management plan are presented below.

CODE	MEASURE	MITIGATION EFFECT
TREE REMOVAL AND TIMBER MANAGEMENT (TM)		
TM10	Ensure that cleared areas that are left bare and exposed to the elements are kept to a strict minimum.	Minimizing bare areas will reduce potential for airborne dust generation by wind erosion during dry periods
EROSION AND SEDIMENTATION CONTROL (ES)		
ES15	Avoid storing excavated material on steep slopes and ensure they are properly compacted. To ensure better compaction of fill more than 60 cm thick, it is preferable to deposit several thin layers rather than a single layer. In zones with no transversal slope, the height and depth of the fill must be limited to three metres.	Airborne dust from wind erosion of excavated material piles will be transported on shorter distances if their height is limited

WASTE MANAGEMENT (WM)		
WM2	Emphasize, in the following order, reduction at source re-use, recycling and conversion of waste. Replace hazardous products with less harmful ones if possible. The quantity of waste can be reduced at source by using up products completely, buying in bulk and accurately estimating required amounts.	Waste reduction will minimize potential air emissions due to landfilling of organic wastes and transport to the landfill site
WM7	Comply with applicable regulations that prohibit the burning of waste.	
DRILLING AND BLASTING (DB)		
DB3	Only properly qualified and trained personnel may handle and detonate explosives as per the manufacturer's instructions and applicable laws and regulations	Best practices used for drilling and blasting will minimize short-term air emissions associated with these activities. Combine these standard measures to the specific measure for management of NOx from Blasts.
DB4	The manufacturer's instructions must be followed to ensure that blasting procedures are safe both for humans and the environment.	
DB21	Take the necessary precautions to control dust emissions from drilling.	
DB22	Fill borehole necks with clean crushed rock to eliminate dust and gas emissions during blasting.	
CONSTRUCTION EQUIPMENT (CE)		
CE4	Construction equipment must be delivered to the site in good working order, without leaks and equipped with all emissions filters required to comply with emissions regulations and reduce noise disturbance. The equipment must be regularly inspected to detect any leaks or mechanical defects that could lead to fuel, lubricant or hazardous material spills.	Well maintained engines will keep air emissions in-line with regulations
CE8	Install appropriate road signs and follow speed limits to minimize accidents and disturbance to the environment.	Road dust emissions are minimized at lower speed.
CE14	Use low sulfur content fuels.	There is a direct relationship between SO2 emissions and fuel sulfur content. Low sulfur content fuel means low SO2 emissions. Fuel sulfur content is limited to 15 ppm, as per Canadian regulations
CE15	The dust-control liquid used must comply with GNL regulations.	Application of a dust control agent will reduce road dust emissions
MINING OPERATIONS (M)		
M3	Reports required by governments must be submitted by the stipulated deadlines.	N/A
MANAGEMENT OF ORE, ROCK PILES, WASTE ROCK, TAILINGS AND OVERBURDEN (MO)		
MO1	Take the necessary steps to prevent wind erosion of waste rock and avoid slope failures on the waste rock piles.	Reduce dust emissions by minimizing waste rock disturbances. Minimizing waste rock volume reduces dust emissions caused by erosion.
MO4	Prepare scenarios for using waste rock. For example, it could be used to build roads and railways.	
MO5	The physico-chemical parameters of the ore and waste rock must be characterized.	
MO6	Control dust emissions from waste rock storage and handling.	
AIR QUALITY CONTROL (AQ)		
AQ1	Dust extractors will be used to control dust emissions at the Howse Mini-Plant dryers.	Well maintained dust emission controls reduce dust emissions by >95%

AQ2	Dust recovered from the dust extractor must be disposed of in a manner that prevents dust emissions.	Good practices in dust handling minimizes punctual releases in the environment
AQ3	Use a water-spraying system at conveyor transfer and drop points.	Water spraying is efficient in reducing dust releases
AQ4	Mix the ore with water in the drum scrubber.	Water mixing is efficient in controlling dust from being released at the source
AQ5	A dust extractor will be used to limit dust emissions from drills.	The dust extractor limits the area in which wind gusts could blow dust away from the drill
AQ6	Roads will be sprayed to reduce dust emissions during dry periods.	Application of a dust control agent will reduce road dust emissions
REHABILITATION (R)		
R1	Follow good practices presented in the rehabilitation plan.	Dust emissions from wind erosion will be minimized by considering it as a specific issue in the rehabilitation plan

3.1 Specific Mitigation Measures

To control dust generated by vehicles associated with the DSO activities and the Howse Project using the road to Schefferville and for vehicles entering Schefferville, TSMC has implemented the following measures which will remain in place throughout the duration of the Howse project:

- A daily bus shuttle service is in place for local workers living in Matimekush-Lac John, Kawawachikamach and Schefferville, as well as rotational workers residing at TSMC owned accommodations in Schefferville, to reduce the number of vehicles travelling between the main site and town.
- A wash bay is available on site. Before leaving the site, all vehicles are monitored by Security personnel, and there is a policy in place that prevents vehicles that are not clean from leaving the site to go to Schefferville; and
- Since 2016, the Proponent implemented a policy which restricts vehicles from travelling to Schefferville. Of those special authorization to travel to Schefferville, they do so to go to the airport (without authorisation to pass through Matimekush), during environment related work or for logistical purposes. More vehicles travel during shift changes (1 day every 2 weeks). It can be logically assumed that this mitigation measure reduces the dust incurred by vehicles travelling to and from the site.

Additional measures are put in place to reduce dust generated by traffic on the road:

- Workers are asked to respect speed limits during the induction process;
- The access road leading to the TSMC mine site is a multi-user road under Québec jurisdiction and the Sécurité du Québec (SQ) have the authority enforce the highway safety code, including speed limits.

Information on road access and safety measures will be included in TSMC's newsletters and communicated during meetings with local stakeholders.

3.2 Erosion Control Plan

TSMC has an Erosion Control Plan as part of its EPP document. The Plan outlines measures that the proponent will continue to implement to limit the amount of erosion (and therefore dust) on site. See section 9.3 of the EPP (2018) for more details. In general, regular road maintenance should limit negative effects associated with

road transportation (e.g., erosion, dust). These measures will also be applied to the northern bypass road which is now in operation.

4. MONITORING

Dust is measured using a variety of methods, including volumetric or optical samplers for Total Suspended Particulates (TSP), which nominally measures up to 50µm, and PM10 or PM2.5 (particulate matter less than 10µm or 2.5µm in size, respectively). Dustfall monitoring measures the mass of any particulate falling out of suspension with results expressed in mass per area per time, and is also used to perform chemical analyses and determine concentrations of heavy metals in the deposited dust.

A follow-up program to verify the accuracy of the environmental assessment as it pertains to air quality will be in place during all phases of the Howse project. As part of this program, air quality will be measured at receptors such as cultural sites located in the vicinity of the project. This program also includes monitoring in both the Matimekush and Kawawachikamach communities. TPM, PM10, PM2.5 and dustfall will be monitored through this follow-up program, along with other contaminants of concern such as nitrogen oxides (NO_2), sulfur oxides (SO_2) and carbon monoxide (CO). The monitoring results will serve to determine the efficiency of the measures detailed in the present Dust Management Strategy.

5. COMPLAINTS

Any complaints received will be registered and will trigger a review of the relevant dust management procedure/s by the site Environmental coordinator as a basis for development and implementation of appropriate modified practice/s.

TSMC has a Communication Strategy in line with the Decision Statement of the Canadian Environmental Assessment Agency document, which provides a procedure for receiving and responding to complaints. This procedure will be followed in the event of a complaint related to dust. Notably, complaints can be raised during the weekly environmental meeting. TSMC's environmental or community affairs teams can also be reached anytime.