Fugitive Dust Control Plan

Project I.D.: 17C050

Copperwood Resources, Inc.
Gogebic County, Michigan

March 2018
Revised August 2018
Fugitive Dust Control Plan

Project ID: 17C050

Prepared for
Copperwood Resources, Inc.
Gogebic County, Michigan

Prepared by
Foth Infrastructure & Environment, LLC

August 2018
Fugitive Dust Control Plan

Contents

List of Abbreviations, Acronyms, Symbols................................................................................... iii
1 Introduction .............................................................................................................................1
2 Underground Mining Operations ............................................................................................2
3 Surface Material Storage and Handling ..................................................................................3
   3.1 Outdoor Transfer Tower, Feed Conveyors and Transfer Points....................................3
   3.2 Ore Stockpile .......................................................................................................3
   3.3 Tailings Disposal Facility ..............................................................................................3
   3.4 Topsoil Storage Area .....................................................................................................4
4 Unpaved Haul Roads ..............................................................................................................5
   4.1 Dust Suppression Techniques........................................................................................5
   4.2 Haul Road Segments......................................................................................................5

Figure
(Figure located after Figures tab)

Figure 1-1 Mining Area Plan

Appendices

Appendix A On-Site Haul Road Watering Documentation Form
### List of Abbreviations, Acronyms, Symbols

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copperwood</td>
<td>Copperwood Resources, Inc.</td>
</tr>
<tr>
<td>Foth</td>
<td>Foth Infrastructure &amp; Environment, LLC</td>
</tr>
<tr>
<td>NAICS</td>
<td>North American Industry Classification System</td>
</tr>
<tr>
<td>Project</td>
<td>Copperwood Project</td>
</tr>
<tr>
<td>PTI</td>
<td>Permit to Install Application</td>
</tr>
<tr>
<td>SAG</td>
<td>Semi-Autogenous Grinding</td>
</tr>
<tr>
<td>TDF</td>
<td>Tailings Disposal Facility</td>
</tr>
</tbody>
</table>
1 Introduction

This Fugitive Dust Control Plan has been prepared by Foth Infrastructure & Environment, LLC (Foth) on behalf of Copperwood Resources, Inc. (Copperwood) as part of the Air Permit to Install Application (PTI) for the proposed mining and ore processing operations. The Copperwood Project (Project) site is located in Ironwood and Wakefield Townships, Gogebic County, Michigan. The deposit and site are located approximately 10 miles north of Wakefield, Michigan and 1 to 2 miles south east of Lake Superior. Figure 1-1 shows the mining area plan, including locations of potential fugitive dust sources. This plan addresses information on best management practices and controls to minimize fugitive dust from the sources at this facility.

Pursuant to R336.1371 of Part 3, Emission Limitations and Prohibitions – Particulate Matter, a Fugitive Dust Control Plan may be required for any fugitive dust source involved in processing, storing, transporting, and conveying bulk materials such as metal ores. The proposed Project will mine and process a copper bearing ore body. The facility will operate under North American Industry Classification System (NAICS) code 212234. The major requirements for dust control under this regulation are the following:

- A written Fugitive Dust Control Program.
- Maintenance of records consistent with activities to be implemented under the program.
- Identification of control technologies and methods that will be implemented as part of the program. Control methods must be selected for activities listed in R 336.1372.

Ore will be excavated underground through use of conventional drill, blast, and mechanized room and pillar methods. Once blasted, ore will be placed onto belt conveyors for transport to the main mine conveyor. The main transfer belt conveyor will bring ore to the surface to the Transfer Tower. The ore will either be transported on belt conveyors to the Bins/Reclaim Area or stored in the Ore Stockpile. Milling and processing will be completed in the processing plant. The Process Plant will generate a tailings slurry that will be pumped to the Tailing Disposal Facility (TDF). All roads at the facility will be unpaved.

Emissions from these operations are characterized and quantified in the air permit application. Below is a description of fugitive dust control measures that will be followed to reduce the potential for generation of dust during these activities. Potential sources of fugitive dust include:

- Underground mining operations
- Outdoor transfer tower, feed conveyors, and conveyor transfer points
- Ore stockpiles
- TDF
- Topsoil stockpile
- Unpaved haul roads
2 Underground Mining Operations

The mine will be ventilated by drawing in air through a mine ventilation intake, located northwest of the mine site. Exhaust exits through three ventilation raises labeled on Figure 1-1: the Mine Vent Exhaust – West, Mine Vent Exhaust – East, and Portal Exhaust Vent. Mining will be accomplished using conventional drill and blast methods in a room and pillar layout. Mining activities with the potential to generate dust emissions include drilling and blasting, ore transfer activities, feed hoppers and rolls/rock breakers, and conveyor transfer from the ore management areas to the surface. Control of fugitive dust emissions from these processes will be implemented as mine development advances into full production.

Fugitive emission controls in the underground mine will be a combination of dust suppression and prevention activity. Fresh water will be used for dust control in the active mining and haulage areas. Water sprays be used to dampen dust generated from transfer points or activities.

Work procedures will be developed as mine construction advances to production that will address specific fugitive emission control activities required for the different mining job tasks.
3 Surface Material Storage and Handling

3.1 Outdoor Transfer Tower, Feed Conveyors and Transfer Points

Particulate fugitive emissions will be generated by movement of ore to various surface locations on the site. These fugitive emission sources include the following ore transfer emission sources:

- Ore transfer from underground mine Portal to Transfer Tower.
- Ore transfer from the Transfer Tower to the Ore Bins/Reclaim Area.
- Surplus ore transfer from the Transfer Tower to the Ore Stockpile.
- Ore transfer points at the SAG Mill prior to the material becoming a slurry.

Each of these locations will be potential sources of fugitive dust that comprise multiple transfer points. Throughout the ore transfer systems, emissions will be controlled through use of belt conveyors with enclosures at the transfer points.

3.2 Ore Stockpile

Ore not directed to the Ore Bins/Reclaim Area will be transferred to the Ore Stockpile on a stacker belt conveyor. The feed conveyor will discharge material through an enclosed chute to the stockpile. Fugitive emissions may occur during management and handling of ore, including movement from the discharge conveyor drop point, and moving ore from the stockpile into transfer hoppers using a front end loader and due to wind erosion.

Particulate emissions will be controlled through enclosure of the discharge chute, and through work practices such as minimizing drop heights of the front end loader bucket. In addition, the particle size distribution for material in the stockpile shows the silt content to be only 2%, which should aid in minimizing particulate emissions.

3.3 Tailings Disposal Facility

The TDF footprint will cover approximately 316 acres (over the 13-year life of the mine). This will include the tailings area as well as the embankments that support the structure. A decant pond will cover a majority of the top tailings surface (approximately 230 acres). Of the “beach” area not covered by the pond, approximately 75% remain wet beach area and approximately 25% will become exposed dry tailings. The dry beach area has been addressed for potential fugitive dust generation.

Tailings slurry from the mill will be pumped to the TDF and distributed through a tailings distribution system. The slurry will be approximately 32% solids. Once deposited, drying will take place over time in non-submerged areas. The deposited material will form a crust that is anticipated to reduce the potential for generation of fugitive dust. The formation of a crust layer in combination with deposition of the material in a wet state are anticipated to significantly reduce the fugitive dust potential. The preferred method of tailings emission control will be to keep as much of the tailings deposit submerged in the operational water pond of the impoundment as practical. During the winter months, snow cover and freezing conditions will naturally dampen dust generation. If additional dust control is necessary, either water spraying or chemical sealants may be applied to beach areas that are not moist.
3.4 Topsoil Storage Area

Any long-term topsoil storage area accumulated during site construction will have vegetative covers established to control erosion from precipitation and wind-blown fugitive dust emissions. Temporary control measures will include water or dust suppressant application until vegetation is established. Once vegetation is established, minimal fugitive dust is expected from topsoil storage.
4 Unpaved Haul Roads

Haul roads at the facility will include the main access road from the front gate to the Process Plant, the explosives storage area, and the Water Truck Offload Area; and haulage roads at the Ore Stockpile. Location of the access roads and Ore Stockpile are shown on Figure 1-1. All haul roads will be unpaved.

A front end loader will be utilized at the Ore Stockpile. A concentrate product truck will transport product along the access road within the facility from the concentrate loadout area at the Process Plant to the main gate. A haulage truck may also transport water for use in the process to the offload area on the west side of the TDF. In addition, water trucks and various other service vehicles will transport reagents and supplies to the Process Plant. Other service vehicles will include reagent transport trucks and trucks hauling emulsion products to the explosives magazine.

4.1 Dust Suppression Techniques

During drier and warmer times of the year and when freezing conditions are not occurring, the access road will be watered periodically throughout the day to maintain it in a relatively wet condition. As needed, an on-site water truck will be used to distribute water evenly across roadway segments to maintain surfaces in a moist state during operational periods when truck traffic may occur. The watering program will be in effect along the access road segments shown on Figure 1-1 (HR-02, HR-03, HR-04, and HR-05).

During winter months and colder times of the year (October to April), roadways may be under snow cover. However, it is not uncommon for “freeze-dry” conditions to occur during this period of time. Freeze-drying occurs when there is no snow cover and a very thin layer becomes desiccated. It is not practical to use water to prevent freeze-drying. Rather than relying on snow cover, approved chemical dust suppressants may be applied to unpaved roadways on an as-needed basis.

In addition to watering and use of chemical dust suppressants, unpaved haul roads will be dressed with coarse aggregate materials to minimize the silt content and fugitive dust potential of the roadway surfaces. As aggregate materials are broken down, they will be replaced with new coarse aggregate materials.

Besides use of the above measures, the facility will also establish a speed limit for on-site roads. The speed limit will be no more than 15 miles per hour. This low speed will reduce the potential for dust generation from unpaved roadway surfaces.

4.2 Haul Road Segments

Documentation of roadway dust suppression activities for haul roads will be done using a form similar to the On-Site Haul Road Watering Documentation Form in Appendix A. The form will be used by field supervision to assess the effectiveness of roadway dust suppression techniques and document corrective actions taken to minimize generation of fugitive dust. The form will be completed each day of operations. For ease in identifying potential problem areas, roadways
within the facility have been assigned roadway segment identification numbers, marked on the Watering Documentation Forms. Identification numbers will be as follows:

<table>
<thead>
<tr>
<th>Haul Road Segment Description</th>
<th>Identification Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process Plant to Main Gate</td>
<td>Segment 1</td>
</tr>
<tr>
<td>Access Road to Water Truck Offload Area</td>
<td>Segment 2</td>
</tr>
<tr>
<td>Ore Stockpile Haulage Route</td>
<td>Segment 3</td>
</tr>
<tr>
<td>Main Gate to Explosives Magazine</td>
<td>Segment 4</td>
</tr>
</tbody>
</table>

Records of the haul road dust suppression program will be maintained over the life of the mine operations. The form or a similar-type form provided in Appendix A will be completed daily to document the status of water used for dust suppression on identified haul road segments. Information on chemical dust suppressants used can also be added to the form.
Appendix A

On-Site Haul Road Watering Documentation Form
On-Site Haul Road Watering Documentation Form
Segment Haul Truck Routes

Date: ________ Name of Employee: ________________________

1. Was watering applied to haul roads on this day? Yes ___ No ___

2. If yes to the above, what was the watering schedule?

   First Shift _______________________

   Second Shift _______________________

3. What was the approximate volume of water used?

   Segment 1 – Process Plant to Main Gate Gallons _______
   Segment 2 – Access Road to Water Truck Offload Area Gallons _______
   Segment 3 – Ore Stockpile Haulage Route Gallons _______
   Segment 4 – Main Gate to Explosives Magazine Gallons _______

4. If water was not used, identify the reason:

   Precipitation

   Snow Pack or Freezing Conditions

   No traffic during the entire period

5. Identify Chemical Dust Suppressants Used and Segment Numbers:

   ________________________________________

   Comments:

   ________________________________________
   ________________________________________
   ________________________________________
   ________________________________________