

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: On-site Inspection

N093469092

FACILITY: EAGLE MINE LLC - HUMBOLDT MILL		SRN / ID: N0934
LOCATION: 4547 COUNTY ROAD 601, CHAMPION		DISTRICT: Marquette
CITY: CHAMPION		COUNTY: MARQUETTE
CONTACT: JENNIFER NUTINI , ENVIRONMENTAL ENGINEER		ACTIVITY DATE: 08/01/2023
STAFF: Joe Scanlan	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MINOR
SUBJECT: On-site inspection to determine compliance with PTI No. 405-08B		
RESOLVED COMPLAINTS:		

REGULATORY AUTHORITY

Under the Authority of Section 5526 of Part 55 of NREPA, the Department of Environment, Great Lakes, and Energy may upon the presentation of their card, and stating the authority and purpose of the investigation, enter and inspect any property at reasonable times for the purpose of investigating either an actual or suspected source of air pollution or ascertaining compliance or noncompliance with NREPA, Rules promulgated thereunder, and the federal Clean Air Act.

FACILITY DESCRIPTION

The Humboldt Mill was built and first used by Cleveland-Cliffs, Inc., for milling iron ore from their adjacent open pit mine. CCI ceased operations at the Humboldt site in 1979 and sold the property to the Callahan Mining Company. From 1985 to 1990, Callahan utilized the Mill to process gold from the Ropes Gold Mine in Ishpeming, Michigan. The last company to use the site was Mineral Processing Corporation. From 1997 to 2008 the facility was idle.? In 2008, Humboldt Mill was purchased by Rio Tinto. Construction and equipment upgrades to the mill began in 2012 to prepare the facility for ore production in 2014. The facility is now owned and operated by Lundin Mining.

The current facility utilizes conventional crushing, grinding, flotation, and pressing to process run-of-mine ore into separate nickel and copper concentrates. The ore goes through three stages of crushing, reducing the size of the ore from 18 inches to 4 inches, and finally to less than ½ inch. Then, a grinding circuit pulverizes the ore to 80 microns, a texture similar to fine sand. The crushed product is introduced to water and processed further through a series of flotation tanks, which separates the nickel from the copper. Once the product is thickened and pressed to dewater the mixture, rail cars are then filled by a front-end loader, covered, and shipped to customers for further processing. The nickel and copper concentrates will have to go through smelting and refining before becoming 99.9 percent nickel and copper. The processes also recovers small amounts of cobalt, platinum, palladium, silver, and gold within the copper and nickel concentrates.

PROCESS DESCRIPTION

Road haul trucks arrive at the mill and dump their load in the enclosed Coarse Ore Storage Area (COSA/FGCOSA). Each truckload weighs on average between 40-45 tons. Haul trucks enter the COSA through a roll-up door on the south side of the building and stop at the unloading area. The trailer covers automatically lift out of the way for dumping and ore is side discharged. Once the ore has been unloaded, the trailers will be covered, and the truck will exit through another roll-up door. Both the entry and exit roll-up doors are closed during the unloading process. The ore is then placed into a dump hopper (EUDUMPHOPPER) by a front-end loader (EUFELCOSA). Oversized material is broken with a rock hammer (EUROCKBREAKER) until it is small enough to be sent through a vibratory feeder/grizzly system (EUGRIZZLYFEED) to the primary crusher (EUPRIMECRUSHER).

From the primary crusher, the product is conveyed out of the COSA building by a covered conveyor (EU2NDFEEDCONVEY) to the secondary crusher building. There, the conveyed product is sent to a screen plant (EU2NDSCREEN) to sort the ore. Oversized material is sent to the secondary crusher, while the remainder of the material is placed on Transfer Conveyor No. 1 (EUTRANCONVEY1). Particulate matter (PM) from EU2NDSCREEN is vented through the baghouse dust collector. The secondary crusher (EU2NDCRUSHER) is a cone crusher that also utilizes the baghouse for PM control. From EU2NDCRUSHER, the product is screened again in EU3RDSCREEN, where oversized material is sent to the tertiary crusher (EU3RDCRUSHER) and the remainder of the material is placed on EUTRANCONVEY1. EU3RDCRUSHER is also a cone crusher and utilizes the baghouse for PM control.

After crusher and screening, the ore product is sent by covered conveyor to the Transfer Building, then sent to the Mill Building by covered conveyor. In the Mill Building, two ball mills utilizing 3" chrome balls pulverize the ore from less than a ½" to 80 microns, creating a texture similar to fine sand. Water is added to the pulverized ore to create a slurry. The slurry is introduced to a process called froth flotation. When air bubbles are introduced to the slurry, the minerals attach to the bubbles and float to the surface, where they are skimmed off. Both the nickel and copper float off together, and then the nickel is separated from the copper. The results of this are two distinct products, a nickel concentrate and a copper concentrate. The last step in this process is to thicken the slurry and remove the excess water. The concentrate is moist (approximately 8%) and is not a dusty material.

The fine ore is stored in three 2000-ton capacity storage bins (EUFINEORESTORAGE), that are located in the Mill Building. Fine ore concentrates are then loaded with a front-end loader (EUFELCON) into covered rail cars (EULOAD) and shipped to customers for further refinement. Rail car loading takes place in the enclosed building and roll-up doors are opened only to allow rail cars to enter or exit.

EMISSIONS

Metallic mineral ore processing operations can cause point and fugitive emissions of PM, PM₁₀, and PM_{2.5}. Emissions from process operations should be considered fugitive unless the source of emissions is vented through an air pollution control device or contained and emitted through a force-air vent or stack. Fugitive sources of emissions are generated from machine movement and wind erosion. Emission sources can include hauling, crushing, screening, and transferring of material. The primary factors affecting PM emissions are wind and the moisture content of the material. Moisture on the surface of the material can cause fine particles to adhere resulting in a dust suppression effect. FGSECONDCRUSH and EUFINEORESTORAGE operations are each equipped with a fabric filter dust collector. A small internal fabric dust collector is also installed on EUPRIMECRUSHER that vents within the COSA building.

EMISSIONS REPORTING

The facility is subject to the federal New Source Performance Standards (NSPS) Subpart LL Standards of Performance for Metallic Mineral Processing Plants and reports its annual emissions to Michigan Air Emissions Reporting System (MAERS). For 2022, the facility reported 0.81 metric tons of Particulate Matter (PM) with control efficiencies of 95 to 99.5% for emission units using water suppression for fugitive dust control.

COMPLIANCE HISTORY

The facility has not received any violation notices in the past five years.

REGULATORY ANALYSIS

The Eagle Humboldt Mill is currently subject to PTI No. 405-08B. The facility is considered a minor source because the potential-to-emit (PTE) of all regulated air pollutants is less than the major source thresholds. The facility is also considered an area source because the PTE of individual HAPs is less than 9 tpy and the PTE of aggregate HAP emissions is less than 25 tpy. The facility is subject to NSPS Subpart LL Standards of Performance for Metallic Mineral Processing Plants.

INSPECTION

EGLE AQD district staff Joe Scanlan and Lauren Luce were accompanied by EGLE Outreach Coordinator Lisa Herron on a scheduled site visit to the Humboldt Mill on 8/01/2023. EGLE staff met with Jennifer Nutini, Eagle Environmental Superintendent, upon arrival, and were escorted around the facility by David Bertucci, Eagle Mine Environmental Compliance Supervisor.

EUFINEORESTORAGE

This emission unit regulates fine ore storage operations, which occurs in three 2,000 metric ton storage bins located in the Mill Building. Particulate matter emissions potentially generated

during the storage and associated fine ore transfer operations are controlled by a baghouse dust collector, identified as SVFINESTORAGE in the PTI.

SC I, SC V: 2015 PM stack test results show EUFINEORESTORAGE is in compliance with its emission rates of 0.1 lbs/hr and 0.0035 lbs/1,000 lbs of exhaust gases. A Method 9 test was also conducted and showed visible emissions from SVFINEORESTORAGE had an average opacity of 0%. No visible emissions were observed during the inspection.

SC III.1: The company submitted an updated Malfunction Abatement Plan (MAP) in December 2022 for the baghouse dust collectors and continues to implement the plan on a daily basis based on review of company records (see attached). No malfunctions have occurred that would trigger notification/reporting requirements under Rule 912.

SC IV: The company has a continuous monitor to measure the pressure drop across SVFINEORESTORAGE with alarms set if the pressure drop for the unit exceeds the normal operating range. At the time of inspection, the pressure drop was 1.5" wg with a normal operating range of 1" to 6" wg.

SC VI: The facility provided daily, monthly, and 12-month rolling PM emissions from January 2022 through August 2023 (see attached). 12-month rolling PM emissions for EUFINEORESTORAGE through August 2023 were 0.0007 tons/month.

SC VIII: Stack height was not confirmed during this inspection. SVFINEORESTORAGE appeared to be a minimum of 125' above ground.

EULOAD

SC I, SC V: The 2015 Method 9 test results showed visible emissions for EULOAD to be 0%. No visible emissions were observed during the inspection.

SC IV: All fine ore concentrate loading via front end loaders takes place in the enclosed Concentrate Load-Out Building.

FGCOSA

SC I, SC IV, SC V: The 2015 Method 9 test results showed visible emissions for FGCOSA to be 0%. No fugitive emissions were observed exiting the building during the inspection. AQD staff observed a truck unloading ore and also watched the front-end loader move the ore to the storage area. Water sprays were evident in the truck unloading area, EUDUMPHOPPER, EUROCKBREAKER, EUGRIZZLYFEED, and EUPRIMECRUSHER. All sprays were activated as necessary for each process.

SC II, SC VI: Crushing typically occurs between 6 PM and 6 AM and the operation is controlled by an interlock system set at 350 tonnes per hour, which allows production up to 385 tons per hour. Hourly records reviewed for August 2023 show the facility to be in compliance with this limit (see attached). The ore feed rate to the dump hopper is measured by a belt scale.

FGSECONDCRUSH

SC I, SC V: 2015 PM stack test results show FGSECONDCRUSH is in compliance with its emission rates of 0.5 lbs/hr and 0.009 lbs/1,000 lbs of exhaust gases. A Method 9 test was also conducted and showed visible emissions from SV2NDCRUSHER had an average opacity of 0%. No visible emissions were observed during the inspection.

SC III.1: The company submitted an updated Malfunction Abatement Plan (MAP) in December 2022 for the baghouse dust collectors and continues to implement the plan on a daily basis based on review of company records (see attached). No malfunctions have occurred that would trigger notification/reporting requirements under Rule 912.

SC IV: The facility has a continuous monitor to measure the pressure drop across SV2NDCRUSHER with alarms set if the pressure drop for the unit exceeds the normal operating range. At the time of inspection, the pressure drop was 4.2" wg with a normal operating range of 1" to 6" wg.

SC VI: The facility provided daily, monthly, and 12-month rolling PM emissions from January 2022 through August 2023 (see attached). 12-month rolling PM emissions for FGSECONDCRUSH through August 2023 were 0.1027 tons/month.

SC VIII: Stack height was not confirmed during this inspection. SV2NDCRUSHER appeared to be a minimum of 65.5' above ground.

FGCONPLANT


SC I, SC V: The 2015 Method 9 test results showed visible emissions from all wheel loaders, truck traffic, and processes to be 0%. No visible emissions were observed during the inspection.

SC III, SC VI: Staff did not observe outside storage piles of any material. A fugitive dust control plan is implemented daily and Roadway Dust Suppression Forms were provided for August 2023. Haul roads were swept and watered, and no fugitive dust issues were observed. Monthly records of ore trucks entering the facility show 15,752 trucks for 2022; the annual limit per calendar year is 17,140. The facility has recorded 9,323 trucks through August of 2023. Daily records were also provided for August 2023. All haul trucks are covered while traveling on site. Records are attached to this report.

SC IV: All of the roads within the Humbolt Mill site are paved except the road to the water treatment plant. All material handling operations for FGCONPLANT occur in enclosed buildings. All dust collectors were operating properly at the time of inspection (SVFINEORESTORAGE & SV2NDCRUSHER). All outside conveyors are enclosed with covers.

COMPLIANCE

Based on the site inspection and records reviewed, it appears Eagle Humbolt Mill is in compliance with PTI No. 405-08B and all other applicable Michigan Air Pollution Control Rules and federal regulations.

NAME 

DATE 9-25-2023

SUPERVISOR 