

TECHNICAL FACT SHEET

February 14, 2020

Purpose and Summary

The Michigan Department of Environment, Great Lakes, and Energy (EGLE or Department), Air Quality Division (AQD), is proposing to act on Permit to Install (PTI) application Nos. 50-06D and 405-08B from Eagle Mine, a subsidiary of Lundin Mining (Eagle Mine).

PTI application No. 50-06D is for proposed changes to the surface operations and the timeframe of the ore truck throughput limit at the underground nickel and copper mine located at 6510 AAA Road, Michigamme Township, Michigan (the Eagle Mine). PTI application No. 405-08B is for a proposed change to the timeframe of the ore truck throughput limit at the nickel and copper processing mill located at 4547 County Road 601, Champion, Michigan (the Humboldt Mill).

The proposed projects are subject to permitting requirements of the Department's Rules for Air Pollution Control. Prior to acting on these applications, the AQD is holding a public comment period and a public hearing to allow all interested parties the opportunity to comment on the proposed PTIs. All relevant information received during the comment period and hearing will be considered by the decision maker prior to taking final action on the applications.

Background Information

On June 28, 2013, after a public comment period and public hearing, the AQD approved PTI No. 50-06B authorizing Eagle Mine (known at the time as Rio Tinto Eagle Mine LLC) to install and operate an underground nickel and copper mine. The facility has been constructed and is currently operating. The operations at the mine include the underground mine, including backfilling activities, with a single main ventilation air raise (MVAR); two propane heaters with a combined heat input of 48 million BTU per hour; an aboveground enclosed coarse ore storage area; an aboveground backfill plant; an enclosed aboveground aggregate storage building; two aboveground cement silos; an aboveground temporary development rock storage area (TDRSA); an aboveground emergency generator; and a variety of supporting equipment including an office building, a warehouse, a core storage building, a maintenance shop, a compressor plant, an assay laboratory, and fuel storage.

On January 27, 2014, after a public comment period and public hearing, the AQD approved PTI No. 405-08A authorizing Eagle Mine to modify and operate a nickel and copper processing mill. The facility is currently operating and includes ore receiving, an enclosed coarse ore storage area, ore crushing in an enclosed building, ore milling in an enclosed building, flotation using a variety of reagents to separate the mineral-bearing materials from the non-economic material (tailings), tailings disposal in the Humboldt Tailings Disposal Facility (a previously mined pit area filled with water above the tailings), loading final nickel and copper concentrate product into rail cars for shipment, lime and soda ash storage silos equipped with bin vents, and other supporting equipment including an emergency generator, a metallurgical laboratory, and space heating equipment.

On September 29, 2019, Eagle Mine began mining an additional ore deposit known as the "Eagle East" ore deposit. Eagle Mine demonstrated to the AQD that emissions from mining the Eagle East ore deposit would not exceed the current permit limits for the MVAR and, therefore, an air permit modification is not required for Eagle Mine to mine ore from the Eagle East deposit.

Proposed Projects

Eagle Mine has proposed three changes to the Eagle Mine facility:

1. Addition of an outdoor aggregate and sand storage area north of the TDRSA.
2. Operation of a portable development rock screening plant to screen development rock for use in backfill.
3. Change the ore truck throughput limit from a 12-month rolling time period limit to a calendar year limit.

These changes do not involve any equipment or operations in the underground mine, the propane heaters, the enclosed coarse ore storage area, the cement silos, the emergency generator, or the supporting equipment and, therefore, these are not subject to review in PTI application No. 50-06D. Note, the emissions of particulate matter equal to or less than 10 microns in diameter (PM10), particulate matter equal to or less than 2.5 microns in diameter (PM2.5), arsenic, cobalt, and nickel from the entire facility were included in the air dispersion modeling analyses.

Eagle Mine has proposed one change to the Humboldt Mill:

1. Change the ore truck throughput limit from a 12-month rolling time period limit to a calendar year limit.

Present Air Quality

The Eagle Mine and the Humboldt Mill are in Marquette County, which is currently classified as attainment for all the National Ambient Air Quality Standards (NAAQS) set by the United States Environmental Protection Agency (USEPA). These air quality standards are for PM10, PM2.5, ozone, carbon monoxide, sulfur dioxide (SO₂), nitrogen dioxide, and lead. These standards are set at levels designed to protect the public health.

Key Permit Review Issues

Staff evaluated the proposed projects to identify all state rules and federal regulations which are, or may be, applicable. The tables in Appendix 1 summarize these rules and regulations.

- **Prevention of Significant Deterioration (PSD) Regulations**

In order for either project to be subject to the PSD regulations, the criteria pollutant emissions from the facility would have to be at or above the 250 tons per year (tpy) major source threshold. As shown in Table A, the potential criteria pollutant emissions of each facility are less than the major source threshold and, therefore, the projects are not subject to PSD review.

Table A – Facility Potential to Emit and PSD Major Source Threshold

Pollutant	Eagle Mine Potential Emissions* Tons Per Year (tpy)	Humboldt Mill Potential Emissions* (tpy)	PSD Major Source Threshold** (tpy)	Subject to PSD?
Oxides of Nitrogen	30.74	NA	250	No
Carbon monoxide	39.65	NA	250	No
Volatile Organic Compounds (VOC)	1.33	NA	250	No
Particulate Matter (PM)	7.7	0.74	250	No
PM10	3.5	0.26	250	No

Pollutant	Eagle Mine Potential Emissions* Tons Per Year (tpy)	Humboldt Mill Potential Emissions* (tpy)	PSD Major Source Threshold** (tpy)	Subject to PSD?
PM2.5	1.15	0.03	250	No
SO ₂	1.01	NA	250	No
Lead	0.00014	0.00008	250	No
* The potential emissions do not include fugitive emissions because neither facility is one of the 28 source categories listed in the regulations that is required to include fugitive emissions in the potential to emit. ** The major source threshold for each facility is 250 tpy because neither is one of the 28 source categories listed in the regulations that has a major source threshold of 100 tpy.				

- **Federal New Source Performance Standard (NSPS) Regulations**

None of the processes or equipment associated with either project is subject to a NSPS.

- **Federal NESHAP Regulations**

None of the processes or equipment associated with either project is subject to a National Emission Standard for Hazardous Air Pollutants.

- **Rule 224 TBACT Analysis**

The EGLE Rules for Air Pollution Control require that best available control technology for toxics (T-BACT) be applied to new or modified emission units. The AQD determined that the emissions of toxic air contaminants (TACs) from the project at the Eagle Mine would meet Rule 224 with the proposed water spray on the portable development rock screening plant as well as the fugitive dust control plan for the outdoor aggregate and sand storage area and the portable development rock screening plant, as well as associated vehicle traffic.

The proposed change in the ore truck throughput limits does not involve any new or modified emission unit and therefore is not subject to Rule 224.

- **Rule 225 Toxics Analysis**

EGLE Rules for Air Pollution Control require the ambient air concentration of TACs be compared against health-based screening levels.

AQD staff reviewed Eagle Mine’s air quality modeling and evaluation of TAC impacts from the project at the Eagle Mine. The TAC evaluation showed the proposed emission rates of most TACs are less than their Allowable Emission Rates (AERs) determined according to Rule 227(1)(a) and, therefore, comply with the requirements of Rule 225.

For those TACs with proposed emission rates that exceed their AERs, Eagle Mine conducted air dispersion modeling to determine the predicted ambient impacts for those TACs. AQD staff reviewed Eagle Mine’s air quality modeling and evaluation of TAC impacts. The review found that all TACs show impacts less than the established health-based screening levels and will comply with the requirements of Rule 225. Note, the dispersion modeling included all emission sources of these TACs at the facility, not just emission sources associated with the project. See Table B for the TAC air quality modeling results.

Table B - Toxic Air Contaminant Modeling

Toxic Air Contaminant	Averaging Time	Screening Level Type	Screening Level ($\mu\text{g}/\text{m}^3$)	Predicted Impact ($\mu\text{g}/\text{m}^3$)	Percent of Screening Level (%)
Cobalt	Annual	SRSL**	0.0013	0.00015	12
Cobalt	8 hour	ITSL	0.2	0.004	2
Nickel	Annual	IRSL*	0.006	0.00189	32
Arsenic	Annual	IRSL	0.0002	0.00014	70
* The Initial Risk Screening Level (IRSL) applies to emissions from the project.					
** The Secondary Risk Screening Level (SRSL) applies to all emissions at the facility.					

The proposed change in the ore truck throughput limits does not involve any new or modified emission units and therefore is not subject to Rule 225.

• **Criteria Pollutants Modeling Analysis**

Eagle Mine conducted, and AQD verified, criteria pollutant computer dispersion modeling to predict the impacts of air emissions from PM2.5 and PM10 for the project at Eagle Mine. Emissions from the proposed project were evaluated against the Significant Impact Levels (SILs) and found to exceed the SILs. Therefore, additional modeling was conducted.

Additional modeling was conducted by Eagle Mine, and verified by the AQD, to evaluate the emissions of PM10 and PM2.5 against the PSD increments and the NAAQS as required for pollutants with impacts that exceed the SILs. The NAAQS are designed to protect human health and the environment. The PSD increments are designed to allow industrial growth while ensuring the area will continue to meet the NAAQS. As shown in Table C, the predicted impacts of PM2.5 and PM10 are less than the PSD increments. Note a PSD increment analysis includes the emissions from the proposed project, other emission sources at the facility, as well as nearby emission sources.

Table C - PSD Increment Analysis

Pollutant	Averaging Time	PSD Increment ($\mu\text{g}/\text{m}^3$)	Predicted Impact ($\mu\text{g}/\text{m}^3$)	Percent of Increment (%)
PM2.5	24-hr	9	4.35	48
PM2.5	Annual	4	0.67	17
PM10	24-hr	30	20.27	68
PM10	Annual	17	3.19	19

As shown in Table D, the predicted impacts of PM2.5 and PM10 are less than the NAAQS. Note a NAAQS analysis includes the emissions from the proposed project, other emission sources at the facility, nearby emission sources, and background concentrations.

Table D - National Ambient Air Quality Standards (NAAQS) Analysis

Pollutant	Averaging Time	NAAQS ($\mu\text{g}/\text{m}^3$)	Predicted Impact + Background ($\mu\text{g}/\text{m}^3$)	Percent of NAAQS (%)
PM2.5	24-hr	35	14.0	40
PM2.5	Annual	12	4.5	38
PM10	24-hr	150	39.0	26

Note there is no NAAQS for annual average PM10.

The dispersion modeling analysis demonstrates that the PM10 and PM2.5 emissions from the proposed project at the Eagle Mine are below the PSD increments and the NAAQS.

The proposed change in the ore truck throughput limit does not involve any change in emissions. Since this is the only change proposed for the Humboldt Mill, no criteria pollutant modeling was done for the Humboldt Mill. The modeling conducted for PTI No. 405-08A demonstrated compliance with the PSD increments and NAAQS and remains valid.

- **Fugitive Sources** - Fugitive particulate emissions from the project at Eagle Mine would primarily be produced by vehicles traveling on facility roads, the proposed outdoor aggregate and sand storage area north of the TDRSA, and the proposed portable development rock screening plant. Water spray will be used on the proposed screening plant screen to control emissions. Fugitive emissions are addressed in the draft Fugitive Dust Control Plan which is included as an appendix to the proposed permit conditions.
- **Practical Enforceability** – USEPA guidance says that, for a limit on a facility’s “potential to emit” to be enforceable as a practical matter, the time period of the limit can’t be longer than an annual limit rolled on a monthly basis. For each specific limit, the appropriate time period to make the limit enforceable as a practical matter is determined on a case by case basis.

For the Eagle Mine and the Humboldt Mill, the truck throughput limit is not used to limit either facility’s “potential to emit”. Each facility’s “potential to emit” is limited by the capacity of the equipment and the emission controls and is well below the major source thresholds (see Table A). Therefore, changing the time period of the truck throughput limit to a calendar year time period does not conflict with USEPA guidance because the limit does not limit the “potential to emit”.

Key Aspects of Draft Permit Conditions

Only those permit conditions that are proposed to be changed as a result of the proposed projects are included in the discussion below.

- **Emission Limits (By Pollutant)**
An opacity limit of 5% is proposed for the new screen plant at the Eagle Mine.
- **Usage Limits**
A development rock throughput limit of 440,920 tons per 12-month rolling time period is proposed for the new screen plant at the Eagle Mine.
- **Process/Operational Restrictions**
The proposed screen plant at the Eagle Mine would not be allowed to operate unless the fugitive dust plan is implemented.

The requirement that aggregate be stored only in the aggregate building at the Eagle Mine is proposed to be removed.

The outdoor aggregate storage pile at the Eagle Mine is proposed to be limited to 5 acres in size.

The ore truck throughput limit at each facility is proposed to be changed from a 12-month rolling time period limit to a calendar year limit.

- **Emission Control Device Requirements**

The proposed screen plant at the Eagle Mine would not be allowed to operate unless the water spray is used as needed to comply with the opacity limit.

- **Testing & Monitoring Requirements**

Since the MVAR testing required by PTI No. 50-06B has been conducted and ore production began several years ago, the MVAR testing is proposed to be required upon request by the AQD District supervisor, rather than within 60 days after commencement of ore production.

Since the emergency generator testing required by PTI No. 50-06B has been conducted, the emergency generator testing is proposed to be required upon request by the AQD District supervisor, rather than within 180 days after issuance of the PTI.

Conclusion

Based on the analyses conducted to date, the AQD staff concludes that the proposed projects would comply with all applicable state and federal air quality requirements. The AQD staff also concludes that the projects, as proposed, would not violate the federal NAAQS or the state and federal PSD Increments.

Based on these conclusions, the AQD staff has developed proposed permit terms and conditions which would ensure that the design and operation of each facility are enforceable and that sufficient monitoring, recordkeeping, and reporting would be performed by Eagle Mine to determine compliance with these terms and conditions. If the permit applications are deemed approvable, the delegated decision maker may determine a need for additional or revised conditions to address issues raised during the public participation process.

If you would like additional information about these proposals, please contact Mr. Andrew Drury, AQD, at 517-284-6792.

**Appendix 1
 STATE AIR REGULATIONS**

State Rule	Description of State Air Regulations
R 336.1201	Requires an Air Use Permit for new or modified equipment that emits, or could emit, an air pollutant or contaminant. However, there are other rules that allow smaller emission sources to be installed without a permit (see Rules 336.1279 through 336.1290 below). Rule 336.1201 also states that the Department can add conditions to a permit to assure the air laws are met.
R 336.1205	Outlines the permit conditions that are required by the federal PSD Regulations and/or Section 112 of the Clean Air Act. Also, the same types of conditions are added to their permit when a plant is limiting their air emissions to legally avoid these federal requirements. (See the Federal Regulations table for more details on PSD.)
R 336.1224	New or modified equipment that emits toxic air contaminants must use T-BACT. The T-BACT review determines what control technology must be applied to the equipment. A T-BACT review considers energy needs, environmental and economic impacts, and other costs. T-BACT may include a change in the raw materials used, the design of the process, or add-on air pollution control equipment. This rule also includes a list of instances where other regulations apply and T-BACT is not required.
R 336.1225 to R 336.1232	The ambient air concentration of each toxic air contaminant emitted from the project must not exceed health-based screening levels. IRSL apply to cancer-causing effects of air contaminants and Initial Threshold Screening Levels (ITSL) apply to non-cancer effects of air contaminants. These screening levels, designed to protect public health and the environment, are developed by Air Quality Division toxicologists following methods in the rules and USEPA risk assessment guidance.
R 336.1279 to R 336.1291	These rules list equipment to processes that have very low emissions and do not need to get an Air Use permit. However, these sources must meet all requirements identified in the specific rule and other rules that apply.
R 336.1301	Limits how air emissions are allowed to look at the end of a stack. The color and intensity of the color of the emissions is called opacity.
R 336.1331	The particulate emission limits for certain sources are listed. These limits apply to both new and existing equipment.
R 336.1370	Material collected by air pollution control equipment, such as dust, must be disposed of in a manner, which does not cause more air emissions.
R 336.1401 and R 336.1402	Limit the sulfur dioxide emissions from power plants and other fuel burning equipment.
R 336.1601 to R 336.1651	VOCs are a group of chemicals found in such things as paint solvents, degreasing materials, and gasoline. VOCs contribute to the formation of smog. The rules set VOC limits or work practice standards for existing equipment. The limits are based upon Reasonably Available Control Technology (RACT). RACT is required for all equipment listed in Rules 336.1601 through 336.1651.
R 336.1702	New equipment that emits VOCs is required to install the Best Available Control Technology (BACT). The technology is reviewed on a case-by-case basis. The VOC limits and/or work practice standards set for a particular piece of new equipment cannot be less restrictive than the Reasonably Available Control Technology limits for existing equipment outlined in Rules 336.1601 through 336.1651.
R 336.1801	Nitrogen oxide emission limits for larger boilers and stationary internal combustion engines are listed.
R 336.1910	Air pollution control equipment must be installed, maintained, and operated properly.
R 336.1911	When requested by the Department, a facility must develop and submit a malfunction abatement plan (MAP). This plan is to prevent, detect, and correct malfunctions and equipment failures.
R 336.1912	A facility is required to notify the Department if a condition arises which causes emissions that exceed the allowable emission rate in a rule and/or permit.
R 336.2001 to R 336.2060	Allow the Department to request that a facility test its emissions and to approve the protocol used for these tests.

State Rule	Description of State Air Regulations
<p>R 336.2801 to R 336.2804 Prevention of Significant Deterioration (PSD) Regulations</p> <p>Best Available Control Technology (BACT)</p>	<p>The PSD rules allow the installation and operation of large, new sources and the modification of existing large sources in areas that are meeting the National Ambient Air Quality Standards (NAAQS). The regulations define what is considered a large or significant source, or modification.</p> <p>In order to assure that the area will continue to meet the NAAQS, the permit applicant must demonstrate that it is installing the BACT. By law, BACT must consider the economic, environmental, and energy impacts of each installation on a case-by-case basis. As a result, BACT can be different for similar facilities.</p> <p>In its permit application, the applicant identifies all air pollution control options available, the feasibility of these options, the effectiveness of each option, and why the option proposed represents BACT. As part of its evaluation, the Air Quality Division verifies the applicant's determination and reviews BACT determinations made for similar facilities in Michigan and throughout the nation.</p>
<p>R 336.2901 to R 336.2903 and R 336.2908</p>	<p>Applies to new "major stationary sources" and "major modifications" as defined in R 336.2901. These rules contain the permitting requirements for sources located in nonattainment areas that have the potential to emit large amounts of air pollutants. To help the area meet the NAAQS, the applicant must install equipment that achieves the Lowest Achievable Emission Rate (LAER). LAER is the lowest emission rate required by a federal rule, state rule, or by a previously issued construction permit. The applicant must also provide emission offsets, which means the applicant must remove more pollutants from the air than the proposed equipment will emit. This can be done by reducing emissions at other existing facilities.</p> <p>As part of its evaluation, the AQD verifies that no other similar equipment throughout the nation is required to meet a lower emission rate and verifies that proposed emission offsets are permanent and enforceable.</p>

FEDERAL AIR REGULATIONS

Citation	Description of Federal Air Regulations or Requirements
<p>Section 109 of the Clean Air Act – National Ambient Air Quality Standards (NAAQS)</p>	<p>The USEPA has set maximum permissible levels for seven pollutants. These NAAQS are designed to protect the public health of everyone, including the most susceptible individuals, children, the elderly, and those with chronic respiratory ailments. The seven pollutants, called the criteria pollutants, are carbon monoxide, lead, nitrogen dioxide, ozone, PM10, PM2.5, and SO₂. Portions of Michigan are currently non-attainment for either ozone or SO₂. Further, in Michigan, State Rules 336.1225 to 336.1232 are used to ensure the public health is protected from other compounds.</p>
<p>40 CFR 52.21 – Prevention of Significant Deterioration (PSD) Regulations</p> <p>Best Available Control Technology (BACT)</p>	<p>The PSD regulations allow the installation and operation of large, new sources and the modification of existing large sources in areas that are meeting the NAAQS. The regulations define what is considered a large or significant source, or modification.</p> <p>In order to assure that the area will continue to meet the NAAQS, the permit applicant must demonstrate that it is installing BACT. By law, BACT must consider the economic, environmental, and energy impacts of each installation on a case-by-case basis. As a result, BACT can be different for similar facilities.</p> <p>In its permit application, the applicant identifies all air pollution control options available, the feasibility of these options, the effectiveness of each option, and why the option proposed represents BACT. As part of its evaluation, the Air Quality Division verifies the applicant's determination and reviews BACT determinations made for similar facilities in Michigan and throughout the nation.</p>
<p>40 CFR 60 – New Source Performance Standards (NSPS)</p>	<p>The USEPA has set national standards for specific sources of pollutants. These New Source Performance Standards (NSPS) apply to new or modified equipment in a particular industrial category. These NSPS set emission limits or work practice standards for over 60 categories of sources.</p>

Citation	Description of Federal Air Regulations or Requirements
<p>Section 112 of the Clean Air Act</p> <p>Maximum Achievable Control Technology (MACT)</p> <p>Section 112g</p>	<p>In the Clean Air Act, Congress listed 189 compounds as Hazardous Air Pollutants (HAPS). For facilities which emit, or could emit, HAPS above a certain level, one of the following two requirements must be met:</p> <ol style="list-style-type: none"> 1) The USEPA has established standards for specific types of sources. These Maximum Achievable Control Technology (MACT) standards are based upon the best-demonstrated control technology or practices found in similar sources. 2) For sources where a MACT standard has not been established, the level of control technology required is determined on a case-by-case basis.

Notes: An “Air Use Permit,” sometimes called a “Permit to Install,” provides permission to emit air contaminants up to certain specified levels. These levels are set by state and federal law, and are set to protect health and welfare. By staying within the levels set by the permit, a facility is operating lawfully, and public health and air quality are protected.

The Air Quality Division does not have the authority to regulate noise, local zoning, property values, off-site truck traffic, or lighting.

These tables list the most frequently applied state and federal regulations. Not all regulations listed may be applicable in each case. Please refer to the draft permit conditions provided to determine which regulations apply.