



STATE OF MICHIGAN
Department of Natural Resources and Environment

NONFERROUS METALLIC MINERAL MINING PERMIT
Part 632, Nonferrous Metallic Mineral Mining, 1994 PA 451

Permit Number: **MP 01 2007** Date Issued: **January 26, 2010**

Issued to:
Kennecott Eagle Minerals Company
1004 Harbor Hill Drive
Marquette, MI 49855

For the:
Mine legally referred to as the Eagle Project

Location of Mine:
T50N, R28 and 29W, Michigamme Township, Marquette County, Michigan

The Department of Natural Resources and Environment ("Department") hereby issues this Nonferrous Metallic Mineral Mining Permit ("Mining Permit") to conduct nonferrous metallic mineral mining operations to the Kennecott Eagle Minerals Company for the Eagle Project. This Mining Permit is issued under the provisions of Part 632, Nonferrous Metallic Mineral Mining, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA).

The terms and conditions that are set forth in the Application for a Mining Permit (Permit Application) submitted by Kennecott Eagle Minerals Company for the Eagle Project, including all supplemental documents amending, clarifying, or revising the initial submittal of the Permit Application, and including the mining, reclamation, and environmental protection plan, are incorporated in and become a part of this Mining Permit. This Mining Permit also incorporates the attached General Permit Conditions and Special Permit Conditions.

[Jim Sygo]

[01/26/2010]

Signed

Date

Department of Natural Resources and Environment

GENERAL PERMIT CONDITIONS
NONFERROUS METALLIC MINERAL MINING PERMIT NO. MP 01 2007
KENNECOTT EAGLE MINERALS COMPANY – EAGLE PROJECT
PART 632, 1994 PA 451

A. Definitions

1. As used in this Mining Permit:
 - a. Section 324.632XX refers to a section of Part 632, 1994 PA 451 of the Michigan Compiled Laws.
 - b. Rule R 425.XXX refers to a rule under the Michigan Administrative Code.
 - c. "Person" means an individual, partnership, corporation, association, governmental entity, or other legal entity.
 - d. "Emergency Management Coordinator" means that term as defined in Section 2 of the Emergency Management Act, 1976 PA 390, MCL 30.402.

B. Frequently Used Acronyms/Abbreviations

CFR	Code of Federal Regulations
COSA	coarse ore storage area
CQA	construction quality assurance
CWB	contact water basin
GCL	geosynthetic clay liner
HDPE	high density polyethylene
ICS	incident command system
MDNRE	Department of Natural Resources and Environment
MDOT	Michigan Department of Transportation
MMU	Minerals and Mapping Unit, Office of Geological Survey
MSHA	Federal Mining Safety and Health Administration
MSL	mean seal level
NCWIB	non-contact water infiltration basin
PIPP	Pollution Incident Prevention Plan
SESC	soil erosion and sediment control
QA/QC	quality assurance and quality control
SPCC	spill prevention control and countermeasures
TDRSA	temporary development rock storage area
TWIS	treated water infiltration system
WWTP	wastewater treatment plant

C. Authorizations

1. The permittee shall not engage in the mining of nonferrous metallic minerals, as defined in Section 324.63201(g), at the Eagle Project except as authorized by this Mining Permit.
2. This Mining Permit is not effective until all other permits required under the NREPA for the Eagle Project are obtained. The permittee shall comply with all other applicable permit standards and requirements under the NREPA and shall be responsible for any contamination that occurs in violation of the NREPA.
3. This Mining Permit will remain in effect until terminated or revoked by the MDNRE. The MDNRE may terminate this Mining Permit under the conditions specified in Section 324.63207(2). The MDNRE may revoke this Mining Permit under the conditions specified in Section 324.63207(3).
4. Compliance with the provisions of this Mining Permit or of Part 632 of the NREPA does not relieve the permittee of the obligation to comply with all other applicable leases or other contractual agreements; or with all other applicable tribal, state, federal, or local statutes, regulations, or ordinances.
5. This Mining Permit does not establish or convey property rights in either real estate or material.

D. Transfer or Amendment of Permit

1. The MDNRE may transfer this Mining Permit to another person after public notice as follows:
 - a. The person acquiring this Mining Permit shall submit to the MDNRE a request for transfer of this Mining Permit and shall provide the financial assurance required under Section 324.63211.
 - b. The person acquiring this Mining Permit shall accept the General Conditions and Special Conditions of this Mining Permit and shall adhere to the requirements set forth in Part 632 of the NREPA.
 - c. If the existing permittee is determined by the MDNRE to be in violation of Part 632 of the NREPA, or the rules promulgated thereunder, at the Eagle Project, then this Mining Permit will not be transferred until the existing permittee has completed the necessary corrective actions or the person acquiring this Mining Permit has entered into a written consent agreement with the MDNRE to correct all of the violations.

Pending the transfer of this Mining Permit, the proposed transferee shall not operate the Eagle Project.

2. The MDNRE will not transfer this Mining Permit to another person if the MDNRE has determined that person to be in violation of Part 632 of the NREPA, rules promulgated thereunder, this Mining Permit, or an order of the MDNRE under Part 632 of the NREPA, unless the person has corrected the violation or the person has

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agreed in writing to correct the violation pursuant to a compliance schedule approved by the MDNRE.

3. A request to transfer this Mining Permit to another person shall include the following:
 - a. An update of the contingency plan.
 - b. Provisions for financial assurance as prescribed in R 425.301.
 - c. An organization report for the acquiring operator.

A transfer of this Mining Permit is not effective until all other applicable permits are transferred to the acquiring operator.

4. If the permittee conveys his or her authority to operate the Eagle Project to another person, and the MDNRE has not approved a request for transfer of this Mining Permit; then, in addition to other enforcement actions, the MDNRE may order the immediate suspension of any or all mining activities at the Eagle Project, including the removal or sale of metallic product.
5. This Mining Permit may be amended subject to the requirements of Section 324.63207(6) and R 425.206. An application for amendment shall include revisions of any of the following that are affected by the changes:
 - a. The Environmental Impact Assessment.
 - b. The Mining, Reclamation, and Environmental Protection Plan.
 - c. The Contingency Plan.
 - d. Federal, state, and local permits and licenses that are anticipated to be required.
 - e. Provisions for financial assurance required under R 425.301.
 - f. Other terms and conditions of this Mining Permit.

E. Financial Assurance

1. The permittee shall maintain financial assurance during mining operations until all reclamation has been completed and approved by the MDNRE, and throughout the postclosure monitoring period, as prescribed under Section 324.63211 and R 425.301; or until the MDNRE releases financial assurance at such time as this Mining Permit may be terminated under Section 324.63207(2)(a). Failure to maintain financial assurance as required constitutes grounds for the MDNRE to order immediate suspension of activities at the Eagle Project, pursuant to Section 324.63221.
2. The MDNRE may provide a partial release of financial assurance for those portions of the site that are reclaimed and have met the criteria for release under Section 324.63211(2) and R 425.301(2), based upon an update of financial assurance as described in Section 324.63211(2) and R 425.308.

F. Mining Operations

1. The permittee shall post safety signs in conspicuous places around the site of any potential hazards to life or property.
2. The permittee shall utilize fencing, gates, or other measures to safeguard the public from unauthorized entry into shafts, adits, portals, or other openings between the land surface and underground workings.
3. The permittee shall submit all design certifications of liners, covers, and leachate collection systems to the MDNRE and shall not begin placement of the ore, waste rock, overburden, or tailings in the storage facility until approved by the MDNRE.
4. The permittee shall conduct reclamation activities at the Eagle Project in accordance with the mining, reclamation, and environmental protection plan submitted as part of the Permit Application.
5. If mining operations are suspended at the Eagle Project for a continuous period exceeding 90 days, the permittee shall take actions to maintain, monitor, and secure the mining area and shall conduct any interim sloping or stabilizing of surfaces necessary to protect the environment, natural resources, or public health and safety in accordance with this Mining Permit.
6. Unless the MDNRE grants an extension, the permittee shall begin final reclamation of a mining area within three years of the date of cessation of mining operations at the Eagle Project and shall complete reclamation within the time set forth in the mining, reclamation, and environmental protection plan submitted as part of the Permit Application.

G. Records, Reports, and Notifications

1. The permittee shall provide written notice to the MMU Supervisor of the date mining will commence at least 30 days prior to mining activities.
2. The permittee shall file with the MMU Supervisor a Mining and Reclamation Report on or before March 15 of each year, both during mine operations and post closure monitoring, as required by Section 324.63213 and R 425.501. The report shall include a description of the status of mining and reclamation operations, an update of the contingency plan, monitoring results from preceding calendar year, tonnage totals of mined material, and amount of metallic product by weight. The report shall be filed in printed and electronic format. The permittee shall file a copy of the report with Michigamme Township.
3. The permittee shall provide a copy of the annual update of the contingency plan to the local emergency management coordinator at the time it is filed with the MDNRE.

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4. In addition to the annual update of the contingency plan filed with the mining and reclamation report, the permittee shall promptly provide an update of the contingency plan to the MDNRE and local emergency management coordinator whenever there is a change of the notification process, change of local representatives of the permittee, substantial change in site conditions, or substantial change of equipment noted on the plan.
5. Records upon which the annual Mining and Reclamation Reports are based shall be preserved by the permittee for three years and made available to the MDNRE upon request.
6. The permittee shall file with the MMU Supervisor an updated estimate of the cost of reclamation for mining activities for the current and succeeding two years of operation of the mine on or before March 15 of every third year after issuance of this Mining Permit, or as the MDNRE determines to be necessary.
7. The permittee shall promptly notify the Office of Geological Survey (OGS) Area Geologist and each emergency management coordinator having jurisdiction over the affected area of any incident, act of nature, or exceedance of a Part 632 permit standard or condition at the Eagle Project that has created, or may create, a threat to the environment, natural resources, or public health and safety. The notification shall be made as soon as possible by telephone or in person to the OGS Area Geologist during normal business hours or to the MDNRE Pollution Emergency Alerting System between 5:00 p.m. and 8:00 a.m. and on weekends and holidays.
8. The permittee shall submit to the OGS Area Geologist a detailed written incident report giving the particulars of the incident, act of nature, or exceedance of a Part 632 permit standard or condition within 10 days of discovery. If the response to the incident, act of nature, or exceedance is not concluded at the time this incidence report is filed as required, then the permittee shall submit to the OGS Area Geologist a written final incident report within 30 days after the incident response is concluded. The permittee shall preserve records upon which incident reports are based for three years or until the end of the postclosure monitoring period, whichever is later.
9. If the permittee ceases all mining activities for a period of 90 days or more, the permittee shall submit written notice to the MMU Supervisor of the date mining activities will resume at least 30 days before resumption of mining activities.
10. The permittee shall file an updated Organization Report, as defined in R 425.103(c), within 30 days after any significant changes in the permittee's corporate organization.

H. Annual Nonferrous Metallic Mineral Surveillance Fee

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1. The permittee shall pay the annual Nonferrous Metallic Mineral Surveillance Fee assessed by the MDNRE pursuant to Section 324.63215, and any penalties that may be assessed if the fee is not paid when due.

I. Access by MDNRE

1. Authorized representatives of the MDNRE may enter at all reasonable times in or upon the Eagle Project site for the purpose of inspecting and investigating conditions relating to the operation of the mine and associated facilities.

SPECIAL PERMIT CONDITIONS
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A. General

1. The MDNRE may modify or amend these Special Permit Conditions, or impose additional permit conditions if necessary and as provided under Part 632 of the NREPA, during mining operations.
2. The permittee shall immediately suspend relevant mining activities and shall promptly notify the OGS Area Geologist in the event that any materials of possible archaeological, historic, or cultural value are unearthed by the mining operations.
3. The permittee shall follow all applicable measures described in Section 2.5 of the Permit Application to prevent damage to adjacent properties not owned by the permittee.

B. Other Permits and Requirements

1. The permittee shall operate the Eagle Project in conformance with the following permits or approvals from the MDNRE: Michigan Air Use Permit, Groundwater Discharge Permit, Notice of Coverage for storm water management during construction activities, and Notice of Intent for storm water management during operations.
2. The permittee shall file annual reports in compliance with the Federal Emergency Planning and Community Right to Know Act during operation of the Eagle Project.
3. The permittee shall prepare and implement a Spill Prevention Control and Countermeasures Plan (SPCC Plan) for the fuel storage area that conforms to 40 Code of Federal Regulations (CFR) 112. The SPCC Plan shall comply with the Part 5 rules promulgated pursuant to Part 31, Water Resources Protection, of the NREPA.
4. The SPCC Plan shall be reviewed and certified by a Professional Engineer, and maintained at the mine facility. The permittee shall design, operate, and maintain all tanks and secondary containment to contain a worst-case spill.
5. The permittee shall design, operate, and maintain all aboveground storage tanks containing flammable or combustible materials in compliance with the Michigan Fire Prevention Code, 1941 PA 207.

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6. The permittee shall submit design plans for all aboveground storage tanks that will contain flammable or combustible materials to the Waste and Hazardous Materials Division (WHMD) of the MDNRE for approval prior to installation. After the tanks are installed, the permittee shall not use the tanks until they are inspected and approved by a Hazardous Materials Storage Inspector of the WHMD.
7. The permittee shall prepare a Pollution Incident Prevention Plan (PIPP) to address potential spillage of fuel, salt, and other polluting materials in compliance with R 324.2001 through R 324.2009 at least 30 days prior to start up of the wastewater treatment plant (WWTP) at the Eagle Project. Within 30 days after its completion, the permittee shall notify the MMU Supervisor and certify that the facility is in full compliance with R 324.2001 through R 324.2009, and shall notify the local emergency planning committee and the local health department. The permittee shall provide a copy of the PIPP to the MMU Supervisor, the local emergency planning committee, or the local health department upon request.
8. The permittee shall review the PIPP every three years or after any release that requires implementation of the plan, whichever comes first. The permittee shall update the plan when facility personnel, processes, or procedures identified in the plan change or as otherwise necessary to maintain compliance with R 324.2001 through R 324.2009. Upon preparation of an updated plan, the permittee shall notify the MMU Supervisor and recertify compliance with these rules.
9. The permittee shall operate and maintain underground sanitation facilities in accordance with applicable requirements.
10. The permittee shall obtain a permit for storage and use of the explosives from the U.S. Bureau of Alcohol, Tobacco, and Firearms in compliance with all applicable federal regulations.

C. Coverage

1. This Mining Permit governs the construction, operation, closure, postclosure monitoring, reclamation, and any necessary remediation of the Eagle Project mine workings, aggregate backfill surface facility, vent shaft, and main project surface facilities. However, this Mining Permit shall not supersede or contravene any provisions on remediation in other applicable Parts of the NREPA.
2. The Eagle Project mine workings include the mine portal, decline, drifts, stopes, raises, and ramps to access and excavate the ore body; ventilation raise, aggregate raise, and binder borehole; and associated underground excavations.
3. Surface facilities shall consist of facilities for crushing and temporary storage for development rock and ore; water storage, treatment and discharge; mine backfilling; mine ventilation; and other ancillary operations as outlined in Section 4.3 and Figure 4-2 in the Permit Application.

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4. The Eagle Project main surface facilities include the following:
 - a. Assay lab and core storage
 - b. Maintenance shop
 - c. Compressor plant
 - d. Generator plant
 - e. Propane storage
 - f. Mine air heater
 - g. Staging area for supplies
 - h. Contact water basins (CWBs) 1 and 2
 - i. Non-Contact Water Infiltration Basins (NCWIBs) 3, 4 and 6
 - j. Loading dock
 - k. Warehouse
 - l. Emergency response facility
 - m. Fuel storage area
 - n. Temporary Development Rock Storage Area (TDRSA)
 - o. Coarse ore storage area (COSA)
 - p. Crusher ramp
 - q. Crusher
 - r. Conveyor
 - s. Crushed ore storage bins
 - t. Septic system
 - u. Mine dry and office buildings
 - v. Wastewater treatment plant (WWTP)
 - w. Treated water infiltration system (TWIS)
 - x. Potable water supply well
 - y. Non-potable water storage tank
 - z. Visitor and employee parking area
 - aa. Truck wash
 - bb. Truck scale
 - cc. Gate house
 - dd. Access road
 - ee. Construction staging area
 - ff. Soil stockpile area
 - gg. Explosives storage buildings
 - hh. Mine Portal
5. The backfill facility includes the following:
 - a. Covered aggregate raise and feed hopper
 - b. 110-ton fly ash silo
 - c. 110-ton cement silo
 - d. Aggregate storage area
 - e. Aggregate raise
 - f. Lined binder borehole
 - g. NCWIB 5
 - h. Exhaust fan housing

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6. Unless approved by the MDNRE pursuant to an amendment to the permit, the permittee shall conduct mining activities in accordance with the approved environmental protection plan, mining plan, containment plan, monitoring plan, contingency plan, reclamation plan, and postclosure monitoring plan submitted in the Permit Application; and the tables, illustrations, figures, technical reports, calculations, and other data accompanying and supporting those documents. The Permit Application includes the applicant's October 27, 2006, response to the MDNRE's June 21, 2006, request for additional information.
7. The permittee shall not conduct chemical or physical processing of ore at the Eagle Project site except for the crushing of ore as described in the permit application documents.

D. Surface Facilities

1. During initial construction of the surface facilities site, the permittee shall utilize the following practices:
 - a. Unmarketable timber, herbaceous plants, dead wood, and other vegetation shall be chipped and stockpiled on-site for use in reclamation.
 - b. Stumps shall be stockpiled and either chipped for use in reclamation or burned on-site, pursuant to a burning permit to be obtained from the MDNRE.
 - c. Erosion control devices such as silt fences shall be installed as detailed in Figure 4-14 of the Permit Application.
 - d. Topsoil shall be stripped from the area, stockpiled, and stabilized for use in landscaping and reclamation.
 - e. Topsoil and subsoil stockpiles will be surrounded by silt fencing or similar erosion control devices, and seeded with a MDOT, 2003 Standard Specification for Construction (MDOT, 2003) Temporary Seed Mixture 24+, as detailed in Figures 4-15, 4-16, and 4-17 of the Permit Application.
 - f. No major disturbance shall occur to vegetation within 66 feet of Narrow-leaved Gentian occurrences.
 - g. Groundwater production wells, groundwater monitoring wells, or additional piezometers shall not be constructed in wetlands regulated under Part 303 of NREPA at the mine site. All such structures shall be constructed in unregulated uplands, unless a subsequent application is made and a permit is received under Part 303 of NREPA.
2. The permittee shall maintain topsoil and other soil stockpiles by replacing or repairing silt fences as needed; maintaining other erosion control structures and measures; repairing eroded areas including regrading and revegetating; and cleaning ditches where silt and/or sand has accumulated.
3. Upon completion of clearing and grubbing the main facilities area, rough grading and final grading contours shall segregate surface water runoff such that runoff from the main operations area will be collected in the CWBs, and runoff from non-contact areas will be collected in the NCWIBs.

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4. Excess soil from the site development and on-site road construction shall be placed in berms to be used during reclamation, as detailed in Figure 4-15 of the Permit Application.
5. The permittee shall construct and maintain all-weather gravel or paved roads for on-site access to the surface facilities. (Refer to Figure 4-2 of the Permit Application for location of access roads.)
6. The permittee shall construct the main haul road from the portal to the COSA and the road from the crushed ore bins to the truck wash with 12 inches of road aggregate topped with four inches of bituminous concrete.
7. The permittee shall locate the fuel storage facility within a fenced and secured area.
8. The permittee shall minimize the potential for fuel spills and leaks through the following measures in a manner that is consistent with SPCC and PIPP requirements:
 - a. Training of personnel responsible for hauling fuel in proper procedures and emergency response.
 - b. Regular equipment inspections and documentation of findings.
 - c. ADNREuate secondary containment around all above ground tanks.
 - d. Staging of on-site emergency response equipment to quickly respond to unanticipated spills or leaks.
9. The permittee shall limit access to the main surface facility to a single road, with a gate and a gatehouse that is manned during facility operation, as detailed in Figure 4-2 of the Permit Application.
10. The permittee shall construct and maintain an eight-foot high chain link fence surrounding the surface facilities, as detailed in Figure 4-2 of the Permit Application.
11. The permittee shall maintain the perimeter fence and gates in a manner that preserves its intended purpose.
12. The permittee shall construct and maintain the excess soil berms around the majority of the facility perimeter to assist in reducing visibility and restricting site access, as detailed in Figure 4-2 of the Permit Application.
13. The permittee shall equip all three diesel generators with exhaust silencers.
14. The crushed ore bins shall be located inside a building. The load-out stations shall be partially enclosed to reduce the potential of fugitive dust, and shall have impervious containment under the truck loadout, as detailed in Section 5.2 of the Permit Application.

15. The permittee shall control fugitive dust from traffic areas at the surface facility using methods consistent with the Air Use Permit fugitive dust control plan. Unpaved areas (including the mine access road) will be surfaced and maintained with coarse aggregate material that is not susceptible to reacting, dissolving, or otherwise forming a leachate that is or may be harmful to the environment or to human health and safety.
16. A silencer shall be installed on the exhaust fan described in Section 4.3.8 of the Permit Application to minimize surface noise levels.

E. Mining Plan

1. The permittee shall utilize only underground mining methods at the Eagle Project.
2. The permittee shall advise the MMU Supervisor in advance of any significant planned departure from the schedule for construction and operation activities proposed in the Permit Application.
3. The permittee shall construct the mine portal such that it enters bedrock below the ground surface on the west side of the rock outcrop adjacent to the surface facilities site.
4. The portal shall be constructed of a prefabricated steel arch, socketed into competent bedrock below the surface expression of the outcrop, as detailed in Figure 4-7 of the Permit Application.
5. Mining shall begin at the level of 143 meters above mean sea level (MSL) and progress upward in accordance with the Mining Plan (Permit Application, Section 4.4.1) to a roof elevation of 327.5 meters MSL.
6. Stopes shall be backfilled sequentially as mining progresses, as detailed in Figure 4-31 of the Permit Application. The primary stopes shall be backfilled using cemented aggregate. The secondary stopes shall be backfilled initially using limestone-amended development rock followed by quarried aggregate; except that, if mining is allowed under Condition E8 to proceed above the 327.5 meters MSL level, all secondary stopes on levels 383 meters and 353 meters will be backfilled with the same cemented mixture that is used for backfilling primary stopes, to prevent vertical movement of water within the workings. Quarry aggregate must be characterized to demonstrate that it has a net neutralization capacity of zero or higher.
7. The permittee shall utilize roof bolting or other rock support mechanisms as may be necessary to stabilize the roof of the decline and ramps at discrete locations.
8. As each level is developed, starting with the lowest level, the permittee shall collect in situ stress data, and standard geologic, geotechnical and hydrologic data to evaluate rock stability for the overlying level or levels. Supplemental diamond

drilling shall be carried out, if necessary, to fill in any data gaps and a 3D physical model shall be developed and maintained to accurately assess ground and hydrologic conditions. The person with overall responsibility for mine operations shall certify to the MDNRE in the permittee's Annual Mining and Reclamation Report whether the rock stability modeling provided in the application is still valid. If at any time unpredicted rock stability conditions are encountered that may result in projection of subsidence to the surface or impacts to surface water, the permittee shall immediately notify the MMU Supervisor and shall cease excavation of earth materials to access or remove ore until a revised predictive model and a plan to prevent adverse impacts to the land surface and/or surface water is submitted to the MMU Supervisor and the MDNRE issues written approval of the plan. In addition, the permittee shall not advance mining above elevation 327.5 meters MSL unless reviewed and approved in writing by the MDNRE based on additional diamond drilling to provide geologic, geotechnical and hydrologic data to supplement the 3D physical model.

F. Development Rock

1. The TDRSA shall be constructed with a leak detection liner system below the entire composite liner. The leak detection liner system shall consist of a drainage layer and underlying high density polyethylene (HDPE) geomembrane liner having a nominal thickness of 40 mils. The leak detection liner system shall be installed across the entire sub-base and tied into the leak detection collection sump, such that the TDRSA liner system performance monitoring can be assured.
2. Construction of the TDRSA shall not begin until the permittee has provided to the MMU Supervisor revised engineering plans and specifications that reflect the requirements outlined in Special Permit Condition F1 for the TDRSA liner system, and has received the written approval of the plan from the MDNRE.
3. The permittee shall not allow the hydraulic head on the TDRSA liner to exceed one foot at any time.
4. Excess development rock excavated to access the ore body shall be placed in the TDRSA. The permittee shall add 20 tons of limestone to every 1000 tons of development rock, which shall be distributed evenly throughout the development rock, to add additional neutralizing capacity and to reduce the concentration of pH sensitive metals in the contact water that is collected in the contact water collection system, as described in Section 5.1 of the Permit Application.
5. The permittee shall utilize the TDRSA as designed to temporarily store development rock until the rock can be returned to the mine as backfill.
6. The permittee shall utilize the TDRSA only to temporarily store development rock from the decline, drifts, ramps, levels, raises, and other underground workings needed to access the ore body.

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7. The permittee shall not store more than the engineered capacity of rock, including development rock and limestone that will be added, in the TDRSA.
8. The permittee shall construct, operate, maintain, and monitor the TDRSA using sound engineering practices and in compliance with the standards prescribed in all applicable rules promulgated under Part 632 of the NREPA.
9. The permittee shall limit infiltration of water and oxidation of the development rock in the TDRSA by:
 - a. Constructing, operating, maintaining, and monitoring the base liner system and contact water collection system to effectively contain the development rock and contact water that drains from the rock.
 - b. Constructing, operating, maintaining, and monitoring a temporary geomembrane cover over the filled areas of the TDRSA.
 - c. Diligently covering the development rock with the geomembrane as soon as is possible during operations thereby leaving a minimum amount of development rock exposed at any one time.
10. The permittee shall construct the composite liner system of the TDRSA at an elevation of approximately 439 meters (1440 feet). A qualified field technician shall observe excavation of the TDRSA area, and any observed unacceptable subgrade material shall be excavated and replaced with compacted clean earthen fill in accordance with the TDRSA Construction Quality Assurance Plan (CQA plan), dated February 2006, and revised July 2006, and any subsequent amendments approved by the MDNRE.
11. The permittee shall construct the TDRSA liner system and shall provide a detailed revised Figure 5-1 including the revised leak detection system as outlined in condition F1. The liner system shall have a 3:1 slope on the interior sidewall sideslope, and a two percent slope from the interior sideslopes to the leachate collection pipes. The system piping shall have a .5 percent slope to the leachate collection sump. The liner system shall be constructed to limit the head on the liner (except for the leachate collection sump) to one foot or less.
12. The permittee shall construct a composite liner system for the TDRSA and shall provide detailed revised Figures 5-3, 5-4 and 5-5 including the revised leak detection system as outlined in condition F1. The composite liner system shall have a geosynthetic clay liner (GCL) consisting of granular bentonite clay encased in two non-woven geotextile fabrics. The GCL shall have a saturated hydraulic conductivity of 1×10^{-10} cm/second. Overlying the GCL shall be a 60-mil HDPE geomembrane. The MDNRE has approved this composite liner system design in accordance with the provisions of R 425.409(a)(i)(B), based on the MDNRE's determination that the permittee has demonstrated the alternative is capable of providing better protection as compared to the requirements for a three-foot thick compacted clay layer prescribed in R 425.409(a)(i)(A).

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13. The HDPE geomembrane shall be covered by a geocomposite drainage fabric consisting of a geonet encased between two 10 ounce/square yard non-woven geotextile, overlain by a two-foot thick layer of aggregate drainage material having a minimum hydraulic conductivity of 1×10^{-3} cm/second.
14. The TDRSA composite liner shall be subjected to a rigorous quality assurance and quality control (QA/QC) process that includes a leak location survey prior to use.
15. The leachate collection piping shall consist of a six-inch diameter perforated SDR-11 HDPE collection pipe surrounded by a coarse aggregate envelope having a minimum hydraulic conductivity of 1×10^{-1} cm/second. The permittee shall clean the contact water collection pipe annually no later than October of each year by a certified high pressure line cleaner under the supervision of the permittee.
16. The permittee shall construct a contact water extraction system as detailed in Figure 5-5, as amended by the revised engineering plans submitted pursuant to Special Permit Condition F 2 of the Permit Application, consisting of a collection sump with an 18-inch diameter perforated HDPE riser and a 50 gallon/minute pump installed in the riser. The riser shall have a riser vault to prevent freezing of the pump, as shown in revised Figure 5-6 of the Permit Application. The water collection sump shall be operated to maintain a water level between 18 inches and 36 inches above the sump invert, with a pump alarm at a water level of four feet above the sump invert. A spare pump shall be maintained on-site to be used in case of malfunction of the main pump.
17. The perforated HDPE riser shall be approximately 50 feet long, and shall have sideslope clean-out risers for periodic cleaning.
18. The permittee shall monitor head levels in the TDRSA continuously through use of a pressure transducer installed in the extraction sump. The pressure transducer and extraction sump shall be instrumented and controlled to pump water out of the sump at levels that maintain less than one foot of head on the TDRSA liner (excluding the sump). The permittee shall record water levels and review water level records on a weekly basis during the life of the TDRSA to confirm system performance.
19. The permittee shall monitor the TDRSA leak detection system by means of a liquid level sensor that provides a measurement of the liquid level (if any) in the sump. Any water that collects in the sump shall be pumped out, the volume recorded, and analyzed for the parameters listed below (see Permit Application, Table 6-1):

<u>Parameter</u>	<u>Analytical Method</u>	<u>Reporting Limit</u>	<u>Units</u>
Sulfate	EPA-375.4/9038	1.0(1)	mg/l
pH	Field Measurement	--	standard pH units

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20. Sulfate concentrations of 500 milligrams per liter (mg/l) will be indicative of leakage from the TDRSA composite liner.
21. The permittee shall calculate and record the average daily flow rate in the leak detection system on a monthly basis. Flow rate shall be calculated as gallons per acre per day. If the average daily flow rate in the leak detection system exceeds 25 gallons per acre per day, this shall be indicative of leakage from the TDRSA composite liner.
22. If the sulfate concentration and/or flow rate limit is exceeded the permittee shall be required to investigate the source of the leakage and develop a corrective action plan to address the leakage.
23. The permittee shall fill the TDRSA in the following sequence, as detailed in Figure 5-7 of the Permit Application:
 - a. Development rock with a typical 3-inch to 4-inch particle size will be placed and graded to a two-foot thickness across the entire floor area.
 - b. Development rock will then be placed and graded to a five to ten-foot layer across the base area.
 - c. The TDRSA will then be filled to final grade. Slopes on the active fill face shall not exceed 1:1. Final sideslopes shall not exceed 2:1.
24. The permittee shall utilize a temporary cover over the development rock, as detailed in Figures 5-3, 5-8, and 5-9 and described in Section 5.2.2 of the Permit Application.
25. The permittee shall conduct a QA/QC program during installation of the TDRSA liner, leachate collection system, and cover system in conformance with construction quality assurance (CQA) procedures under Michigan's Solid Waste Management Rules. The CQA procedures shall adhere to the following:
 - a. A CQA technician, experienced in construction documentation of liner system components, shall conduct on-site observation, documentation, and testing during construction of the TDRSA. The technician shall be under the supervision of a professional engineer registered in the State of Michigan. The technician shall provide continuous on-site inspections during all major construction activities of the TDRSA including subgrade preparation, liner system installation, leachate detection system installation, and contact water collection system installation.
 - b. Laboratory testing shall be conducted on soils and geosynthetics properties by a qualified third-party laboratory.
 - c. Following completion of liner installation and prior to placing the TDRSA into service, a certification report shall be prepared documenting that installation of the various liner components and the contact water collection system was performed in accordance with project specifications and manufacturer's specifications. The report will be certified by a professional engineer registered in the State of Michigan.

26. The permittee shall inspect and maintain the Side Slope Riser Pump and Piping at the TDRSA as follows:
 - a. Service pumps in accordance with the manufacturer's requirements.
 - b. Clean pump according to the manufacturer's recommendations.
 - c. Clean interior piping annually (if needed).
 - d. Inspect liquid level sensor as per manufacturer's operation and Maintenance manual.
27. The permittee shall inspect and maintain the Contact Water Collection Pipe at the TDRSA by jetting the pipe annually using pipe jetting equipment supplied by the vendor.

G. Ore Transporting and Processing

1. The permittee shall assure that all vehicles and equipment leaving the contact area of the main facilities site will be required to be washed before leaving. The truck wash shall consist of an enclosed system that recycles wash water. Failures of the wash water collection system shall be repaired, and the truck wash shall be fully operational before vehicles may leave the contact area. Any wash water that cannot be recycled due to excess sediment content shall be conveyed to the WWTP.
2. The permittee shall maintain all access roads and interior roads by minimizing mud tracking and removing mud as needed, and by promptly repairing ruts, potholes, or washouts, as weather permits.
3. The permittee shall transport ore from the decline through the portal to the COSA in production trucks. The permittee shall monitor the haul road to minimize accidental spillage of development rock or ore and to assure that any spillage is promptly recovered and cleaned up.
4. The permittee shall enclose crushing related equipment in a crusher building. The crusher shall be equipped with a wet-type dust collector equipped with a 25,000 cubic feet per minute fan and silencer. In addition to the dust collection at the crusher, the building shall be equipped with a baghouse to further reduce dust emissions from activities inside the building.
5. The permittee shall inspect the wet scrubber and baghouse operations on a daily basis when the equipment is operating as required in the Air Use permit. The permittee shall monitor for pressure drop across the bags, gas flow, liquid flow rate, and visual observation of stack emissions. In the event the monitoring program reveals an abnormality, the permittee shall conduct a thorough investigation of the cause. If necessary, ore processing operations shall be shut down until the problem is corrected.
6. The permittee shall convey crushed ore from the crusher building to the crushed ore bins on a covered conveyor as detailed in Figure 4-8 of the Permit Application

and as required by the Air Use Permit. The conveyor shall be inspected and maintained on a continuous basis during operation.

7. The permittee shall transport ore from the surface facility to the railhead in ore trucks covered with secured caps.
8. The permittee shall construct and maintain the COSA as follows:
 - a. The COSA shall be enclosed in a three-sided building with a full roof, constructed of steel framing with steel siding.
 - b. The floor of the COSA building shall be reinforced concrete, approximately 12 inches thick and sloped toward a collection sump.
 - c. A clear plastic drop door shall be installed across the open side to minimize precipitation contact with the ore and reduce fugitive dust release.
 - d. The permittee shall assure that ore shall be confined to the enclosed area.

H. Water Management and Treatment

1. The permittee shall utilize the CWBs designed to temporarily store contact water pumped from the TDRSA and from the mine workings until the water can be treated in the WWTP and discharged to the TWIS.
2. The permittee shall construct CWBs 1 and 2 as follows, and as detailed in Figure 4-19 of the Permit Application:
 - a. The subgrade immediately underneath the liner shall be compacted native soils or clean earthen fill, and shall be free of stumps, brush, or large or angular stones. A qualified field technician shall observe excavation of the CWB area, and any observed unacceptable subgrade material shall be excavated and replaced with compacted clean earthen fill.
 - b. The liner system shall have a 4:1 slope on the interior sidewall sideslope. The permittee shall construct a composite liner system for the CWBs with a GCL consisting of granular bentonite clay encased in two non-woven geotextile fabrics. The GCL shall have a saturated hydraulic conductivity of 1×10^{-10} cm/second. Overlying the GCL shall be a geomembrane consisting of 60-mil HDPE or 40-mil PVC.
 - c. The geomembrane shall be covered by a geotextile fabric, overlain by a 6-inch thick layer of sand.
 - d. The CWB composite liner shall be subjected to a rigorous QA/QC process that includes a leak location survey prior to use.
 - e. The water extraction system for the CWBs shall consist of an 18-inch diameter perforated SDR-11 HDPE riser with a pump and flexible discharge hose installed in the riser.
3. The permittee shall inspect and maintain the Side Slope Riser Pump and Piping at the CWBs as follows:
 - a. Service pumps in accordance with the manufacturer's requirements.
 - b. Clean pump according to the manufacturer's recommendations

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- c. Clean interior piping annually (if needed)
 - d. Inspect liquid level sensor as per manufacturer's Operation and Maintenance manual
4. The permittee shall inspect and maintain the Contact Water Collection Pipe at the CWBs by jetting the pipe annually using pipe jetting equipment supplied by the vendor.
5. The permittee shall operate and maintain the surface facility to segregate contact runoff (from the areas that will contain ore processing or storage facilities) from non-contact runoff (from the areas that will not contain ore processing or storage facilities), as described in Section 4.3.10 of the Permit Application.
6. Contact storm water runoff shall be conveyed to the CWBs, prior to treatment in the WWTP. Non-contact runoff water shall be conveyed to the NCWIBs. The permittee shall install and maintain an agitator or other devices in the CWBs if necessary to prevent ice build-up during cold weather.
7. The permittee shall construct and maintain four NCWIBs to retain storm water runoff for infiltration to the subsurface at the following locations:
 - a. One basin in the northwest portion of the main surface facility, serving the construction staging and soil storage area.
 - b. Two basins southeast of the main site along the access road, serving the office/warehouse and employee parking lot areas.
 - c. One basin at the clean backfill surface facility.
8. Any storm water release from the NCWIBs due to a precipitation event exceeding the 100-year 24-hour precipitation event or 50-year combined rainfall and snowmelt runoff event shall be subject to the provisions of the Industrial Storm Water Permit.
9. The permittee shall conduct regular inspections of the NCWIBs to determine the extent of any silt that could reduce the infiltration capacity as required under the Industrial Storm Water Permit. The permittee shall maintain the NCWIBs as required under the Industrial Storm Water Permit by cleaning sediment from the basins as required to maintain infiltration rates; removing debris from ditches and basin bottoms as needed; promptly repairing eroded inlets, outlets, dikes, and other structures; and promptly repairing eroded or silted-in areas.
10. The permittee shall maintain ditches, culverts, spillways, and other water diversion or conveyance structures by cleaning sediment from ditches; cleaning debris from culverts; replacing rusted or damaged culverts; and repairing eroded areas and installing erosion control measures to remedy erosion as required under the Industrial Storm Water Permit.
11. The permittee shall produce, manage, treat, and discharge water associated with the mine operations only in conformance with the Groundwater Discharge Permit.

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12. The permittee shall collect surplus mine drainage water in underground sumps and pump it to the CWBs to be treated in the WWTP.
13. The permittee shall convey all wastewater generated at the Eagle Project, with the exception of sanitary wastewater, to CWBs 1 and 2, for temporary storage, then to the WWTP and TWIS.
14. The permittee shall operate and monitor the WWTP and TWIS to maintain the designed capacity for treating and discharging produced water.
15. The permittee shall maintain the mine dewatering system as detailed in Illustration 4-5 of the Permit Application at the design capacity of 600 gallons per minute or at a capacity that equals the rate of actual groundwater inflow plus operational input of water based on actual mine operating conditions plus a safety factor of ten percent.
16. The permittee shall treat mine utility water for the truck wash to meet applicable water quality standards before release into the environment. Only treated or potable water shall be used to supply water to the truck wash.
17. The permittee shall construct and operate the wastewater treatment system to handle process upset conditions such as power disruption or malfunctions of the process units in accordance with the plans set forth in the Permit Application.
18. The permittee shall remove and replace damaged sections of pipe in the TWIS if pipe breakage occurs.
19. All conveyance pipes leading to and from the CWBs shall be constructed as double walled piping systems.
20. If a runoff event exceeds capacity of the CWBs, excess water shall be routed to the lined TDRSA for emergency temporary storage. As an additional contingency, water may be pumped into vacant underground mine workings for additional temporary storage if the TDRSA does not have aDNREuate capacity for the surplus.
21. The permittee shall submit a full set of WWTP engineering designs to the MMU Supervisor prior to construction of the WWTP. The permittee must receive written approval of the engineering designs from the MDNRE before construction of the WWTP.
22. Water from the crusher and COSA shall be collected in the sump and pumped to the CWB for treatment.
23. Construction of the CWBs and NCWIBs shall not be begin until the permittee has submitted to the MMU Supervisor a detailed and specific plan for non-lethal harassment or exclusion of wildlife from the CWBs and NCWIBs, and has received the written approval of the plan from the MDNRE.

I. Waste Management

1. The permittee shall dispose of the dewatered microfiltration sludge from the WWTP at a licensed landfill.
2. The permittee shall dispose of the reverse osmosis concentrate from the WWTP by an evaporation/crystallization process for volume reduction and then by disposing the waste at a licensed landfill.
3. The permittee shall characterize, transport, and dispose of materials not exempt from the definition of solid waste in accordance with federal and state solid and hazardous waste regulations. These materials shall be properly stored, labeled, and containerized prior to shipment and disposal or recycling.
4. Lubricants used for maintenance purposes shall be stored inside at the maintenance shop. All storage will be in accordance with the federal Spill Prevention Control and Countermeasure Plan (SPCC) and/or the PIPP. Used oil and grease will be stored and recycled in accordance with federal and MDNRE used oil regulations. Metal shavings will be properly contained in the shop area and shipped to a metals recycler for recycling and reuse.

J. Management of Hazardous Materials

1. The permittee shall store blasting materials in a secure magazine building as described in Section 4.3.17 of the Permit Application. The magazine building(s) shall be constructed of reinforced concrete and shall conform to MSHA standards. The building(s) shall have explosion proof air handling and moisture control systems. Entry into the building(s) shall be controlled by certified blasting material handlers.

K. Soil erosion and Sediment Control

1. The permittee shall implement soil erosion and sediment control (SESC) measures that effectively reduce off-site soil erosion and sedimentation and control dust, as described in Section 4.3.10 of the Permit Application.
2. The permittee shall utilize Best Management Practices in constructing, operating, and maintaining all temporary and permanent SESC measures.
3. The permittee shall implement temporary SESC measures during construction, and shall maintain temporary SESC features on a daily basis.
4. The temporary SESC measures shall incorporate the following:
 - a. Materials and methods specified in the MDOT, 2003 Standard Specification for Construction (MDOT, 2003), where available, shall be used for specification of the materials to be used.

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- b. Permittee's staff shall be certified as storm water operators to complete the required inspections and coordinate repairs and maintenance during construction.
 - c. Marketable timber shall be removed from the site. Unmarketable timber, herbaceous plants, dead wood, stumps, and other vegetation may be chipped and stockpiled on-site for use in reclamation. Stumps that are too large to be chipped shall be stockpiled and burned on-site, pursuant to a burning permit to be obtained from the MDNRE.
 - d. Clearing and grubbing shall be completed as a single continuous operation to minimize disturbance.
 - e. Silt fencing shall be placed downgradient before clearing and grubbing.
 - f. Topsoil shall be stripped from the mine site area immediately after clearing and grubbing.
 - g. Topsoil and subsoil shall be stockpiled in a previously prepared area. Any excess subsoil shall be segregated from the topsoil and stockpiled separately. Stockpiles shall have maximum slopes of three to one, and shall be surrounded by additional silt fence.
 - h. As soon as possible after establishment, stockpiles shall be prepared and seeded with a variety of plants that are native to the area, except that non-native species may be used as approved by the MDNRE when necessary to provide temporary stabilization and prevent erosion. Seed mixtures shall include temporary species such as oats or perennial rye, and perennial native species.
5. The permittee shall establish permanent SESC measures as soon as possible after grading and stockpiling has been completed and shall maintain the permanent measures for the life of the Eagle Project.
 6. The permittee shall maintain the storm water conveyance and storage basins as designed and constructed as required under the Storm Water Pollution Plan in the Industrial Storm Water Permit. The permittee shall conduct inspections promptly after precipitation or snow melt events. The permittee shall repair areas that exhibit erosion as soon as practical by filling with topsoil and seeding with the appropriate mix as specified above.

L. Monitoring

1. The permittee is required to provide to the MMU Supervisor plans for installation of a monitoring well as close as practical to, and down gradient of, the NCWIBs, and receive approval of the plans from the MDNRE prior to construction of the NCWIBs. The permittee shall install the monitoring wells prior to mine operations.
2. In the event of a surface discharge from the NCWIBs, the permittee shall collect and analyze samples for all parameters indicated in the surface water monitoring plan, and shall submit the results to the OGS Area Geologist.

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3. The permittee shall construct, utilize, maintain, operate, and abandon, as applicable, a comprehensive monitoring well network as identified in Figure 6-1 of the Permit Application, and in Special Permit Conditions L5, 6, and 7, and in compliance with R 425.406.
4. The permittee shall monitor ground water and wetland water elevations throughout the life of mine dewatering operations, and shall report the data to the MMU Supervisor quarterly for the following wells and piezometers:
 - a. Daily measurements shall be taken by transducers placed in wells QAL023B, QAL024A, QAL044B, QAL064, QAL065, and QAL066.
 - b. Monthly water level elevations shall be obtained from four wetland piezometers, WLD025, WLD026, WLD027, and WLD028.
 - c. If water levels in the wetland monitoring wells specified in condition L4b fall more than 6 inches below pre-mining baseline measured minimums, weekly monitoring of the water levels in the wells shall be implemented. If after 4 weeks of weekly monitoring, the water levels in the wells remain more than 6 inches below pre-mining baseline minimums, additional monitoring and/or mitigation measures shall be implemented as approved by the Department.
5. The permittee shall construct a monitor well cluster at or near the location indicated by coordinate position 431,735E, 5,177,910N from Kennecott Eagle Minerals Company Figure 6-1, Operations Ground Water Quality Monitoring Program. The permittee shall collect quarterly water quality monitoring samples and ground water elevations from the A, B, and D aquifer horizons at this well location.
6. The permittee shall construct a monitor well for collection of water quality samples from the first saturated aquifer formation encountered at or near the location indicated by coordinate position 432,800E, 5,177,265N from Kennecott Eagle Minerals Company Figure 6-1, Operations Ground Water Quality Monitoring Program, prior to commencing mining operations. The permittee shall collect quarterly water quality samples and ground water elevations from this location.
7. The permittee shall convert QAL025A to a clustered well with sampling intervals in the A, B, and D aquifer horizons. The permittee shall collect quarterly samples for water quality monitoring and ground water elevation from the existing QAL025A and from the new QAL025B and QAL025D data locations.
8. The permittee shall monitor the flow of water from mine dewatering with a meter that reports total flow. The permittee shall keep a log of daily meter readings and computed daily flow in U.S. gallons per day, which shall be available for inspection by the MDNRE upon request. The permittee shall report data to the MMU Supervisor quarterly.
9. If mine dewatering flows exceed 200,000 U.S. gallons per day for more than two days in any consecutive 10-day period or for more than five days in any consecutive 30-day period, and the increase in dewatering is the result of increased influx and not solely the result of temporary accelerated drainage of

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stored water, then in addition to the quarterly report required in Special Permit Condition 8, the permittee shall submit monthly reports that contain the mine dewatering flow information, the daily transducer ground water elevation information, and the wetland water elevation information. The permittee may request a return to quarterly reporting if dewatering flows are less than 200,000 U.S. gallons per day for 30 consecutive days.

10. If mine dewatering exceeds 300,000 U.S. gallons per day for more than two days in any ten-day period or for more than five days in any 30-day period, and the increase in dewatering is the result of increased influx and not solely the result of temporary accelerated drainage of stored water, then the permittee shall perform the following actions:
 - a. Increase the frequency of monitoring of the four wetland piezometers to weekly.
 - b. Begin weekly reporting of mine dewatering flow, daily transducer ground water elevation information, and the weekly wetland water elevation information.
 - c. Revise the predictive ground water model using upper-bound mine dewatering values equivalent to the higher value of either 125 percent of the previous upper-bound value or the average daily flow from the highest reported seven-day period; and provide the revised modeling report to the MMU Supervisor within 30 days of the commencement of weekly reporting.
 - d. Prepare and submit within 30 days of the commencement of weekly reporting a remedy proposal to ensure that wetlands above and around the entire facility will not be impacted by continued mine dewatering.

Based on the results of the revised predictive model and on efforts by the permittee to reduce mine dewatering flow, the permittee may request a return to quarterly reporting.

11. The permittee shall add surface water monitoring locations for fish, aquatic macroinvertebrates, aquatic habitat, and water quality at the following locations:
 - a. T50N, R28W, Section 5; Upstream of Northwestern Road Crossing.
 - b. T51N, R28W, Section 34; Upstream of Northwestern Road Crossing.
 - c. T51N, R28W, Section 33; Upstream of Northwestern Road Crossing.
12. The permittee shall utilize results of the fish, aquatic macroinvertebrates, and aquatic habitat surveys in conjunction with water quality monitoring results, as applicable, to evaluate compliance with Part 632. The permittee shall notify the MMU Supervisor and shall institute an increased monitoring program or implement response activity, as described in R 425.406 of the rules promulgated under Part 632 of the NREPA and as approved by the MDNRE, at such time results indicate an actual or potential impact from mining operations.
13. The permittee shall sample water pumped from the TDRSA sump on a quarterly basis and analyze the samples for the parameters listed below (see Permit Application, Table 6-2):

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<u>Parameter</u>	<u>Frequency</u>	<u>Analytical Method</u>	<u>Method Reporting Limit</u>	<u>Units</u>
Alkalinity, Bicarbonate	Quarterly	310.1/SM 2320 B	2.0	mg/l
Alkalinity, Carbonate	Quarterly	310.1/SM 2320 B	2.0	mg/l
Aluminum	Annual	EPA-200.7/6010B	50	ug/l
Antimony	Annual	EPA-200.8/6020	2	ug/l
Arsenic	Quarterly	EPA-200.8/6020	1.0	ug/l
Barium	Annual	EPA-200.8/6020	10	ug/l
Beryllium	Annual	EPA-200.8/6020	1.0	ug/l
Boron	Quarterly	EPA-200.8/6020	50	ug/l
Cadmium	Annual	EPA-200.8/6020	0.2	ug/l
Calcium	Annual	EPA-200.7/6010B	0.50	mg/l
Chloride	Quarterly	325.2/4599-CL E	1.0	mg/l
Chromium	Annual	EPA-200.8/6020	1.0	ug/l
Cobalt	Annual	EPA-200.8/6020	10	ug/l
Copper	Quarterly	EPA-200.8/6020	1.0	ug/l
Fluoride	Annual	SM 4500 F-C	0.10	mg/l
Iron	Quarterly	EPA-200.7/6010B	20	ug/l
Lead	Annual	EPA-200.8/6020	1.0	ug/l
Lithium	Annual	EPA-200.7/6010B	10	ug/l
Magnesium	Annual	EPA-200.7/6010B	0.50	mg/l
Manganese	Quarterly	EPA-200.8/6020	10	ug/l
Mercury	Quarterly	EPA-1631E	0.25	ng/l
Molybdenum	Annual	EPA-200.8/6020	10	ug/l
Nickel	Quarterly	EPA-200.8/6020	1.0	ug/l
Nitrate	Annual	EPA-353.2/4500 N03F	0.05	mg/l
Potassium	Annual	EPA-200.7/6010B	0.50	mg/l
Selenium	Quarterly	EPA-200.8/6020	2.0	ug/l
Silver	Annual	EPA-200.8/6020	0.2	ug/l
Sodium	Annual	EPA-200.7/6010B	0.50	mg/l
Sulfate	Quarterly	EPA-375.4/9038	1.0	mg/l
Strontium	Annual	EPA-200.8/6020	50	ug/l
Thallium	Annual	EPA-200.8/6020	2	ug/l
Vanadium	Annual	EPA-200.8/6020	10	ug/l
Zinc	Quarterly	EPA-200.8/6020	10	ug/l
Field pH	Quarterly	Field	--	su
Specific Conductance	Quarterly	Field	--	umhos/cm

14. The permittee shall not put into operation impermeable surfaces that will be exposed to contact storm water until the permittee has submitted to the MMU Supervisor a plan for monitoring the integrity (such as cracks, holes, etc.) of all impermeable surfaces that will be exposed to contact storm water and has received the written approval of the plan from the MDNRE. The monitoring plan shall include frequency of inspection and action plans for surface repair. The permittee shall maintain an inspection log indicating the date, inspector, results of inspection, and required follow-up action. The permittee shall make the log available to the MDNRE if requested.
15. The permittee shall operate, monitor, and maintain the WWTP to assure the treated effluent meets the effluent standards for discharge through the TWIS. The

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WWTP and TWIS shall meet or exceed the standards established by the Groundwater Discharge Permit.

16. The permittee shall monitor wastewater effluent continuously for indicator parameters to verify proper operation as required under the Groundwater Discharge Permit. Effluent not meeting treatment requirements shall be pumped back to the CWBs for re-treatment.
17. The permittee shall conduct subsidence monitoring beginning with opening of the lowest drift and continuing throughout the postclosure monitoring period. Monitoring shall consist of surveying the ground surface above the mine workings and within the mine workings. Points shall be surveyed quarterly and vertical control of the survey points shall be to the nearest centimeter or better. If the permittee proposes alternate monitoring methods, the permittee shall not begin mining the ore body until the permittee submits to the MMU Supervisor a subsidence monitoring plan and receives the written approval of the plan from the MDNRE.
18. The permittee shall conduct ongoing characterization of the geochemistry of the ore, waste rock, and overburden that is mined, and peripheral rock that is exposed in the process of mining, throughout the mining operation to calibrate and adjust the model and predictions of potential generation of acid, dissolved metals, and other related substances.
19. The permittee shall operate, maintain, and monitor all treatment and containment facilities and practices to protect geological formations, groups of formations, or parts of formations capable of yielding significant quantities of groundwater to wells or springs.
20. The permittee shall collect and analyze samples of water being pumped from the mine as listed below (see Permit Application, Table 6-2):

<u>Parameter</u>	<u>Frequency</u>	<u>Analytical Method</u>	<u>Method Reporting Limit</u>	<u>Units</u>
Alkalinity, Bicarbonate	Quarterly	310.1/SM 2320 B	2.0	mg/l
Alkalinity, Carbonate	Quarterly	310.1/SM 2320 B	2.0	mg/l
Aluminum	Annual	EPA-200.7/6010B	50	ug/l
Antimony	Annual	EPA-200.8/6020	2	ug/l
Arsenic	Quarterly	EPA-200.8/6020	1.0	ug/l
Barium	Annual	EPA-200.8/6020	10	ug/l
Beryllium	Annual	EPA-200.8/6020	1.0	ug/l
Boron	Quarterly	EPA-200.8/6020	50	ug/l
Cadmium	Annual	EPA-200.8/6020	0.2	ug/l
Calcium	Annual	EPA-200.7/6010B	0.50	mg/l
Chloride	Quarterly	325.2/4599-CL E	1.0	mg/l
Chromium	Annual	EPA-200.8/6020	1.0	ug/l
Cobalt	Annual	EPA-200.8/6020	10	ug/l
Copper	Quarterly	EPA-200.8/6020	1.0	ug/l

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<u>Parameter</u>	<u>Frequency</u>	<u>Analytical Method</u>	<u>Method Reporting Limit</u>	<u>Units</u>
Fluoride	Annual	SM 4500 F-C	0.10	mg/l
Iron	Quarterly	EPA-200.7/6010B	20	ug/l
Lead	Annual	EPA-200.8/6020	1.0	ug/l
Lithium	Annual	EPA-200.7/6010B	10	ug/l
Magnesium	Annual	EPA-200.7/6010B	0.50	mg/l
Manganese	Quarterly	EPA-200.8/6020	10	ug/l
Mercury	Quarterly	EPA-1631E	0.25	ng/l
Molybdenum	Annual	EPA-200.8/6020	10	ug/l
Nickel	Quarterly	EPA-200.8/6020	1.0	ug/l
Nitrate	Annual	EPA-353.2/4500 N03F	0.05	mg/l
Potassium	Annual	EPA-200.7/6010B	0.50	mg/l
Selenium	Quarterly	EPA-200.8/6020	2.0	ug/l
Silver	Annual	EPA-200.8/6020	0.2	ug/l
Sodium	Annual	EPA-200.7/6010B	0.50	mg/l
Sulfate	Quarterly	EPA-375.4/9038	1.0	mg/l
Strontium	Annual	EPA-200.8/6020	50	ug/l
Thallium	Annual	EPA-200.8/6020	2	ug/l
Vanadium	Annual	EPA-200.8/6020	10	ug/l
Zinc	Quarterly	EPA-200.8/6020	10	ug/l
Field pH	Quarterly	Field	--	su
Specific Conductance	Quarterly	Field	--	umhos/cm

21. In addition to monitoring described elsewhere in this permit, the permittee shall conduct monitoring required under the groundwater discharge permit, air permit, and storm water construction and industrial storm water permits.
22. The permittee shall monitor groundwater surrounding the TWIS as required under the Groundwater Discharge Permit.
23. The permittee shall monitor groundwater quality and water level elevation at the TDRSA, CWBs, underground mine, and surface facility site at wells identified in Figure 6-1 of the Permit Application, and in Special Permit Conditions L5, 6, and 7, on a quarterly basis. The permittee shall sample and analyze the water as listed below:

<u>Parameter</u>	<u>Frequency</u>	<u>Analytical Method</u>	<u>Method Reporting Limit</u>	<u>Units</u>
Alkalinity, Bicarbonate	Quarterly	USEPA-310.1	2.0	mg/l
Alkalinity, Carbonate	Quarterly	USEPA-310.1	2.0	mg/l
Aluminum	Annual	USEPA-6010B	50	ug/l
Antimony	Annual	USEPA-6020	5.0	ug/l
Arsenic	Quarterly	USEPA-6020	2.0	ug/l
Barium	Annual	USEPA-6020	20	ug/l
Beryllium	Annual	USEPA-6020	1.0	ug/l
Boron	Quarterly	USEPA-6010B	100	ug/l
Cadmium	Annual	USEPA-6020	0.50	ug/l
Calcium	Annual	USEPA-6010B	0.50	mg/l
Chloride	Quarterly	USEPA-325.2	1.0	mg/l
Chromium	Annual	USEPA-6020	5.0	ug/l

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<u>Parameter</u>	<u>Frequency</u>	<u>Analytical Method</u>	<u>Method Reporting Limit</u>	<u>Units</u>
Cobalt	Annual	USEPA-6010B	10	ug/l
Copper	Quarterly	USEPA-6020	5.0	ug/l
Fluoride	Annual	APHA 4500-F C	0.10	mg/l
Iron	Quarterly	USEPA-6010B	20	ug/l
Lead	Annual	USEPA-6020	1.0	ug/l
Lithium	Annual	USEPA-6010B	8.0	ug/l
Magnesium	Annual	USEPA-6010B	0.50	mg/l
Manganese	Quarterly	USEPA-6010B	20	ug/l
Mercury	Quarterly	USEPA-1631E	0.25	ng/l
Molybdenum	Annual	USEPA-6020	10	ug/l
Nickel	Quarterly	USEPA-6020	25	ug/l
Nitrate	Quarterly	USEPA-353.2	0.05	mg/l
Potassium	Annual	USEPA-6010B	0.50	mg/l
Selenium	Quarterly	USEPA-6020	1.0	ug/l
Silver	Annual	USEPA-6020	0.20	ug/l
Sodium	Quarterly	USEPA-6010B	0.50	mg/l
Sulfate	Quarterly	USEPA-375.4	2.0-5.0	mg/l
Strontium	Annual	USEPA-6010B	50	ug/l
Thallium	Annual	EPA-200.8/6020	2	ug/l
Vanadium	Annual	EPA-200.8/6020	10	ug/l
Zinc	Quarterly	USEPA-6020	10	ug/l
Redox	Quarterly	Field	NA	meV
Field pH	Quarterly	Field	NA	su
Groundwater Elevation	Quarterly	Field	NA	ft MSL
Specific Conductance	Quarterly	Field	NA	umhos/cm
Temperature	Quarterly	Field	NA	°C
Dissolved Oxygen	Quarterly	Field	NA	mg/l

24. The permittee shall maintain groundwater monitoring wells by marking the wells with flags to prevent damage during other maintenance; installing protector pipes; and repairing or replacing broken protector pipes, surface seals, and locks.
25. At such time as monitor wells are to be abandoned, the permittee shall abandon the wells in accordance with MDNRE requirements.
26. The permittee shall construct, utilize, maintain, operate, and abandon, as applicable, a comprehensive monitoring well network as identified in Figure 6-1 of the Permit Application, and in Special Permit Conditions L5, 6, and 7, and in compliance with R 425.406.
27. The permittee shall maintain and operate Wells QAL026 A/D/E as background monitoring wells in the A, D, and E Zone hydrostratigraphic units for project facilities and the underground mine.
28. The permittee shall operate and maintain surface water monitoring stations identified in Figure 6-2 of the Permit Application and Special Permit Condition L11 for monitoring potential environmental impacts to stream flow and surface water quality. The stations are located as follows:
 - a. Four monitoring stations are located on the Salmon Trout River Main Branch.

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- b. Two monitoring stations are located on the Salmon Trout River East Branch.
- c. One monitoring station is located on the Yellow Dog River.
- d. One monitoring station is located on the Cedar River as a reference watershed that will not be influenced by project activities.

All monitoring stations shall be operative prior to commencing mining operations.

29. Devices utilized for continuous monitoring of temperature, conductivity, and stage shall remain throughout the mining project at monitoring stations STRM004, STRM005, STRE002 and YDRM002.
30. The quarterly surface water monitoring events shall take place during the summer baseflow (August), fall rain (likely October of each year), winter baseflow (February), and spring snowmelt and runoff (likely April of each year). Sampling events shall occur for each station at the same time, or as close as possible. Each station shall be monitored on a quarterly or annual basis for the following parameters (Permit Application, Table 6-4):

<u>Parameter</u>	<u>Frequency</u>	<u>Analytical Method</u>	<u>Method Reporting Limit</u>	<u>Units</u>
Field				
Temperature	Quarterly	Field	NA	°C
D.O.	Quarterly	Field	NA	mg/l
Specific Conductance	Quarterly	Field	NA	umhos/cm
pH	Quarterly	Field	NA	su
Metals				
Aluminum	Annual	EPA-200.7/6010B	50	ug/l
Lithium	Annual	EPA-200.7/6010B	10	ug/l
Antimony	Annual	EPA-200.8/6020	2.0	ug/l
Arsenic	Quarterly	EPA-200.8/6020	1.0	ug/l
Barium	Annual	EPA-200.8/6020	10	ug/l
Iron	Quarterly	EPA-200.7/6010B	20	ug/l
Beryllium	Annual	EPA-200.8/6020	1.0	ug/l
Boron	Quarterly	EPA-200.8/6020	50	ug/l
Cadmium	Annual	EPA-200.8/6020	0.2	ug/l
Chromium	Annual	EPA-200.8/6020	1.0	ug/l
Copper	Quarterly	EPA-200.8/6020	1.0	ug/l
Cobalt	Quarterly	EPA-200.8/6020	10	ug/l
Lead	Annual	EPA-200.8/6020	1.0	ug/l
Manganese	Quarterly	EPA-200.8/6020	10	ug/l
Molybdenum	Annual	EPA-200.8/6020	10	ug/l
Nickel	Quarterly	EPA-200.8/6020	1.0	ug/l
Selenium	Quarterly	EPA-200.8/6020	2.0	ug/l
Silver	Annual	EPA-200.8/6020	0.2	ug/l
Zinc	Quarterly	EPA-200.8/6020	10	ug/l
Mercury	Quarterly	EPA-1631E	0.25	ng/l
Anions				
Alkalinity, Bicarbonate	Annual	310.1/SM 2320 B	2.0	mg/l
Alkalinity, Carbonate	Annual	310.1/SM 2320 B	2.0	mg/l
Chloride	Annual	325.2/4500-CL E	1.0	mg/l
Fluoride	Annual	SM 4500 F-C	0.10	mg/l

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<u>Parameter</u>	<u>Frequency</u>	<u>Analytical Method</u>	<u>Method Reporting Limit</u>	<u>Units</u>
Nitrate-N	Annual	353.2/4500 NO3F	0.05	mg/l
Sulfate	Quarterly	EPA-375.4/9038	1.0	mg/l
Cations				
Calcium	Annual	EPA-200.7/6010B	0.50	mg/l
Potassium	Annual	EPA-200.7/6010B	0.50	mg/l
Magnesium	Annual	EPA-200.7/6010B	0.50	mg/l
Sodium	Annual	EPA-200.7/6010B	0.50	mg/l
Total Dissolved Solids	Quarterly	EPA-160.1	50	mg/l

31. The permittee shall inspect the exterior containment berms and embankments of the TDRSA, CWBs, and the NCWIBs monthly or after any rainfall event that exceeds ½ inch in a 24-hour period. These inspections will identify preventative maintenance required to maintain stability of the berms and embankments. The permittee shall maintain a surface inspection log at the Eagle Project site that documents the results of the inspections. The preventative maintenance, inspection, and corrective maintenance procedures are as follows:
 - a. Inspect ditches and storm water conveyance structures. Record the location of any erosion or silt and clean any sediment from ditches and culvert pipes. Sediment cleaned from ditches and culvert pipes shall be managed in accordance with applicable requirements.
 - b. Inspect and record the location and extent of any cracking or settlement of berms. Repair defects or damaged areas as soon as possible.
32. The permittee shall inspect all exterior berms at the TDRSA, facility perimeter, and other locations on a regular basis, and shall promptly repair eroded areas by filling with soil to grades and adding erosion mat; revegetating bare spots and eroded areas by seeding, fertilizing, and mulching as weather permits.
33. The permittee shall inspect the CWBs monthly, utilizing a staff gage or probe to determine the thickness of the sediment accumulated in the bottom of the basins. When the sediment thickness exceeds three feet, the permittee shall clean out the CWB. Sediment removed shall be recycled or managed in accordance with applicable regulations.
34. The permittee shall conduct the following monitoring of flora and fauna during mine operations:
 - a. Semi-annual (spring and fall) observations along the seven transects established and surveyed during the permittee's initial environmental assessment.
 - b. Recording observations at the 21 wildlife sampling stations shown in Figure 6-4 of the Permit Application.
 - c. Recording observations at the three frog/toad sampling stations shown in Figure 6-4 of the Permit Application.
35. The permittee shall document the observations and shall include them with the annual report required under R 425.501. The flora and fauna monitoring will be

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completed to document the trends and conditions of these resources during operations.

36. The permittee shall document on an annual basis the health of the narrow-leaved gentian communities identified along the Salmon Trout River Main Branch south of the Triple A Road. The annual evaluation shall include an assessment of local climatic conditions (drought, insect infestations, precipitation, etc.), photographic documentation, and a visual description of the health of the colonies relative to other colonies that have been documented in the area as described in Figure 3-11 of the Environmental Impact Assessment that is part of the Permit Application.
37. During mine operations, the permittee shall monitor wetlands adjacent to the ore body and mine site identified in Figure 3-8 of the Environmental Impact Assessment, including the following:
 - a. Ore body and backfill facility – wetland areas 1, 6, 7, 8, 9, 10, 11, 12 and 13.
 - b. Mine surface facility – wetland area 26
38. The monitoring and observation of the wetlands listed in Special Permit Condition L39 shall include the following:
 - a. Monitoring of shallow groundwater levels in nested wetland piezometers shown in Figure 6-5.
 - b. An annual visual assessment of these wetlands for wetland vegetation.
39. The permittee shall submit the wetland monitoring data with the annual monitoring report required under R 425.501.
40. During operations the permittee shall continue to monitor and assess the fisheries and aquatic macro invertebrate populations at locations identified in Figure 6-6 of the Permit Application and add locations identified in Special Permit Condition L11 (Monitoring). Annual assessments shall take place in late summer to early fall. The permittee shall submit the results of the annual survey to the MDNRE Area Geologist within 30 days after the annual survey takes place. The annual surveys shall also be documented and included in the annual report required under R 425.501. The aquatic monitoring shall be completed to document trends and conditions of these resources during operations.
41. Prior to development, brook trout tissue samples, including liver samples, shall be collected and analyzed using Procedure 31 (Fish Contaminant Monitoring Program – Fish Collection Procedure) established by the Great Lakes and Environmental Assessment Section, Water Bureau, MDNRE; and subsequent samples shall be collected as part of the aquatic annual survey until ten years after closure. The permittee shall meet with the MDNRE and MDNRE prior to collecting samples to assure proper sampling procedures are followed. In addition, the permittee shall provide advance notice so the MDNRE and MDNRE may accompany the permittee during the sampling to confirm whether adjustments are needed due to brook trout population and to collect split samples.

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42. The permittee shall conduct postclosure management and monitoring for 20 years after the completion of mine reflooding and surface reclamation. The postclosure monitoring period may be modified by the MDNRE pursuant to R 425.407. Postclosure management and monitoring shall primarily consist of conducting quarterly site visits, observing site conditions, and conducting post-closure monitoring.
43. Postclosure monitoring shall include the following:
- Monitoring of groundwater and surface water quality.
 - Monitoring of flora and fauna for five years.
 - Monitoring of fisheries and aquatic macroinvertebrates for 10 years.
 - Monitoring and maintenance of the reclaimed areas.
44. The permittee shall operate and maintain groundwater quality monitoring wells and bedrock piezometers during the postclosure monitoring period as depicted in Figure 7-3 of the Permit Application. Monitoring wells around the former TDRSA and CWBs shall be monitored until project year 22 to confirm that the TDRSA and CWBs did not release measurable quantities of constituents of concern to the subsurface. Wells around the reclaimed mine shall be monitored for water quality parameters for a period of 20 years following reclamation of the WWTP. The wells shall be sampled and analyzed as follows (see Permit Application, Table 7-4):

<u>Parameter</u>	<u>Frequency</u>	<u>Analytical Method</u>	<u>Method Reporting Limit</u>	<u>Units</u>
Alkalinity, Bicarbonate	Quarterly(1)	USEPA-310.1	2.0	mg/l
Alkalinity, Carbonate	Quarterly(1)	USEPA-310.1	2.0	mg/l
Aluminum	Annual	USEPA-6010B	50	ug/l
Antimony	Annual	USEPA-6020	5.0	ug/l
Arsenic	Quarterly(1)	USEPA-6020	2.0	ug/l
Barium	Annual	USEPA-6020	20	ug/l
Beryllium	Annual	USEPA-6020	1.0	ug/l
Boron	Quarterly(1)	USEPA-6010B	100	ug/l
Cadmium	Annual	USEPA-6020	0.50	ug/l
Calcium	Annual	USEPA-6010B	0.50	mg/l
Chloride	Quarterly(1)	USEPA-325.2	1.0	mg/l
Chromium	Annual	USEPA-6020	5.0	ug/l
Cobalt	Annual	USEPA-6010B	10	ug/l
Copper	Quarterly(1)	USEPA-6020	5.0	ug/l
Fluoride	Annual	APHA 4500-F C	0.10	mg/l
Iron	Quarterly(1)	USEPA-6010B	20	ug/l
Lead	Annual	USEPA-6020	1.0	ug/l
Lithium	Annual	USEPA-6010B	8.0	ug/l
Magnesium	Annual	USEPA-6010B	0.50	mg/l
Manganese	Quarterly(1)	USEPA-6010B	20	ug/l
Mercury	Quarterly(1)	USEPA-1631E	0.25	ng/l
Molybdenum	Annual	USEPA-6020	10	ug/l
Nickel	Quarterly(1)	USEPA-6020	25	ug/l
Nitrate	Quarterly(1)	USEPA-353.2	0.05	mg/l
Potassium	Annual	USEPA-6010B	0.50	mg/l
Selenium	Quarterly(1)	USEPA-6020	1.0	ug/l

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<u>Parameter</u>	<u>Frequency</u>	<u>Analytical Method</u>	<u>Method Reporting Limit</u>	<u>Units</u>
Silver	Annual	USEPA-6020	0.20	ug/l
Sodium	Quarterly(1)	USEPA-6010B	0.50	mg/l
Sulfate	Quarterly(1)	USEPA-375.4	2.0-5.0	mg/l
Strontium	Annual	USEPA-6010B	50	ug/l
Thallium	Annual	EPA-200.8/6020	2	ug/l
Vanadium	Annual	EPA-200.8/6020	10	ug/l
Zinc	Quarterly(1)	USEPA-6020	10	ug/l
Redox	Quarterly(1)	Field	NA	meV
Field pH	Quarterly(1)	Field	NA	su
Groundwater Elevation	Quarterly(1)	Field	NA	ft MSL
Specific Conductance	Quarterly(1)	Field	NA	umhos/cm
Temperature	Quarterly	Field	NA	°C
Dissolved Oxygen	Quarterly(1)	Field	NA	mg/l

(1) After project year 27, parameters will be analyzed on an annual basis.

45. The permittee shall operate and maintain surface water monitoring stations during the 20-year postclosure monitoring period as depicted Figure 7-4 of the Permit Application. The monitoring stations shall be sampled as follows (see Permit Application, Table 7-5):

<u>Parameter</u>	<u>Frequency</u>	<u>Analytical Method</u>	<u>Method Reporting Limit</u>	<u>Units</u>
Field				
Temperature	Quarterly	Field	NA	°C
D.O.	Quarterly	Field	NA	mg/l
Specific Conductance	Quarterly	Field	NA	umhos/cm
pH	Quarterly	Field	NA	su
Metals				
Aluminum	Annual	EPA-200.7/6010B	50	ug/l
Lithium	Annual	EPA-200.7/6010B	10	ug/l
Antimony	Annual	EPA-200.8/6020	2.0	ug/l
Arsenic	Quarterly(1)	EPA-200.8/6020	1.0	ug/l
Barium	Annual	EPA-200.8/6020	10	ug/l
Iron	Quarterly(1)	EPA-200.7/6010B	20	ug/l
Beryllium	Annual	EPA-200.8/6020	1.0	ug/l
Boron	Quarterly(1)	EPA-200.8/6020	50	ug/l
Cadmium	Annual	EPA-200.8/6020	0.2	ug/l
Chromium	Annual	EPA-200.8/6020	1.0	ug/l
Copper	Quarterly(1)	EPA-200.8/6020	1.0	ug/l
Cobalt	Quarterly(1)	EPA-200.8/6020	10	ug/l
Lead	Annual	EPA-200.8/6020	1.0	ug/l
Manganese	Quarterly(1)	EPA-200.8/6020	10	ug/l
Molybdenum	Annual	EPA-200.8/6020	10	ug/l
Nickel	Quarterly(1)	EPA-200.8/6020	1.0	ug/l
Selenium	Quarterly(1)	EPA-200.8/6020	2.0	ug/l
Silver	Annual	EPA-200.8/6020	0.2	ug/l
Zinc	Quarterly(1)	EPA-200.8/6020	10	ug/l
Mercury	Quarterly(1)	EPA-1631E	0.25	ng/l
Anions				
Alkalinity,	Annual	310.1/SM 2320 B	2.0	mg/l

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<u>Parameter</u>	<u>Frequency</u>	<u>Analytical Method</u>	<u>Method Reporting Limit</u>	<u>Units</u>
Bicarbonate				
Alkalinity, Carbonate	Annual	310.1/SM 2320 B	2.0	mg/l
Chloride	Annual	325.2/4500-CL E	1.0	mg/l
Fluoride	Annual	SM 4500 F-C	0.10	mg/l
Nitrate-N	Annual	353.2/4500 NO3F	0.05	mg/l
Sulfate	Quarterly(1)	EPA-375.4/9038	1.0	mg/l
Cations				
Calcium	Annual	EPA-200.7/6010B	0.50	mg/l
Potassium	Annual	EPA-200.7/6010B	0.50	mg/l
Magnesium	Annual	EPA-200.7/6010B	0.50	mg/l
Sodium	Annual	EPA-200.7/6010B	0.50	mg/l
Total Dissolved Solids	Quarterly(1)	EPA-160.1	50	mg/l

(1) After project year 27, parameters will be analyzed on an annual basis.

46. Unless otherwise approved by the MDNRE, the sampling procedures and statistical methods used in the operational monitoring plan shall continue to be used by the permittee during the post-closure monitoring period. The permittee shall continue the operational biological monitoring program described in Section 6 of the Permit Application for a period of five years after reflooding of the underground mine.
47. Joints in concrete floors shall be sealed in the COSA. The permittee shall inspect all concrete floors monthly for cracks. If cracks are noted, they shall be sealed to reduce the possibility of leaks. Where floor sumps are used, the sumps will be wrapped with a plastic geomembrane to reduce the possibility of leaks.
48. Unless this Mining Permit otherwise requires a different specific schedule, the permittee shall inspect or monitor liners, covers, leachate collection systems, leak detection systems, berms, and embankments at least monthly.

M. Contingencies

1. As a contingency measure, the permittee shall leave the WWTP and associated infrastructure in place for five years after reflooding is complete, as described in Section 7.4.2.8.1 of the Permit Application. If monitoring indicates there is the potential for upward migration of fluids associated with the underground openings such that there could be an impact on the quaternary aquifer, the permittee shall pump water out of the upper bedrock workings, treat it at the WWTP, and recirculate the treated water back into the upper bedrock workings. Flushing the upper bedrock workings with clean water shall continue until water quality conditions in the upper workings are protective of groundwater in the regional aquifer.
2. The permittee shall maintain sufficient reserve electrical power to keep all necessary pumps and treatment systems operational in the event of a generator malfunction.

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3. The permittee shall provide a fire water system for fire protection during construction, operations, and decommission.
4. In the event of a roll over of a truck while transporting ore from the mine site to the railhead site, spilled ore shall be picked up with conventional earthmoving equipment and placed back into a truck or railcar as soon as possible. If an accident results in spillage of ore into a water body, the permittee will immediately notify MDNRE and other agencies as identified in the Contingency Plan and will expeditiously remove the spilled material in a manner approved by the applicable agencies.
5. The permittee shall implement contingency measures to mitigate a fuel spill as specified in the SPCC and/or PIPP. The permittee shall perform fuel tank integrity testing at regular frequencies to verify that the storage tanks are not leaking.
6. The permittee shall assure that operators are trained to respond to potential releases of fuel from leaking hoses or valves, mobile storage tank failure, mishandling of fuels, or related accidents. The permittee shall provide aDNREuate on-site spill response equipment.
7. Absorptive materials may be used initially to contain a potential spill. After the initial response, soil impacted with residual fuel shall be addressed. Remedial efforts shall include the removal of impacted soil to preclude migration of fuel to groundwater or surface water. The project's SPCC and/or PIPP plan shall address fueling operations, fuel spill prevention measures, inspections, training, security, spill reporting, and equipment needs. All responses to a fuel spill, both large and small, shall follow the guidelines dictated by the spill response plan. The tanks shall be inspected regularly, and records of spills shall be kept and reported to the MDNRE and other agencies as required.
8. In the event of a massive fuel tank failure, the permittee shall pump fuel released into the secondary containment into portable tanks and shall take such additional remedial action as may be required by the MDNRE.
9. The permittee shall implement appropriate preventative and contingency measures as required by MSHA to protect personnel in the event of a potential mine fire. These measures include fire suppression systems, the availability of fire extinguishers throughout the mine, employee safety training programs, and the use of a mine rescue team trained in firefighting techniques. Mine evacuation procedures, as described in the Permit Application, may be invoked as necessary.
10. The permittee shall provide for required safety equipment, personnel training, and standard operating procedures to respond to potential surface fires.
11. The permittee shall provide for a water truck to be stationed on-site during construction and operation of surface facilities and for all construction equipment to be equipped with fire extinguishers.

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12. During the operation of surface facilities, the permittee shall provide for fire extinguishers and standby water pipelines to be located in high risk areas, and shall train personnel in their use.
13. The permittee shall utilize an Incident Command System (ICS) structure to respond to emergencies. An emergency is defined as any unusual event or circumstance that endangers life, health, property, or the environment. The ICS shall provide for the following designated individuals to take immediate responsibility and control of the situation and ensures appropriate public authorities, safety agencies, and the general public are notified:
 - a. Incident Commander (IC). The General Manager at the facility will be designated the IC and will be responsible to ensure that emergency response actions are carried out in an appropriate and timely manner. The IC will ensure that appropriate resources are available, ensure the incident is secured, and release resources in an orderly manner. The IC will also ensure appropriate notification is made to all required regulatory agencies and necessary emergency response agencies.
 - b. Safety Officer. The facility Safety Officer and staff are responsible for ongoing review of ICS structures and will monitor activities in response to any emergencies. During an emergency, the Safety Officer will manage special situations that expose responders to hazards, coordinate emergency response personnel, mine rescue teams, fire response, and ensure relevant emergency equipment is available for emergency service. This individual will also work with the IC to ensure appropriate personnel are made available to respond to the situation.
 - c. Environmental Officer. The facility environmental manager will be responsible for managing any environmental aspects of an emergency situation. This individual will coordinate with the IC to ensure environmental impact is minimized, determine the type of response that is needed, and act as a liaison between environmental agencies and mine site personnel.
 - d. Public Relations Officer. The facility human relations manager will be responsible for managing all contacts with the public and will coordinate with the IC and the safety and environmental officers.
14. The permittee shall handle evacuation of the general public, if necessary, in conjunction with emergency response agencies. The Public Relations Officer will be responsible for notifying emergency response agencies and coordinating with other site personnel.
15. The permittee shall provide and maintain emergency equipment including, but not limited to, the following:
 - a. ABC Rechargeable fire extinguishers
 - b. Telephone mine communication system
 - c. Radios
 - d. First aid kits, stretchers, backboards, and appropriate medical supplies
 - e. 30 minute air packs

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- f. BG 4 breathers, RZ testers
 - g. Cap lamps
 - h. Self rescuers
 - i. Portable Refuge Stations
 - j. Mine elevator
 - k. Spill Kits (hydrocarbon and chemical)
 - l. Water truck and fire hoses
 - m. HAZMAT response equipment
16. The emergency equipment shall be located both underground and at the surface facilities. Fire extinguishers shall be located at appropriate locations throughout the facility, in accordance with MSHA requirements. Other emergency response equipment shall be located at appropriate and convenient locations for easy access for response personnel.
17. As part of the contingency plan, the permittee shall maintain a current list of the following emergency telephone numbers as required by R 425.205(1)(c):
- a. Representatives of the permittee.
 - b. The emergency management coordinator.
 - c. Local ambulance services.
 - d. Local hospitals.
 - e. Local fire and police departments.
 - f. The District Office of the MDNRE.
 - g. The MDNRE Pollution Emergency Alerting System.
 - h. Federal regulatory agencies as appropriate.
 - i. The MDNRE.
 - j. The Marquette County Health Department.
 - k. The Michigamme Township Supervisor.
18. The permittee shall provide appropriate and adequate training programs on emergency response procedures for employees responsible for responding to emergencies. These individuals shall include the Incident Commander, Safety Officer, Environmental Officer, Public Relations Officer, and other individuals designated to respond to emergencies and participate in mine rescue.
19. At least once each year, the permittee shall conduct a mock field exercise of the Contingency Plan. Test situations shall consist of emergencies that could be encountered at the mine operation, such as a release of a hazardous substance, an aboveground or underground fire, or a natural disaster. The permittee shall evaluate the response exercise after completion to determine the effectiveness of the Contingency Plan. The permittee shall involve local emergency response officials as appropriate. The permittee shall implement any changes or improvements found to be necessary and incorporate them into a revision of the facility Contingency Plan.

N. Groundwater and Surface Water Sampling Procedures

1. The collection of groundwater samples, water samples from the TDRSA and mine, and surface water samples shall be completed in accordance with the Eagle Project Quality Assurance Project Plan and Standard Operating Procedures, as described in Section 6.4 of the Permit Application. These quality control documents have been previously provided to the MDNRE and describe the following in accordance with R 425.203:
 - a. Surface water sampling procedures.
 - b. Groundwater sampling procedures including well purging procedures.
 - c. Procedures to prevent cross contamination of samples.
 - d. QA/QC program including the use of field blanks and duplicates.
 - e. Procedures for the collection of groundwater and surface water field data.
 - f. Sample preservation, documentation, and chain-of-custody procedures.
 - g. Data validation procedures.
 - h. Well installation development and abandonment procedures.
2. The permittee shall statistically assess groundwater and surface water quality data during operations for distributional changes as a result of mining activities, as described in Section 6.4 of the Permit Application. Statistical methods will include testing for trends in water chemistry and comparing constituent concentration levels to those observed in background or upgradient locations. Appropriate parametric or nonparametric statistical methods shall be utilized in consideration of the observed data characteristics, i.e., the distributional form of the data and the amount of data points below the detection level. In addition, sources of variation in the data unrelated to site activities, such as seasonality, shall be statistically estimated and controlled. Relevant documents containing guidance for selecting appropriate statistical tests are:
 - a. Department of Natural Resources and Environment, 2002. Sampling Strategies and Statistics Training Materials for Part 201 Cleanup Criteria.
 - b. Gilbert, R. O., 1987. Statistical Methods for Environmental Pollution Monitoring, Van Nostrand Reinhold, New York.
 - c. USEPA, 2000. Practical Methods for Data Analysis—EPA QA/G-9, EPA/600/R-96/084.
 - d. USEPA, 1992. Statistical Analysis for Groundwater Monitoring Data at RCRA Facilities – Addendum to Interim Final Guidance, PB89-151047.
3. The permittee shall provide to the MMU Supervisor quarterly and annual summary reports of monitoring data and analyses completed. The permittee shall maintain all related monitoring data in a database including well borehole logs and construction records.

O. Financial Assurance

1. This Mining Permit is not effective until the permittee establishes financial assurance in the amount of \$17,000,000. The value is based on additional commitments made by the permittee in their response to the MDNRE's June 21,

2006, letter which includes the cost to the MDNRE for overseeing the work. The following are specific cost increases:

- a. Reclamation of the TWIS will likely take place in Year 12 as identified in Section 7.4.1.8 of the Permit Application. The estimated cost for removal of the TWIS piping and infrastructure, and regrading and vegetating the area is approximately \$50,000.
 - b. In the event the WWTP needs to be operated for five years after reclamation of the under ground mine, as described as a contingency in Section 7.4 in the Permit Application and in the Kennecott Eagle Minerals Company response to comment No. 46 in MDNRE's June 21, 2006, letter, the operating costs and MDNRE oversight are estimated to be \$5,000,000.
 - c. The addition of backfill material for backfilling secondary stopes on mine levels 383 meters and 353 meters with the same cement mixture used for backfilling the primary stopes increases the cost by approximately \$500,000 relative to what is specified in Table 7-6 of the Permit Application.
 - d. Increasing the thickness of the drainage layer in the TDRSA as outlined in Special Permit Condition F 13, increases the reclamation cost by \$35,000.
2. The permittee shall periodically update the amount of financial assurance in accordance with the requirements of R 425.301.

P. Reclamation Plan

1. After mining is completed, the ventilation shaft shall be reclaimed as detailed in Section 7.4.2.3 of the Permit Application, with the additional requirement of a reinforced concrete plug that is tied into the surrounding rock to prevent collapse, set from a depth of 10 feet below ground surface to 18 inches below ground surface. The ventilation shaft site shall then be backfilled to the ground surface, then seeded and mulched for final restoration.
2. The underground workings, portal, and vent shaft shall be reclaimed to prevent adverse impacts from migration of fluids from the underground openings upward into the alluvial aquifer.
3. The permittee shall place cemented backfill plugs at approximately 335 meters MSL (as depicted in Figure 7-2 of the Permit Application) in the mine decline and underground workings to prevent adverse impacts from interconnection of different groundwater regimes as described in the Reclamation Plan.
4. After mining is completed, the permittee shall accelerate reflooding of the underground openings through two wells (as depicted in Figures 7-2 and 7-3 of the Permit Application) that will pump water into the mine workings in the upper and lower bedrock to prevent further exposure to oxygen. The permittee shall monitor the workings and surrounding bedrock vertical gradients utilizing bedrock piezometers (as depicted in Figure 7-3 of the Permit Application) to confirm the vertical gradient after reflooding is completed.

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5. The permittee shall reclaim the portal by removing salvageable equipment and installing a reinforced concrete plug at the portal opening that is two feet or greater in thickness.
6. The permittee shall utilize all development rock generated in the mine development for backfilling of mined-out areas of the mine.
7. If the permittee utilizes Class C Fly ash as an amendment to cement, as outlined in the Permit Application, it must conform to the requirements of Part 115, Solid Waste Management, of the NREPA and as approved by the MDNRE.
8. At such time as monitor wells are to be abandoned, the permittee shall abandon the wells in accordance with MDNRE requirements.
9. The permittee shall reclaim the Eagle Project site, consisting of approximately 90 acres of surface area and the underground mine workings, at the conclusion of mining to establish a self-sustaining ecosystem in conformance to R 425.204 and R 425.407. The reclamation shall restore the property to a condition commensurate with the pre-mining landscape using native vegetation to promote enhancement of wildlife habitat. The final land use of the site will be compatible with existing uses on adjacent properties.
10. The permittee shall, to the extent feasible, conduct reclamation activities concurrently with the mining operation, and in any event shall initiate reclamation activities at the earliest possible time after cessation of mining activities in any portion of the mining area. Reclamation activities shall commence during initial construction activities and shall continue through facility closure and the postclosure care period.
11. During site construction, the permittee shall reclaim areas disturbed during construction as soon as practical after construction is completed for a particular area. At the main surface facility site and backfill site, the permittee shall grade and seed vacant disturbed areas. At the access road, the permittee shall seed disturbed areas between the shoulder and right-of-way. The permittee shall seed soil stockpiles.
12. At facility closure after mining activities cease, the permittee shall decommission unnecessary site infrastructure and restore the property to pre-mining conditions. The permittee shall remove the TDRSA and other site structures no longer needed; complete site final grading; seed and mulch disturbed areas; install erosion control features; remove underground equipment; remove site utilities and generators (one generator shall remain for the WWTP contingency plan); install postclosure monitoring devices; and reclaim the underground mine workings.
13. Closure of the TDRSA is expected in operating year eight. Development rock shall be returned to the mine as part of the underground reclamation. The underlying water collection system and liner will be removed; the water collection drainage

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layer may be used as backfill in the mine if it meets statutory requirements or disposed off-site in accordance with applicable regulations. Geosynthetic liner components will be removed and disposed of as backfill in the mine if they meet statutory requirements or in a licensed landfill. Mechanical components such as pumps or other salvageable materials will be removed from the property. Upon removal of all facility components, the area will be regraded to allow efficient use of the area during the remainder of the mining operation and postclosure monitoring period.

14. Closure of the remaining surface facilities and underground facilities is expected to occur in years 9 through 12. However, the CWBs, WWTP, and one generator shall remain in operation for the first five years of post-closure as a contingency for treatment of mine water. It is expected these facilities will close in year 17.
15. Buildings shall be demolished after salvageable materials have been removed. Demolition debris shall be removed from the site and disposed at an approved off-site disposal facility. All regulated materials, if any, shall be disposed in a manner consistent with state and federal regulations.
16. Concrete foundations and floor slabs shall be broken up and recycled or managed in accordance with applicable regulations.
17. After removal of all debris, the building areas shall be graded to eliminate ponding and to promote surface water drainage.
18. As an alternative to demolition of a building, the permittee may enter into an agreement with another party for beneficial use of the building, subject to applicable laws or ordinances.
19. Reclamation of facility roads is expected to begin in year 9 and 10. With the exception of the main site access roads, internal site roads will be graded to provide a natural pre-development condition. A minimum number of roads will be maintained to allow access to post-closure monitoring devices. Roads to be reclaimed shall be graded consistent with surrounding ground slopes, topsoiled, and revegetated. Any gravel surface material shall be disposed of underground if statutory requirements are met or removed from the site.
20. Reclamation for the surface water management facilities shall include removal of the CWBs and NCWIBs; removal of hard structures such as pumps, culverts and risers; and revegetating.
21. Culverts shall be removed and ditches regraded to conform to the reclamation grading plan. After hard structures are removed, the areas shall be regraded and vegetated.
22. Reclamation of the sanitary systems shall include removal of septic holding tanks, pipes and valves, including all pipes in the drain field. Most of sanitary components

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will not be salvageable and will be managed in accordance with applicable regulations. The disturbed areas shall then be regraded consistent with the reclamation grading plan and revegetated.

23. Reclamation of the potable water system shall include removal of pressure tanks, piping, treatment systems, and piping. The potable well shall be abandoned pursuant to MDNRE well abandonment requirements.
24. The TWIS shall be decommissioned when the WWTP is no longer necessary, including the five year post-closure contingency specified in Special Permit Condition P25. Reclamation of the TWIS shall include removal of all piping and mechanical systems and regrading the infiltration cell areas. Plastic pipe shall be disposed of in a licensed landfill.
25. During the postclosure monitoring period, the permittee shall remove any remaining infrastructure. The permittee shall conduct incidental grading; install erosion control features; seed and mulch remaining disturbed areas; monitor groundwater and surface water to end of postclosure monitoring period; monitor flora and fauna for five years after completion of reclamation; remove WWTP, CWBs, and electrical generator in approximately year 17.
26. The water treatment system shall remain in operation for five years into the post-closure period (approximately year 17) as part of the contingency plan for the underground mine. In year 17 the WWTP, CWBs, and the generator building shall be decommissioned and the areas reclaimed.
27. The permittee shall complete final site grading as shown on Figure 7-1 of the Permit Application, consistent with pre-development topography gently sloping towards the west/southwest.
28. Topsoil stockpiled during site development shall be re-spread over the disturbed area. In year 17, the WWTP, CWB, and generator building areas will be regraded and topsoiled. After the surface facilities have been removed, the disturbed areas will be final graded and topsoiled. Stockpiled excess soils will be graded across the site in lifts not exceeding 18 to 24 inches. After placement of each lift, the soil will be compacted and the subsequent lift of soils will be placed. Generally topsoil material will be graded to approximately three inches thick, consistent with pre-development thickness.
29. All disturbed surface areas shall be revegetated with a variety of plants that are native to the area, except that non-native plants may be used for revegetation in areas where appropriate for an approved final land use.
30. Erosion control methods described for construction shall be utilized during reclamation. During reclamation, erosion control practices shall include:
 - a. Applying mulch to all ground cover areas.
 - b. Installing silt fence.

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- c. Installing erosion control fabric on slopes steeper than eight percent.
 - d. Installing straw bale check dams or rock filled gabions in drainage ditches.
 - e. Using of sized riprap in ditches to reduce water velocity.
31. During reclamation, temporary silt control basins shall be constructed to contain surface water runoff. These structures shall be strategically placed during final site grading to better control surface water runoff during site reclamation activities. Exposed areas being reclaimed will be kept wet as necessary to control fugitive dust. After completion of site grading the temporary basins shall be filled in and restored to the surrounding topography.