



STATE OF MICHIGAN
Department of Environmental Quality



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

Permit Number: **MP 01 2012** Date Issued: **April 30, 2012**

Issued to:

Orvana Resources US Corp
N 10199 Lake Road
Ironwood, MI 49938

For the:

Copperwood Mine

Location of Mine:

T49N, R45W ; T49N, R46W; and T50N, R46W, Ironwood and Wakefield
Townships, Gogebic County, Michigan

The Michigan Department of Environmental Quality (MDEQ) hereby issues this Nonferrous Metallic Mineral Mining Permit (Mining Permit) to conduct nonferrous metallic mineral mining operations to Orvana Resources US Corp for the Copperwood Mine. 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 Orvana Resources US Corp for the Copperwood Mine, 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.

Signed

Michigan Department of Environmental Quality

4/30/2012

Date

**GENERAL PERMIT CONDITIONS
NONFERROUS METALLIC MINERAL MINING PERMIT NO. MP 01 2012
ORVANA RESOURCES US CORP – COPPERWOOD MINE
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, Nonferrous Metallic Mineral Mining, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, of the Michigan Compiled Laws.
 - b. "Rule 425.XXX" refers to a rule under the Michigan Administrative Code.
 - c. "MDEQ" means the Michigan Department of Environmental Quality.
 - d. "MDNR" means the Michigan Department of Natural Resources.
 - e. "MDOT" means the Michigan Department of Transportation.
 - f. "MSHA" means the FEDERAL Mining Safety and Health Administration.
 - g. "Person" means an individual, partnership, corporation, association, governmental entity, or other legal entity.
 - h. "Emergency Management Coordinator" means that term as defined in Section 2 of the Emergency Management Act, 1976 PA 390, MCL 30.402.

B. Authorizations

1. The permittee shall not engage in the mining of nonferrous metallic minerals, as defined in Rule 425.102(1)(e), at the Copperwood Mine except as authorized by this Mining Permit.
2. This Mining Permit is not effective until all other permits required under the Natural Resources and Environmental Protection Act (NREPA) for the Copperwood Mine are obtained. The permittee shall comply with all other applicable permit standards under the NREPA.
3. This Mining Permit will remain in effect until terminated or revoked by the MDEQ. The MDEQ may terminate this Mining Permit under the conditions specified in Section 324.63207(2). The MDEQ 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 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.

C. Transfer or Amendment of Permit

1. The MDEQ may transfer this Mining Permit to another person after public notice as follows:
 - a. The person acquiring this Mining Permit shall submit to the MDEQ 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 MDEQ to be in violation of Part 632 of the NREPA, or the rules promulgated thereunder, at the Copperwood Mine, 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 MDEQ to correct all of the violations.

Pending the transfer of this Mining Permit, the proposed transferee shall not operate the Copperwood Mine.

2. The MDEQ will not transfer this Mining Permit to another person if the MDEQ 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 MDEQ under Part 632 of the NREPA, unless the person has corrected the violation or the person has agreed in writing to correct the violation pursuant to a compliance schedule approved by the MDEQ.
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 Rule 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 Copperwood Mine to another person, and the MDEQ has not approved a request for transfer of this Mining Permit, then, in addition to other enforcement actions, the MDEQ may order the immediate suspension of any or all mining activities at the Copperwood Mine, 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 Rule 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 Rule 425.301.
 - f. Other terms and conditions of this Mining Permit.

D. Financial Assurance

1. The permittee shall maintain financial assurance during mining operations until all reclamation has been completed and approved by the MDEQ, and throughout the post-closure monitoring period, as prescribed under Section 324.63211 and Rule 425.301; or until the MDEQ 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 MDEQ to order immediate suspension of activities at the Copperwood Mine, pursuant to Section 324.63221.
2. The MDEQ 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 Rule 425.301(2), based upon an update of financial assurance as described in Section 324.63211(2) and Rule 425.308.

E. Mining and Beneficiation

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 milling facility.
3. Tailings transport systems, if not buried, should be designed to provide for emergency tailings conveyance or storage should a pipeline break, plug, freeze or require repairs and be made accessible for inspection, emergency repair, and maintenance. Location of emergency spill areas shall be designed to prevent contamination of surface water. If a power failure occurs, then tailing pipelines shall be self-draining to the tailings area or to an emergency spill area or standby pumps and pipelines or standby power shall be provided. In some cases (such as a long pipeline over rough country), several spill areas may have to be provided.
4. The permittee shall submit all design certifications of liners, covers, and leachate collection systems to the MDEQ and shall not begin placement of the

ore, waste rock, overburden, or tailings in the storage facility until approved by the MDEQ.

5. The permittee shall conduct reclamation activities at the Copperwood Mine in accordance with the mining, reclamation, and environmental protection plan submitted as part of the Mine Permit Application.
6. If mining operations are suspended at the Copperwood Mine 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.
7. Unless the MDEQ 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 Copperwood Mine and shall complete reclamation within the time set forth in the mining, reclamation, and environmental protection plan submitted as part of the Mine Permit Application.

F. Records, Reports, and Notifications

1. The permittee shall provide written notice to the Office of Oil, Gas and Minerals (OOGM) Upper Peninsula District Geologist, of the date mining will commence at least 30 days prior to mining activities.
2. The permittee shall file with the OOGM Upper Peninsula District Geologist 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 Rule 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 Ironwood and Wakefield Townships.
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 MDEQ.
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 MDEQ 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.

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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 MDEQ upon request.
6. The permittee shall file with the OOGM Upper Peninsula District Geologist an updated estimate of the cost of reclamation for mining activities for the current and succeeding 2 years of operation of the mine on or before March 15 of every third year after issuance of this Mining Permit, or as the MDEQ determines to be necessary.
7. The permittee shall promptly notify the OOGM Upper Peninsula District 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 Copperwood Mine 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 OOGM Upper Peninsula District Geologist during normal business hours or to the MDEQ Pollution Emergency Alerting System (PEAS) between 5:00 p.m. and 8:00 a.m. and on weekends and holidays.
8. The permittee shall submit to the OOGM Upper Peninsula District 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 OOGM Upper Peninsula District 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 post-closure 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 OOGM Upper Peninsula District Geologist 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 Rule 425.103(c), within 30 days after any significant changes in the permittee's corporate organization.

G. Annual Nonferrous Metallic Mineral Surveillance Fee

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

H. Access by MDEQ

1. Authorized representatives of the MDEQ may enter at all reasonable times in or upon the Copperwood Mine 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 MDEQ 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 OOGM Upper Peninsula District 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 the Mine Permit Application to prevent damage to adjacent properties not owned by the permittee.

B. Other Permits and Requirements

1. The permittee shall operate the Copperwood Mine in conformance with all applicable NREPA permits.
2. The permittee shall file annual reports in compliance with the Federal Emergency Planning and Community Right to Know Act during operation of the Copperwood Mine.
3. The permittee shall prepare and implement a Spill Prevention Control and Countermeasures (SPCC) Plan for the fuel storage area that conforms to the 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.
6. The permittee shall submit design plans for all aboveground storage tanks that will contain flammable or combustible materials to the MDEQ 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.

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 Rule 324.2001 through Rule 324.2009 at least 30 days prior to start up of the Wastewater Treatment Plant (WWTP) at the Copperwood Mine. Within 30 days after its completion, the permittee shall notify the OOGM Upper Peninsula District Geologist and certify that the facility is in full compliance with Rule 324.2001 through Rule 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 MDEQ at their 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 Rule 324.2001 through Rule 324.2009. Upon preparation of an updated plan, the permittee shall notify the MDEQ and recertify compliance with these rules.

C. Coverage

1. The Permittee will both extract and beneficiate the ore on-site. Therefore, a separate mine permit for beneficiation is not required as prescribed in Rule 201, (2), (a) and (b).
2. This Mining Permit governs construction, operation, closure, post-closure monitoring, reclamation, and any necessary remediation of the Copperwood mine workings, mill site, Tailings Disposal Facility (TDF), and other project facilities. However, this Mining Permit shall not supersede or contravene any provisions on remediation in other applicable Parts of the NREPA.
3. The Copperwood Mine consists of three basic operations: Underground mine, beneficiation of ore and tailings disposal.
4. The Copperwood Mine underground mine workings include the Box Cut (mine entrance), ramp, and associated underground excavations.
5. Surface facilities may consist of milling facilities; temporary storage for ore; water storage, treatment and discharge; TDF; and other ancillary operations as outlined in Section 203.3 in the Mine Permit Application.
6. Unless approved by the MDEQ pursuant to an amendment to the permit, the permittee shall conduct mining operations in accordance with the approved environmental protection plan, mining plan, containment plan, monitoring plan,

contingency plan, reclamation plan, and post-closure monitoring plan submitted in the Mine Permit Application; and the tables, illustrations, figures, technical reports, calculations, and other data accompanying and supporting those documents.

D. Surface Facilities

1. During initial construction of the surface facilities, the permittee shall utilize the following practices:
 - a. Any unmarketable timber removed from activities may be chipped and stockpiled on-site for use in landscaping and reclamation.
 - b. Roots and stumps that will be chipped or burned on-site, pursuant to a burning permit to be obtained from the MDNR.
 - c. Erosion control devices, such as silt fences, shall be installed in accordance with best management practices.
 - 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 an appropriate seed mixture.
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. Excess soil from the site development and on-site road construction shall be stockpiled on site for use during reclamation. The permittee shall maintain topsoil and other soil stockpiles by replacing or repairing silt fences as needed; maintaining other soil erosion control structures and measures; repairing eroded areas including regrading and revegetating; and cleaning ditches where silt and/or sand has accumulated.
4. The permittee shall construct and maintain all-weather gravel or paved roads for on-site access to the facilities.
5. All fuel storage shall comply with applicable state and federal standards.
6. 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. Adequate secondary containment around all above ground tanks.
 - d. Staging of on-site emergency response equipment to quickly respond to unanticipated spills or leaks.

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7. The permittee shall limit access to the Copperwood Mine.
8. The permittee shall maintain fences and gates in a manner that preserves their intended purpose.
9. 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.
10. The permittee shall control fugitive dust from traffic areas at the surface facility using methods consistent with the Air Use Permit for fugitive dust control plan. Unpaved areas 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.

E. Mining/ Beneficiation Plan

1. The permittee shall advise the MDEQ in advance of any significant planned departure from the schedule for construction and operation activities proposed in the Mine Permit Application.
2. The permittee shall utilize only underground mining methods at the Copperwood Mine.
3. The permittee shall use grout if necessary following industry standard techniques, methods, equipment, and grouting material.
4. As mining progresses, starting at the Box Cut, the permittee shall collect geotechnical and hydrogeologic data to evaluate the potential of mine induced impacts to groundwater and surface water.
5. Coarse ore and concentrate shall be maintained to prevent leachate from contaminating the environment.
6. All mill buildings shall be equipped with collection sumps to collect contact water. Contact water shall be used as facility process water, routed to the tailings discharge line, or treated in the WWTP.
7. All crushing, grinding, and conveyor equipment shall be equipped with systems to suppress dust such as "wet spray" systems or a bag-house.
8. After concentrate trucks are loaded they shall be washed prior to leaving the mill facilities.
9. At the load out facility, rail cars shall be covered to reduce the potential for concentrate to escape to the environment during transport to an off site smelter.

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10. All accumulated concentrate shall be removed from trucks and rail cars prior to leaving the mill facilities and load out facilities.
11. All chemical reagents used for processing shall be stored in secure contained locations.
12. The tailings transport system to the TDF shall have secondary containment.
13. The tailings transport system shall be equipped with a leak detection system to monitor system breaches.

F. Tailings Disposal Facility (TDF)

1. Construction of the TDF shall not begin until the permittee has demonstrated that the design of the TDF is consistent with the requirements of Rule 425.409 of Part 632 of the NREPA, and the permittee has received approval of the plans and specifications from the MDEQ. The permittee is encouraged to work with the MDEQ throughout preliminary and final design phases to ensure timely approval.
2. The permittee shall conduct a Quality Assurance and Quality Control (QA/QC) program during the installation of the TDF liner system, leachate collection and cover system, as applicable, in conformance with the Construction Quality Assurance (CQA) procedures under Michigan's Solid Waste Management Rules.
3. The permittee shall develop an operations plan for the TDF that addresses all components of the final design, including, but not limited to, the operations and maintenance of the basin underdrain system, drainage collection systems, instrumentation systems, and embankment and cover system maintenance.
4. Upon approval by the DEQ, the plans and specifications for the TDF and the operations plan for the TDF, including any DEQ-approved modifications thereto, shall become incorporated into and enforceable under the permit issued pursuant to Part 632 of the NREPA. All modifications of, changes to, or deviations from the approved plans and specifications or operations plan require approval by the DEQ prior to construction and/or implementation.

G. Ore/Concentrate Transporting

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. Wash water shall be used as facility process water, routed to the tailings discharge line, or treated in 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.

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3. The permittee shall monitor haul roads to minimize accidental spillage of ore, concentrate, or tailings and to assure that any spillage is promptly recovered and cleaned up.
4. The permittee shall transfer concentrate from the milling facilities to the railhead in haul trucks covered with secured caps.
5. The permittee shall convey crushed ore on covered conveyors. The conveyors shall be inspected and maintained on a continuous basis during operations.

H. Water Management and Treatment

1. 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.
2. The permittee shall submit a full set of WWTP and sewage lagoon system engineering designs to the OOGM Upper Peninsula District Geologist prior to construction. The permittee must submit such designs in a timely manner to receive written approval of the engineering designs from the MDEQ before construction of the WWTP and sewage lagoon system. The permittee is encouraged to work with the MDEQ throughout preliminary and final design phases to ensure timely approval.
3. The permittee shall operate and maintain the surface facility to segregate contact runoff from non-contact runoff.
4. The permittee shall conduct regular inspections of water retention basins to determine the extent of sedimentation build up that could reduce water retention storage capacity.
5. The permittee shall produce, manage, treat, and discharge water associated with the mine operations only in conformance with the National Pollutant Discharge Elimination System (NPDES) Permit.
6. All conveyance pipes leading to and from the Mill, TDF and WWTP shall be constructed with secondary containment.

I. Waste and Hazardous Materials Management

1. 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.

2. Lubricants used for maintenance purposes shall be stored indoors. All storage will be in accordance with the federal SPCC Plan and/or the PIPP. Used oil and grease will be stored and recycled in accordance with federal and MDEQ used oil regulations. Metal shavings will be properly contained in the shop area and shipped to a metals recycler for recycling and reuse.
3. The permittee shall install secondary containment areas for chemical reagents being stored. In addition, all off-loading areas of bulk chemicals shall have a sloped and curbed pad to direct and contain spills.
4. The permittee shall dispose of the dewatered microfiltration sludge from the WWTP according to state and federal regulations.
5. The permittee shall store blasting materials in a secure area in conformance with the Alcohol Tobacco and Firearm and MSHA standards.

J. 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 203.3.22 of the Mine Permit Application and Orvana Resources US Corp's December 28, 2011, and January 6, 2012, response to MDEQ comments.
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.
 - b. Permittee's staff shall be certified as storm water operators to complete the required inspections and coordinate repairs and maintenance during construction.
 - c. Clearing and grubbing shall be completed as a single continuous operation to minimize disturbance.
 - d. Silt fencing shall be placed downgradient before clearing and grubbing.
 - e. Topsoil shall be stripped from the mine site area immediately after clearing and grubbing.
 - f. 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.

- g. As soon as possible after establishment, stockpiles shall be prepared and seeded with a mixture adapted for clay soil as specified in the MDOT 2003. 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 Copperwood Mine.
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 snowmelt 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.

K. Monitoring

1. 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.
2. At such time as monitor wells are to be abandoned, the permittee shall abandon the wells in accordance with MDEQ requirements.
3. To assess regional impacts to groundwater and major surface water features from mine dewatering and post-closure re-flooding, the permittee shall install four nested pair monitoring wells. The final locations and well construction details must receive MDEQ approval. Existing wells may be used if appropriate. Each nested pair shall have one well completed in the unconsolidated formation and one well completed in the upper portion of the bedrock. The permittee shall measure each calendar quarter the groundwater elevations to the nearest 0.01 foot in each well and report to the MDEQ the results annually throughout the life of the mining and reclamation periods. The four nested well pairs shall be located approximately in the below-listed areas.
 - a. NW1/4 of the SW1/4 of Sec 32, T50N, R45W
 - b. NW1/4 of the SE1/4 of Sec 36, T50N, R46W
 - c. SE1/4 of the NW1/4 of Sec 12, T49N, R46W
 - d. SW1/4 of the SW1/4 of Sec 2, T49N, R46W
4. If monitoring of the four nested well pairs required in Special Permit Condition K3 indicates an impact to regional groundwater, the predictive model must be re-evaluated and re-calibrated to better match actual conditions. The permittee must provide to the MDEQ within 180 days of identifying an impact, the re-calibrated predictive model output. The new model will also assess the

potential impact to stream flow in the Presque Isle and Black Rivers and the potential impact to nearby private water supply wells.

5. To assess potential impacts to groundwater quality the permittee shall use existing or install new monitoring wells as necessary to monitor upgradient, downgradient, and cross-gradient groundwater quality around the TDF. Monitoring frequency and schedule shall follow the plan specified in Section 203.7.4 of the Mine Permit Application. The monitoring point locations shall be prior approved by the MDEQ. In addition to the constituents listed in Table 203.7.6-1 in the Mine Permit Application, samples shall be collected and analyzed biannually for antimony, beryllium, lithium, and thallium.
6. To assess potential impacts to groundwater quality, the permittee shall use existing or install new monitoring wells as necessary to monitor upgradient, downgradient, and cross-gradient groundwater quality around the entire surface facility area. Monitoring frequency and schedule shall follow the plan specified in Section 203.7.4 of the Mine Permit Application. The monitoring point locations shall be prior approved by the MDEQ. In addition to the constituents listed in Table 203.7.6-1 in the Mine Permit Application, samples shall be collected and analyzed biannually for antimony, beryllium, lithium, thallium, and Volatile Organic Compounds (VOC's) annually.
7. The permittee shall collect samples of water being pumped from the mine workings following the monitoring and frequency schedule, and analyze the samples for the parameters listed, in Special Permit Condition K5.
8. As mining proceeds and intersects the fault zone identified on figure 202.2.3-11 of the permit application, the permittee shall assess the hydraulic conductivity of the fault zone area. If the hydraulic conductivity of the fault zone is greater than or equal to one order of magnitude higher than the surrounding bedrock, the permittee shall adjust and re-run the predictive groundwater model. Either the new predictive model output, which shall show the revised predictive impacts to regional groundwater and surface water levels due to mine dewatering or the results of tests proving that the fault zone is not more conductive shall be submitted to the MDEQ within 180 days of encountering the fault zone.
9. If the fault zone identified in Special Permit Condition K8 is more conductive than originally modeled, the permittee shall provide within 180 days of the determination a plan of action. The plan shall detail how the permittee will identify if the fault zone is expressed at the bedrock surface or if the fault zone intersects with Lake Superior. The plan will also contain details, if necessary, on how the permittee will reduce water flow through the fault zone into the mine workings and minimize impacts to the regional groundwater network.
10. The permittee may request approval to adjust the list of parameters or frequency of groundwater monitoring based on results of analytical data.

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11. The permittee shall conduct regional hydrologic monitoring to evaluate local and regional stream flow and quality and local and regional groundwater elevations in accordance with the requirements of Rule 425.203(g) and Rule 425.406.
12. In addition to its proposed groundwater monitoring, as described in Section 203.7 of the Mine Permit Application, the permittee shall monitor groundwater elevations in the wells referred as MW-09-57, MW-09-66, MW-08-15, MW-08-13, MW-08-9, and MW-08-2, as shown on Figure 203.7.1-1 using automated dataloggers. An individual datalogger shall be deployed and maintained in each well, with a programmed recording interval of every six hours. The groundwater level data, along with relevant quality data QA/QC notes, shall be submitted to MDEQ every six months for a minimum of five years after permit issuance. The dataloggers shall be installed prior to commencing mining operations.
13. The permittee shall monitor the flow of water from the WWTP with a meter that reports total flow. The permittee shall keep a log of daily meter readings and computed daily flow in United States (US) gallons per day, which shall be available for inspection by the MDEQ upon request.
14. The permittee shall collect quarterly surface water quality samples from locations identified on Figure 203.7.2-1 of the Mine Permit Application, and analyze for parameters listed on Table 203.7.6-2 in the Mine Permit Application.
15. In addition to Special Permit Condition K15, the permittee shall submit a plan to the OOGM Upper Peninsula District Geologist to monitor surface water and aquatic biota. The permittee must receive written approval of the plan from the MDEQ before conducting any mining operations. The plan shall incorporate the following information:
 - a. Surface Water Quality Control Sites: Since regional influences may cause either chronic or acute impacts to water quality, a long-term control data set is needed to help explain consequences of ore milling operations versus natural occurrences. Therefore, the permittee shall add surface water quality stations outside the influence of the Copperwood Mine site to serve as controls to the stations already being monitored as part of an approved long-term monitoring plan.
 - b. Analytical methods used for ambient water samples shall include the US Environmental Protection Agency (USEPA) trace metals/elements methods.
 - c. Aquatic Biota Sampling: To detect environmental impacts and evaluate compliance with Part 632 of the NREPA, the permittee shall continue to monitor and assess the fisheries, aquatic macroinvertebrate communities, and aquatic habitat at currently selected baseline monitoring locations and at acceptable control sites. A long-term aquatic sampling plan

- including a description of proposed control sites, sampling methods, and a standardized monitoring schedule shall be submitted to the OOGM Upper Peninsula District Geologist for approval.
- d. The current ambient monitoring stations selected by the company should be revisited on a periodic basis over the life of the discharge. To reduce the effects of seasonal variability, ambient monitoring should be conducted in the same season throughout the life of the facility operations.
16. The permittee shall notify the OOGM Upper Peninsula District Geologist and shall institute an increased monitoring program or implement response activity, as described in Rule R 425.406 of the rules promulgated under Part 632 of the NREPA and as approved by the MDEQ, at such time results indicate an actual or potential impact from mining operations.
17. The permittee shall survey the relative abundance of reptile and amphibian communities at two sampling locations agreed to by the permittee, MDEQ, and MDNR Fisheries Division, Habitat Management Unit. The survey shall be conducted consistent with the procedures used in the April 2010 Baseline Wildlife Inventory, including the installation of drift fences near perennial streams during the breeding season prior to construction. The permittee shall submit to MDEQ a report of the methods, findings, and data within 60 days of the field survey.
18. The permittee shall utilize results of the fish, aquatic macroinvertebrates, and aquatic habitat surveys in conjunction with water quality monitoring results, as applicable, to determine compliance with Part 632 of the NREPA.
19. The permittee shall conduct regular inspections of impermeable surfaces, and make repairs as necessary.
20. The permittee shall operate, monitor, and maintain the WWTP to assure the treated effluent meets the effluent standards set in the NPDES permit.
21. The permittee shall monitor wastewater effluent continuously for indicator parameters to verify proper operation. Effluent not meeting treatment requirements shall be pumped back to the TDF for re-treatment.
22. The permittee shall conduct ongoing characterization of the geochemistry of the footwall and hanging wall rocks, ore, and tailings throughout the mining operation to calibrate and adjust the model and predictions of reactivity.
23. In addition to monitoring described elsewhere in this permit, the permittee shall conduct monitoring required under the NPDES permit, air permit, and storm water construction and industrial storm water permits, and Parts 301/303 permits.

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24. 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 US gallons per day, which shall be available for inspection by the MDEQ upon request.
25. The permittee shall inspect the diversion berms around the mill and box cut, storm water basins, conveyance structures, the detention pond north of the mill building, and the TDF decant overflow pond monthly or after any rainfall event that exceeds ½ inch in a 24-hour period. The permittee shall maintain an inspection log at the Copperwood Mine that documents the results of the inspections. Preventive or corrective maintenance actions shall be performed as soon as possible to repair defects or damaged areas.
26. Leak detection systems shall be inspected monthly, after any rainfall event that exceeds ½ inch in a 24-hour period, and after the spring snowmelt and runoff period. Any flows present in a leak detection system shall be sampled and analyzed for key parameters that are indicative of the source of the flow. The permittee shall maintain an inspection log at the Copperwood Mine that documents the results of the inspections. Preventive or corrective maintenance actions shall be performed as soon as possible as required.
27. The permittee shall inspect the retention dam surrounding the TDF on a shift-by-shift schedule as required by MSHA and Part 315 Dam Safety regulations. The permittee shall maintain an inspection log at the Copperwood Mine that documents the results of the inspections. Preventative or corrective maintenance actions shall be performed as soon as possible as required.
28. The permittee shall monitor for threatened and endangered species during mine operations as specified in Section 203.10 of the Mine Permit Application and Permit Application Responses dated December 28, 2011.
29. The permittee shall monitor for flora, fauna, fish, and wildlife habitats, and biodiversity during mine operations as specified in Section 203.11 of the Mine Permit Application.
30. The post-closure monitoring period shall be 20 years following completion and approval of reclamation, as required by Rule 425.407 and as specified by the Groundwater and Surface Water Monitoring Plans in Section 203.7 of the Mine Permit Application. Subsidence shall be monitored as specified in the December 28, 2011, Permit Application Responses (#92) and Figure R-54A in the January 6, 2012, Permit Application Responses. The department may shorten the post-closure monitoring period at any time upon determining that there is no significant potential for water contamination resulting from the mine operation.

L. Contingencies

1. The permittee shall maintain sufficient reserve electrical power to keep all necessary pumps and treatment systems operational in the event of a power malfunction.
2. The permittee shall provide a fire suppression system for fire protection during construction, operations, and decommission.
3. 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.
4. Concentrate trucks shall be loaded in an enclosed facility and washed before leaving the plant site. In the event of a truck accident resulting in the spilling of concentrate, the permittee shall notify MDEQ and appropriate agencies, and implement an approved cleanup and remediation plan to include actions listed in Section 205.1.1.3 of the Mine Permit Application.
5. 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 adequate on-site spill response equipment.
6. 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 MDEQ and other agencies as required.
7. 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 MDEQ.
8. The permittee shall provide for required safety equipment, personnel training, and standard operating procedures to respond to potential surface fires.
9. The permittee shall utilize appropriate measures for emergency response in accordance with MSHA requirements. An emergency is defined as any unusual event or circumstance that endangers life, health, property, or the environment.

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10. The permittee shall handle evacuation of the public if necessary, in conjunction with emergency response agencies.
11. 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.
 - f. BG 4 breathers, RZ testers.
 - g. Portable Refuge Stations.
 - h. Spill Kits (hydrocarbon and chemical).
 - i. Fire suppression equipment.
 - j. HAZMAT response equipment.
12. 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.
13. As part of the contingency plan, the permittee shall maintain a current list of the following emergency telephone numbers as required by Rule 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 MDEQ.
 - g. The MDEQ Pollution Emergency Alerting System,
 - h. Federal regulatory agencies as appropriate.
 - i. The MDNR.
 - j. The Western Upper Peninsula District Health Department.
 - k. The Ironwood and Wakefield Township Supervisors.
14. The permittee shall provide appropriate and adequate training programs on emergency response procedures for employees responsible for responding to emergencies.
15. 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 Copperwood Mine, such as a release of a hazardous substance, 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.

16. Any ore spillage outside the vehicle access opening to the stockpile building, in the reclaim tunnel, or transfer conveyor leading out of the stockpile building shall be cleaned up as soon as practical and shall not be allowed to accumulate.
17. The permittee shall notify the MDEQ as soon as practical after identifying a leak in the tailings transport system that results in a tailings slurry spill that is not contained by the transport system. An approved corrective action plan shall be implemented by the permittee to include cleanup and any necessary remediation.
18. A new monitoring well shall be installed as close as practical to the location of any well that has to be abandoned due the effects of subsidence.
19. If surface subsidence is determined to cause impacts to upland areas, reclamation plans to restore the affected areas shall be submitted to MDEQ for approval, and approved plans shall be included in the reclamation plan.

M. Groundwater and Surface Water Sampling Procedures

1. The collection of groundwater samples, water samples from the TDF and mine, and surface water samples shall be completed in accordance with the Copperwood Mine Sampling, Measurement and QA/QC Procedures, as described in Section 203.7 of the Mine Permit Application. These quality control documents have been provided to the MDEQ and describe the following in accordance with Rule 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 because of mining activities, as described in Section 203.7 of the Mine 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 Environmental Quality 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 a summary of monitoring data and analyses completed in the annual mining and reclamation report. The permittee shall maintain all related monitoring data in a database including well borehole logs and construction records.

N. Financial Assurance

1. The financial assurance required shall apply to all mining and reclamation operations subject to the mining permit and shall be sufficient to cover the cost to administer, and to hire a third party to implement, reclamation under the mining, reclamation, and environmental protection plan as well as necessary environmental protection measures, including remediation of any contamination of the air, surface water, or groundwater that is in violation of this mining permit. The total financial assurance estimated for the Copperwood Mine for reclamation costs at the closure stage of production is determined to be \$37,960,000 as of the date this permit was issued. This number is based on reclamation cost estimates with administrative oversight and contingencies added.
2. The permittee shall periodically update the amount of financial assurance in accordance with the requirements of Rule 425.301.

O. Reclamation Plan

1. The permittee shall reclaim the Copperwood Mine site at the conclusion of mining and ore processing to establish a self-sustaining ecosystem in conformance to Rule 425.204 and Rule 425.407. The final land use of the site will be compatible with existing uses on adjacent properties.
2. 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 post-closure care period.

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3. Buildings shall be demolished after salvageable materials have been removed unless the permittee enters into an agreement with another party in which a property end use is established that includes beneficial use of any building(s). Concrete foundations and floor slabs shall be removed for all buildings that are demolished. 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.
4. After removal of all debris, the building areas shall be graded to eliminate ponding and to promote surface water drainage.
5. The underground workings, box cut opening, and any other mine openings shall be reclaimed to prevent adverse impacts from migration of fluids from the underground openings upward to the surface. The mined area shall be flooded with fresh water as soon as practical after mining is completed.
6. The sewage lagoon system shall be reclaimed and area regraded to conform to the reclamation grading plan, unless the permittee enters into an agreement with another party in which a property end use is established that included beneficial use of the lagoon system.
7. Dikes constructed for the temporary control or diversion of surface water run-on or runoff shall be abandoned where possible and regraded to conform to the reclamation grading plan.
8. A multi-layer cover system shall be constructed over the disposed tailings in the TDF with a grade that will provide adequate surface water drainage. The TDF cover system shall be designed to be consistent with the requirements of Rule 425.409 of Part 632 of the NREPA.
9. Leachate shall be pumped from the TDF to the WWTP for a period of 5 years, or until the volume of water coming out of the TDF reduces to a rate that is determined can be contained within the TDF indefinitely without an excessive buildup of water on the liner system.
10. The water treatment system shall be removed when it is no longer needed to implement permit condition P9.
11. Revegetation shall include species indigenous to the area, promoting a self-sustaining plant community. Native grass planting shall follow the procedures outlined in the Natural Resources Construction Service, Native Grass Planting Conservation Reserve Enhancement Program (CREP-CP2). Fertilizer shall be applied at an appropriate rate based on topsoil nutrient testing.
12. During site construction, the permittee shall reclaim areas disturbed during construction as soon as practical after construction is completed for a particular area. Erosion control methods described for construction shall be

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utilized during reclamation. During construction erosion control practices shall include:

- a. Applying mulch to all ground cover areas.
 - b. Installing silt fence.
 - c. Installing erosion control fabric on slopes steeper than eight percent.
 - d. Installing straw bail check dams or rock filled gabions in drainage ditches.
 - e. Using of sixed riprap in ditches to reduce water velocity.
13. 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.
14. When monitor wells are to be abandoned, the permittee shall abandon the wells in accordance with MDEQ requirements.