Appendix E

1. Contingency Plan – Eagle Mine Site

This contingency plan addresses the requirements defined in R 425.205. This includes a qualitative assessment of the risk to public health and safety or the environment (HSE risks) associated with potential accidents or failures involving activities at the Eagle Mine. Engineering or operational controls to protect human health and the environment are discussed in Section 4 and Section 5 of this document. The focus of this contingency plan is on possible HSE risks and contingency measures. Possible HSE risks to on-site workers will be addressed by Eagle Mine through HSE procedures in accordance with Occupational Safety and Health Administration (OSHA) and Mine Safety and Health Administration (MSHA) requirements.

Processes undertaken at the Eagle Mine site include mining ore, as well as storing and treating by-products of that process. Eagle Mine's mining, storage, and treatment facilities have been designed, constructed, and operated in a manner that is protective of the environment using proven technologies and engineering practices.

1.1 Contingency Items

This contingency plan addresses the items listed below in this Section in accordance with R 425.205 (1)(a)(i) - (xii).

- Release or threat of release of toxic or acid-forming materials
- Storage, transportation, and handling of explosives
- Fuel storage and distribution
- Fires
- Wastewater collection and treatment system
- Basin berm failures
- Air emissions
- Spills of hazardous substances
- Other natural risks defined in the EIA
- Power disruption
- Unplanned subsidence
- Leaks from containment systems for stockpiles or disposal and storage facilities, and
- Emergency procedures.

For each contingency item, a description of the risk is provided, followed by a qualitative assessment of the risk(s) to the environment or public health and safety. Next, the response measures to be taken in the event of an accident or failure are described.

1.1.1 Release of Toxic or Acid-Forming Materials

Potentially reactive materials generated because of mining operations include the ore and development rock. Both the development rock and ore have the potential to leach mining-related constituents when exposed to air and water. As described in the following sub-sections, handling, and temporary storage of both the ore and development rock have been carefully considered in the design of the Eagle Mine to prevent the uncontrolled release of acid rock drainage (ARD). Since secondary processing will occur at an off-site mill, the only chemical reagents used at the mine site are associated with the water treatment plant (WTP).

1.1.1.1 Coarse Ore Storage Area (COSA)

Coarse ore from the underground mine is trucked to the surface and placed in the COSA. The COSA is a steel-sided building with a full roof that is used for temporary storage of stockpiled coarse ore. The COSA has a concrete floor that is sloped to a floor drain that collects any contact water associated with the ore. This contact water is collected in an epoxy-lined sump in the COSA and pumped into the composite lined contact water basins (CWB) where it is stored until treatment at the water treatment plant. Contingency measures associated with the CWB liner systems are discussed in Section 1.1.12. Also, per Air Permit to Install (No. 50-06D) all overhead doors must be closed during ore loading or unloading and a fugitive dust management plan, which includes sweeping and watering, is in place to minimize the generation of dust.

1.1.1.2 Temporary Development Rock Storage Area (TDRSA)

Development of the mine began with the excavation of surrounding rock to provide access to the ore body through portals, raises, and ramps. This rock is known as "development rock" and upon excavation is transported to the surface and temporarily stored in the TDRSA. The development rock stored in the TDRSA is returned underground as backfill in areas where ore has been removed.

Development rock has the potential to oxidize when exposed to air and water over longer periods of time. Therefore, Eagle Mine handles the development rock in a way to minimize the potential formation of ARD, and if formed, prevents it from being released into the environment.

Accordingly, Eagle Mine has designed and constructed a state-of-the-art TDRSA to contain the development rock. The TDRSA is constructed of the following components to prevent releases to the environment:

- A composite liner system comprised of a geo-membrane liner underlain by a geosynthetic clay liner (GCL).
- A water collection system over the composite liner to collect precipitation that comes in contact with development rock. The collection system also helps protect the geo-membrane from damage by the development rock. The collection system consists of a geo-composite drainage fabric overlain by a 12-in thick granular drainage layer sloping towards the collection sump.
- A leak detection system for early detection and collection of potential percolation through the composite liner system. The leak detection system includes a collection sump and a sump pump for liquid removal.
- A geo-membrane cover system placed over the development rock if development stops for an extended period.

~~Per MP 01 2007, condition F4 and the Limestone Addition Plan (January 2017), when development rock is stored on the TDRSA for greater than one year, the rock pile will be amended with high-calcium~~

limestone or an approved alternative at a rate of two percent as an additional contingency measure to offset the formation of ARD. Per the 2024 Mine Permit Amendment request for paste backfill, the TDRSA will be amended with limestone per an adaptive management-based approach. If a portion of the material will be crushed for cemented rock fill (CRF) or returned underground as gob fill in the year, the material will not be considered in the application volume calculation. Some of the limestone that Eagle Mine previously placed on the TDRSA has been removed to be used with development rock for backfill. Therefore, Eagle Mine monitors potential acid generation and previously applied limestone neutralization by measuring the pH of the TDRSA contact water collection system quarterly. Moreover, if development or mining is suspended for an extended period the development rock will be covered with a high-density polyethylene (HDPE) geo-membrane to further limit the generation of ARD by minimizing contact with precipitation. As an added measure, the time in which development rock will be stored on the TDRSA has been modified. Development rock was originally scheduled for storage on the TDRSA for approximately seven years before being returned underground. Eagle Mine has chosen to immediately return the rock underground as cemented rock fill or gob fill to further reduce the risk of ARD generation. The short-term nature of this project significantly reduces the potential for release of toxic and acid-forming materials.

If the water in contact with the development rock becomes acidic, it is captured in the TDRSA and transferred to the CWBs and treated at the WTP. The contingency actions that address potential failure of the liner contact water collection system are discussed in Section 1.1.12.

1.1.1.3 Ore Transportation

The ore will be loaded from the COSA building into tractor-trailer combinations using front end-loaders and transported to the Humboldt Mill. All loaded ore trucks will be covered and have the tires washed at the on-site truck wash prior to leaving the contact area at the Mine site.

The following sixty-six-mile route is being used for moving the ore from the Eagle Mine site to the Humboldt Mill on existing roadways:

- East on Triple A Road, 9.0 miles to CR 510.
- East on CR 510, 3.0 miles to CR 550
- South on CR 550 approximately 20 miles to Sugarloaf Avenue
- South on Sugarloaf to Wright Street
- Wright Street to US-41 West
- US-41 West to M-95
- M-95 South to CR 601
- CR 601 East to the Humboldt Mill entrance.

Eagle Mine, in cooperation with the Marquette County Road Commission (MCRC), upgraded the portions of the sixty-six-mile route that were not currently "all season" status. These upgrades included the widening of roadways and the addition of passing lanes all of which add a level of safety for all drivers on the road.

The trucks are covered side-dump units with a length limit of approximately 80 feet. They consist of a tractor, a trailer, and a second trailer (pup). The truck carries approximately 45 metric tons per load on average. All loads are weighed prior to departure from the COSA to ensure that they do not exceed roadway weight limits.

Safety is stressed with the ore truck drivers. Forward-facing cameras and tracking devices are mounted on the tractors to monitor and record speed, location and braking effort. Excessive speeds or erratic driving are not tolerated. In addition, Eagle Mine works with the MCRC to maintain a safe road surface for employees, vendors and ore shipment.

Truck accidents are possible while transporting ore from the Eagle Mine to the Humboldt Mill. In the event of a truck rollover, ore could be spilled onto the road and adjacent areas. Since the coarse ore is run of mine rock and not crushed, it will be easy to pick the material up with conventional earthmoving equipment and place the ore back into a truck. If such an event should occur, removal action would take place as soon as possible. Although geochemical testing of the ore has shown that ARD will not occur in this short time, it is important to respond appropriately to any spills. If an accident results in a spill to a waterway, temporary engineered cleanup designs and procedures may be required to remove the material. Eagle Mine has an emergency response contractor on call to immediately respond to environmental incidents, assist with clean-up efforts, and conduct environmental monitoring associated with any spills. In addition, a transportation spill response standard operating procedure has been developed.

The Humboldt Mill COSA is designed so that all unloading of ore will occur in an enclosed building with a concrete floor. These features will prevent the release of dust and prevent precipitation from contacting the ore. After the ore is unloaded into the COSA, it is crushed and transferred with loading and transfer points featuring dust control in accordance with the Air Permit to Install (No. 50-06D).

1.1.1.4 Tailings Handling and Storage

An addition to the COSA was designed so that all unloading and management of tailings would occur within an enclosed building with a concrete floor. These features prevent the release of tailings in the form of dust, and prevent precipitation from contacting the material. All paste backfill equipment is also located indoors. An air permit to install is anticipated to require the handling operations to occur only when roll-up doors are closed. The paste backfill plant will be equipped with best available control technology (BACT) equipment for air pollution control.

1.1.1.5 Paste Borehole

The Class V well has been designed to prevent contamination of groundwater and to inhibit movement of paste from within the steel borehole or mine workings. The double-walled pipeline is consistent with standards for used in the oil and gas and mining paste backfill industries. The line will be equipped with pressure transducers, and periodic inspections of the annulus between the paste pipe and the borehole casing are a part of a traditional maintenance program. A leak from the paste pipe, which is a low probability event, can be detected through pressure monitoring and would be contained within the outer casing. Paste pipes may be retracted and replaced as needed.

1.1.2 Storage, Transportation and Handling of Explosives

Blasting agents or explosives are required for blasting operations in the development and operation of the mine. The bulk explosives selected for use at the Eagle Mine are composed of ammonium nitrate and small percentages of sodium and calcium nitrate, and diesel fuel. Although uncommon, the accidental detonation of explosives could result from impact, shock, fire, or electrical discharge.

The entire surface operations are located within a fenced area. Vehicular access to Eagle Mine is controlled by a gatehouse and fence system. To further mitigate concerns related to explosives, except the bulk emulsion, all explosives components are stored in a locked explosives magazine located underground.

The storage, transportation, and use of explosives comply with applicable MSHA and/or (Bureau of Alcohol, Tobacco, Firearms and Explosives) ATF standards. Caps, primers, and detonating cord are stored in a locked magazine underground while the bulk emulsion is stored in locked storage tanks on the surface. Explosives are transported by a clearly marked truck.

The main impacts of an uncontrolled explosion on the surface would be in the immediate area of the explosion and would include direct injury from the blast zone, falling debris, fire, and the release of combustion products. Combustion products expected from the explosives are carbon monoxide and nitrogen oxides. Neither of these products is expected to be generated in high enough concentrations for significant above-ground or off-site exposures to occur. Dust could also be generated but would likely settle to the ground before migrating beyond the Eagle Mine site. Uncontrolled underground explosions have not been considered since the environmental effects would not be different from controlled explosions in normal mine operations. In the event of a surface explosion, Emergency Procedures will be followed, as discussed in Section 1.2.

1.1.4 Fuel Storage and Distribution

The fuel storage area is located within the contact area of the Eagle Mine site. The entire surface operations are located within a fenced area and controlled by a gatehouse and fence system.

The fuel storage area contains two diesel fuel storage tanks with the capacity of 20,000 gallons each and one 560-gallon on road diesel AST (aboveground storage tank). Additionally, there is a 1,700 gallon diesel generator day tank, a 500-gallon diesel generator refill tank and a 300 gallon mobile fuel tank used during crushing operations stored on the TDRSA. All fuel tanks are made of double-walled construction for added protection against leaks. In addition, the mine site currently has a propane storage capacity of approximately 51,500 gallons. All propane tanks currently on site are adjacent to the buildings requiring fuel for heating.

In general, fuel spills and leaks will be minimized by the following measures:

- A Spill Prevention Control and Countermeasures Plan (SPCC) has been written and implemented.
- Training of personnel responsible for handling fuel in proper procedures and emergency response;
- Regular equipment inspections and documentation of findings;
- Double-walled construction of all above ground tanks and/or additional secondary containment, and
- Staging of on-site emergency response equipment to quickly respond to unanticipated spills or leaks.

Specific procedures have been prepared as part of the project's SPCC Plan. In addition, a Pollution Incident

Prevention Plan (PIPP) has been prepared which addresses the potential spillage of fuels and other polluting materials.

Diesel fuel and propane (fuels) are transported to the Eagle Mine by tanker truck from local petroleum distributors. The probability of an accidental release during transportation will be dependent on the location of the supplier(s) and the frequency of shipment. A fuel release resulting from a vehicular accident during transportation is a low-probability event. Transport of fuel in tanker trucks does not pose an unusual risk to the region since tanker trucks currently travel to the region on a regular basis to deliver fuels to gasoline stations located in the communities surrounding the Eagle Mine.

Three potential release events associated with the surface-stored fuels are a bulk tank failure, mishandling/leaking hoses, and a construction/reclamation phase release.

<u>Bulk Tank Failure</u> – A tank failure could potentially result from unusual thermal, mechanical, or chemical stresses. Chemical stresses are not anticipated as the storage tanks will be constructed of materials compatible with the fuels. Mechanical stress is also not anticipated since the tanks will be located within an area offering protection from vehicles. Contingency measures required to mitigate a fuel spill are included in the SPCC and PIPP. All fuel tanks are double-walled and visually inspected at regular frequencies to verify that the storage tanks are not leaking.

<u>Mishandling/Leaking Hoses</u> – A release might result from leaking hoses or valves, or from operator mishandling. This type of release is likely to be small in volume and is judged to be a low probability event given that operators will be trained to manage these types of potential releases. These small spills will be cleaned up by using on-site spill response equipment such as absorbent materials and/or removing impacted soils.

<u>Construction/Reclamation Phase Release</u> – A major fuel spill during the construction or reclamation phases could occur from a mobile storage tank failure or mishandling of fuels. Such a release is a low probability event given that operators will be trained to manage these types of potential releases and all tanks are required to have secondary containment. As with mishandling or leaking hoses, these small spills will be cleaned up by using on-site spill response equipment such as absorbent materials and/or removing impacted soils.

Absorptive materials may be used initially to contain a potential spill. After the initial response, soil impacted with residual fuel would be addressed. Remedial efforts could include, if necessary, the removal of soil to preclude migration of fuel to groundwater or surface water. The project's PIPP and SPCC plans addresses fueling operations, fuel spill prevention measures, inspections, training, security, spill reporting, and equipment needs. In addition, standard operating procedures have been developed which cover fueling operations and spill response activities. All responses to a fuel spill, both large and small, will follow the guidelines dictated by the spill response plan and be reported internally. The tanks will be inspected regularly, and records of spills will be kept and reported to Environment, Great Lakes and Energy (EGLE) and other agencies as required.

In the event of a release in the contact area, fuels would be routed (due to site grading) to the CWBs where they would be cleaned with absorbent pads/booms or other fuel-absorbing products. Any fuel not absorbed would be routed to the WTP and treated before release to the environment. In the event of a release on the non-contact area, fuels would be absorbed by soil, retarding their migration. Exposures to contaminated groundwater are not expected because of regulatory requirements for timely and effective response actions which will dictate soil or source removal before migration to groundwater takes place. A transportation-related fuel spill resulting from a non-traffic accident is considered a low-probability event. Therefore, the risk of a fuel spill from a non-traffic accident is judged to be minor.

Contingency plans for responding to fuel spills from tanker trucks are required of all mobile transport owners as dictated by Department of Transportation (DOT) regulation 49 CFR 130. These response plans require appropriate personnel training and the development of procedures for timely response to spills. The plan must identify who will respond to the spill and describe the response actions to potential releases, including the complete loss of cargo. The plan must also list the names and addresses of regulatory contacts to be notified in case of a release.

1.1.4 Fires

This section discusses contingency measures to be taken in the event of either an underground mine fire or surface fires.

1.1.4.1 Mine Fire

One potential source of combustion could occur during the handling of combustible minerals in the Eagle Mine ore body. The ore body contains certain quantities of pyrrhotite, which is an iron sulfide mineral. Iron sulfide is a pyrophoric material that oxidizes exothermically when exposed to air. Due to the exothermic reaction, ignition can occur, especially if the surface area is increased with the occurrence of finely divided material. This situation is often encountered in a petroleum refinery, where finely divided iron sulfide scales form in refinery units in oxygen-deficient atmospheres. When subsequently exposed to air, these crystals of iron sulfide oxidize rapidly back to iron oxide. While this condition can also occur in underground mines, this problem should be adequately controlled through proper mine ventilation.

If a mine fire develops it would be expected to be localized, short-lived, and would not pose a threat to the workers or the environment. Off-site populations would not be exposed to agents resulting in adverse effects. Events that do not result in exposure cannot result in health effects and do not pose a risk. Mine fires, therefore, pose a negligible risk to the environment.

Appropriate preventive and contingency measures will be exercised as required by MSHA. These measures include housekeeping, installation of fire suppression systems on mobile equipment, widespread distribution of fire extinguishers throughout the mine, employee safety training programs, and use of a mine rescue team trained in firefighting techniques. Mine evacuation procedures, as discussed in Section 1.2, may be invoked, depending on the nature and extent of an underground fire.

1.1.4.2 Surface Fire

Surface fires can be started by a variety of causes including vehicular accidents, accidental ignition of fuels or flammable chemical reagents, and lightning strikes. Smoking is only allowed in designated areas on the site. Contingency measures include having the required safety equipment, appropriate personnel training and standard operating procedures. Given these measures, uncontrolled or large surface fires are considered low probability events with negligible risk.

Because the Eagle Mine is situated in a forested region, forest fires started off-site could potentially impact the mine site. The cleared area in the vicinity of the surface facilities and excess soil berms will serve as a fire break to protect surface facilities. At Eagle Mine, a Wildfire Response Guideline has been developed in conjunction with Michigan Department of Natural Resources (DNR) Fire Division to ensure the best possible response. Contingency measures discussed below can be implemented in the event of an off-site forest fire.

In order to minimize the risk of a fire on-site, stringent safety standards are being followed during both the construction and operation phases of surface facilities. All vehicles/equipment are required to be equipped with fire extinguishers and all personnel trained in their use. In addition, all personnel are required to complete a "hot work" permit whenever work is being performed where an ignition source is present. Water pipelines and a network of fire hydrants have been installed throughout the site and additional fire extinguishers are also located in high-risk areas. On-site firefighting equipment includes:

- An above-ground water storage tank and distribution system for fire suppression.
- Stocked and maintained fire hose stations/cabinets.
- Multiple dry chemical fire extinguishers are located throughout the facility.
- An alarm system that automatically notifies security of any on-site alarm.

1.1.5 Wastewater Collection and Treatment

The major sources of water requiring treatment are groundwater inflow to the mine, water used for underground operations, contact water from the TDRSA, and precipitation and storm water runoff from the operations area. All water is routed to CWBs No.1 or No.2. These basins provide wastewater storage and equalization capacity. Water from the basins is conveyed to the WTP which is composed of several unit processes, including metals precipitation, multi-media filtration, weak acid ion exchange, and double-pass reverse osmosis. The final product water is pH adjusted prior to subsurface discharge via a Treated Water Infiltration System (TWIS). This discharge is authorized by the State of Michigan under a Groundwater Discharge Permit.

The water treatment system is designed to handle various process upset conditions such as power disruption (Section 1.1.10) or maintenance of the various process units. The effluent is continually monitored for key indicator parameters to verify the proper operation. Effluent not meeting treatment requirements is pumped back to the CWBs for re-treatment. The CWBs are designed to hold approximately 14,000,000 gallons of water. This storage capacity allows sufficient time to correct the process upset condition. Potential hazards and chemical reagents associated with the WTP are discussed in Section 1.1.8.

In the event the CWBs dissolved solid mass reaches 200,000 kgs, a change in facility operations will be implemented. The change in operations consists of hauling reverse osmosis (RO) concentrate from the Mine WTP to the Humboldt Tailings Disposal Facility (HTDF) under Part 121 administrative rules. The concentrate transfer plan will be implemented on an intermittent basis dependent on operational conditions. This transfer is intended to allow for mining and water treatment operations to continue under normal operations. The liquid RO concentrate hauled to the Mill will be managed in the HTDF.

1.1.5.1 Contact Water Basins

The CWBs were very conservatively designed to handle a combined 50-year peak snow melt and rain event. The CWBs have also been designed with the following contingencies which are further addressed in the Eagle Mine Water Management Plan:

- The CWBs are designed to hold approximately 14,000,000 gallons of water allowing sufficient time for maintenance of WTP equipment.
- In the unlikely event that a runoff event exceeds the capacity of the CWBs the following actions will be taken:
  - By-pass CWBs and divert underground mine water directly to the WTP.
  - Transfer water from CWBs to the TDRSA (during a true emergency, more than one foot of head can be stored on the TDRSA with consent from EGLE).
- Water can be pumped into vacant underground mine workings for additional temporary storage of water.

Potential release events associated with a breach of the composite liner and overtopping of the berms are discussed in Section 1.1.6 and the Eagle Mine Water Management Plan. Potential leakage of the liner system is discussed in Section 1.1.12.

1.1.5.2 Non-Contact Storm Water

Storm water runoff from the non-contact areas will be directed to one of four Non-Contact Water Infiltration Basins (NCWIBs). The NCWIBs allow runoff from non-contact areas to infiltrate through the on-site sandy soils. In general, the NCWIBs have been designed such that no runoff is expected to leave the disturbed areas of the site. The NCWIBs are very conservatively sized to accommodate the same runoff event as the CWBs.

As an additional conservative design measure, the NCWIBs have been sized assuming the ground is frozen six months out of the year with no infiltration during this time. If the infiltration capacity of the NCWIB soils is reduced over time by the presence of silt, the solids will be removed to restore the infiltration capacity.

1.1.5.3 Treated Water Infiltration System (TWIS)

Treated water is piped from the WTP to the TWIS in a buried pipeline. The treated water is discharged to the on-site sandy soils through the TWIS. The TWIS is located in highly permeable soil. The treated effluent is applied evenly within individual infiltration cells and discharged to groundwater. The treated effluent is applied to the TWIS through five separate infiltration cells. This design allows at least one cell to be out of service for resting and/or maintenance while the other cells are being used.

Potential failure mechanisms of the TWIS include reduced infiltration capacity, pipe breakage and frost damage. The infiltration capacity of the TWIS is designed with a capacity that is greater than the capacity of the WTP. In the unlikely event that the infiltration capacity becomes reduced over time, additional capacity could be constructed adjacent to the proposed footprint. If pipe breakage occurs, the damaged sections will be removed and replaced. Frost is not expected to be a problem. As a contingency against frost damage, styrofoam insulation was incorporated into the design, which keeps the natural temperature of the earth above 32 degrees. Furthermore, since the material below the TWIS is free-draining, water should not freeze in the interstitial space.

1.1.6 Berm Failures

This section discusses contingency actions to be taken in the event of berm failures at the CWBs and TDRSA. Liner failures are discussed in Section 1.1.12.

Embankment failure of the CWBs or the TDRSA is not likely due to the small height of the embankments, the flat slopes, and the stable nature of the on-site foundation soils at the site. All construction was under strict QA/QC procedures to verify the quality construction of the embankments. In addition, the berms are inspected monthly or after a rain event that exceeds 0.5 inches in a 24-hour period, as required by permit conditions L-31 & L-32 of the mining permit. These inspections identify preventive maintenance required to maintain the stability of the berms and embankments. All identified issues are immediately reported to on-site maintenance staff for repair.

A CWB overtopping event is also very unlikely due to the requirement to maintain two feet of freeboard above an already conservative design. In addition, in the event of a catastrophic flood event, the TDRSA and underground workings will be used for excess water storage.

Erosion on the external berm slopes could be caused by unusually high precipitation. Erosion control contingency measures will be to quickly repair potential rutting or other soil instability with conventional earth-moving equipment.

1.1.7 Air Emissions

The construction, operation, and reclamation phases of the project will be performed in a manner to minimize the potential for accidents or failures that could result in off-site air quality impacts. All phases of the project will incorporate a combination of operating and work practices, maintenance practices, emission controls, and engineering design to minimize potential accidents or failures. Below is a description of identified areas of risk and associated contingency measures that may be required. As part of a comprehensive environmental control plan, these contingency measures will assist in minimizing air impacts to the surrounding area.

1.1.7.1 Air Emissions during Operations

During the operation of the mine, potential emissions from the facility will be controlled as detailed in the project's current Michigan Air Use Permit (No. 50-06D). These controls include the paving of site access road and parking areas, implementation of an on-site roadway sweeping and watering program, the use of building enclosures, flexible membrane covers, or dust suppressants on storage areas, installation of dust collection systems where necessary, and following prescribed preventive maintenance procedures for the facility. Ore that is moved off-site will be transported in covered trucks to minimize dust emissions. Below is a more detailed discussion of potential airborne risks associated with proposed operations at the facility.

During facility operations, Eagle Mine will use certain pieces of mobile equipment to move ore about the site. Equipment includes ore production trucks, front-end loaders, product haul trucks, and miscellaneous delivery trucks. Although the movement of most vehicles across the site is on asphalt surfaces, a comprehensive on-site watering and sweeping program has been developed to control potential fugitive sources of dust. While the watering program is closely monitored, if excessive dust emissions should occur, the facility will take appropriate corrective action, which may include intensifying and/or adjusting the watering program to properly address the problem.

Materials will be moved to and from the TDRSA and COSA during operations, so dust will be minimized by enclosing the COSA and appropriately managing fugitive dust on the TDRSA. Given the relatively large size and moisture content of these materials, it is anticipated that the risk of excessive fugitive dust emissions from these activities is low. Any development rock that is crushed in preparation for use in backfill will be watered prior to crushing and conveyors will be equipped with water sprays to minimize dust emissions. The TDRSA will also be temporary in nature, in that development rock will be moved back underground to fill stopes that have been mined.

The COSA is designed as an enclosed structure to control fugitive emissions from ore transfer between underground production vehicles and offsite haul trucks. Though rock-breaking may occur to reduce the size of ore that is too large to load into a haul truck, no crushing will occur in the COSA, so fugitive emissions are estimated to be negligible. If necessary, water sprays are used to control dust within the building and best housekeeping practices will be applied to ensure the cleanliness of the building (i.e. sweeping and wetting floors). Although the risk of fugitive dust during the transportation of ore material off-site is low due to its large size, this risk is further reduced by covering the trailer beds. Trucks undergo a tire wash prior to exiting the facility to reduce the potential for ore dust migration from the property.

Portland cement is being incorporated as a binder for aggregate material used in backfilling primary stope areas underground. The cement is unloaded at the surface and stored in silos at the surface backfill facilities. Controls have been incorporated to minimize fugitive dust emissions during this process and include the use of a truck-mounted pneumatic conveying system, vent fabric collectors and enclosed screw conveyors. While the risk of accidental emissions from these operations is moderate, Eagle Mine will be prepared to take appropriate corrective action if an upset condition should occur. All cemented rock fill generating activities will occur under emissions control such as fabric filters and enclosures until the material is wet and transferred back to the underground.

1.1.7.2 Air Emissions During Reclamation

Once underground mining and ore transfer activities are completed at the site, reclamation will commence following the requirements of R 425.204. Like construction activities, there is a moderate risk fugitive dust emissions could be released during certain demolition, restoration activities, and during temporary storage of materials in stockpiles. Like controls employed during the construction phase, areas that are reclaimed will be re-vegetated to stabilize soil and reduce dust emissions. If severe wind or an excessive rain event reduces the effectiveness of these protective measures, appropriate action will take place as soon as possible to restore vegetated areas to their previous effectiveness and replace covers as necessary.

To the extent necessary, areas being reclaimed will be kept in a wet state by continuing the watering program. It is anticipated this program should minimize the possibility of excessive dust associated with mobile equipment. In the event that fugitive dust is identified as an issue, the root cause will be determined and corrective actions will be taken.

1.1.8 Spills of Hazardous Substances

Since secondary mineral processing is not planned on-site, the primary chemical reagents used are associated with the WTP. Table 1-1 includes a list of reagents used at WTP along with the storage volumes and physical state of each chemical.

Table 1-1 – Chemical Reagents Used at the Water Treatment Plant

Item No.	Chemical Name	CAS No.	Storage Volume (gallons)	Storage Volumes (pounds)	Delivery State
1	Sodium Hydroxide (50%)	1310-73-2	5,000 gallons	63,308 lbs.	Liquid
2	Sodium Hydroxide (Euco-Fill 25 & Eucon Retarder 100)	1310-73-2	2,250 gallons	20,992 lbs.	Liquid
3	Sodium Hypochlorite (12.5%)	7681-52-9	55 gallons	573 lbs.	Liquid
4	Sodium Carbonate (Soda Ash)	497-19-8	-	40,000 lbs.	Solid
5	Ferric Chloride (35%)	7705-08-0	900 gallons	10,496 lbs.	Liquid
6	Hydrochloric Acid (32%)	7647-01-0	5,000 gallons	49,147 lbs.	Liquid
7	Suppressor 1615 (Antifoam)	N/A	275 gallons	2,268 lbs.	Liquid
8	Nitric Acid (30%)	7697-37-2	600 gallons	5,898 lbs.	Liquid
9	Sulfuric Acid (93%)	7664-93-9	660 gallons	10,116 lbs.	Liquid
10	Sodium Metabisulfite	7681-57-4	-	50 lbs.	Solid
11	PC-191-T (Antiscalant)	20592-85-2	520 gallons	4,882 lbs.	Liquid
12	POL-EZ 83904 Polymer	64742-47-8	220 gallons	2,000 lbs.	Liquid
13	Nalco Enact 7880 Polymer	10043-52-4	550 gallons	6,070 lbs.	Liquid
14	Hydrex 6511 Polymer	64742-47-8	110 gallons	1,008 lbs.	Liquid
15	Citric Acid	77-92-9	-	2,000 lbs.	Liquid
16	Carbon Dioxide Gas	124-38-9	-	1,200 lbs.	Gas
17	Propane (on site)	74-98-6	4 cylinders at WTP; tanks	371,900 lbs.	Gas
18	High pH RO Cleaner	-	-	800 lbs.	Liquid
19	Sodium Aluminate	1302-42-7	900 gallons	10,871 lbs.	Liquid
20	J-LOK Part A Resin	N/A	1,100 gallons	10,996 lbs.	Liquid
21	J-LOK Part B Catalyst	N/A	1,100 gallons	8,980 lbs.	Liquid

Chemical storage and delivery systems follow current standards that are designed to prevent and to contain spills. Both outdoor and indoor working areas of the WTP were designed, constructed and/or protected to prevent run-on and run-off to surface or groundwater. This includes the development of secondary containment areas for liquids and polluting materials. The secondary containment area is constructed of materials that are compatible with and impervious to the liquids that are being stored. In addition, the truck off-loading area for bulk chemicals is an enclosed facility curbed with a sloped pad so that any spills are directed and contained within the secondary containment area. A release in the WTP from the associated piping would be contained within the curbed and contained plant area and neutralized. Absorbent materials are available to contain acid or caustic spills. Eagle Mine has an emergency response contractor on call to immediately respond to environmental incidents, assist with clean-up efforts, and conduct environmental monitoring associated with any spills.

Spill containment measures for chemical storage and handling will reduce the risk of a spill impacting the environment. Due to the low volatility of these chemicals, fugitive emissions from the WTP to the atmosphere during a spill incident are likely to be negligible. Off-site exposures are not expected, so management and handling of WTP reagents will not pose a significant risk to human health or the environment.

1.1.9 Other Natural Risks

Earthquakes – The Upper Peninsula of Michigan is in a seismically stable area. The United States Geological

Survey (USGS) seismic impact zone maps show the maximum horizontal acceleration to be less than 0.1 g in 250 years at 90% probability. Therefore, the mine site is not located in a seismic impact zone and the risk of an earthquake is minimal. Therefore, no contingency measures are discussed in this section.

Floods – High precipitation events have been discussed previously in sections that describe the CWBs, NCWIBs, and the TDRSA. High precipitation could also lead to the failure of erosion control structures. The impact of such an event would be localized erosion. Contingency measures to control erosion include sandbag sediment barriers and temporary diversion berms. Long-term or off-site impacts would not be expected. Failed erosion control structures would be repaired or rebuilt. Impacts from high precipitation are reversible and off-site impacts are not expected to occur. Given the considerable planning and engineering efforts to manage high precipitation events, the risk posed by high precipitation is considered negligible.

Severe Thunderstorms or Tornadoes – Severe thunderstorms or tornadoes are addressed in the emergency procedures developed for the mine site. Certain buildings are designated shelters in severe weather. Evacuation procedures are part of the on-site training of all employees.

Blizzard – The mine site is designed to accommodate the winter conditions anticipated for the Upper Peninsula. The Triple A Road has been upgraded to accommodate the increased vehicle traffic which allows access to the mine during the worst of winter weather. Eagle Mine and the MCRC have an arrangement for the maintenance of the County Roads during winter conditions. If road conditions deteriorate beyond the capability of the maintenance equipment, Eagle Mine will have arrangements to keep workers on-site for extended periods.

Forest Fires – Forest fires were discussed in Section 1.1.4.

1.1.10 Power Disruption

Facility electric power is provided by Alger-Delta Electric Cooperative, as well as a backup generator capable of delivering 2,000 kW of power. The electrical distribution system provides power to the main surface facilities, the backfill surface facilities, the potable well, and the underground facilities. In the event of a power outage, the backup generator automatically starts and provides power to the surface facilities and underground ventilation system. A second portable generator can be utilized to power the potable water system, if necessary. During the outage, Eagle Mine would have to reduce operations to keep critical equipment in operation with the reduced power.

In the event the WTP would need to be temporarily shut down during power disruptions, the CWBs were designed with a significantly larger capacity than required in daily operations. The CWBs can hold approximately 14,000,000 gallons of mine inflow water which would be sufficient in size to store water for an extended period of time if necessary.

1.1.11 Unplanned Subsidence

The blast hole mining method being used at Eagle Mine consists of primary and secondary stopes. This method requires that prior to mining a secondary stope, the primary stopes on both sides and on the level above be backfilled with cemented rock fill. Mining will start with a small number of stopes near the middle elevation of the ore body and then proceed to the lower parts of the ore body and progress vertically to the top of the deposit over the life of the mine. This mining method and sequence will minimize the potential for surface subsidence to occur.

The primary stopes in Eagle Mine are backfilled using an engineered cemented development rock or aggregate fill. Primary stopes in Eagle East and Upper Eagle East are backfilled using engineered cemented development rock, aggregate fill, or tailings. A Portland cement binder is used to prepare the backfill. The quantity of binder required is estimated at approximately four to six percent by weight. The secondary stopes are backfilled with development rock from the TDRSA or local uncemented fill material obtained from off-site sources. Backfilling the primary and secondary stopes as proposed above is designed to mitigate surface subsidence and the subsidence is predicted to be immeasurable at the ground surface.

A comprehensive evaluation of the stability of the Eagle crown pillar and surface subsidence was completed as part of the mine design. The conclusion of the stability assessment was that the pillar is predicted to be stable with the typical rock mass classification values obtained prior to the start of mining. The crown pillar assessment also predicted the vertical displacement of the crown pillar. The modeling results predicted vertical displacement at the top of bedrock less than 2 cm (<1 in). Given that the bedrock is covered by overburden, this displacement of the crown pillar and this subsidence will be imperceptible at the ground surface. As a contingency, a Crown Pillar Management Plan has been developed that includes subsidence monitoring measured both through surface and underground extensometers as well as five survey monuments that detect vertical subsidence and progressive ground movement. The surface extensometer is downloaded and a survey is completed on a monthly basis. The underground extensometers are continually monitored and tied into a telemetry system for on-demand data retrieval. In the event of unanticipated subsidence, the mining sequence and backfill methods as described above and in Section 4 will be evaluated and adjusted to reduce the subsidence. Adjustments to the stope sequence, backfill methods, crown pillar thickness, and backfill mix would be adjusted as needed to minimize subsidence. In addition, ground support inspections are completed daily by on-site staff to ensure safe working conditions for miners.

1.1.12 Containment System Leaks

Details of the containment systems for the CWBs and TDRSA were previously discussed. These containment facilities are both designed with composite liner systems to minimize the potential for release. In addition, QA/QC measures required by the mining permit assure proper construction of the containment structures. As an additional preventive measure to minimize the potential for leaks from these facilities, leak location surveys were completed during the construction of the TDRSA and CWBs and will continue to be completed periodically for the CWBs to identify potential leaks that occur during operations. The TDRSA is equipped with a leak detection system, so a leak detection survey is not needed.

If a leak is detected in the TDRSA the following actions shall be considered. These steps are listed in an increasing level of effort and some steps may be omitted when a successful resolution is realized:

- If the leak was identified through groundwater sampling, perform confirmation sampling to ensure there is a leak in the primary containment system;
- Upon confirmation of a leak in the primary containment system notify EGLE;
- Review operational records for the location of recent equipment activity. Consider possible activities such as equipment traffic or excavation efforts within the TDRSA where liner may have been struck. Identify and uncover area(s) most likely to be damaged from such activities in order to perform a visual inspection of the composite liner system;
- Pump more frequently, set sump pump controls lower, maintain water on the primary containment system as low as reasonably possible;

- Consider increasing the frequency of monitoring well sampling;
- Expedite operations to remove loading from TDRSA, return development rock underground or set up a temporary containment with prior EGLE approval for a portion of the materials;
- Remove material above the collection system, either in a locally suspected area or a widespread location if necessary. Perform a leak location survey to identify the location of the breach in the primary containment system;
- A qualified geosynthetics contractor should be retained to perform the repair.

If damage compromising the composite liner system in the TDRSA was discovered visually, without any detection monitoring being triggered, the following actions would be taken:

- The immediate area of the damage should be tarped to hinder leakage through the composite liner system;
- EGLE should be notified;
- A qualified geosynthetics contractor should be contacted to perform the repair.

If a leak is detected in the CWBs the following steps shall be considered. These steps are listed in an increasing level of effort and some steps may be omitted when a successful resolution is realized:

- If the leak was identified through groundwater sampling, perform confirmation sampling;
- Inspect paved contact areas from which the CWBs receives runoff. Begin inspection with areas receiving the highest volume of truck traffic or locations of recent suspect activity.
- Construct a temporary barrier to prevent runoff from the contact area from entering the CWBs. Pump water captured by the barrier to a tanker for treatment at the WTP or other applicable location;
- Upon confirmation of a leak in the primary containment system notify EGLE;
- Divert underground mine water directly to the WTP;
- Transfer water from the CWBs to the TDRSA, obtain consent from EGLE prior to exceeding more than one foot of head on the TDRSA;
- Review operational records for recent activity within or near the CWBs. Consider possible activities where inadvertent damage to the primary containment system may have occurred. Identify the area(s) most likely to be damaged from such activities in order to perform a visual inspection of the composite liner system;
- Perform a leak location survey to identify the location of the breach in the primary containment system;
- A qualified geosynthetics contractor should be contacted to perform the repair.

1.2 Emergency Procedures

This section includes the emergency notification procedures and contacts for the Eagle Mine. Per R 425.205(2), a copy of this contingency plan will be provided to each emergency management coordinator having jurisdiction over the affected area at the time the application is submitted to the EGLE.

Emergency Notification Procedures – An emergency will be defined as any unusual event or circumstance that endangers life, health, property, or the environment. If an incident were to occur, all employees are instructed to contact Security via radio or phone. Security then makes the proper notifications to the facility managers and activates the Eagle Mine Emergency Response Guideline as needed. If personnel on site need to be notified of such an event an emergency toned broadcast via radio will be made with instructions.

Eagle Mine has adopted an emergency response structure that allows key individuals to take immediate responsibility and control of the situation and ensures appropriate public authorities, safety agencies and the general public are notified, depending on the nature of the emergency. A brief description of the key individuals is as follows:

- Health & Safety Officer: The facility H&S manager and H&S staff are responsible for monitoring activities in response to any emergencies. During an emergency, H&S representatives 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 ensure appropriate personnel are made available to respond to the situation.
- Environmental Officer: The facility environmental manager will be responsible for managing any environmental aspects of an emergency. This individual will coordinate with personnel 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.
- Public Relations Officer: The facility external relations manager will be responsible for managing all contacts with the public and will coordinate with the safety and environmental officers to provide appropriate information to the public.

In addition to the emergency response structure cited above, Eagle Mine has a Crisis Management Team (CMT) and Plan developed to manage situations that may result in multiple injuries, loss of life, environmental damage, property or asset loss, or business interruption. If a situation is deemed a "crisis" the CMT immediately convenes to actively manage the situation. The CMT meets quarterly to review and practice the plan implementation; annually a third party develops a desktop exercise to challenge and ensure the preparedness of the CMT. The following is a description of the core members and their roles:

Table 1-2 – Crisis Management Team – Core Members and Roles

Core Members	Role
Team Leader	Responsible for strategy and decision-making by the CMT during a crisis and maintaining a strategic overview.
Coordinator	Ensures a plan is followed and all logistical/administrative support required is provided.
Administrator	Records key decisions and actions and provides appropriate administrative support to the CMT.
Information Lead	Gathers, shares, and updates facts on a regular basis.
Emergency Services and Security	Liaises with external response agencies and oversees requests for resources. Maintains a link between the Emergency Response Team (ERT) and CMT and oversees any necessary evacuations.
Communications Coordinator	Develops and implements the communications plan with support

	from an external resource.
Spokesperson	Conducts media interviews and stakeholder briefings.

Evacuation Procedures – While the immediate surrounding area is sparsely populated, if it is necessary to evacuate the public, this activity will be handled in conjunction with local emergency response agencies. The Public Relations Officer will be responsible for this notification and will work with other site personnel, including the safety and environmental officers.

If evacuation of mine personnel is required, Eagle Mine has developed emergency response procedures for underground facilities as well as surface facilities. All evacuation procedures were developed in compliance with MSHA regulations and practiced regularly. A surface muster point has been established and an Escape and Evacuation Plan developed and practiced for underground operations. The escape and evacuation plan details the locations of the eight (12-person) and four (4-person) Mine Arc refuge chambers as well as the locations of escapeway ladders and Alimak elevator all of which may be utilized during an emergency based on employee location and type of incident. Should a site evacuation become necessary, two escape routes have been identified per site.

In addition, in accordance with MSHA, Eagle Mine is required to have Mine Rescue teams that are routinely and adequately trained to respond to underground emergency situations. Monthly training is conducted to provide the opportunity for the team to practice their skills both in the classroom and field. Training may include exploration in smoke (theatrical), basic first aid & CPR, firefighting, rope rescue hoisting, and operation and maintenance of both the BG4 closed-circuit breathing apparatus (CCBA) and MX6 gas instruments. Both Mine Rescue teams are required to log two hours of CCBA use every other month to maintain proficiency.

Security personnel are Emergency Medical Technicians (EMTs) and paramedics trained according to state and federal regulations. Eagle Mine also maintains a state-licensed advanced life support (ALS) ambulance on-site for immediate response to emergency situations.

Emergency Equipment – Emergency equipment includes but is not limited to the following:

- ABC rechargeable fire extinguishers
- Fire suppression systems for mobile and stationary equipment
- Stench release system
- Telephone mine communication system
- Radios
- First aid kits, stretchers, backboards, and appropriate medical supplies with a licensed transporting advance life support ambulance on site properly staffed at all times.
- BG-4 self-contained breathing apparatus
- Gas detection monitors that detect five gases and lower explosive limit (LEL)
- Cap lamps
- Self-rescuers
- Underground refuge stations
- Mine elevator
- Spill kits (hydrocarbon and chemical)

- High expansion foam machines
- Portable drift seal.

This equipment is located both underground and at the surface facilities. Fire extinguishers are located at appropriate locations throughout the facility and on mobile equipment, per MSHA requirements. Mine and surface facility personnel are also equipped with radios for general communications and emergencies. The underground ventilation system is equipped with a stench release system at multiple points for emergency notification. Other emergency response equipment is located at appropriate and convenient locations for easy access for response personnel. In addition, the Eagle Mine has an ALS ambulance and state-licensed EMTs and paramedics on-site at all times to respond in the event of an emergency.

Emergency Telephone Numbers – Emergency telephone numbers are included for site and emergency response agencies, as required by R 425.205(1)(c). They are as follows:

- Mine Security: (906) 339-7018
- Local Ambulance Services: Mine ALS Ambulance Service provided by Allied Security - they can be contacted at Extension 7018, or on the radio system using the Security, Emergency, or Underground (UG) out channels.
- Hospitals: UP Health System Marquette – (906) 449-3000
    - Bell Hospital – (906) 486-4431
- Local Fire Departments: Powell Township – 911 or (906) 345-9345
- Local Police: Marquette County Central Dispatch – 911
    - Marquette County Sheriff's Department – (906) 225-8435
    - Michigan State Police – (906) 475-9922
- Trimedia 24-hr emergency spill response: 1-866-866-5125
- EGLE Marquette Office: (906) 228-4853
- Marquette County Emergency Management Coordinator: Brian Hummel, (906) 475-1134
- Michigan Pollution Emergency Alerting System (PEAS): 1 (800) 292-4706
- Federal Agencies: EPA Region 5 Environmental Hotline – (800) 621-8431
    - EPA National Response Center – (800) 424-8802
    - MSHA North Central District – (218) 720-5448
- MDNR Marquette Field Office: (906) 228-6561
- Michigamme Township Supervisor: (906) 323-6608
- MSHA: 1 (800) 746-1553

1.3 Testing of Contingency Plan

During each year, the facility will test the effectiveness of the Contingency Plan. Conducting an effective test will have two components. The first component will involve participation in adequate training programs on emergency response procedures for those individuals that will be involved in responding to emergencies and the second component is the completion of a mock field or desktop exercise.

Training will include the participation of the Safety Officer, Environmental Officer, Public Relations Officer, and other individuals designated to respond to emergencies including the Humboldt Mill ERT. Individuals will receive appropriate training and information concerning their specific roles, including emergency response procedures and the use of applicable emergency response equipment.

The second component of an effective Contingency Plan is to conduct desktop exercises or mock field tests. At least one desktop exercise or mock field test will be performed each year which will test the emergency response measures of the contingency plan and crisis management plan in place at Eagle Mine. The Safety Officer will work with the Environmental Officer and Emergency Response Coordinator to first define the situation that will be tested. The types of test situations may include responding to a release of a hazardous substance, fire, or natural disaster such as a tornado. A list of objectives will be developed for planning and evaluating each identified test situation at a pre-established date and time. Local emergency response officials may be involved, depending on the type of situation selected.

Once the test is completed, a third-party observer and members of the crisis management team and emergency response team will evaluate the effectiveness of the response and make recommendations to improve the system. These recommendations will then be incorporated into a revision of the facility Contingency Plan and Crisis Management Plan.