RioTinto

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March 15, 2012

Mr. Joe Maki
Michigan Department of Environmental Quality
420 5th Street
Gwinn, MI 49841

Dear Mr. Maki:

Subject: Annual Mining and Reclamation Report, Kennecott Eagle Minerals Company, Nonferrous Metallic Mineral Mining Permit (MP 01 2007), Eagle Mine

Kennecott Eagle Minerals Company (KEMC) has an approved Mining Permit (MP 01 2007) dated December 14, 2007. General Permit Condition G2 states, "The permittee shall file with the MMU Supervisor a Mining and Reclamation Report on or before March 15 of each year, both during milling operations and post closure monitoring, as required by Section 324.63213 and R 425.501. The report shall include a description of the status of mining and reclamation operations, an update of the contingency plan, monitoring results from the preceding calendar year, tonnage totals of materials mined, and amount of metallic product by weight."

Please find attached, the 2011 Annual Mining and Reclamation Report for the Eagle Mine. This initial Annual Report also includes a discussion of construction activities that have occurred since the commencement of project implementation in May 2010.

Should you have any questions about this report please do not hesitate to contact me at 906-486-1257.

Sincerely,

Kristen Mariuzza, P.E.
Environmental and Permitting Manager

Cc: Hal Fitch, MDEQ, Lansing (electronic)
Alvar Maki, Michigamme Township

2011 Annual Mining and Reclamation Report

Kennecott Eagle Minerals Company
Eagle Mine

March 15, 2012

Eagle Project
Kennecott Eagle Minerals Company
2011 Annual Mining and Reclamation Report

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1 Introduction

Kennecott Eagle Minerals Company (KEMC) officially began construction of the Eagle Mine, an underground nickel and copper mine in Michigamme Township, in May 2010 and began underground operations in September 2011. Due to the commencement of underground operations, KEMC is required per Part 632 to submit an annual Mining and Reclamation Report (MRR) as detailed in R 425.501.

The MRR is required to provide a description of mining and reclamation activities, updated contingency plan, monitoring results, tonnage of material mined, and a list of incident reports that created, or may create a threat to the environment, natural resources, or public health and safety at the Eagle Mine Site. In addition, this MMR will also provide a mine site project construction status update to memorialize all that has been completed and the decisions and/or modifications that have been approved throughout the process.

2 Site Development and Construction Status

Initial construction began in 2010 with clearing, grubbing and stockpiling excess soils to create the final grades for surface facility construction. This work was accompanied by implementing temporary and final soil erosion control measures as discussed in Section 2.1. In 2011, following installation of site utilities and the final grade preparation that segregates contact and non-contact storm water, the site was fully paved to ensure an impermeable surface in the operations area. The paved surface and water management systems constructed ensure that there is no surface water runoff from the site. The facilities that have been constructed through 2011 will support the mine development and provide the environmental protection required by all permits. Additional facilities will be constructed in 2012 to support both the actual mining of the ore body and the stope backfilling process.

2.1 Soil Stockpiling and Erosion Control Measures

Due to clearing, grubbing and grading activities beginning with initial construction in May 2010 and continuing through December 2011, approximately 750,000 cubic yards of soil has been relocated onsite to allow for the construction of the surface facilities. All topsoil has been stockpiled and stabilized in a designated topsoil storage area or utilized along berms to support vegetative growth. Excess soil not utilized in re-grading activities has also been stockpiled and stabilized, and is currently being utilized as a screening berm for security and to protect the aesthetics of the area; e.g., light, noise, visual. Following operations, both the topsoil and the excess stabilized material will be used for final landscaping and reclamation.

Soil Erosion and Sediment Control (SESC) measures have been fully implemented in accordance with Part 91 (NREPA, 1994 PA 451, as amended) around the site. To ensure the integrity of the installed controls, they are inspected on a weekly basis (except during frozen conditions) and after a 0.5” rain event or greater. Any issues identified are immediately addressed by onsite staff. KEMC staff conduct the inspections and maintain the proper SESC and storm water certifications. Inspections are recorded in a logbook maintained at the mine site guardhouse.

Best management practices implemented onsite include grading; roughening, seeding, and mulching of berms; silt fencing around the site perimeter and utility corridors; and water on travel ways to control dust. As construction activities conclude, any exposed soil is immediately seeded and mulched to encourage vegetative growth and reduce potential wind/water erosion. In addition, more permanent measures are being evaluated for implementation in 2012. These may include site grading, swales, and additional vegetative control measures.

Soil Berms and Stabilization, June 2011

2.2 Site Grading and Storm Water Control

The grading plan was designed to segregate the operations area storm water runoff from the non-contact area runoff. Two contact water collection basins (CWBs) and three non-contact water infiltration basins (NCWIBs) were constructed in 2010 and 2011 to maintain control and segregation of the water.

2.2.1 Non-Contact Water Infiltration Basins (NCWIB)

Inspections of the NCWIB following wet weather events have indicated no storage of site runoff water due to rapid infiltration. The basins will be monitored for excess silting that would prevent infiltration from occurring and not allow the basins to operate as designed. On September 21, 2010, KEMC received MDEQ approval for the sampling plan and locations of the wells required to be installed down gradient of the NCWIBs. These wells will be monitored annually in Q2 following the spring snowmelt.

2.2.2 Contact Water Basins (CWB) and Storm Water Catchment

As stated above, operations area storm water is collected as a result of planned site grading, whereby contact area runoff is contained by a paved surface and flows to the CWBs. Overall site grading began in 2010 with final segregation and paving of the contact area occurring in 2011. To ensure permit compliance, a standard operating procedure was implemented for all site personnel that identified requirements for ingress and egress from the contact area. This was activated when underground mining commenced on September 22, 2011. Because the automatic truck wash is not yet in operation, all vehicles leaving the contact area are manually washed in a designated area near the CWBs. All wash water flows over an impermeable surface and into the CWBs.

The CWBs are lined basins designed to appropriately store contact water until it can be treated in the Water Treatment Plant (WTP). The original permitted site layout identified the CWBs on the far west side of the mine site. During final design, it was decided to locate the CWBs centrally on site to ensure better capture of all contact area runoff. This also situated the basins directly alongside the WTP requiring less piping and further reducing any environmental risk.

Currently, two areas within the storm water contact area remain to be constructed. The Coarse Ore Storage Building and Mine Substation footprints remain unpaved until construction of the facilities during the summer of 2012. In order to ensure contact area snow is not plowed into those footprints, and that storm water runoff cannot discharge to the open area, reflective posts and curbing have been installed surrounding the footprints of the buildings.

Contact Area Paving Underway, August 2011

2.3 Surface Facility Construction

During final design of the Eagle Mine site, modifications were implemented to improve overall environmental control, safety and project efficiency. Optimization of the formerly planned Mine Administration and Services facility resulted in a surface footprint change of approximately 2000 square meters less than the original design. These modifications were communicated to the MDEQ in the form of Part 632 mine permit amendment requests and approved by MDEQ as minor modifications to the permit. The structures that were constructed through 2011 are necessary to support mine development and provide additional environmental protection. Facilities to be constructed in 2012 will support both the actual mining of the ore body and the stope backfilling process.

2.3.1 Site Modifications and Amendments

On March 19, 2010, KEMC received approval from MDEQ on a Part 632 amendment request to construct the Treated Water Infiltration System (TWIS) above ground rather than the original design of a subsurface system.

In August 2010, prior to the commencement of permanent surface facilities construction, an amendment request was submitted to relocate the WTP, CWBs and the Temporary Development Rock Storage Area (TDRSA). The primary purpose for relocating these facilities was for optimal environmental control of site water, reduction of underground piping, and safer traffic patterns. MDEQ approved this request on August 18, 2010.

Due to this initial amendment for relocation of the TDRSA, CWB and WTP, the final engineering and site layout design reflected the relocation of the remaining structures as well. Therefore, an amendment to relocate the Powerhouse and Guardhouse was submitted and approved by MDEQ on November 3, 2010. This amendment also relocated one NCWIB to the inside of the mine site fence from the south side of the Triple A near the Guardhouse. One additional relocation amendment was submitted for the remaining surface facilities to be constructed in 2011. This was approved by MDEQ on May 31, 2011.

In November 2010, a request was submitted to extend electrical service onto the mine site to power all activities and eliminate the continuous source of diesel generated power. A stand-by generator is installed and will be used in the event of a power failure to evacuate the mine and operate necessary equipment for environmental protection; e.g., WTP. This adjustment resulted in a significant decrease in greenhouse gas and Nitrogen Oxide (NOx) emissions for the project. A public hearing for the power line was held in early December and final approval received on December 28, 2010.

The final amendment submitted was a request to add a communications tower to the site that would supply vehicles traveling between the mine and the Humboldt mill with radio communication. Although approval of the amendment was received on May 31, 2011, the actual purchase, construction and use continue to be evaluated.

In summary, the following amendments to the Part 632 Mine Permit have been requested and approved through 2011:

- TDRSA, WTP and CWB relocation
- NCWIB, Powerhouse and Guardhouse relocation
- Power Line Extension
- Communications Tower
- Surface Facilities relocation

A full summary of all permit amendment requests, along with some additional submittals and approvals, can be found in Table 2.1 on the following page.

An updated Site General Arrangement (GA) reflecting the approved relocations can be found in Appendix A. This GA also identifies proposed locations for additional buildings which will require approval through the Part 632 amendment process.

Table 2.1 Amendments, Submittals, and Approvals

Date	Description	Approval
2/12/2010	TWIS Design Change	3/19/2010
6/25/2010	WTP Designs Submittal	7/6/2010
7/14/2010	Cessation of Kinetic Testing Notification (to resume at mining commencement)	None
7/26/2010	Wildlife Management Plan (revised 9/15)	9/21/2010
8/4/2010	Surface Facility Amendment for the CWBs and TDRSA*	8/18/2010
8/13/2010	NCWIB Well Installation Approval & Commencement of Mining Clarification	9/21/2010
9/1/2010	TDRSA Design and Construction Plans	9/3/2010
10/18/2010	NCWIB, Powerhouse, Guardhouse*	11/3/2010
11/15/2010	Power Line*	12/28/2010
3/7/2011	Communications Tower*	7/11/2011
4/25/2011	Final Building Relocations*	5/31/2011
8/5/2011	Epoxy liner equivalency	9/20/2011
8/10/2011	Fish Tissue Sampling Protocol	10/5/2011
8/15/2011	Certificate of Survey for Exhibit G (outcrop) of the Surface Use Lease	NA
9/13/2011	P51 Aquatic Monitoring Clarification	1/17/2012
9/16/2011	AST Plans submitted to MDEQ Storage Tank Unit	10/5/2011
10/11/2011	PIPP Notification Distributed MDEQ, Marquette County LEPC & Marquette County Health Department	n/a
8/16/2011	Construction Quality Assurance Document for TDRSA & CWB	9/14/2011
11/11/2011	Reporting limit adjustment for Hg	Pending

* Amendments

2.3.2 Water Treatment Plant and Treated Water Infiltration System

In June 2010, final WTP designs were submitted to MDEQ for review, and approval was received on July 7, 2010. Construction of the WTP commenced following the August 18, 2010 amendment approval for relocation. Commissioning began in August 2011 and first the first discharge of treated water to the Treated Water Infiltration System (TWIS) occurred on October 9, 2011. All documents and information required per the State of Michigan issued Groundwater Discharge Permit (GW1810162) were submitted, and if applicable, approved by MDEQ.

Construction of the TWIS began in September 2010 and was completed during the 2011 construction season. KEMC received a final Construction Quality Assurance (CQA) report in November 2011 that is available upon request.

Water Treatment Plant, September 2011

Reverse Osmosis Units in WTP, 2011


Treated Water Infiltration System (TWIS), September 2011

2.3.3 Contact Water Basins

Construction of the CWBs began in 2010, leak detection tests on the welded seam membrane liner were completed in May 2011, and the Construction Quality Assurance (CQA) certification report was approved by MDEQ on September 14, 2011.

During the 2012 construction season, aerators will be installed to minimize ice formation, provide mixing for better WTP operations, prevent excessive sediment deposition, and assist in optimizing water quality before treatment from the underground operations.


Contact Water Basins, September 2011

2.3.4 Temporary Development Rock Storage Area

The TDRSA is designed to safely store rock produced from the decline and other underground development until it can be returned to the underground as backfill. Permanent construction of the TDRSA began following MDEQ approval of the final liner design which was received on September 3, 2010.

Prior to the installation of the secondary liner, also known as the leak detection sump, density tests were performed on the compacted sub-base to ensure a solid foundation. Following the liner installation, a leak location survey was performed and completed in September/October 2010. The risers, pumping system and primary liner were then installed and leak tested in October/November 2010. The final CQA certification report for the primary and secondary liner systems was submitted to MDEQ August 16, 2011 and approved on September 14, 2011. Prior to any placement of development rock on the TDRSA, MDEQ inspected the final grading of the sand layer.

Temporary Development Rock Storage Area (TDRSA), November 2011

2.3.5 On-Site Utilities

As discussed above in Section 2.3.1, KEMC received approval to extend line power to the Mine Site in lieu of using diesel-fired generators as originally permitted. Underground conduit installation commenced in April 2011 and was completed in August 2011, with the site being permanently energized at that time. Overhead line installation commenced in June 2011 and was completed in September 2011. KEMC provides stand-by power generation to the site with a MDEQ Air Quality Division (AQD) permitted diesel generator located in the powerhouse. The diesel generator is designed to operate critical mine support systems to ensure safety and environmental protection.

These systems include the underground ventilation system and (when constructed) the mine escape elevator, as well as the WTP.

KEMC uses a septic system to treat sanitary water from shower and bathroom facilities. The septic system installation began in November 2010 and was complete in August 2011. KEMC services the sanitary facilities with a permitted Type IIb non-transient potable water system.

Construction of the water distribution system began in November 2010 and was completed in September 2011. The system includes both a potable water well and a mine service well that were registered in June 2011 with the MDEQ through the Water Withdrawal Assessment Tool for an aggregate total capacity of 210 gpm (60 gpm potable, 150 gpm services). Water use from the potable and mine services wells must be reported to the MDEQ by April 1 of each year.

2.3.6 Miscellaneous

KEMC completed construction of ancillary facilities including the mine development office and drys, fuel canopy, parking areas, remaining NCWIBs, and the truck wash between the summer of 2011 and February 2012. The truck wash will be commissioned for full time use during the spring of 2012, and the temporary vehicle wash will be eliminated.

Although not required, KEMC installed a permanent chain link fence delineating the boundary between active mine property and the rock outcrop to protect the outcrop integrity. This work was completed in October 2011 following a legal survey of the outcrop as defined by Exhibit G in the MDNR Surface Use Lease. This survey was submitted to MDNR on August 15, 2011.

Eagle Mine Site Aerial View, November 2011

2.4 Upcoming 2012 Work

During the remainder of 2012, KEMC intends to complete surface facility construction including: a concrete backfill batch plant and aggregate storage building, mine substation and mine air heater, compressor building, coarse ore storage building (with truck scale), permanent guardhouse and facility entrance, and the main ventilation air raise and surface infrastructure to complete the permanent mine ventilation plan, which includes earthwork and fence installation at a separate surface location.

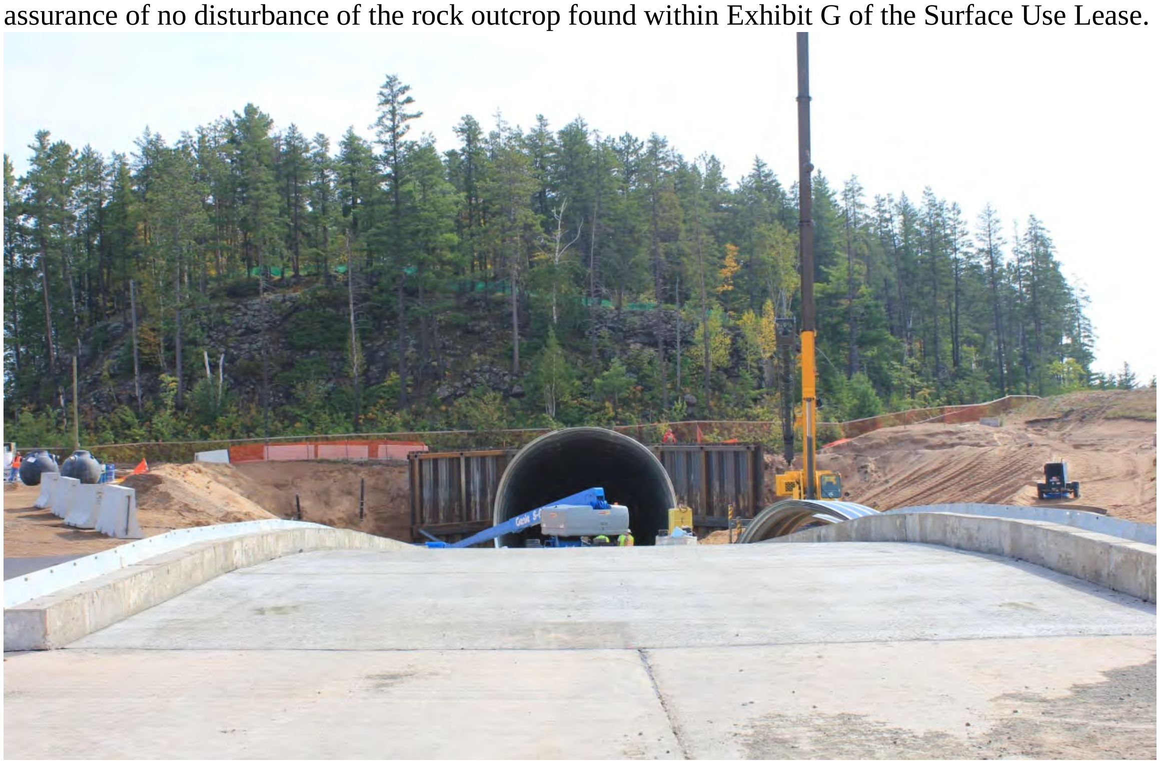
3 Mining Activities and Data Report

Underground mining activities began on September 15, 2011, with drilling operations in preparation for blasting. On September 22, 2011, blasting at the Eagle Mine commenced and the project was officially "mining." The commencement of mining activities initiated all monitoring programs per the Part 632 Mining Permit. A description of the monitoring activities can be found in Section 4 of this MRR.

3.1 Underground Operations

3.1.1 Portal Development and Decline Progress

Prior to the start of drilling, the mine entrance, or portal, was constructed. The portal measures approximately 78 meters in length and is constructed of reinforced steel. This was extended from the original plan of 37 meters in order to enter the bedrock further below grade and provide additional assurance of no disturbance of the rock outcrop found within Exhibit G of the Surface Use Lease.



Portal Construction, August 2011

As of December 31, 2011, mining of the primary decline had progressed a total of approximately 230 meters (excluding the 78 meter portal). The primary decline is arch shaped and measures approximately 5.5 meters wide by 5.3 meters high. Table 3.1 below summarizes the monthly progress of underground advance and Appendix B contains a map which outlines the development positions for 2011 and predictions for 2012.

Table 3.1 Underground Advance

Month	Distance of Advance (m)
September	10
October	94.4
November	91.6
December	33.6
Total	**229.6**

Steel Arch Complete, 2011

3.1.2 Dewatering Volume and Quality

As stated in Section 3.3.1, water is required underground in order to complete drilling, bolting, and dust suppression activities. The WTP supplies treated water to the utility water tank which is then utilized underground. If the WTP does not have an adequate supply of utility water, the mine services well is utilized.

Utility water supplied to the underground, as well as any groundwater infiltration, is pumped from the mine and temporarily stored in a settling tank prior to discharge to the CWBs. The lines both supplying and removing water to and from the underground are equipped with totalizer meters. These meters are monitored daily by the shift supervisor and the flows are recorded in a "mine water utilization log."

The amount of water supplied for underground operations in 2011 ranged from an average of approximately 1160 gallons per day in September to 7600 gallons per day in November. The water pumped from the mine corresponded with the amount of water provided for operations and ranged from an average of 1150 gallons per day in September to 7200 gallons per day in November.

Table 3.3.2.1 below summarizes the monthly average flow provided to the underground and the calculated dewatering volume during the months of operation in 2011. Over time, these numbers may fluctuate due to an increase in groundwater infiltration into the mine. The current volumes, as well as visual inspections underground, indicate that very little groundwater infiltration has occurred at this time. Therefore, due to water being removed with the development rock, and evaporation associated with equipment operations, the average dewatering volumes in 2011 were slightly less than the volume of water supplied.

Table 3.3.2.1 Average Monthly Flow Provided and Dewatering Volume

Month	Average Water Supplied Underground (GPD)	Average Water Pumped from Underground (GPD)	Average Dewatering Volume (GPD)
September	1163	1150	-13
October	6166	2758	-3408
November	7619	7200	-419
December	7589	7111	-478

Notes: Dewatering volume is calculated by subtracting the volume of water provided to the mine from the volume of water removed from the mine. Dewatering volume is indicative of the amount of groundwater infiltration occurring.

In addition to monitoring water volumes from the underground mine, the water is sampled and characterized quarterly to further understand how the water chemistry is changing over the course of operations and to identify potential trends that may result in modifying process controls at the WTP. This data will also be utilized in the ongoing geochemistry assessment.

The Q4 underground dewatering sample was analyzed for the required annual parameter list and results can be found in Appendix C.

3.2 TDRSA Development Rock Storage Area

3.2.1 Development Rock Storage Volume

As required by mining permit condition F23, all development rock is placed in the TDRSA during the underground mine development until it is reused as backfill. Assuming an estimated 23% swell of the 7933 m^3 (24,591 t) of development rock removed, approximately 9759 m^3 (30,253 t) was placed on the TDRSA in 2011. The initial phase requires that the first two feet of material placed in the TDRSA is a 3-4 inch particle size. Therefore, a portable crusher is being utilized and the crushed development rock is graded across the entire floor area to establish the two foot base layer that is required by design. This base layer was not completed in 2011 and therefore crushing operations will continue into 2012. Table 3.2 below summarizes the monthly volume and tonnage of development rock mined for 2011.

Table 3.2 Volume of Rock Mined in 2011

Month	Volume of Rock Mined (m^3)	Tonnage Mined (tonnes)
September	314	973
October	2863	8875
November	2808	8704
December	1948	6039
Total	**7933**	**24,591**

The 2012 mining forecast calls for the continuation of the decline with an additional 56,592 m^3 (164,117 t) of development rock being removed and stored on the TDRSA. Assuming a conservative estimate of 40% swell, approximately 79,229 m^3 (229,764 t) of development rock will be placed on the TDRSA in 2012.

3.2.2 Sump Dewatering Volume and Quality

The TDRSA has two collection sumps. The contact water sump collects drainage from the primary TDRSA liner in contact with waste rock. The leak detection sump collects water from beneath the primary liner within the secondary liner system. Both sumps are continuously monitored through the use of pressure transducers. The contact water pumping system is equipped with an automatic pump start and high water alarm to indicate when the water level is approaching the one foot maximum head level. The leak detection sump is manually pumped and sampled as necessary. Operational controls, which include operator training and control panel lockout have been implemented to ensure the systems operate as designed and required sampling and volume collection occurs.

3.2.2.1 Primary Contact Water Sump Monitoring

Daily inspections of the TDRSA primary sump level are conducted by WTP operators and an additional weekly inspection by the Environmental Department. The water level is recorded in a compliance logbook that is kept on site and available upon request. Results of the daily and weekly inspections indicate that water levels in the sump were maintained within the ranges specified by the Part 632 permit or returned to those ranges shortly after heavy rainfall events. Quarterly water quality monitoring of the contact water sump commenced during Q1 2012 .

3.2.2.2 Leak Detection Sump Monitoring

Permit conditions require that the leak detection sump be purged and sampled as “accumulation” occurs. “Accumulation” was determined to be a volume of water significant enough to allow for three minutes of purging prior to sample collection. In addition to water quality analysis, the volume pumped must be utilized to calculate the average daily rate of accumulation into the sump.

In 2011, three separate samples between September and December were collected and the accumulation rate was calculated. The average rate ranged from a maximum of 6.89 gal/acre/day in September to 0.30 gal/acre/day in November. All results were well below 25 gal/acre/day threshold indicated in the permit. Table 3.2.2 below summarizes the calculated flow rate from the TDRSA leak detection sump for 2011.

Due to the water that accumulated in the leak detection sump during construction as a result of rain events, it is expected that the sump will slowly release this water and be purged from the system. Golder Associates, Inc., who designed the TDRSA, calculated the approximate volume of water which entered the secondary detection system during construction to be more than 26,000 gallons. During operations some of the available water will be released and extracted and some may not be released until the TDRSA is filled and compression of the geosynthetic materials occurs. As required by the permit, KEMC will continue to monitor accumulation rates in the leak detection sump and sample accordingly. A total of 2,258 gallons of water was purged from the leak detection sump in 2011.

As stated above, permit condition F19 requires that a monthly sample be collected from the leak detection sump if accumulation occurs. Samples were collected from the leak detection sump in September, November, and December 2011. No sample was collected during October as limited accumulation was reported. Upon sample collection, the pH of the sample is immediately determined and the remaining sample aliquot is sent to an off-site laboratory for sulfate analysis. Once the sample is collected, the remaining water contained in the leak detection sump is purged to the contact water basins.

Table 3.2.2 below summarizes the TDRSA leak detection sump analytical results for 2011. The pH results were consistently reported at 8.1 while sulfate results ranged from a minimum of 63 mg/L in September to 200 mg/L in December. All sulfate results were well below the 500 mg/L threshold identified in the permit.

The Q1 2012 water analysis from the contact water sump indicated a sulfate level of 27 mg/l. Because there is no correlation between the sulfate results in the primary contact water sump and the results from the leak detection sump, and because of the reduction in the rate of accumulation, it is suspected that the source of sulfate in the leak detection sump is due to materials utilized during construction. This is currently being evaluated and will be monitored closely.

Table 3.2.2 TDRSA Leak Detection Sump Results for 2011

Month	**Sulfate (mg/L)**	**pH**	**Average Daily Flow Rate (gal/acre/day)**
September	63	NM	6.89
October	NS	NS	6.89
November	150	8.15	0.30
December	200	8.11	1.60

Notes:
NS = Not Sampled. Not enough water accumulated in the leak detection sump to warrant sampling/purging.
NM = Not Measured

3.3 Site Water Usage, Treatment and Discharge

The site wide water usage and treatment include three separate sources to supply the mining activities and three primary sources that supply water to the CWBs and WTP for treatment. The WTP processes the water and provides a portion for recycle within the WTP itself, for recycle within the mining operations and for discharge to the TWIS.

3.3.1 Supply Water Sources and Use

Three separate sources supply water to the mine site to support various development and operational activities. These sources include the potable well, mine services well, and treated utility water from the WTP. Utilizing the detailed water use logs maintained on site, the following summary of average water use from each source has been compiled.

The domestic well (QALPSW001) is used to supply potable water to the mine development office, mine drys, WTP laboratory and restroom facilities, and temporary truck shop. Potable water may also be utilized to replenish the fire water tank and eventually supply make-up water to the truck wash. During September through December 2011, approximate water use was 15,500 gpd (approximately 11 gpm).

The mine services well (QAL011D) is primarily used to supply water for dust suppression and exploration drilling. It also provides water to the network of fire hydrants on site and may be used to supplement the water demands of underground mine operations if necessary. The volume of water supplied from this well will fluctuate seasonally and with weather conditions because the primary use is associated with dust suppression. From September through December 2011, approximately 6650 gpd of water was utilized.

The third source of water on the mine site is the treated utility water which is supplied by the WTP. This is water that is collected in the CWBs, recycled through the WTP, and utilized for on-site activities rather than being discharged to the TWIS. Utility water is supplied to the underground as required for drilling, bolting, and dust suppression. In addition, the utility water is required in various stages of the water treatment process. The total volume of utility water treated and supplied for mining activities was approximately 2300 gpd.

3.3.2 CWB Water Management and Water Quality

Three primary sources of site water are discharged to the CWB prior to treatment in the WTP. These include dewatering from the underground mine, dewatering from the TDRSA and site wide storm water. Additional intermittent sources include sump dewatering and truck wash water.

Immediately following the commencement of mining, CWB levels have been recorded daily by the WTP operators. This log is available on request. All rainfall during the fall season was collected and managed within the CWB capacity. Due to the onset of winter, snow management on site has been the primary focus. All snow has been stored within the contact area and is expected to provide a significant amount of water to the CWBs during the spring melt. A water management plan has been developed for the site and is available upon request.

The CWBs are also sampled on a quarterly basis to provide the WTP operators with valuable data that may affect process control. The characterization will also provide information to identify any parameter trending in water quality as mining progresses. Due to safety concerns associated with collecting samples directly from the CWB, a single sample, representing the CWBs is collected from the influent sampling point at the WTP. The Q4 sample was analyzed for the annual parameter list with a summary of the results in Appendix D.

3.3.3 Water Treatment Plant Operations and Discharge

Operations at the WTP began with commissioning during August 2011. During this phase of start-up, all water treated in the plant was recycled back into the CWBs. Discharge from the WTP commenced on October 9, 2011, and continued until November 1. Due to minimal water on-site, the WTP did not discharge again until November 30 and continued for four days. No discharge occurred for the remainder of 2011.

Effluent discharges to the TWIS are regulated under the GWDP with analytical results and discharge volume reported to the MDEQ on a monthly basis through the e2 electronic reporting system. Table 3.3.3 below outlines the volume of water per month that was discharged to the TWIS.

Table 3.3.3 Volume of Water Discharged in 2011

Month	Volume of Water Discharged (gallons)
October	6,042,940
November	46,932
December	406,643
Total	**6,496,515**

Source: WTP Operators log

During the four days of discharge in late November and early December, the biochemical oxygen demand (BOD) was elevated in the product water. Due to an internal sampling effort that was undertaken, including split samples between two individual laboratories, it was determined that the WTP unit processes were operating as designed with BOD levels below the detection limit. The pH of the final product water was adjusted with citric acid prior to discharge. Because citric acid is a weak acid, it was the optimal choice due to the very clean, low total dissolved solids in our final product water. However, citric acid is also organic in nature and has the potential to influence parameters such as BOD. Therefore, it has been replaced with HCl for the final pH adjustment. The adjustment now occurs in the product water tank rather than the discharge line. Appropriate verbal and written notifications per the Groundwater Discharge Permit were provided to MDEQ.

3.4 Materials Handling

3.4.1 Fuel Handling

KEMC constructed a motor fueling area for underground equipment that consists of two identical 20,000-gallon Class II diesel aboveground storage tanks (ASTs) and one 560-gallon gasoline AST. KEMC also constructed a storage pad for a standalone 1,700-gallon day tank to fuel its standby generator located in the powerhouse. Prior to tank installation, on September 16, 2011, KEMC submitted applications to MDEQ Storage Tank Unit for review. Approval was received on October 5, 2011. The MDEQ's Hazardous Materials Storage Inspector field approved the tank installations for use on March 1, 2012.

The aforementioned tanks use a double skinned containment design to capture at least 100% of the tank contents in the event of a failure. Additional engineering controls, such as bollards to protect the fuel area and pavement that slopes toward containment, are available as tertiary containment. KEMC has developed a Spill Prevention, Control, and Countermeasures (SPCC) plan according to the provisions of Title 40 of the Code of Federal Regulations Part 112 (40 CFR 112) and in accordance with the conditions of its Mine Permit for the motor fueling area, the generator storage tank, and other temporary storage tanks.

3.4.2 Bulk Chemical Handling and Storage

KEMC's HSE Department follows an established procedure for evaluating and approving chemicals (hazardous or non-hazardous) in any quantity that are brought to the site by KEMC or its subcontractors. Following a risk assessment that includes health, safety and environmental factors, the chemical or an alternative is approved, and the associated MSDS is entered into KEMC's online Hazard Communication program, MAXCOM. MAXCOM is a database of materials used on site that is searchable by any employee to obtain product information such as manufacturer, MSDS summary, and a safe use guide.

KEMC and its subcontractors follow a strict approach to respond to and report spills. In 2011, KEMC had no spills that were reportable per the Part 5 Rules of Part 31, Water Resources Protection of NREPA, 1994 PA 451 as amended (Spillage of Oil and Polluting Materials).

KEMC has developed two Standard Operating Procedures (SOPs) for chemical and petroleum product offloading. These SOPs are read and understood by product haulers and include responsibilities for complying with Department of Transportation (DOT) regulations, required safety equipment, completion of a Permit to Unload, and standard guidelines for procedures prior to, during, and after transfer of fuel or other material.

KEMC has developed a Pollution Incident Prevention Plan (PIPP) in accordance with administrative rule R324.2006(2) of Part 31, Water Resources Protection of NREPA, 1994 PA 451 as amended, and the facility's Mine Permit. Notification of the PIPP was provided to the MDEQ Water Resources Division, the Marquette County Local Emergency Planning Committee, and the Marquette County Health Department on October 11, 2011.

3.4.3 Blasting Material Handling and Storage
The blasting and cap magazine buildings are located at a secure location within the mine facility and are constructed with steel following Mining Safety and Health Administration (MSHA) requirements. The buildings are ventilated to control dampness and excessive heating with methods that do not create a fire or explosion hazard. Only certified blasting material handlers are allowed entry into these buildings. KEMC has obtained the required permits from the Bureau of Alcohol, Tobacco and Fire Arms for storage and use of explosives.

4 Additional Monitoring Activities

Several additional permit required monitoring activities commenced in 2011 with the start of underground development. Many of these activities will provide the final baseline analysis of conditions and are discussed below.

4.1 Water Quality Monitoring

Both a significant amount of surface water and groundwater quality monitoring is required both on and surrounding the project site. Following is a summary of the water quality monitoring activities.

4.1.1 Quarterly Groundwater Quality Monitoring
Groundwater quality is monitored through a network of monitoring wells located both inside and outside the mine site perimeter fence. A map of the well locations can be found in Appendix E. Installation of the monitoring wells occurred at various times from 2004, to the final wells being installed in July 2011. Appendix F, summarizes the year of installation and the amount of background data that was collected prior to the start of operations in September.

The commencement of underground development in September 2011 initiated the first round of quarterly groundwater monitoring which was completed in Q4 2011. Samples were collected in accordance with the Eagle Project Quality Assurance Project Plan and Standard Operating Procedures (North Jackson, 2004a and 2004b) and the results are summarized and compared to background data in the tables found in Appendix F.

Twenty-two monitoring well samples were collected during the Q4 2011 sampling event. Samples were collected using low-flow sampling techniques, and field parameters (DO, ORP, pH, specific conductivity, temperature, turbidity) are collected and analyzed using a flow-through cell and YSI probe. All samples are shipped overnight to TriMatrix Laboratories in Grand Rapids, Michigan, for analysis.

The majority of parameters analyzed at all wells were reported at values below the analytical reporting limit and listed as non-detect. Metals above the laboratory detection level were arsenic and mercury at six of twenty-two locations, and iron was reported at thirteen of twenty-two locations. Additional analytes detected included alkalinity-carbonate, alkalinity–bicarbonate, chloride, nitrate, sodium, and sulfate.

Arsenic was detected at location QAL066D with a result of 10 µg/L. Because this well is located southwest of the mine site in the wetland above the ore body, current project activities would have no impact on the groundwater quality of this well, and the results are indicative of the natural range of water chemistry for the location. As additional data is collected, a better understanding of the water chemistry will be developed and compared to results of future sampling events.

The mercury result at location QAL066D was 2.51 ng/L, and less than 0.7 ng/L at locations QAL060A, QAL061A, and QAL064D. These results are slightly above baseline data but appear consistent with local regional background conditions.

Lastly, all iron results with the exception of QAL044B were found to be within baseline levels. Although the result at QAL044B was above baseline it also appears to be consistent with regional background conditions.
For additional information on the sample results see Appendix F. A comprehensive full data report will be made available upon request.

4.1.2 Quarterly Surface Water Quality Monitoring

The first round of surface water sampling was conducted on October 17-19, 2011, at eleven locations; nine on the Salmon-Trout River and one each on the Yellow Dog River and Cedar Creek. A map of the surface water sampling locations is found in Appendix G. All samples are collected in accordance with the Eagle Project Quality Assurance Project Plan and Standard Operating Procedures (North Jackson, 2004a and 2004b).

Grab samples were collected from each location along with field parameters, including stream stage and flow measurements. Field measurements (DO, pH, specific conductivity, temperature) were collected and determined through the use of a YSI probe. The stream stage and flow measurements were obtained using a wading rod and current meter. All water quality samples were shipped overnight to TriMatrix Laboratories in Grand Rapids, Michigan for analysis.

Stream flow measurements were collected from each location during the October 2011 sampling event with the exception of STRE001. Beaver dams have caused a large pool to build up at location STRE001 which has affected the upstream channel morphology; i.e., poorly defined stream channel banks, and sediment dispersal; i.e., soft sediment deposited on the river bed. Due to the poor measuring conditions created by this disturbance, stream stage and discharge measurements were not performed during the October quarterly sampling event. However, a water quality sample was collected at this location.

All surface water samples were analyzed for the quarterly parameter list with the majority of parameters reported at values below the analytical reporting limit and listed as non-detect. Parameters reported above the laboratory detection level included iron, mercury, manganese and total dissolved solids (TDS).

Iron and mercury were detected at all eleven locations with the highest iron (710 µg/L) and mercury (5.01 ng/L) results reported at location YDRM002. Manganese was only reported at location YDRM002 at a concentration of 28 µg/L. TDS was the only other parameter detected at the surface water locations. All results were compared to the calculated background minimum and maximum result intervals and found to be consistent with background data.

4.2 Regional Hydrologic Monitoring

4.2.1 Continuous, Daily and Monthly Groundwater Elevations

Monitoring wells QAL023B, QAL024A, QAL044B, QAL064, QAL065, QAL066 and wetland locations WLD022, WLD023, WLD024, WLD025, WLD026, WLD027, WLD028, and WLD029 are instrumented with continuous water level meters and downloaded monthly by North Jackson Company field technicians. A map of these locations can be found in Appendix I. As required by permit condition L4c, water levels at the wetland locations must not fall more than 6 inches below pre-mining baseline levels.

Calculated background water levels and monthly water level results are based on mean daily values and summarized in Appendix K. Water level results for September through December 2011 were found to be consistent with this baseline information. Water levels at the wetland locations also did not fall more than six inches below pre-mining baseline levels.

In addition to continuous monitoring, KEMC implemented a regional hydrologic monitoring program to assess potential groundwater elevation changes due to mine dewatering. The regional monitoring wells cover an area of approximately 14 square miles. Discrete groundwater elevations are measured on a quarterly basis at 116 locations. A map of the hydrologic monitoring locations can be found in Appendix I. All discrete water elevations from Q4 were found to be consistent with pre-operation levels. A summary of the discrete water elevation results from Q1 – Q4 2011 are summarized in Appendix K.

4.2.2 Continuous Surface Water Monitoring

Locations STRE002, STRM004, STRM005, and YDRM002 are each instrumented with meters that continuously monitor for temperature, conductivity, and flow rate. The meters were originally installed in 2004 and are downloaded monthly by North Jackson Company field technicians.

Continuous readings were averaged over each month of operation in 2011 and are based on mean daily values. Background levels are based on data collected from September 2004 through August 2011 for all locations. Monthly temperature, flow, and specific conductivity are summarized in Appendix L.

All stream temperature and flow measurements were found to consistent with background results and fall within historical minimum and maximum value readings. Specific conductivity was also found to be consistent with background results and within historical minimum and maximum values, with the exception of the September results at locations STRE002 and STRM005 which were reported at levels slightly higher than background. However, specific conductivity levels in August 2011 were consistent with results from September 2011, and therefore are likely not associated with project activities.

4.3 Biological Monitoring

The final baseline biological monitoring events were conducted during 2011. Monitoring events included flora and fauna surveys, wetland monitoring, fish and macro invertebrate surveys, brook trout metal tissue monitoring, and a narrow-leaved gentian survey. Results from each survey have been compiled into annual reports which are available upon request. A brief summary of each survey is provided below

4.3.1 Flora and Fauna/Wetland Monitoring Report

The 2011 flora, fauna, and wetland vegetation surveys were conducted by King & MacGregor Environmental, Inc. (KME). This was the final baseline survey to be completed and encompasses the areas in and around the Eagle mine site. Previous surveys for birds, large and small mammals and toads and frogs were completed in 2006 through 2008 and previous wetland monitoring and vegetation surveys were completed in 2007 and 2008. Table 4.3.1 below outlines the type and duration of the surveys that were conducted in 2011.

Table 4.3.1 Type and Duration of 2011 Flora, Fauna, and Wetland Surveying Events

Survey Type	Survey Date
Bird	June 7-8, September 16-17
Small Mammals	September 17-19
Large Mammals	September 17-19
Toads/Frogs	April 25, May 18-19
Threatened and Endangered Species	August 24
Wetland Vegetative Monitoring	June 24-25
Vegetative Monitoring	June 21-24, August 23

The wildlife and plant species identified during the 2011 surveys within the Study Area were similar to those identified during the 2006, 2007, and 2008 KME surveys. Forty-seven species of birds, none of which are threatened or endangered, were observed during the bird surveys, and three additional bird species were identified during other KME surveys; e.g., nocturnal surveys for frog and toad species. Six small mammal species, none of which are threatened or endangered, were identified. One species of large mammal was directly observed by KME biologists and indirect evidence of five other large mammal species was also documented. None of the large mammal species recorded in 2011 were threatened or endangered. However, gray wolves remain a protected, nongame species in Michigan. Three frog species and one species of toad were identified; none of them are threatened or endangered.

Vegetative sampling plots in both wetland and upland communities identified plant species common to this region. No threatened or endangered plant species were encountered within the vegetative survey plots; narrow-leaved gentian plants (a state-threatened plant species) were found by KME botanists in abundance (hundreds) along the Salmon Trout River in approximately the same areas where they were recorded by Wetland and Coastal Resources in 2004. However, no narrow-leaved gentian were found in the previously occupied headwater reach of the river where it flows through the southwest portion of the Study Area, apparently because of beaver dam flooding. All of the wildlife and plant species identified within the Study Area are typically associated with vegetative communities that are relatively common within the region.

4.3.2 Narrow-Leaved Gentian (NLG)

The annual survey was conducted in late August during the 2011 peak flowering period by King & MacGregor Environmental, Inc. This survey was the final baseline investigation to be conducted prior to the start of operations in September 2011 and is a continuation/update of baseline investigations previously conducted by John Meier in 2005, 2006, and 2008.

Results from the 2011 survey were generally similar to those of the 2010 survey. Flowering NLG plants are found to proliferate in Northern Marquette County and northeastern Baraga County. NLG were consistently found along and near streams in both wet organic soil and in dryer sand and gravel near wetlands again in the 2011 survey. NLG occurs in the Eagle Project area as well as in other areas of the region away from the Eagle Project area.

4.3.3 Fisheries and Macro Invertebrate Report

The 2011 Fisheries and Macro-Invertebrate annual surveys were conducted by Advanced Ecological Management (AEM). This was the final baseline study to be completed prior to the start of operations in September. Previous surveys were completed in 2005 through 2008. A total of ten stations were surveyed during summer 2011, including one station in the Yellow Dog River, one station in Cedar Creek, five stations in the Main Branch of the Salmon Trout River, and three stations in tributaries of the East Branch of the Salmon Trout River.

A total of 322 fish representing ten species were collected from all stations. Northern redbelly dace (*Phoxinus eos*), blacknose dace (*Rhinichthys obtusus*), and brook trout (*Salvelinus fontinalis*) were the most frequently collected species.

A total of 1,536 macro-invertebrates representing 52 taxa identified to the family level were observed and/or collected from all ten stations that were investigated in 2011. The macro-invertebrate communities within the Salmon Trout River have been scored by AEM as excellent or acceptable communities. In most stations, the macro-invertebrate community rating was consistent with previous sampling efforts.

The aquatic and stream habitats were both rated as excellent or good by AEM and were generally consistent with previous evaluations.

4.3.4 Fish Tissue Survey

A baseline brook trout metals survey was conducted during October 2011 by Advanced Ecological Management (AEM). Information from this survey was intended to provide an additional year of baseline data regarding metals concentrations within brook trout that were collected from the project vicinity. One previous baseline survey was conducted in 2008.

One-hundred and twenty-eight brook trout were collected on October 7-9, 2011, from ten sampling stations located in the vicinity of the Eagle project site. These sample stations are situated in the same sample locations, or close to the same stations that were surveyed by AEM during the 2011 annual aquatic survey. Of the fish collected, 25 brook trout, including 13 males and 12 females, were selected for metals analyses. Metals analyses were completed on both the fillets and liver of each fish. A table summarizing the metal results can be found in the Eagle Brook Trout Tissue Metals Survey Report which is available upon request.

4.4 Miscellaneous Monitoring

4.4.1 Berms, Embankments and Basins

All containment berms and embankments of the TDRSA, CWB, NCWIBs, and facility perimeter are inspected on a monthly basis, or after a 0.5" rain event, to ensure cracking, settlement, or erosion is not affecting the integrity of the berms. Inspections have been completed since the start of operations in September with observations and/or repair recommendations recorded in the surface inspection log stored in the compliance binder at the mine site. Issues identified are immediately reported and corrected by onsite staff. A follow-up inspections is completed to ensure that repairs have been made.

Inspections conducted in 2011, did not uncover any issues with the integrity of the berms, but did note that additional erosion control measures were required to reduce the amount of sediment migrating in the CWBs. Although seeding and mulching had been utilized on site, some of the construction had just been completed and the vegetation did not take hold. In addition, fall temperatures and minimal rainfall impeded vegetative growth. Therefore, additional best management practices were initiated. Roughening, seeding, and mulching were applied on berms near the CWBs and NCWIBs; the north, east, and south berms of the TDRSA; and reapplied on the exterior perimeter berm near the portal. In addition, silt fence was installed around the toe of the TDRSA exterior berm to further mitigate sediment migration into the CWBs.

4.4.2 Impermeable Surface Inspections

The impermeable surfaces monitoring plan, found in Appendix M, was finalized in July 2011 and outlines the requirements of integrity monitoring of surfaces exposed to contact storm water. Areas inspected in 2011 include the WTP floor, sumps, and trench drains and contact area and travel ways comprised of bituminous concrete or asphalt.

The WTP floors, sumps, and drains were inspected monthly from the start of operations in September through December 2011. Inspections of the contact area and travel ways were completed during the months of September and October. Per the monitoring plan, inspections of the contact area and travel ways are suspended during the months of November to April when winter weather prevents effective patching efforts.

All inspection results are recorded on the impermeable surface inspection form, stored in the compliance binder at the Eagle Mine Site. Any issues identified during the inspections are immediately reported and fixed by onsite staff. Follow-up inspections are completed to ensure the repairs were made.

Only one item was identified as requiring repairs during 2011. Three gouges in the asphalt were identified in the contact area and quickly repaired by an onsite construction crew.

4.4.3 Geochemistry Program

Since the start of operations in September, samples have been collected and logged at a rate of one sample per one hundred meters of decline development. Samples are visually characterized and percentage of sulfides noted in a comprehensive spreadsheet. The analytical program will consist of static testing and potentially limited kinetic testing if required. Static results will be compared to baseline data to determine any deviations from predictions. Kinetic testing will be completed if static results deviate significantly from baseline predictions. In addition, results from long-term kinetic testing will be used to update the geochemistry model and predictions of potential generation of acids, dissolved metals, and other related substances. Due to the fall start of operations, there is no analytical data to report in this MRR.

4.4.4 NCWIB & CWB Sediment Accumulation Measurements

Sediment accumulation is monitored and measured at both the contact and non-contact water basins. This requirement is in place as sediment accumulation in the NCWIBs could result in diminished infiltration capacities and decreased water storage capacity in the CWBs. As required by the mining permit, sediment accumulation measurements are conducted on an annual basis for the NCWIBs and on a monthly basis for the CWBs. Once three feet of sediment has accumulated in the CWBs, or less in the NCWIBs if infiltration is impacted, the sediment is removed and disposed of in accordance with applicable regulations.

In November 2011, each of the three NCWIBs, currently on site were inspected with no reportable accumulation observed at any of the locations. Sediment accumulation inspections of the CWBs were completed in September for both CWBs and in November for CWB 1 and December for CWB 2. Only trace amounts of sediment accumulated in either basin in 2011.

Although monthly sediment accumulation measurements are required by the permit they were not conducted at this interval in 2011 due to initial start-up and newly identified safety concerns associated with completing this task. A procedure has been developed that will mitigate safety concerns associated with completing the sediment measurements and will be submitted to MDEQ for review in early 2012.

5 Reclamation Activities

No reclamation projects were completed in 2011 as construction continued throughout the site. However, as the construction of facilities was completed, the areas surrounding the facilities were seeded and mulched to encourage vegetative growth.

6 Contingency Plan Update

An updated contingency plan can be found in Appendix N. This plan will also be submitted to the Local Emergency Management Coordinator.

7 Financial Assurance Update

Updated reclamation costs can be found in Appendix O. It is understood that MDEQ will notify KEMC if these updated costs require re-negotiation of the current bond for financial assurance.

8 Organizational Information

An updated organization report can be found in Appendix P.

Appendix A

Eagle Development Project Mine Site

General Arrangement

REFERENCES		REFERENCES	
DWG. NO.	TITLE	DWG. NO.	TITLE
050-GA-002	PORTAL AREA SITE PLAN		

REVISIONS					
NO.	DESCRIPTION	BY	APP'D	DATE	OWNER
8	REVISED CIVIL & BUILDINGS	KLR	GER	13 SEP 11	JH
7	REVISED CIVIL & BUILDINGS	KLR	GER	22 JUL 11	JH
6	REVISED CIVIL & BUILDINGS	JAL	GER	08 APR 11	FvH
5	REVISED PORTAL & GUARDHOUSE AREAS	JAL	GER	17 FEB 11	FvH
4	RELOCATED U'GROUND ELECTRICAL LINE	GER	JAN	11 NOV 10	FvH
3	UPDATED PROJECT NUMBER, ADD NOTE	MSB	JAN	14 OCT 10	RMT
2	ADDED FENCE, REVISED SEPTIC	GER	JAN	07 SEP 10	RMT
1	REVISED PER NEW SITE LAYOUT	GER	JAN	30 JUL 10	RMT
0	APPROVED FOR CONSTRUCTION	RMV	GER	10 MAY 10	WJH

SCALE: 1:2000		DATE
DESIGNED BY	JAN	JUN 06
DRAWN BY	ETB	JUN 06
CHECKED BY	GER	MAY 10
PROJECT MGR	JAN	MAY 10
OWNER APPR	WJH	MAY 10

ARCHITECTURE
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Hermosillo, Sonora Mexico
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KENNECOTT EAGLE MINERALS

EAGLE DEVELOPMENT PROJECT
MINE SITE
GENERAL ARRANGEMENT
OVERALL PLAN

JOB NO. M3-PN100115
DWG NO. **050-GA-001**
REV NO. 8
DATE 13 SEP 11

File: \\file2.chandler.m3.local\Projects\2010\100115\500 Eng\542 GA\542.2 Dwgs\050\050GA001.dwg LAST UPDATE: SEP 13, 2011 @ 8:53 AM BY: kr5777 LAST REV: regen PLOT SCALE: 1:25.40

Appendix B

Eagle Mine

Monthly Development Positions

	Sign-off	Date
Mine Manager		
Safety Manager		
Environmental Manager		
Operations Superintendent		
Technical Superintendent		

20 0 10 20 30 40 50
Metres

Design By:
Drawn By: J.Chan
Check By:
Comp. File:
Scale: 1:1000
Draw Date: 13-Mar-2012
Sheet: 1 of 1
Dwg. No.: R12M_2013-03-13

RioTinto

Eagle Mine

Eagle R12M
2013-03-13

Appendix C

Summary of Detected Results from Mine Water

Sample ID			EMUGINF-112211
Sample Location			Water from Mine
Sample Date			22-Nov-11
Analyte	**RL**	**Unit**	**Result**
Alkalinity, Bicarbonate	2.0	mg/L	95
Alkalinity, Carbonate	2.0	mg/L	80
Aluminum, Total	0.050	mg/L	0.27
Arsenic, Total	1.0	ug/L	2.7
Barium, Total	10	ug/L	44
Boron, Total	10	ug/L	190
Calcium, Total	0.50	mg/L	14
Chloride	10	mg/L	510
Cobalt, Total	5.0	ug/L	7.1
Copper, Total	5.0	ug/L	44
Iron, Total	50	ug/L	1900
Lead, Total	1.0	ug/L	3.8
Magnesium, Total	0.50	mg/L	32
Manganese, Total	5.0	ug/L	28
Mercury, Total	0.000500	ug/L	0.000783
Molybdenum, Total	5.0	ug/L	9.0
Nickel, Total	5.0	ug/L	190
Nitrogen, Nitrate	1.2	mg/L	91
pH	NA	pH Units	9.16
Potassium, Total	200	ug/L	18000
Sodium, Total	0.5	mg/L	350
Specific Conductivity	NA	µS/cm	2720
Strontium, Total	25	ug/L	200
Sulfate	5.0	mg/L	33
Zinc, Total	20	ug/L	22

Source: North Jackson Company REACH system

Appendix D

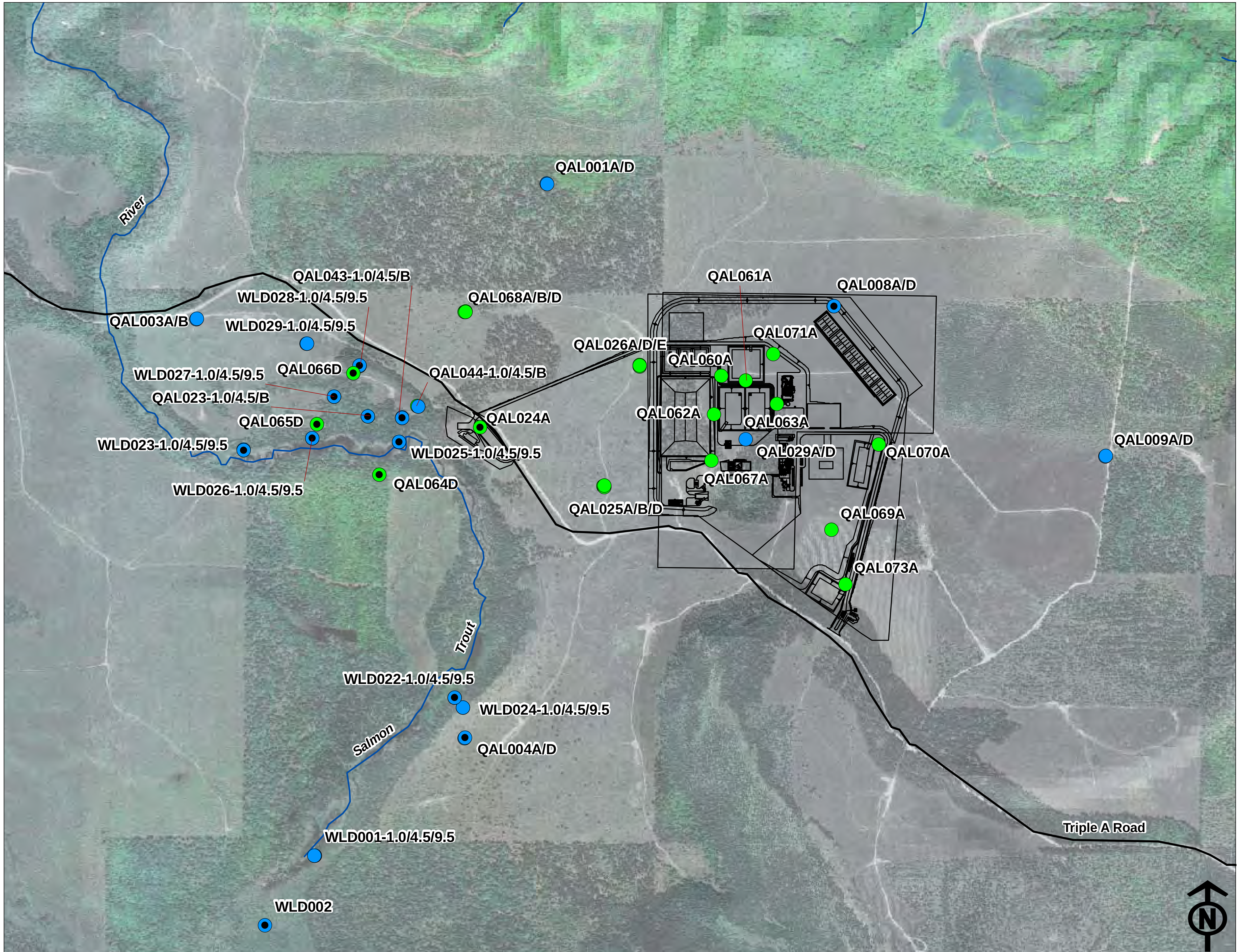
Summary of Detected Results from CWB

Sample ID			EMCWB-121211
Sample Location			CWB
Sample Date			12-Dec-11
Analyte	**RL**	**Unit**	**Result**
Alkalinity, Bicarbonate	2.0	mg/L	110
Alkalinity, Carbonate	2.0	mg/L	72
Aluminum, Total	0.050	mg/L	0.33
Arsenic, Total	1.0	ug/L	6.8
Barium, Total	10	ug/L	42
Boron, Total	10	ug/L	56
Calcium, Total	0.50	mg/L	27
Chloride	10	mg/L	3400
Copper, Total	5.0	ug/L	6.8
Fluoride	100	ug/L	120
Iron, Total	50	ug/L	890
Lead, Total	1.0	ug/L	1.2
Magnesium, Total	0.50	mg/L	4.8
Manganese, Total	5.0	ug/L	27
Mercury, Total	0.000500	ug/L	0.00272
Molybdenum, Total	5.0	ug/L	5.3
Nickel, Total	5.0	ug/L	22
Nitrogen, Nitrate	1.2	mg/L	7.8
pH	NA	pH Units	9.54
Potassium, Total	200	ug/L	6200
Sodium, Total	0.5	mg/L	2100
Specific Conductivity	NA	µS/cm	10540
Strontium, Total	25	ug/L	350
Sulfate	5.0	mg/L	70
Vanadium, Total	4.0	ug/L	4.0
Zinc, Total	20	ug/L	21

Source: North Jackson Company REACH system

Appendix E

Groundwater Monitoring Locations



MINE PERMIT GROUNDWATER MONITORING LOCATIONS
Project View

- ROAD
- HYDROGRAPHY
- PROPOSED MINE FACILITY
- GROUNDWATER QUALITY MONITORING WELL
- GROUNDWATER ELEVATION MONITORING STATION
- *Instrumented for continuous monitoring*

Reference

Data provided by: Kennecott Eagle Minerals, North Jackson Company
Projection & Datum: UTM NAD 83 Zone 16N

0 2,000 Feet

Scale: 1:12,000

Kennecott Eagle Minerals

North Jackson Company
ENVIRONMENTAL SCIENCE & ENGINEERING

Figure: XX

Appendix F

Groundwater Monitoring Sampling Locations

Location	Year of Installation	Background Data Available
QAL023B	2004	NA
QAL024A	2005	NA
QAL025A	2005	2 Rounds: Mar & May 2011
QAL025B	2010	2 Rounds: Mar & May 2011
QAL025D	2010	2 Rounds: Mar & May 2011
QAL026A	2005	15 Rounds: May 2008 – August 2011
QAL026D	2005	17 Rounds: May 2008 – August 2011
QAL026E	2005	NA
QAL044B	2005	3 Rounds: Nov 2005 - Oct 2006
QAL060A	2011	2 Rounds: Aug & Sept 2011
QAL061A	2011	2 Rounds: Aug & Sept 2011
QAL062A	2011	2 Rounds: Aug & Sept 2011
QAL063A	2011	2 Rounds: Aug & Sept 2011
QAL064D	2010	2 Rounds: Mar & May 2011
QAL065D	2010	2 Rounds: Mar & May 2011
QAL066D	2010	2 Rounds: Mar & May 2011
QAL067A	2011	2 Rounds: Aug & Sept 2011
QAL068A	2010	2 Rounds: Aug & Sept 2011
QAL068B	2010	2 Rounds: Mar & May 2011
QAL068D	2010	2 Rounds: Mar & May 2011
QAL069A	2010	2 Rounds: Mar & May 2011
QAL071A	2011	2 Rounds: Aug & Sept 2011

Notes:
NA = No background water quality data is available for these locations.

Appendix F

Groundwater Monitoring Well Results*

QAL023B					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results 26-OCT-11**
Field Parameters					
D.O.	ppm	NA	NA	NA	0.2
ORP	mV	NA	NA	NA	-157
pH	SU	NA	NA	NA	8.9
Specific Conductance	µmhos/cm	NA	NA	NA	139
Temperature	°C	NA	NA	NA	7.4
Turbidity	NTU	NA	NA	NA	3
Water Elevation	ft MSL	NA	NA	NA	1418.33
Detected Analytes					
Iron	µg/L	NA	NA	NA	54
Alkalinity, Bicarbonate	mg/L	NA	NA	NA	61
Alkalinity, Carbonate	mg/L	NA	NA	NA	2.8
Sulfate	mg/L	NA	NA	NA	5.1
Sodium	mg/L	NA	NA	NA	11

QAL024A					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (15-DEC-11)**
Field Parameters					
D.O.	ppm	NA	NA	NA	11
ORP	mV	NA	NA	NA	150
pH	SU	NA	NA	NA	6.7
Specific Conductance	µmhos/cm	NA	NA	NA	97
Temperature	°C	NA	NA	NA	7.8
Turbidity	NTU	NA	NA	NA	<1
Water Elevation	ft MSL	NA	NA	NA	1417.84
Detected Analytes					
Iron	µg/L	NA	NA	NA	48
Alkalinity, Bicarbonate	mg/L	NA	NA	NA	22
Nitrogen, Nitrate	mg/L	NA	NA	NA	0.084
Sulfate	mg/L	NA	NA	NA	2.8
Sodium	mg/L	NA	NA	NA	0.81

Appendix F

Groundwater Monitoring Well Results*

QAL025A					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (24-OCT-11)**
Field Parameters					
D.O.	ppm	12	11	12	12
ORP	mV	249	218	279	94
pH	SU	6.7	6.5	6.8	6.9
Specific Conductance	µmhos/cm	46	44	48	35
Temperature	°C	8.4	8.3	8.5	7.8
Turbidity	NTU	<1	<1	<1	<1
Water Elevation	ft MSL	1416.34	1416.10	1416.57	1417.14
Detected Analytes					
Iron	µg/L	27	<10	48	21
Mercury	ng/L	<0.25	<0.25	<0.25	0.933
Alkalinity, Bicarbonate	mg/L	21	19	23	20
Chloride	mg/L	1.2	1.0	1.4	1.6
Nitrogen, Nitrate	mg/L	0.93	0.90	0.96	0.79
Sodium	mg/L	0.65	0.62	0.67	0.76

QAL025B					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (24-OCT-11)**
Field Parameters					
D.O.	ppm	10	10	10	11
ORP	mV	37	16	58	86
pH	SU	9.2	9.1	9.2	9.4
Specific Conductance	µmhos/cm	91	87	94	85
Temperature	°C	7.9	7.7	8.0	7.2
Turbidity	NTU	3	<1	5	2
Water Elevation	ft MSL	1416.37	1416.27	1416.47	1417.02
Detected Analytes					
Iron	µg/L	29	<10	53	43
Alkalinity, Bicarbonate	mg/L	36	34	37	33
Alkalinity, Carbonate	mg/L	7.3	6.4	8.1	5.8
Nitrogen, Nitrate	mg/L	0.16	0.15	0.17	0.16
Sulfate	mg/L	3.0	2.6	3.4	2.6
Sodium	mg/L	4.5	3.4	5.6	3.4

Appendix F

Groundwater Monitoring Well Results*

QAL025D					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (24-OCT-11)**
Field Parameters					
D.O.	ppm	3.7	3.6	3.8	3.9
ORP	mV	72	26	117	55
pH	SU	9.1	8.9	9.3	8.8
Specific Conductance	µmhos/cm	126	113	138	82
Temperature	°C	7.7	7.7	7.7	7.3
Turbidity	NTU	34	21	46	8
Water Elevation	ft MSL	1412.56	1412.56	1412.56	1413.05
Detected Analytes					
Arsenic	µg/L	4.2	4.0	4.3	3.2
Alkalinity, Bicarbonate	mg/L	48	46	49	47
Alkalinity, Carbonate	mg/L	15	14	16	6.2
Chloride	mg/L	1.8	1.8	1.8	1.6
Nitrogen, Nitrate	mg/L	0.061	0.052	0.07	0.13
Sulfate	mg/L	8.2	6.3	10	5
Sodium	mg/L	14.0	13.0	15.0	7.7

QAL026A					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (2-NOV-11)**
Field Parameters					
D.O.	ppm	NM	NM	NM	NM
ORP	mV	NM	NM	NM	NM
pH	SU	NM	NM	NM	NM
Specific Conductance	µmhos/cm	NM	NM	NM	NM
Temperature	°C	NM	NM	NM	NM
Turbidity	NTU	8	<1	19	8
Water Elevation	ft MSL	1416.10	1415.70	1416.25	1416.37
Detected Analytes					
Alkalinity, Bicarbonate	mg/L	20	11	45	23
Nitrogen, Nitrate	mg/L	0.24	0.11	0.42	0.49
Sulfate	mg/L	2.4	1.4	4.4	3.9
Sodium	mg/L	0.71	0.62	0.91	0.95

Appendix F

Groundwater Monitoring Well Results*

QAL026D					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (2-NOV-11)**
Field Parameters					
D.O.	ppm	11	8	12	11
ORP	mV	137	-24	260	79
pH	SU	9	7.8	9.2	9
Specific Conductance	µmhos/cm	62	54	88	62
Temperature	°C	8.1	7.4	8.6	7.3
Turbidity	NTU	NA	NA	NA	<1
Water Elevation	ft MSL	1409.73	1409.21	1410.11	1409.77
Detected Analytes					
Alkalinity, Bicarbonate	mg/L	30	21	63	31
Nitrogen, Nitrate	mg/L	0.103	0.071	0.13	0.095
Sodium	mg/L	0.62	0.53	0.79	0.68

QAL026E					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (24-OCT-11)**
Field Parameters					
D.O.	ppm	NA	NA	NA	0.2
ORP	mV	NA	NA	NA	-174
pH	SU	NA	NA	NA	8.3
Specific Conductance	mmhos/cm	NA	NA	NA	140
Temperature	°C	NA	NA	NA	7.2
Turbidity	NTU	NA	NA	NA	<1
Water Elevation	ft MSL	NA	NA	NA	1409.57
Detected Analytes					
Arsenic	µg/L	NA	NA	NA	7.5
Alkalinity, Bicarbonate	mg/L	NA	NA	NA	55
Alkalinity, Carbonate	mg/L	NA	NA	NA	2.6
Chloride	mg/L	NA	NA	NA	1.1
Sulfate	mg/L	NA	NA	NA	7.1
Sodium	mg/L	NA	NA	NA	1.9

Appendix F

Groundwater Monitoring Well Results*

QAL044B					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (25-OCT-11)**
Field Parameters					
D.O.	ppm	0.1	ND	0.2	0.1
ORP	mV	NM	NM	NM	-486
pH	SU	8.8	8.7	9.0	9.0
Specific Conductance	µmhos/cm	127	118	136	90
Temperature	°C	7.6	7.4	7.7	7.9
Turbidity	NTU	NM	NM	NM	6
Water Elevation	ft MSL	NM	NM	NM	1416.71
Detected Analytes					
Iron	µg/L	383	55	710	27
Alkalinity, Bicarbonate	mg/L	67	59	75	54
Alkalinity, Carbonate	mg/L	<1	<1	<1	3.4
Sulfate	mg/L	7.1	6.5	7.6	7.1
Sodium	mg/L	3.2	0.98	5.2	2.4

QAL060A					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (25-OCT-11)**
Field Parameters					
D.O.	ppm	5.1	5	5.2	4.9
ORP	mV	103	-5	211	49
pH	SU	8.4	8.4	8.4	8.8
Specific Conductance	µmhos/cm	108	105	111	120
Temperature	°C	8.5	8.4	8.5	7.1
Turbidity	NTU	2	<1	4	<1
Water Elevation	ft MSL	1405.22	1404.88	1405.55	1405.28
Detected Analytes					
Arsenic	µg/L	3.9	3.6	4.2	4.2
Mercury	ng/L	0.330	<0.25	0.535	0.667
Alkalinity, Bicarbonate	mg/L	55	54	56	52
Nitrogen, Nitrate	mg/L	0.103	0.096	0.110	0.087
Sulfate	mg/L	4.1	4.0	4.1	3.7
Sodium	mg/L	1.9	1.8	1.9	1.9

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Groundwater Monitoring Well Results*

QAL061A					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (25-OCT-11)**
Field Parameters					
D.O.	ppm	11	11	11	11
ORP	mV	35	31	39	30
pH	SU	8.5	8.5	8.5	8.5
Specific Conductance	µmhos/cm	72	72	72	90
Temperature	°C	8.25	8.2	8.3	8
Turbidity	NTU	4	2	5	<1
Water Elevation	ft MSL	1406.62	1406.28	1406.95	1406.72
Detected Analytes					
Mercury	ng/L	<0.25	<0.25	<0.25	0.614
Alkalinity, Bicarbonate	mg/L	38.5	38	39	37
Alkalinity, Carbonate	mg/L	<1.0	<1.0	<1.0	2.4
Nitrogen, Nitrate	mg/L	0.19	0.11	0.27	0.12
Sodium	mg/L	0.68	0.66	0.69	0.64

QAL062A					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (26-OCT-11)**
Field Parameters					
D.O.	ppm	12	11	12	11
ORP	mV	16.5	-1	34	-94
pH	SU	9	8.6	9.4	8.5
Specific Conductance	mmhos/cm	69	63	75	85
Turbidity	NTU	1	<1	2	<1
Temperature	°C	8.5	8.4	8.6	7.5
Water Elevation	ft MSL	1407.995	1407.63	1408.36	1408.14
Detected Analytes					
Iron	µg/L	27.5	25	30	20
Alkalinity, Bicarbonate	mg/L	43	38	48	37
Chloride	mg/L	0.825	<0.5	1.4	1.1
Nitrogen, Nitrate	mg/L	0.325	0.3	0.35	0.32
Sulfate	mg/L	2.05	1.9	2.2	2
Sodium	mg/L	0.68	0.66	0.69	0.70

Appendix F

Groundwater Monitoring Well Results*

QAL063A					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (26-OCT-11)**
Field Parameters					
D.O.	ppm	11	11	11	12
ORP	mV	25	16	34	62
pH	SU	8.6	8.6	8.6	8.6
Specific Conductance	µmhos/cm	75	75	75	58
Temperature	°C	8.45	8.4	8.5	7.4
Turbidity	NTU	6	3	8	<1
Water Elevation	ft MSL	1401.69	1401.36	1402.02	1401.78
Detected Analytes					
Iron	µg/L	21.5	<10	38	47
Alkalinity, Bicarbonate	mg/L	38.5	38	39	38
Chloride	mg/L	0.825	<0.5	1.4	1
Nitrogen, Nitrate	mg/L	0.215	0.19	0.24	0.22
Sulfate	mg/L	2.25	2.1	2.4	2.2
Sodium	mg/L	0.655	0.62	0.69	0.76

QAL064D					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (24-OCT-11)**
Field Parameters					
D.O.	ppm	<0.1	<0.1	<0.1	0.3
ORP	mV	-105	-124	-85	-188
pH	SU	8.5	8.4	8.6	8.9
Specific Conductance	µmhos/cm	139	120	157	143
Temperature	°C	7.5	7.4	7.5	6.8
Turbidity	NTU	<1	<1	<1	<1
Water Elevation	ft MSL	1419.02	1418.83	1419.2	1418.73
Detected Analytes					
Iron	µg/L	24	24	24	28
Mercury	ng/L	<0.25	<0.25	<0.25	0.502
Alkalinity, Bicarbonate	mg/L	67	66	67	69
Chloride	mg/L	3.8	3.6	3.9	2.8
Sodium	mg/L	6.4	6.2	6.6	6.9

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Groundwater Monitoring Well Results*

QAL065D					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (25-OCT-11)**
Field Parameters					
D.O.	ppm	0.1	0.1	0.1	0.3
ORP	mV	-18	-71	35	-95
pH	SU	8.5	8.4	8.6	8.6
Specific Conductance	µmhos/cm	160	151	169	159
Temperature	°C	7.1	6.9	7.3	7.1
Turbidity	NTU	<1	<1	<1	<1
Water Elevation	ft MSL	1417.41	1417.12	1417.7	1417.39
Detected Analytes					
Arsenic	µg/L	4.1	3.6	4.5	3.6
Iron	ug/L	<10	<10	<10	41
Alkalinity, Bicarbonate	mg/L	76	76	76	83
Sulfate	mg/L	3.1	2.1	4.1	2.9
Sodium	mg/L	8.5	7.6	9.4	11

QAL066D					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (25-OCT-11)**
Field Parameters					
D.O.	ppm	1.3	0.2	2.3	1.0
ORP	mV	67	22	111	-213
pH	SU	9.7	9.3	10.0	10.9
Specific Conductance	µmhos/cm	145	118	171	291
Temperature	°C	7.7	6.9	8.4	7.5
Turbidity	NTU	2	<1	4	<1
Water Elevation	ft MSL	1417.08	1416.86	1417.3	1417.27
Detected Analytes					
Arsenic	µg/L	7.0	6.2	7.8	10
Iron	µg/L	24	<10	43	36
Mercury	ng/L	0.96	0.89	1.03	2.51
Alkalinity, Carbonate	mg/L	31	30	31	20
Chloride	mg/L	1.2	1.0	1.3	1.3
Sulfate	mg/L	7.1	6.5	7.7	8.0
Sodium	mg/L	6.9	6.4	7.4	6.5

Appendix F

Groundwater Monitoring Well Results*

QAL067A					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (26-OCT-11)**
Field Parameters					
D.O.	ppm	12	11	12	11
ORP	mV	103	17	189	86
pH	SU	7.5	7.5	7.5	6.3
Specific Conductance	µmhos/cm	43	27	58	62
Temperature	°C	8.3	8.2	8.3	7.6
Turbidity	NTU	<1	<1	<1	<1
Water Elevation	ft MSL	1416.57	1416.54	1416.59	1416.17
Detected Analytes					
Alkalinity, Bicarbonate	mg/L	16	13	19	25
Chloride	mg/L	1.2	1.1	1.2	1.8
Nitrogen, Nitrate	mg/L	0.12	0.09	0.16	0.16
Sulfate	mg/L	5.7	3.5	7.8	2.8
Sodium	mg/L	1.10	0.89	1.3	1.3

QAL068A					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (24-OCT-11)**
Field Parameters					
D.O.	ppm	12	11	12	12
ORP	mV	103	17	189	95
pH	SU	7.5	7.5	7.5	7.6
Specific Conductance	µmhos/cm	43	27	58	36
Temperature	°C	8.3	8.2	8.3	7.2
Turbidity	NTU	<1	<1	<1	<1
Water Elevation	ft MSL	1416.57	1416.54	1416.59	1421.73
Detected Analytes					
Alkalinity, Bicarbonate	mg/L	16	13	19	22
Chloride	mg/L	1.2	1.1	1.2	1.2
Sulfate	mg/L	5.7	3.5	7.8	2.4
Sodium	mg/L	1.10	0.89	1.3	0.98

Appendix F

Groundwater Monitoring Well Results*

QAL068B					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (24-OCT-11)**
Field Parameters					
D.O.	ppm	11	11	11	11
ORP	mV	160	157	162	10
pH	SU	9	9	9	8.9
Specific Conductance	µmhos/cm	76	70	81	76
Temperature	°C	8.3	8.3	8.3	7.5
Turbidity	NTU	3	<1	5	<1
Water Elevation	ft MSL	1413.63	1413.63	1413.63	1414.16
Detected Analytes					
Iron	µg/L	88	<10	170	27
Alkalinity, Bicarbonate	mg/L	29	29	29	27
Alkalinity, Carbonate	mg/L	3.7	3.6	3.8	5.6
Nitrogen, Nitrate	mg/L	0.11	0.1	0.11	0.11
Sulfate	mg/L	2.3	2.1	2.5	2.2
Sodium	mg/L	1.5	1.5	1.5	1.6

QAL068D					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (24-OCT-11)**
Field Parameters					
D.O.	ppm	0.9	0.4	1.3	1.0
ORP	mV	111	18	203	-140
pH	SU	8.4	8.3	8.4	8.3
Specific Conductance	µmhos/cm	115	111	118	138
Temperature	°C	8.1	7.1	9.1	7.2
Turbidity	NTU	1	<1	2	<1
Water Elevation	ft MSL	1413.67	1413.64	1413.70	1414.19
Detected Analytes					
Arsenic	µg/L	5.0	4.4	5.6	4.6
Iron	µg/L	120	79	160	25
Mercury	ng/L	1.61	1.5	1.72	0.964
Alkalinity, Bicarbonate	mg/L	57	56	57	57
Chloride	mg/L	1.4	1.2	1.6	1.2
Sulfate	mg/L	8.7	8.5	8.8	6.6
Sodium	mg/L	5.8	5.6	5.9	4.3

Appendix F

Groundwater Monitoring Well Results*

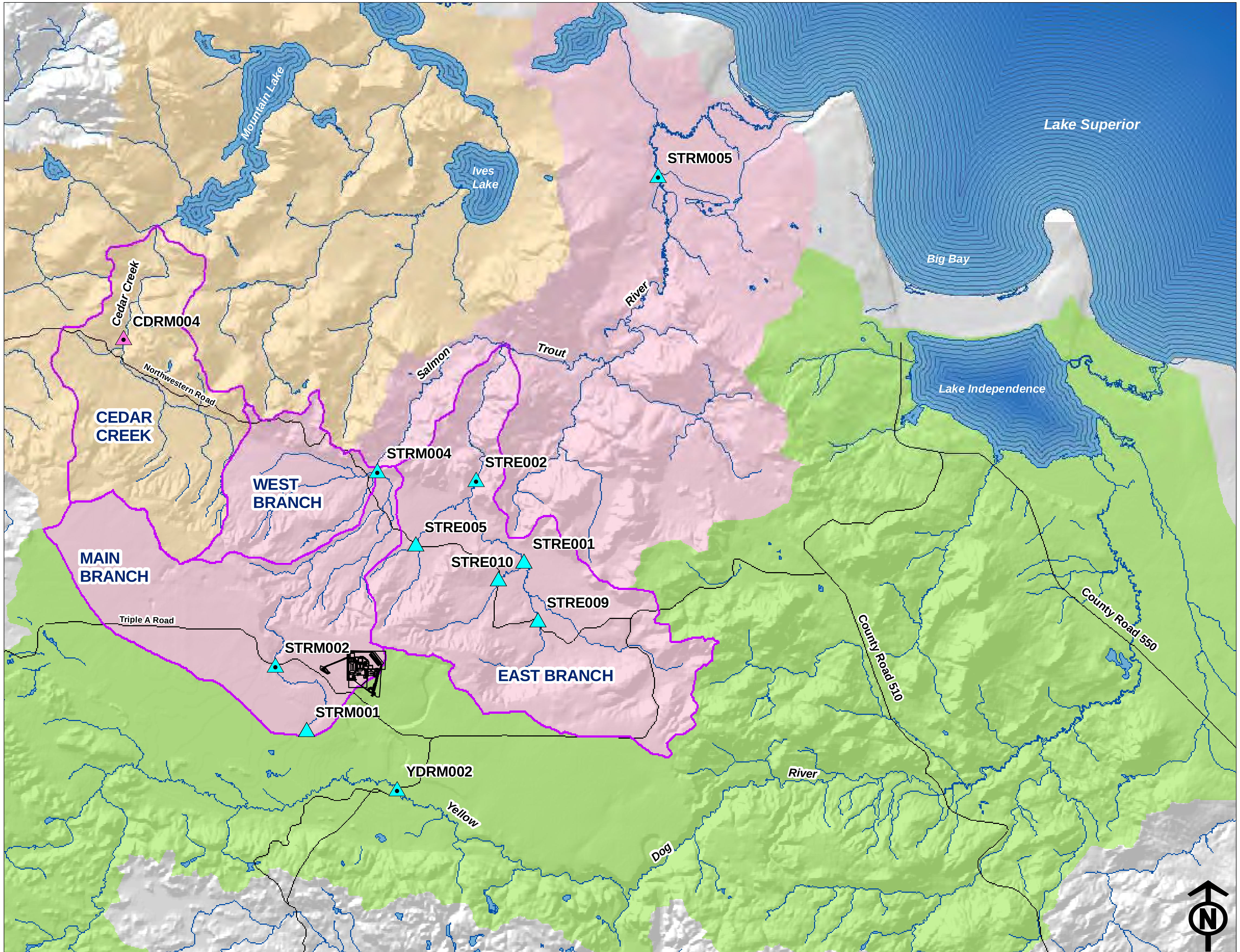
QAL069A					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (24-OCT-11)**
Field Parameters					
D.O.	ppm	11	11	11	11
ORP	mV	175	165	185	80
pH	SU	8.6	8.5	8.6	8.7
Specific Conductance	µmhos/cm	108.5	99	118	130
Temperature	°C	8.6	8.3	8.8	8.3
Turbidity	NTU	<1	<1	<1	<1
Water Elevation	ft MSL	1380.55	1380.51	1380.59	1381.41
Detected Analytes					
Alkalinity, Bicarbonate	mg/L	50	49	51	60
Chloride	mg/L	<0.5	<0.5	<0.5	2.4
Nitrogen, Nitrate	mg/L	0.09	0.08	0.10	0.49
Sodium	mg/L	0.78	0.71	0.84	0.91

QAL071A					
PARAMETER	**UNIT**	**Background Mean**	**Background Min**	**Background Max**	**Q4 Results (25-OCT-11)**
Field Parameters					
D.O.	ppm	12	11	12	12
ORP	mV	122	42	202	27
pH	SU	8.6	8.6	8.6	8.6
Specific Conductance	µmhos/cm	77	71	82	54
Temperature	°C	10.4	9.8	11.0	7.0
Turbidity	NTU	1	<0.5	2	1
Water Elevation	ft MSL	1405.60	1405.50	1405.70	1405.23
Detected Analytes					
Iron	µg/L	30	26	34	26
Alkalinity, Bicarbonate	mg/L	36	36	36	32
Alkalinity, Carbonate	mg/L	1.7	<1.0	2.8	2.2
Nitrogen, Nitrate	mg/L	0.22	0.20	0.24	0.16
Sulfate	mg/L	2.6	2.5	2.6	2.4
Sodium	mg/L	1.5	1.2	1.7	1.0

Notes:
*Source for all background and Q4 data is North Jackson Company REACH System

Appendix G

Surface Water Monitoring Locations



MINE PERMIT SURFACE WATER MONITORING LOCATIONS

- PINE RIVER WATERSHED
- SALMON TROUT RIVER WATERSHED
- YELLOW DOG RIVER WATERSHED
- SUBWATERSHED
- HYDROGRAPHY
- ROAD
- PROPOSED MINE FACILITY
- SURFACE WATER MONITORING LOCATION
- REFERENCE WATERSHED MONITORING LOCATION
- • *Instrumented for continuous monitoring*

Reference

Data provided by: Kennecott Eagle Minerals, North Jackson Company
Projection & Datum: UTM NAD 83 Zone 16N

0 1 2 Miles

Scale: 1:90,000

Kennecott Eagle Minerals

North Jackson Company
ENVIRONMENTAL SCIENCE & ENGINEERING

Figure: 18

Appendix H

Surface Water Sampling Locations

Location	Year Location was Established	Background Data Available
STRM001	2002	16 rounds: Nov 2002 – Oct 2006
STRM002	2002	19 rounds: Nov 2002 – Oct 2006
STRM004	2004	9 rounds: June 2004 – Oct 2006
STRM005	2004	6 rounds: Aug 2004 – Oct 2006
STRE001	2004	9 rounds: Feb 2004 – Oct 2006
STRE002	2004	9 rounds: June 2004 – Oct 2006
STRE005	2005	3 rounds: Flow only, Oct 2004 – June 2005
STRE009	2005	1 round: Flow only, June 2005
STRE010	2005	2 rounds: Flow only, May 2005 – June 2005
YDRM002	2002	19 rounds: Nov 2002 – Oct 2006
CDRM004	2003	14 rounds: Aug 2003 – Oct 2006

Appendix H

Surface Water Results*

STRM001							
PARAMETER	**UNIT**	**Background Mean**	**Background Median**	**Background Minimum**	**Background Maximum**	**Background Standard Deviation**	**Q4 Results (17-OCT-11)**
Field Parameters							
D.O.	ppm	4.1	4.5	2.0	7.0	1.5	0.4
Flow	cfs	NA	NA	NA	NA	NA	0.3
pH	SU	6.9	6.7	6.1	8.7	0.7	6.2
Specific Conductance	µmhos/cm	47	42	17	99	20	42
Temperature	oC	8.2	6.0	0.2	22	7.9	7.2
Detected Analytes							
Iron	ug/L	1097	490	240	5860	1467	510
Mercury	ng/L	1.49	0.94	0.66	3.26	0.87	0.91
TDS	mg/L	50	51	<10	96	33	50

STRM002							
PARAMETER	**UNIT**	**Background Mean**	**Background Median**	**Background Minimum**	**Background Maximum**	**Background Standard Deviation**	**Q4 Results (17-OCT-11)**
Field Parameters							
D.O.	ppm	6.6	7.0	0.4	11	2.2	9.8
Flow	cfs	2.5	NA	NA	NA	NA	2.7
pH	SU	7.2	7.2	6.2	8.3	0.5	6.8
Specific Conductance	µmhos/cm	58	59	34	70	11	52
Temperature	oC	7.4	5.1	0.2	20	7.0	6.4
Detected Analytes							
Iron	ug/L	333	290	160	650	158	500
Mercury	ng/L	1.87	1.59	<0.5	3.88	1.0	3.24
TDS	mg/L	54	59	10	110	24	66

Appendix H

Surface Water Results*

STRM004							
PARAMETER	**UNIT**	**Background Mean**	**Background Median**	**Background Minimum**	**Background Maximum**	**Background Standard Deviation**	**Q4 Results (19-OCT-11)**
Field Parameters							
D.O.	ppm	7.9	8.0	7.0	10	1.1	12
Flow	cfs	7.7	6.3	4.3	15.2	NA	7.1
pH	SU	7.8	7.8	6.9	8.3	0.4	7.5
Specific Conductance	µmhos/cm	89	92	64	100	11	95
Temperature	°C	8.5	9.4	0.1	16	5.9	5.9
Detected Analytes							
Iron	ug/L	258	260	110	390	86	240
Mercury	ng/L	1.94	2.08	0.73	3.86	0.95	2.42
TDS	mg/L	51	55	<10	74	23	80

STRM005							
PARAMETER	**UNIT**	**Background Mean**	**Background Median**	**Background Minimum**	**Background Maximum**	**Background Standard Deviation**	**Q4 Results (18-OCT-11)**
Field Parameters							
D.O.	ppm	8.7	8.5	7.0	10	1.2	11
Flow	cfs	63	35	33	123	NA	58
pH	SU	7.8	7.8	7	8.3	0.5	7.7
Specific Conductance	µmhos/cm	110	123	50	135	33	112
Temperature	°C	9.0	8.4	0.0	19	6.8	7.0
Detected Analytes							
Iron	ug/L	178	175	110	250	46	190
Mercury	ng/L	1.94	1.18	0.74	5.61	1.86	2.46
TDS	mg/L	73	73	60	85	10	76

Appendix H

Surface Water Results*

STRE001							
PARAMETER	**UNIT**	**Background Mean**	**Background Median**	**Background Minimum**	**Background Maximum**	**Background Standard Deviation**	**Q4 Results (19-OCT-11)**
Field Parameters							
D.O.	ppm	7.6	8.0	4.0	9.0	1.4	12
Flow	cfs	NA	NA	NA	NA	NA	NM
pH	SU	7.9	7.9	7.2	8.3	0.3	7.8
Specific Conductance	µmhos/cm	117	127	83	136	22	124
Temperature	°C	8.4	7.2	2.1	16.0	4.9	6.6
Detected Analytes							
Iron	ug/L	100	92	49	190	44	120
Mercury	ng/L	1.54	1.10	0.52	3.92	1.14	1.20
TDS	mg/L	73	73	42	124	25	86

STRE002							
PARAMETER	**UNIT**	**Background Mean**	**Background Median**	**Background Minimum**	**Background Maximum**	**Background Standard Deviation**	**Q4 Results (18-OCT-11)**
Field Parameters							
D.O.	ppm	7.7	8.0	6.0	10	1.1	11
Flow	cfs	24	17	16	46	NA	19
pH	SU	8.2	8.1	7.7	8.9	0.3	7.3
Specific Conductance	µmhos/cm	120	126	90	136	17	137
Temperature	°C	8.7	10	0.1	15	5.4	7.1
Detected Analytes							
Iron	ug/L	102	91	55	150	33	100
Mercury	ng/L	1.22	1.36	0.63	1.94	0.44	1.75
TDS	mg/L	64	72	<10	90	26	76

Appendix H
Surface Water Results*

STRE005							
PARAMETER	**UNIT**	**Background Mean**	**Background Median**	**Background Minimum**	**Background Maximum**	**Background Standard Deviation**	**Q4 Results (18-OCT-11)**
Field Parameters							
D.O.	ppm	NA	NA	NA	NA	NA	11
Flow	cfs	0.57	0.6	0.4	0.7	NA	1.2
pH	SU	NA	NA	NA	NA	NA	7.7
Specific Conductance	µmhos/cm	NA	NA	NA	NA	NA	114
Temperature	°C	NA	NA	NA	NA	NA	7.8
Detected Analytes							
Iron	ug/L	NA	NA	NA	NA	NA	220
Mercury	ng/L	NA	NA	NA	NA	NA	1.74
TDS	mg/L	NA	NA	NA	NA	NA	70

STRE009							
PARAMETER	**UNIT**	**Background Mean**	**Background Median**	**Background Minimum**	**Background Maximum**	**Background Standard Deviation**	**Q4 Results (18-OCT-11)**
Field Parameters							
D.O.	ppm	NA	NA	NA	NA	NA	11
Flow	cfs	3.6	3.6	3.6	3.6	NA	4
pH	SU	NA	NA	NA	NA	NA	6.8
Specific Conductance	µmhos/cm	NA	NA	NA	NA	NA	115
Temperature	°C	NA	NA	NA	NA	NA	6.6
Detected Analytes							
Iron	ug/L	NA	NA	NA	NA	NA	80
Mercury	ng/L	NA	NA	NA	NA	NA	0.64
TDS	mg/L	NA	NA	NA	NA	NA	60

Appendix H
Surface Water Results*

STE010							
PARAMETER	**UNIT**	**Background Mean**	**Background Median**	**Background Minimum**	**Background Maximum**	**Background Standard Deviation**	**Q4 Results (18-OCT-11)**
Field Parameters							
D.O.	ppm	NA	NA	NA	NA	NA	11
Flow	cfs	2.9	NA	2.7	3.1	NA	2.6
pH	SU	NA	NA	NA	NA	NA	7.1
Specific Conductance	µmhos/cm	NA	NA	NA	NA	NA	129
Temperature	°C	NA	NA	NA	NA	NA	7.1
Detected Analytes							
Iron	ug/L	NA	NA	NA	NA	NA	66
Mercury	ng/L	NA	NA	NA	NA	NA	0.82
TDS	mg/L	NA	NA	NA	NA	NA	72

YDRM002							
PARAMETER	**UNIT**	**Background Mean**	**Background Median**	**Background Minimum**	**Background Maximum**	**Background Standard Deviation**	**Q4 Results (17-OCT-11)**
Field Parameters							
D.O.	ppm	7.2	7.0	5.5	9.0	1.0	9.9
Flow	cfs	47	19	8	198	NA	43
pH	SU	7.2	7.2	6.5	7.9	0.4	6.8
Specific Conductance	µmhos/cm	57	59	18	90	20	55
Temperature	oC	7.6	4.7	0.0	19	7.3	6.7
Detected Analytes							
Iron	ug/L	728	750	230	1200	267	710
Manganese	ug/L	27	29	<5	47	11	28
Mercury	ng/L	3.30	2.85	<0.50	6.78	1.76	5.01
TDS	mg/L	56	64	<10	94	24	70

Appendix H

Surface Water Results*

CDRM004							
PARAMETER	**UNIT**	**Background Mean**	**Background Median**	**Background Minimum**	**Background Maximum**	**Background Standard Deviation**	**Q4 Results (18-OCT-11)**
Field Parameters							
D.O.	ppm	8.0	7.5	5.0	11	1.7	12
Flow	cfs	NA	NA	NA	NA	NA	16
pH	SU	7.9	8.0	7.0	8.2	0.3	7.8
Specific Conductance	µmhos/cm	124	121	84	149	16	127
Temperature	°C	8.0	6.9	0.9	16	5.4	6.9
Detected Analytes							
Iron	ug/L	121	115	87	190	30	150
Mercury	ng/L	1.07	0.87	0.40	3.67	0.78	1.91
TDS	mg/L	78	85	31	112	23	88

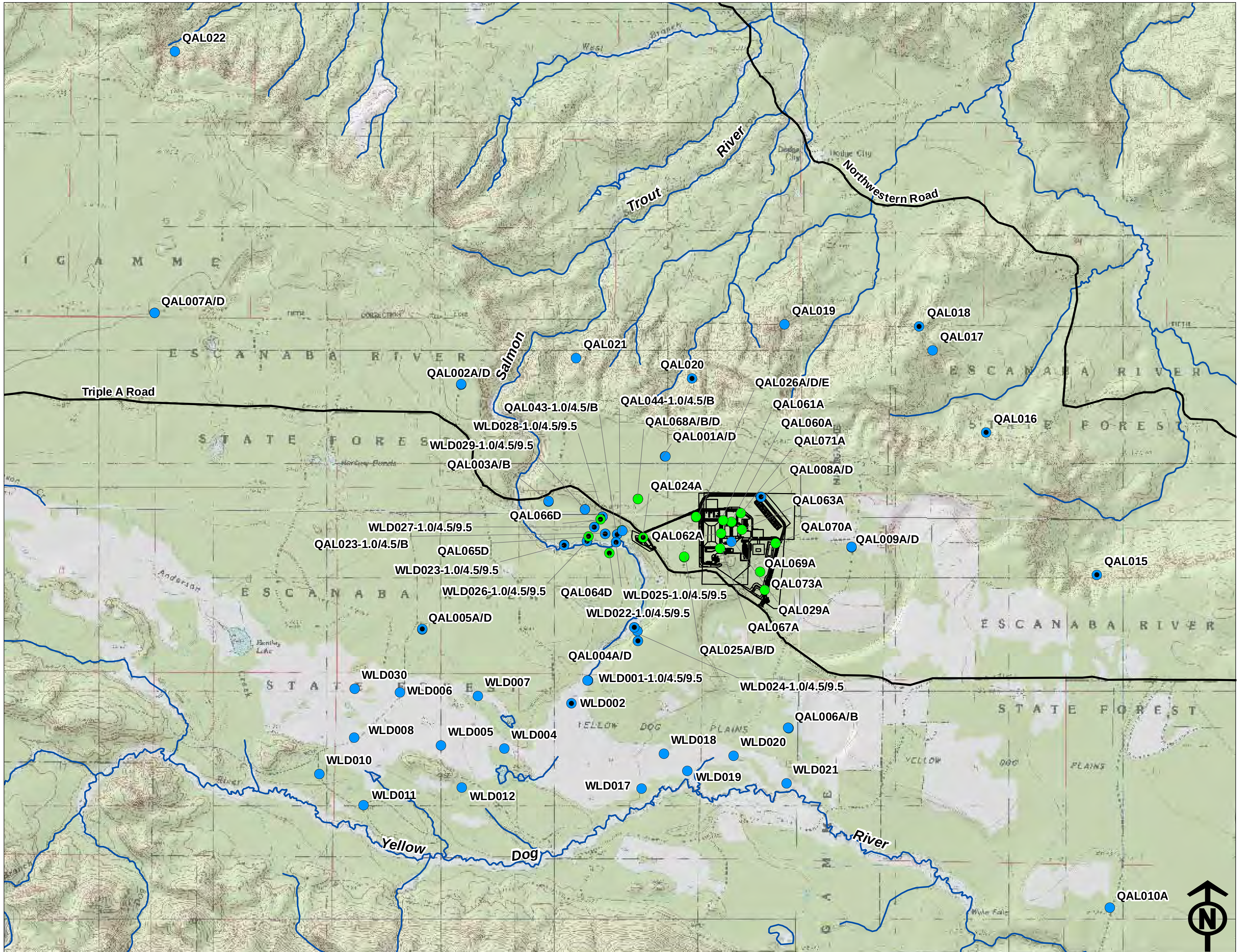
Notes:
*Source for all background and Q4 data was North Jackson Company REACH system
NA = Either no background data was available or insufficient data was available to perform calculations.
Highlighted cells indicate results slightly above calculated background

Appendix I

Groundwater Elevation

Monitoring Locations

GROUNDWATER MONITORING LOCATIONS



- ROAD
- HYDROGRAPHY
- PROPOSED MINE FACILITY
- GROUNDWATER QUALITY MONITORING WELL
- GROUNDWATER ELEVATION MONITORING STATION
- *Instremented for continuous monitoring*

Reference

Data provided by: Kennecott Minerals,
North Jackson Company
Projection & Datum: UTM NAD 83 Zone 16N

0 1 Miles

Scale: 1:36,000

Mine Permit
Kennecott Eagle Minerals Company

Kennecott
Eagle Minerals

North Jackson Company
ENVIRONMENTAL SCIENCE & ENGINEERING

Figure: XX

Appendix J

2011 Discrete Groundwater Elevations

LOCATION	1st Qtr 2011	Date Q1	2nd Qtr 2011	Date Q2	3rd Qtr 2011	Date Q3	4th Qtr 2011	Date Q4
QAL001A	1408.74	3/1/2011	1408.41	5/24/2011	1408.87	8/16/2011	1409.20	11/3/2011
QAL001D	1404.57	3/1/2011	1404.31	5/24/2011	1404.59	8/16/2011	1404.73	11/3/2011
QAL002A	1431.50	3/1/2011	1431.51	5/24/2011	1432.63	8/16/2011	1432.39	11/3/2011
QAL002D	1393.68	3/1/2011	1393.39	5/24/2011	1393.78	8/16/2011	1393.78	11/3/2011
QAL003A	1423.90	3/1/2011	1426.72	5/24/2011	1424.92	8/17/2011	1424.63	11/3/2011
QAL003B	1411.61	3/1/2011	1413.48	5/24/2011	1411.83	8/17/2011	1411.71	11/3/2011
QAL004A	1424.48	3/2/2011	1425.68	5/24/2011	1425.02	8/18/2011	1424.69	11/3/2011
QAL004D	1433.18	3/2/2011	1430.49	5/24/2011	1418.89	8/18/2011	1433.23	11/3/2011
QAL005A	1452.08	3/1/2011	1455.07	5/24/2011	1452.10	8/18/2011	1452.63	11/3/2011
QAL005D	1451.25	3/1/2011	1453.02	5/24/2011	1450.61	8/18/2011	1451.68	11/3/2011
QAL006A	1413.28	3/1/2011	1415.48	5/24/2011	1413.35	8/18/2011	1413.77	11/3/2011
QAL006B	1396.59	3/1/2011	1397.54	5/24/2011	1397.57	8/18/2011	1397.02	11/3/2011
QAL007A	1425.91	3/3/2011	1426.10	5/24/2011	1427.09	8/16/2011	1426.70	11/3/2011
QAL007D	1434.62	3/3/2011	1435.57	5/24/2011	1435.89	8/16/2011	1435.36	11/3/2011
QAL008A	1386.85	3/2/2011	1387.09	5/24/2011	1387.64	8/8/2011	1388.46	11/3/2011
QAL008D	1352.19	3/2/2011	1352.54	5/24/2011	1352.88	8/8/2011	1352.89	11/3/2011
QAL009A	1351.58	3/1/2011	1351.15	5/24/2011	1351.36	8/18/2011	1351.48	11/3/2011
QAL009D	1351.44	3/1/2011	1351.00	5/24/2011	1351.22	8/18/2011	1351.34	11/3/2011
QAL010A	1421.39	3/3/2011	1422.93	5/24/2011	1422.72	8/16/2011	1421.97	11/3/2011
QAL015	1292.14	3/3/2011	1292.19	5/24/2011	1291.86	8/18/2011	1291.94	11/3/2011
QAL016	F	2/8/2011	1273.65	5/24/2011	1274.40	8/18/2011	1274.36	11/3/2011
QAL017	1250.53	2/8/2011	1251.13	5/24/2011	1249.42	8/16/2011	1249.98	11/3/2011
QAL018	F	2/8/2011	1249.06	5/24/2011	1248.87	8/17/2011	1249.23	11/3/2011
QAL019	1284.74	3/3/2011	1284.80	5/24/2011	1284.51	8/16/2011	1284.49	11/3/2011
QAL020	1335.20	3/2/2011	1334.90	5/24/2011	1334.85	8/17/2011	1334.66	11/3/2011
QAL021	1388.58	3/3/2011	1388.70	5/24/2011	1388.78	8/16/2011	1388.70	11/3/2011
QAL022	1297.95	3/7/2011	1298.15	5/24/2011	1298.07	8/16/2011	1297.72	11/3/2011
QAL023-1.0	F	1/19/2011	1418.57	5/24/2011	D	8/17/2011	1417.95	11/3/2011
QAL023-4.5	F	1/19/2011	1418.51	5/24/2011	1416.52	8/17/2011	1417.71	11/3/2011
QAL023B	1417.04	3/1/2011	1417.44	5/24/2011	1416.66	8/17/2011	1417.25	11/3/2011
QAL024A	1417.58	3/1/2011	1418.30	5/24/2011	1418.32	8/17/2011	1418.04	11/3/2011

Appendix J

2011 Discrete Groundwater Elevations

LOCATION	1st Qtr 2011	Date Q1	2nd Qtr 2011	Date Q2	3rd Qtr 2011	Date Q3	4th Qtr 2011	Date Q4
QAL025A	1416.53	3/1/2011	1417.11	5/24/2011	1417.65	8/17/2011	1417.07	11/3/2011
QAL025B	1416.44	3/1/2011	1416.97	5/24/2011	1417.26	8/17/2011	1416.96	11/3/2011
QAL025D	1412.76	3/1/2011	1412.88	5/24/2011	1413.26	8/17/2011	1413.03	11/3/2011
QAL026A	<1415.4 BP	3/1/2011	<1415.4 BP	5/24/2011	1416.36	8/9/2011	1415.48	11/3/2011
QAL026D	1409.52	3/1/2011	1409.40	5/24/2011	1409.59	8/8/2011	1409.74	11/3/2011
QAL026E	1409.37	3/1/2011	1409.23	5/24/2011	1409.58	8/17/2011	1409.51	11/3/2011
QAL029A	NM		NM		1418.69	8/8/2011	1417.94	11/3/2011
QAL029D	NM		NM		1407.40	8/8/2011	1407.65	11/3/2011
QAL031D	1369.36	3/3/2011	1369.06	5/24/2011	1369.48	8/18/2011	1369.59	11/3/2011
QAL043-1.0	1419.51	3/1/2011	1420.39	5/24/2011	D	8/17/2011	1419.50	11/3/2011
QAL043-4.5	1419.55	3/1/2011	1420.36	5/24/2011	1417.76	8/17/2011	1419.52	11/3/2011
QAL043B	1416.66	3/1/2011	1417.02	5/24/2011	1416.39	8/17/2011	1416.88	11/3/2011
QAL044-1.0	1423.83	3/1/2011	1425.21	5/24/2011	D	8/17/2011	1424.30	11/3/2011
QAL044-4.5	1423.71	3/1/2011	1424.92	5/24/2011	1422.68	8/17/2011	1424.21	11/3/2011
QAL044B	1416.28	3/1/2011	1416.59	5/24/2011	1416.20	8/17/2011	1416.55	11/3/2011
QAL050A	1360.31	3/1/2011	1359.76	5/24/2011	1360.35	8/9/2011	1360.24	11/3/2011
QAL051A	<1363.1 BP	3/1/2011	<1363.1 BP	5/24/2011	<1363.1 BP	8/9/2011	<1363.1 BP	11/3/2011
QAL051D	1362.70	3/1/2011	1362.29	5/24/2011	1362.63	8/8/2011	1362.63	11/3/2011
QAL052A	1350.73	3/1/2011	1350.44	5/24/2011	1351.01	8/9/2011	1350.81	11/3/2011
QAL053A	1385.64	3/1/2011	1385.34	5/24/2011	1386.09	8/9/2011	1385.89	11/3/2011
QAL055A	1361.21	3/1/2011	1360.64	5/24/2011	1361.20	8/9/2011	1361.20	11/3/2011
QAL056A	1389.09	3/1/2011	1389.17	5/24/2011	1390.03	8/9/2011	1390.69	11/3/2011
QAL057A	1359.01	3/1/2011	1358.45	5/24/2011	1359.01	8/9/2011	1358.96	11/3/2011
QAL057D	1357.10	3/1/2011	1358.53	5/24/2011	1359.13	8/9/2011	1359.04	11/3/2011
QAL060A	NM		NM		1404.88	8/10/2011	1405.25	11/3/2011
QAL061A	NM		NM		1406.28	8/10/2011	1406.66	11/3/2011
QAL062A	NM		NM		1407.63	8/10/2011	1408.08	11/3/2011
QAL063A	NM		NM		1401.36	8/10/2011	1401.68	11/3/2011
QAL064D	1418.88	3/1/2011	1419.40	5/24/2011	1417.76	8/17/2011	1418.80	11/3/2011
QAL065D	1417.15	3/1/2011	1417.75	5/24/2011	1416.77	8/17/2011	1417.35	11/3/2011
QAL066D	1416.94	3/1/2011	1417.35	5/24/2011	1416.80	8/17/2011	1417.29	11/3/2011

Appendix J

2011 Discrete Groundwater Elevations

LOCATION	1st Qtr 2011	Date Q1	2nd Qtr 2011	Date Q2	3rd Qtr 2011	Date Q3	4th Qtr 2011	Date Q4
QAL067A	NM		NM		1416.59	8/10/2011	1416.12	11/3/2011
QAL068A	1420.63	3/1/2011	1420.20	5/24/2011	1421.56	8/17/2011	1421.68	11/3/2011
QAL068B	1413.91	3/1/2011	1413.77	5/24/2011	1414.08	8/17/2011	1414.19	11/3/2011
QAL068D	1413.94	3/1/2011	1413.77	5/24/2011	1414.07	8/17/2011	1414.21	11/3/2011
QAL069A	1380.71	3/1/2011	1380.72	5/24/2011	1381.45	8/18/2011	1381.37	11/3/2011
QAL070A	1367.13	3/1/2011	1366.61	5/24/2011	1367.03	8/18/2011	1367.23	11/3/2011
QAL071A	NM		NM		1405.50	8/10/2011	1405.11	11/3/2011
QAL073A	1381.36	3/1/2011	1380.87	5/24/2011	1381.77	8/18/2011	1381.65	11/3/2011
QAL074A	NM		NM		1401.58	8/10/2011	1402.33	11/3/2011
STRM002	1400.93	3/1/2011	1401.22	5/24/2011	1399.66	8/17/2011	1399.74	11/3/2011
STRM011	1415.91	3/1/2011	1416.75	5/24/2011	1414.33	8/17/2011	1414.09	11/3/2011
WLD001-1.0	F	3/7/2011	1428.64	5/24/2011	1428.66	8/18/2011	1428.44	11/3/2011
WLD001-4.5	F	3/7/2011	1428.59	5/24/2011	1427.72	8/18/2011	1427.46	11/3/2011
WLD001-9.5	F	3/7/2011	1429.15	5/24/2011	1428.96	8/18/2011	1428.73	11/3/2011
WLD002	1430.68	3/7/2011	1430.62	5/24/2011	1430.08	8/18/2011	1429.71	11/3/2011
WLD004	1445.67	3/8/2011	1446.46	5/24/2011	1444.56	8/22/2011	1445.91	11/3/2011
WLD005	1450.10	3/15/2011	1451.11	5/24/2011	1448.73	8/22/2011	1450.49	11/3/2011
WLD006	1453.74	3/15/2011	1455.44	5/24/2011	1452.50	8/22/2011	1454.56	11/3/2011
WLD007	1449.33	3/8/2011	1450.60	5/24/2011	1448.03	8/22/2011	1449.79	11/3/2011
WLD008	1452.78	3/15/2011	1453.60	5/24/2011	1450.81	8/22/2011	1453.09	11/3/2011
WLD010	1446.73	3/15/2011	1447.69	5/24/2011	1445.04	8/22/2011	1447.20	11/3/2011
WLD011	1445.57	3/15/2011	1446.97	5/24/2011	1444.09	8/22/2011	1445.83	11/3/2011
WLD012	1445.57	3/15/2011	1446.28	5/24/2011	1444.08	8/22/2011	1445.71	11/3/2011
WLD017	1422.39	3/9/2011	1423.63	5/24/2011	1421.17	8/22/2011	1422.84	11/3/2011
WLD018	1422.86	3/9/2011	1423.00	5/24/2011	1420.46	8/22/2011	1422.62	11/3/2011
WLD019	1419.27	3/9/2011	1420.78	5/24/2011	1417.78	8/22/2011	1419.76	11/3/2011
WLD020	1419.01	3/9/2011	1420.00	5/24/2011	1416.37	8/22/2011	1419.05	11/3/2011
WLD021	1414.78	3/9/2011	1415.95	5/24/2011	1413.64	8/22/2011	1414.87	11/3/2011
WLD022-1.0	F	3/2/2011	1422.49	5/24/2011	1422.16	8/18/2011	1422.34	11/3/2011
WLD022-4.5	F	3/2/2011	1422.58	5/24/2011	1422.36	8/18/2011	1422.54	11/3/2011
WLD022-9.5	F	3/2/2011	1423.00	5/24/2011	1422.82	8/18/2011	1422.84	11/3/2011

Appendix J

2011 Discrete Groundwater Elevations

LOCATION	1st Qtr 2011	Date Q1	2nd Qtr 2011	Date Q2	3rd Qtr 2011	Date Q3	4th Qtr 2011	Date Q4
WLD023-1.0	F	3/2/2011	1414.62	5/24/2011	1414.56	8/17/2011	1414.47	11/3/2011
WLD023-4.5	F	3/2/2011	1414.45	5/24/2011	1414.29	8/17/2011	1414.22	11/3/2011
WLD023-9.5	F	3/2/2011	1416.31	5/24/2011	1415.54	8/17/2011	1416.31	11/3/2011
WLD024-1.0	F	3/2/2011	1423.21	5/24/2011	1422.99	8/18/2011	1423.04	11/3/2011
WLD024-4.5	F	3/2/2011	1423.53	5/24/2011	1423.25	8/18/2011	1423.25	11/3/2011
WLD024-9.5	F	3/2/2011	1424.10	5/24/2011	1423.64	8/18/2011	1423.48	11/3/2011
WLD025-1.0	F	3/2/2011	1415.93	5/24/2011	1415.78	8/17/2011	1416.04	11/3/2011
WLD025-4.5	F	3/2/2011	1415.94	5/24/2011	1415.81	8/17/2011	1416.03	11/3/2011
WLD025-9.5	F	3/2/2011	1416.18	5/24/2011	1415.99	8/17/2011	1416.35	11/3/2011
WLD026-1.0	F	1/19/2011	1416.34	5/24/2011	1416.11	8/17/2011	1416.39	11/3/2011
WLD026-4.5	F	1/19/2011	1416.45	5/24/2011	1415.56	8/17/2011	1416.25	11/3/2011
WLD026-9.5	F	1/19/2011	1417.14	5/24/2011	1416.32	8/17/2011	1416.99	11/3/2011
WLD027-1.0	F	1/19/2011	1423.07	5/24/2011	1422.35	8/17/2011	1422.84	11/3/2011
WLD027-4.5	1422.51	3/2/2011	1422.81	5/24/2011	1420.59	8/17/2011	1422.54	11/3/2011
WLD027-9.5	1422.51	3/2/2011	1422.82	5/24/2011	1420.57	8/17/2011	1422.53	11/3/2011
WLD028-1.0	F	3/2/2011	1427.95	5/24/2011	D	8/17/2011	1427.49	11/3/2011
WLD028-4.5	1426.80	3/2/2011	1427.81	5/24/2011	1425.27	8/17/2011	1427.31	11/3/2011
WLD028-9.5	1426.25	3/2/2011	1427.40	5/24/2011	1425.46	8/17/2011	1426.81	11/3/2011
WLD029-1.0	D	3/7/2011	1429.16	5/24/2011	D	8/17/2011	D	11/3/2011
WLD029-4.5	1426.84	3/7/2011	1429.14	5/24/2011	1426.40	8/17/2011	1427.58	11/3/2011
WLD029-9.5	1426.81	3/7/2011	1429.00	5/24/2011	1426.81	8/17/2011	1427.61	11/3/2011
WLD030	1453.53	3/15/2011	1454.99	5/24/2011	1452.14	8/22/2011	1454.37	11/3/2011
YDRM002	1412.52	3/3/2011	1413.46	5/24/2011	1412.17	8/17/2011	1412.60	11/3/2011

Notes:
Source, North Jackson Company REACH System
BP – Below Pump, Max H_20 elevation is shown
D – Dry
F – Frozen
NI – Not Installed
NM – Not Measured

Appendix K

2011 Continuous Water Elevation Summary

Location	Year Location was Established	Background Data Available
QAL023B	2004	Jan 2011 – Aug 2011
QAL024A	2005	Jan 2011 – Aug 2011
QAL044B	2005	Jan 2011 – Aug 2011
QAL064D	2010	Jan 2011 – Aug 2011
QAL065D	2010	Jan 2011 – Aug 2011
QAL066D	2010	Jan 2011 – Aug 2011
WLD022	2004	Oct 2004 – Aug 2011
WLD023	2004	Aug 2004 – Aug 2011
WLD024	2005	May & Aug 2011
WLD025	2005	Mar, May, Aug 2011
WLD026	2005	Jan 2011 – Aug 2011
WLD027	2005	Jan 2011 – Aug 2011
WLD028	2005	Nov 2005 – Aug 2011
WLD029	2005	Nov 2005 – Aug 2011

Appendix K

2011 Continuous Water Elevation Summary

2011 Monitoring Well Water Elevation Summary*						
	QAL023B	**QAL024A**	**QAL044B**	**QAL064D**	**QAL065D**	**QAL066D**
Background						
Mean	1416.9	1417.8	1416.2	1418.7	1417.1	1416.9
Standard Dev.	0.4	0.4	0.4	0.7	0.4	0.3
Minimum	1415.68	1417.21	1414.93	1415.71	1416.12	1416.14
Maximum	1417.6	1418.53	1416.85	1419.58	1417.77	1417.5
September						
Mean	1416.6	1418	1416.1	1417.7	1416.7	1416.7
Minimum	1416.4	1417.5	1415.8	1417.1	1416.6	1416.6
Maximum	1417.2	1418.1	1416.5	1418.6	1417.2	1417.1
October						
Mean	1417.2	1417.9	1416.5	1418.5	1417.3	1417.2
Minimum	1417.1	1417.9	1416.3	1418.1	1417.1	1417.1
Maximum	1417.4	1417.9	1416.6	1418.9	1417.5	1417.4
November						
Mean	1417.3	1417.7	1416.5	1418.8	1417.4	1417.3
Minimum	1417.2	1417.7	1416.3	1418.3	1417.3	1417.2
Maximum	1417.4	1417.9	1416.7	1419.2	1417.5	1417.4
December						
Mean	1417.3	1417.6	1416.5	1419	1417.4	1417.2
Minimum	1417.1	1417.6	1416.3	1418.4	1417.4	1417.2
Maximum	1417.4	1417.7	1416.7	1419.2	1417.6	1417.4

Source: North Jackson Company REACH system
*All results are calculated based on mean daily values from continuous monitoring

Appendix K

2011 Continuous Water Elevation Summary

2011 Wetland Water Elevation Summary*												
	WLD022-4.5	**WLD023-4.5**	**WLD024-4.5**	**WLD025-4.5**	**WLD025-9.5**	**WLD026-4.5**	**WLD026-9.5**	**WLD027-4.5**	**WLD027-9.5**	**WLD028-4.5**	**WLD028-9.5**	**WLD029-4.5**
Background												
Mean	1422.6	1413.5	1423.4	1415.5	1415.9	1416.3	1416.2	1422.1	1422.2	1427.2	1427.0	1427.5
Standard Dev.	0.2	0.5	NA	0.3	0.2	0.3	0.3	0.7	0.7	0.5	0.5	NA
6" limit	1416.6	1407.5	1417.4	1409.5	1409.6	1410.3	1410.2	1416.1	1416.2	1421.2	1421.0	1421.5
Minimum	1422.1	1411.9	1423.3	1414.8	1415.1	1415.8	1415.8	1420.3	1420.3	1425.0	1425.2	1426.4
Maximum	1422.9	1414.7	1423.5	1416.5	1416.7	1417.0	1416.7	1423.1	1423.1	1428.3	1428.3	1429.1
September												
Mean	1422.5	1414.3	NA	1415.8	1415.9	1415.8	1415.9	1420.5	1420.5	1425.0	1425.2	NA
Minimum	1422.4	1414.3	NA	1415.7	1415.9	1415.7	1415.7	1420.1	1420.2	1424.7	1425.0	NA
Maximum	1422.8	1414.3	NA	1416.1	1416.4	1416.7	1416.7	1422.7	1422.7	1427.5	1427.0	NA
October												
Mean	1422.5	1414.2	NA	1416.0	1416.3	1416.5	1416.6	1422.5	1422.5	1427.3	1426.9	NA
Minimum	1422.5	1414.1	NA	1415.9	1416.2	1416.3	1416.4	1422.2	1422.3	1426.7	1426.5	NA
Maximum	1422.7	1414.5	NA	1416.1	1416.5	1416.8	1416.9	1422.9	1422.9	1427.7	1427.3	NA
November												
Mean	1422.5	1414.2	1423.3	1416.0	1416.4	1416.6	1416.8	1422.6	1422.6	1427.3	1426.9	1427.6
Minimum	1422.5	1414.1	NA	1416.0	1416.3	1416.5	1416.8	1422.4	1422.5	1427.0	1426.7	NA
Maximum	1422.6	1414.3	NA	1416.0	1416.5	1416.8	1417.1	1422.8	1422.9	1427.6	1427.3	NA
December												
Mean	1422.5	1414.1	NA	1415.9	1416.3	1416.6	1416.8	1422.6	1422.6	1427.3	1426.8	NA
Minimum	1422.5	1414.1	NA	1415.8	1416.3	1416.5	1416.5	1422.5	1422.5	1427.0	1426.7	NA
Maximum	1422.6	1414.2	NA	1416.0	1416.5	1416.7	1417.1	1422.7	1422.8	1427.5	1427.1	NA

Source: North Jackson Company, REACH system
*All results are calculated based on mean daily values from continuous monitoring
NA = Either no data was available or insufficient data was available to perform calculations.

Appendix L

Surface Water Continuous Monitoring Results*

STRE002								
Parameter	**Month**	**Background MEAN**	**Background MIN**	**Background MAX**	**Background SD**	**2011 MEAN**	**2011 MIN**	**2011 MAX**
Temperature	September	11.4	7.0	16.6	0.8	10.7	7.3	14.9
	October	7.5	3.2	14.6	1.5	8.0	4.3	13.1
	November	3.4	-0.1	9.3	0.5	3.0	1.1	6.5
	December	0.8	-0.2	3.2	0.4	0.7	-0.2	2.4
Flow	September	16.9	11.7	69.8	3.2	16.3	11.9	62.3
	October	22.9	12.0	119.0	7.1	18.9	13.4	49.8
	November	18.5	12.4	37.8	3.1	20.0	13.0	39.0
	December	17.8	12.1	58.8	4.1	15.0	12.4	34.0
Specific Conductivity	September	138.2	80.0	149.0	6.0	157.1	108.0	163.0
	October	127.8	70.0	146.0	14.4	135.3	117.0	155.0
	November	130.2	80.0	148.0	9.2	114.1	91.0	125.0
	December	132.9	89.0	153.0	6.7	119.0	113.0	122.0

STRM004								
Parameter	**Month**	**Background MEAN**	**Background MIN**	**Background MAX**	**Background SD**	**2011 MEAN**	**2011 MIN**	**2011 MAX**
Temperature	September	11.8	7.3	17.3	4.5	11.2	6.9	16.2
	October	7.5	2.3	15.2	1.6	8.1	4.1	13.3
	November	3.0	0.0	9.6	0.5	2.6	0.4	6.4
	December	0.3	-0.1	2.5	0.2	0.2	-0.1	1.5
Flow	September	5.2	2.8	24.0	2.2	7.2	4.5	31.4
	October	7.7	3.9	41.1	2.2	9.6	6.4	34.2
	November	6.8	4.2	23.1	2.5	8.2	6.0	15.3
	December	6.7	4.6	18.9	1.6	7.2	5.9	13.4
Specific Conductivity	September	81.3	57.0	130.0	48.8	112.9	78.0	121.0
	October	87.3	56.0	140.0	9.2	92.7	76.0	99.0
	November	87.1	59.0	96.0	4.2	91.2	76.0	98.0
	December	84.7	61.0	95.0	11.6	88.3	73.0	95.0

Appendix L

Surface Water Continuous Monitoring Results*

STRM005								
Parameter	**Month**	**Background MEAN**	**Background MIN**	**Background MAX**	**Background SD**	**2011 MEAN**	**2011 MIN**	**2011 MAX**
Temperature	September	13.1	9.2	18.7	1.1	12.4	8.8	17.2
	October	7.9	2.6	15.5	2.4	8.7	4.3	14.7
	November	3.1	0.0	7.6	0.2	2.9	0.3	6.8
	December	0.3	-0.1	2.2	0.2	0.0	-0.1	1.1
Flow	September	38.6	21.8	155.5	14.2	35.0	26.5	158.9
	October	64.2	29.2	346.6	29.2	43.7	30.9	120.6
	November	52.8	29.2	188.7	24.1	48.6	34.6	90.7
	December	55.7	33.6	131.3	17.6	43.1	41.4	45.0
Specific Conductivity	September	133.3	90.0	150.0	15.7	153.7	93.0	162.0
	October	112.0	29.0	147.0	26.8	135.3	100.0	154.0
	November	123.5	65.0	143.0	15.9	123.5	87.0	148.0
	December	126.6	79.0	145.0	8.4	126.0	98.0	140.0

YDRM002								
Parameter	**Month**	**Background MEAN**	**Background MIN**	**Background MAX**	**Background SD**	**2011 MEAN**	**2011 MIN**	**2011 MAX**
Temperature	September	14.3	8.5	21.0	0.7	13.5	10.1	18.7
	October	8.5	2.7	17.2	1.9	8.7	4.0	14.9
	November	2.4	0.0	9.3	0.5	2.0	0.1	6.0
	December	0.1	0.0	1.4	0.0	0.0	0.0	0.1
Flow	September	13.1	5.5	68.5	5.9	11.2	6.5	75.2
	October	34.6	7.1	214.9	25.4	26.5	12.0	62.5
	November	26.8	10.0	94.0	9.9	23.4	14.4	38.7
	December	21.1	10.6	74.0	6.9	20.7	15.9	29.0
Specific Conductivity	September	80.3	42.0	103.0	11.0	95.2	69.0	103.0
	October	61.3	30.0	102.0	18.8	64.8	55.0	83.0
	November	53.1	32.0	74.0	7.6	61.6	48.0	72.0
	December	62.0	32.0	91.0	9.0	59.2	51.0	67.0

Notes:
*Source of all background and 2011 data is North Jackson Company REACH System
Highlighted cells indicate results slightly above calculated background

Appendix M

Impermeable Surface Inspection and Repair Plan

Kennecott Eagle Minerals Company

Eagle Mine

Impermeable Surface Inspection and Surface Repair Plan

July 2011

Prepared By: Kennecott Eagle Minerals Company

Adapted from: ***Foth Infrastructure & Environment, LLC Impermeable Surface Inspection and Surface Repair Plan, December 2007, for Kennecott Eagle Minerals Company***

Contents

Figures

Appendices

Impermeable Surface Inspection and Surface Repair Plan

1.1. Introduction

This Impermeable Surface Inspection and Surface Repair Plan (Plan) has been prepared to address integrity monitoring of impermeable surfaces that will be exposed to contact water or other potentially impacted water. The monitoring plan includes frequency of inspection and action plans for surface repair, along with a sample inspection log documenting the date of inspection, identification of the inspector, results, and required follow-up action. Inspection documents will be kept on site and copies will be forwarded to the main Kennecott Eagle Minerals Company (KEMC) office in Ishpeming on a monthly basis.

Figure 1 indicates impermeable surface areas with potential for exposure to contact or other impacted water. Areas covered under this plan include:

- Coarse Ore Storage Area (COSA);
- Water Treatment Plant (WTP);
- Fuel Storage Area;
- Truck Wash Area;
- Bituminous Surfaced Mine Traffic Areas; and,
- Concrete Surfaced Mine Traffic Areas.

2. Impermeable Surface Descriptions and Use

2.1. COSA

The COSA will contain mined ore awaiting transport to the Humboldt Mill. The COSA building will have a storage capacity of 3,000m^3 of bulk ore. The building will be enclosed on four sides, except where roll-up doors allow passage of underground haul trucks and ore transport trucks enter the building to load or unload, respectively. The building will be constructed of steel framing with steel siding. Two doors along the south side of the building will allow truck access to the COSA to dump mined ore. The floor of the COSA will be constructed of 12-in thick reinforced concrete sloping to a catch basin for collection of contact water. The sump will be coated with a corrosion resistant epoxy to protect the integrity of the sump, and the sump will be emptied with a vacuum truck for eventual treatment at the WTP.

2.2. WTP

The WTP will treat all waste water streams with the exception of sanitary wastewater. The building is enclosed and the floor is constructed of concrete. The floors are sloped to direct spills to one of five trench drains that discharge to a centralized sump. Trench drains and sump in the WTP are coated with a corrosion resistant epoxy. The corrosives storage area, designed to hold up to 10,000 gallons total of treatment chemicals, is coated with a corrosion resistant epoxy to protect the integrity of the storage area floor and walls.

2.3. Fuel Storage Area

The fuel storage area consists of a canopy, three aboveground storage tanks (ASTs), a concrete slab, a trench drain, and a sump. The tank area is not enclosed so both contact and non contact water are expected to enter the drain and sump and be emptied with a vacuum truck on a regular basis. The drain and sump will be coated with a corrosion resistant epoxy.

2.4. Truck Wash Area

Ore transport trucks leaving the main operations area will be required to go through a truck wash prior to leaving the facility. The truck wash is an enclosed system that recycles wash water. Solids are removed from the water in a two-stage settling basin that holds wash water. The settling basins will be coated with a corrosion resistant epoxy to protect the concrete surface integrity.

2.5. Bituminous Surfaced Mine Traffic Areas

Bituminous surfaced areas will be constructed in the areas shown on Figure 1. These areas are generally located in the main operations area, with the exception of the mine traffic areas that are concrete-paved. The bituminous areas will consist of 4 inches of bituminous concrete supported by 12 inches of road aggregate.

2.6. Concrete Surfaced Mine Traffic Areas

Above-ground mine vehicle traffic pathways are constructed with concrete pavement, as shown on **Figure 1.** The concrete areas will consist of 8 inches of concrete pavement supported by 8 inches of road aggregate.

3. Site Inspections and Monitoring

3.1. COSA

KEMC Personnel will provide monthly inspections of the COSA floor slab during time periods when ore is stored in the facility. Areas of the COSA which do not contain ore will be inspected and repaired as necessary. Then, ore will be moved to these previously inspected/repaired areas and the exposed portion of the COSA floor inspected and repaired as necessary. Staging of inspections as described herein will be performed until the entire COSA floor area is evaluated. To evaluate the catch basin in the COSA, any standing liquid will be removed and appropriately managed, and the catch basins will be inspected for any areas of cracking, pitting or other surface deficiencies. KEMC personnel will complete monthly inspection logs outlining dates of inspection, identification of the inspector, results, and required follow-up action. A sample inspection log is included in Appendix A.

3.2. WTP

KEMC Personnel will provide monthly inspections of the WTP floor slab. Any cracks that develop will be filled with epoxy. To evaluate the sumps and trench drains in the WTP, any standing liquid will be evacuated to the facility process, and the sump or drain will be inspected for any areas of cracking, pitting, or other surface deficiencies. KEMC personnel will complete monthly inspection logs outlining dates of inspection, identification of the inspector, results, and required follow-up action. A sample inspection log is included in Appendix A.

3.3. Fuel Storage Area

KEMC Personnel will provide monthly inspections of the fuel storage area slab, trench drain, and sump. Any cracks that develop will be filled with epoxy or other impermeable substance appropriate for all weather applications. To evaluate the sump and trench drain, any standing liquid will be emptied via the sump pump to a vacuum truck and appropriately managed, and the sump or drain will be inspected for any areas of cracking, pitting, or other surface deficiencies. KEMC personnel will complete monthly inspection logs outlining dates of inspection, identification of the inspector, results, and required follow-up action. A sample inspection log is included in Appendix A.

3.4. Truck Wash Area

KEMC personnel will provide monthly (or at a frequency equal to the emptying of the basins during time periods of reduced usage) inspections, of the truck wash concrete pavement during mining operations. The basis will be emptied and cleaned of settled solids dependent on the loading as a result of the frequency of truck washing, but at least monthly during full scale operation. Catch basins will be evaluated by removing standing liquid and visually inspecting the basin for cracks, pitting, or other surface deficiencies. Monthly inspection logs (Appendix A) will be completed during the inspections.

3.5. Paved Traffic Areas

Both concrete and asphalt pavement will undergo a complete inspection twice yearly, and maintenance will be performed between May and October of each year as necessary. No inspections or repair will occur during the time that pavement is covered in ice/snow, or when winter weather would prevent effective patching efforts. One inspection will be performed in the spring following frost thaw. Any cracks, pits, gaps in established joints between concrete and pavement, deteriorating previous patchwork, or other surface deficiencies will be repaired. Ongoing as-needed repairs will occur during the summer and fall months if additional deficiencies are noted. One final complete inspection will be performed in October to identify any deficiencies prior to snowfall, and areas will repaired following the same guidelines as noted above.

4. Repair Methods

4.1. Bituminous Areas

As with concrete pavement, repair methods for cracks in bituminous surfaced areas will vary with the size of the crack as described below:

- Minor Cracks: Minor cracks less than ¼ inch wide can generally be filled with an asphalt emulsion sealer.
- Structural Cracks: Structural cracks between ¼ inch and 1 inch wide will generally be sealed with a hot elastomeric-type crack sealant.
- Cracks wider than 1 inch: Cracks wider than 1 inch will be patched with hot mix asphalt.

Prior to repair, the cracks will be cleaned with compressed air, or other appropriate method, to remove deleterious material. Cracks between ¼ inch and ½ inch wide will be routed to a minimum of ½ inch by ½ inch shape. The cleaned cracks will be sealed with the elastomeric sealant or hot mix asphalt, depending on size, and allowed to cure prior to exposure to traffic.

4.2. Concrete Areas

Once identified, cracks that have the potential to provide a conduit for contact water transmittal will be sealed by methods appropriate to their size. Based on the size of the crack, repairs will be conducted by one of two methods: routing and epoxy toweling, and epoxy grouting. Cracks that are less than 1/8 inch wide will be considered Class 1 cracks; greater than 1/8 inch in width will be Considered Class 2 cracks.

Class 1 cracks will be repaired by routing and epoxy toweling. Routing of the crack consists of routing the crack with a concrete saw or other hand pneumatic tool, to open the crack sufficiently to receive the sealant. A minimum routed width of ¼ inch is desirable since smaller openings are difficult to fill. The surface of the routed crack will be cleaned and allowed to dry. Epoxy sealing will then be toweled into the crack. Separation of the floor slab from the perimeter of the wall/foundation will generally be treated as Class 1 cracks and filled by epoxy toweling.

Class 2 cracks will be repaired by epoxy injection. This method generally consists of drilling holes at close intervals in the crack and injecting epoxy under pressure. This fills the crack entirely to provide a good seal.

Larger areas where mechanical damage has occurred may require removal and replacement with new concrete. In these areas, the damaged area will be cut out and removed, new reinforcement bars drilled and grouted into existing concrete, and a new section of concrete placed.

FIGURES

REFERENCES	
DWG. NO.	TITLE
050-GA-001	OVERALL SITE PLAN

REFERENCES	
DWG. NO.	TITLE

NO.	DESCRIPTION	BY	APP'D	DATE	OWNER
5	REVISED CIVIL AND BUILDINGS	JAL	GER	08 APR 11	DNH
4	REVISED PORTAL AREA	JAL	GER	17 FEB 11	FvH
3	POWERHOUSE/SEPTIC AREA LOCATION	RMV	GER	09 NOV 10	FvH
2	ADDED FENCE, REVISED SEPTIC	GER	JAN	07 SEP 10	RMT
1	REVISED PER NEW SITE LAYOUT	GER	JAN	23 JUL 10	RMT
0	APPROVED FOR CONSTRUCTION	GER	JAN	10 MAY 10	WH

SCALE: 1:1000		DATE
DESIGNED BY	JAN	SEP 10
DRAWN BY	NAL	SEP 10
CHECKED BY	GER	SEP 10
PROJECT MGR	JAN	SEP 10
OWNER APPR	WJH	SEP 10

Tucson, Arizona
Chandler, Arizona
Hermosillo, Sonora Mexico

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KENNECOTT EAGLE MINERALS

EAGLE DEVELOPMENT PROJECT
MINE SITE
GENERAL ARRANGEMENT
PORTAL AREA PLAN

JOB NO. M3-PN100115
DWG NO. 050-GA-002
REV NO. 5
DATE 08 APR 11

File: \\file2.chandler.m3.local\Projects\2010\100115\500 Eng\590 Ref Docs\592 To Be Issued\GA\050-GA-002 REV 5.dwg LAST UPDATE: APR 08, 2011 @ 10:47 AM BY: jl5749 LAST REV: regen PLOT SCALE: 1:25.40

APPENDIX A

RioTinto

IMPERMEABLE SURFACE INSPECTION FORM - KENNECOTT EAGLE MINERALS COMPANY

BITUMINOUS SURFACES

Month: ______________________

Inspector: ______________________

Date of Inspection: ______________________

Inspection Area(s) (Circle What Applies)

Portal TDRSA Area CWB Area Central Site

Explosives Storage Office Areas Waste Segregation

INSPECTION RESULTS
RECOMMENDED ACTIONS
FOLLOW-UP OF PREVIOUS RECOMMENDATIONS

**Return this original form to Jennifer Nutini at the end of the month for recordkeeping purposes.*

Prepared By: J. Nutini

Approved By: K. Mariuzza

IMPERMEABLE SURFACE INSPECTION FORM - KENNECOTT EAGLE MINERALS COMPANY

CONCRETE SURFACES

Month: ______________________

Inspector: ______________________

Date of Inspection: ______________________

Inspection Area(s) (Circle What Applies)

COSA Floor	COSA Sump	WTP Floor	WTP Sumps
Truck Wash	Truck Wash Sump	Fuel Canopy Area	Fuel Canopy Sump
Truck Shop	Truck Shop Sump	Travel Ways	Backfill

INSPECTION RESULTS
RECOMMENDED ACTIONS
FOLLOW-UP OF PREVIOUS RECOMMENDATIONS

**Return this original form to Jennifer Nutini at the end of the month for recordkeeping purposes.*

Appendix N

Contingency Plan

8 Contingency Plan

This section of the *Mining Permit Application* addresses contingency plan 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 with the Eagle Project. 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 KEMC through HSE procedures in accordance with Occupational Safety and Health Administration (OSHA) and Mine Safety and Health Administration (MSHA) requirements.

The Eagle Project involves mining ore, as well as storing and treating by-products of that process. KEMC's mining, storage, and treatment facilities have been designed, constructed, and operated in a manner that is protective of the environment through the use of proven technologies and engineering practices. The environmental protection features are discussed in Section 4 and Section 5.

8.1 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
- Air emissions
- Spills of hazardous substances
- Other natural risks defined in the EIA
- Power disruption
- Unplanned subsidence, and
- Leaks from containment systems for stockpiles or disposal and storage facilities.
- Basin berm failures.

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.

8.1.1 Release of Toxic or Acid-Forming Materials

Potentially reactive materials generated as a result of mining operations include the ore and development rock. As discussed in Section 4, 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 Project so as 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 on-site are associated with the WTP and are discussed in Section 8.1.5.

8.1.1.1 Coarse Ore Storage Area

Coarse ore from the underground mine will be trucked to the surface and placed in the COSA. The COSA will be a three-sided building with a full roof that is used for temporary storage of stockpiled coarse ore. The COSA will have a concrete floor that will be sloped to a floor drain that will collect any contact water associated with the ore. This contact water will be drained or pumped into the composite lined CWB where it is stored until treatment at the water treatment plant. Contingency measures associated with the CWB liner systems are discussed in Section 8.1.12.

8.1.1.2 Temporary Development Rock Storage Area

Development of the mine began with excavation of surrounding rock to provide access to the ore body through portals, raises and ramps. This surrounding rock is known as "development rock." At the beginning of mining, the development rock from these excavations is being temporarily stored at the surface in the TDRSA. As mining progresses, the development rock stored on the TDRSA will be returned underground to backfill areas where the ore has been removed.

Most of the development rock will be inert while stored on the surface, posing no threat to the environment. Ongoing tests show some of this rock has the potential to oxidize when exposed to air and water over longer periods of time. Therefore, KEMC will handle the development rock in a way to minimize the potential formation of ARD, and if formed, prevent it from being released into the environment.

Accordingly, KEMC has designed and constructed a state-of-the-art TDRSA to contain the development rock. As discussed in Section 5, the TDRSA is constructed of the following components to minimize the potential generation of ARD, and if formed, prevent it from being released to the environment:

- A composite liner system comprised of a geomembrane liner underlain by a 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 geomembrane from damage by the development rock. The collection system will consist of a geocomposite 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 geomembrane cover system placed over the development rock.

As development rock is placed in the TDRSA it will be amended with high-calcium limestone at a rate of 20 tons per 1,000 tons of development rock. This is added as an additional contingency measure to offset the formation of ARD. Moreover, the development rock will be covered to further limit the generation of ARD by minimizing contact with precipitation. After approximately seven years, the development rock will be returned underground as mine backfill. The short term nature of this project significantly reduces the potential for release of toxic and acid-forming materials.

If the water that comes in contact with the development rock does become acidic, it will not be exposed to the environment due to the design of the TDRSA. Further, all contact water from the TDRSA is collected and treated at the WTP. Contingency actions associated with potential water basin berm failures are discussed in Section 8.1.6. The contingency actions that address potential failure of the liner contact water collection system are discussed in Section 8.1.12.

8.1.1.3 Ore Transportation

The ore will be loaded from the Coarse Ore Storage Building into tractor-trailer combinations utilizing an end-loader and transported to the Humboldt Mill. All loaded ore trucks will have the tires, sides, and undercarriages washed at the on-site truck wash prior to leaving the Contact Area at the Mine site.

During initial mining operation, the following 65 mile route is proposed 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 Humbolt Mill entrance.

KEMC is currently working with the Marquette County Road Commission (MCRC) to permit and construct CR 595. This North-South route would reduce the 65 mile route described above to 26 miles. CR 595 and a short portion of the existing Triple A Road would be constructed to “all season” status, thus not subject to spring time weight restrictions.

The shorter route is as follows:

- East on Triple A Road, 1 mile to CR 595
- South on CR 595, 21 miles to US-41
- West on US-41, 2 miles to M-95
- South on M-95, 1 mile to CR 601
- East on CR 601, 1 mile to the Mill entrance

In the event that the 26 mile route is not permitted, KEMC will upgrade the portions of the 65 mile route that are not currently “all season” status and utilize the longer route as the permanent route.

The trucks will be covered side-dump units with a length limit of approximately 80 ft. They will consist of a tractor, a trailer, and second trailer (pup). The truck will handle approximately 40 metric tons per load on average. Loads will be appropriately reduced during spring time load restrictions if the hauling occurs prior to upgrading the route to “all season” status.

Safety will be stressed with the ore truck drivers. Tracking devices will be mounted on the tractors to monitor and record speed, location and braking effort. Excessive speeds or erratic driving will not be tolerated. Any movements on the gravel portion, prior to upgrades, will utilize escort vehicles. In addition, KEMC will work with MCRC to maintain a safe road surface for employees, vendors and ore shipment.

Potential truck accidents are possible while transporting ore from the Mine to the Mill. In the event of a truck roll over, ore could be spilled onto the road and adjacent areas. Since the coarse ore is a crushed rock sized material, it will be relatively 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 Acid Rock Drainage (ARD) will not occur in this short of a time period, it will be important to respond appropriately to any spills. If an accident results in spillage of ore into a water body, specialized equipment and procedures may be required. Items such as temporary dams/cofferdams and large backhoes may be required to remove the material from the water.

The Mill Course Ore Facility will be designed such that all unloading of ore will occur in an enclosed building with a concrete floor. These features will prevent release of dust and prevent precipitation from contacting the ore. After the ore is unloaded into the Coarse Ore Facility, it is crushed and transferred, with loading and transfer points featuring dust control.

8.1.2 Storage, Transportation and Handling of Explosives

Blasting agents or explosives are required for blasting operations in the development and operation of the mine. The explosives selected for use at the Eagle mine are comprised of an emulsion of ammonium nitrate/diesel fuel. Although uncommon, 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 the Eagle Project will be controlled by a gate house and the fence system.

The storage, transportation, and use of explosives comply with applicable MSHA and/or ATF standards. Explosives stored on the surface are stored in an isolated magazine located at a secure site at the mine facility.. Caps, primers, and detonating cord are stored in a separate magazine away from the emulsion mixture. Explosives are transported by a clearly marked truck via a dedicated road, from the explosives storage area to the mine portal for distribution and use in the mine.

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 Project 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, the Emergency Procedure will be followed, as discussed in Section 8.2.

8.1.3 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 gate house and the fence system. The fuel storage area contains two diesel fuel storage tanks with a capacity of 20,000 gallons each and one smaller 500 gallon tank for regular unleaded gasoline. An additional 1,700 gallon diesel fuel storage tank is located in the non-contact area near the power house generator. 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 18,500 gallons with additional propane needs expected once the mine's propane-fired air heating system is online. The propane tanks, currently on site, are located adjacent to the buildings that require the fuel for heating purposes.

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

- Training of personnel responsible for hauling fuel in proper procedures and emergency response,
- Regular equipment inspections and documentation of findings, and
- Double-walled construction of all above ground tanks, and
- Staging of on-site emergency response equipment to quickly respond to unanticipated spills or leaks.

Specific procedures will be prepared as part of the project's SPCC Plan. In addition, a PIPP has been prepared which addresses potential spillage of fuels and other polluting materials.

Diesel fuel, gasoline, and propane (fuels) will be transported to the Eagle Project 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, which is yet to be fully determined. A fuel release resulting from a vehicular accident during transportation is judged to be 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 Project.

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 PIPP. In addition, tank integrity testing will be performed 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.

Construction/Reclamation Phase Release - 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 also considered to be a low probability event given that operators will be trained to manage these types of potential releases. 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 plan and SPCC plan addresses fueling operations, fuel spill prevention measures, inspections, training, security, spill reporting, and equipment needs. All responses to a fuel spill, both large and small, will follow the guidelines dictated by the spill response plan. The tanks will be inspected regularly, and records of spills will be kept and reported to MDEQ and other agencies as required.

All permanent fuel storage tanks located on the Eagle Mine Site are designed with double-walled construction to protect against leaks. In addition, any temporary fuel storage tanks are required to have secondary containment with significant capacity to contain the contents of the tank and covered to minimize accumulation of precipitation inside the secondary containment.

In the event of a release in the contact area, fuels would be routed (due to site grading) to the contact water basins where they would cleaned-up using absorbent pads/booms or other fuel absorbing products. Any fuel not absorbed would be routed to the WTP and treated prior to release to the environment. In the event of a release in the non-contact area, fuels would be adsorbed 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 the event of a release.

8.1.4 Fires

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

8.1.4.1 Mine Fire

One potential source of combustion could occur during the handling of combustible minerals in the Eagle Project ore body. The ore body contains certain quantities of pyrrhotite, which is an iron sulfide mineral. Iron sulfide is considered to be a phyrophoric 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.

In the event that 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.

Appropriate preventative and contingency measures will be exercised as required by MSHA. These measures include the installation of fire suppression systems, the widespread distribution of fire extinguishers throughout the mine, employee safety training programs, and the use of a mine rescue team trained in firefighting techniques. Mine evacuation procedures, as discussed in Section 8.2, may be invoked, depending on the nature and extent of an underground fire.

8.1.4.2 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 will only be 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 a low probability event with negligible risk.

Because the Eagle Project 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. 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. A standby water pipelines and network of fire hydrants have been installed throughout the site and additional fire extinguishers are also located in high risk areas. The surface rescue team is trained in fire fighting techniques and will respond to fires. On-site fire fighting equipment includes a fire control vehicle and an above ground water storage tank and distribution system for fire suppression.

8.1.5 Wastewater Collection and Treatment

The major sources of water requiring treatment are groundwater inflow to the mine, contact water from the TDRSA, and storm water runoff from the operations area. All water is routed to CWBs No.1 and No.2. These basins provide wastewater storage and equalization capacity. Water from the basins is conveyed to the WTP which is comprised 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 8.1.10) 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 11,500,000 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 8.1.8.

8.1.5.1 Contact Water Basins

The CWBs were very conservatively designed to handle peak snow melt and rain events that exceed the 100-yr, 24-hr precipitation event.

The CWBs have also been designed with the following contingencies which are further addressed in the Eagle Mine Site Water Management Plan:

- The CWBs are designed to hold 11,500,000 gallons of water allowing sufficient time for maintenance of WTP equipment.

- In the unlikely event that a runoff event exceeds 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 the MDEQ).
  - Water can be pumped into vacant underground mine workings for additional temporary storage of water.

Potential release events associated with breach of the composite liner, and overtopping of the berms are discussed in Section 8.1.6 and the Eagle Mine Site Water Management Plan. Potential leakage of the liner system is discussed in Section 8.1.12.

8.1.5.2 Non-Contact Storm Water

Storm water runoff from the non-contact areas will be directed to one of three NCWIBs (a fourth is scheduled for construction in 2012). The NCWIBs allows 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 6 months out of the year with no infiltration during this time period. In the event that the infiltration capacity of the CWB soils is reduced over time by the presence of silt, the solids will be removed to restore the infiltration capacity.

8.1.5.3 Treated Water Infiltration System

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.

8.1.6 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 8.1.12.

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

Overtopping of the CWBs is also very unlikely due to 2 ft freeboard above an already very 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.

8.1.7 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.

8.1.7.1 Fugitive Emissions During Construction

During surface construction, areas subject to cut and fill operations and development of soil stockpiles will be temporarily re-vegetated and/or covered after final grading for soil stabilization and dust control. Temporary re-vegetation will start during the first year and continue through the completion of construction. After final grading of embankment slopes, temporary or permanent vegetation will be planted for soil stabilization and to reduce wind blown dust. While these soil stabilization efforts are expected to be effective, there is a potential that excessive dust could be created by extreme weather conditions. These conditions could include strong wind storms or gusts in the area or excessive rain events. Such events could erode soil and vegetation, creating newly exposed soil that could also be subject to wind dispersion.

To address this risk, KEMC will closely monitor re-vegetated and covered areas during the construction phase. If vegetated or covered areas are disturbed by wind activity or excessive rainfall, protective mats and/or vegetation will be re-established as soon as possible. Temporary covers may also need to be re-anchored to ensure temporary stockpiles are protected.

In addition to the above situation, there may be periods when hot and/or dry conditions could occur during the construction phase. To the extent necessary during these periods, roadways will be kept moist by instituting a watering program over identified traffic areas. It is anticipated this program will minimize excessive dust associated with mobile equipment. In the event fugitive dust is still identified as an issue, the cause of the problem will be determined such that appropriate action can occur.

8.1.7.2 Air Emissions During Operations

During operation of the mine, potential emissions from the facility will be controlled as detailed in the project's current *Michigan Air Use Permit*. These controls will include implementation of an on-site roadway watering program, use of building enclosures or flexible membrane covers on storage areas, installation of dust collection or suppression systems such as a baghouses where necessary, or enclosed structures to control dust during ore transfer operations, 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, KEMC will utilize certain pieces of mobile equipment to move crushed ore materials about the site. Equipment will include ore production trucks, front end loaders, product haul trucks and miscellaneous delivery trucks. To control dust emissions during movement of these vehicles across the site during dry periods, a comprehensive on-site watering program has been developed to control these potential fugitive sources of dust. While the watering program will be closely monitored, if excessive dust emissions should occur, the facility will take appropriate corrective action, which could include intensifying and/or adjusting the watering program to properly address the problem.

To minimize dust emissions from development rock and coarse ore storage areas, such areas will either be fully or partially enclosed. Materials will be moved to and from these areas during the course of operations. 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. The TDRSA will also be temporary in nature, in that development rock will be moved back underground to fill secondary stope areas that have been mined.

The coarse ore storage building is designed as an enclosed structure to control fugitive emissions from ore transfer between underground production vehicles and offsite haul trucks. Crushing will not occur within this building, so the risk of fugitive dust emissions from this activity is low due to the enclosed nature of the building and moisture content of the ore. If necessary, water sprays may be used to control dust within the building and best housekeeping practices will apply to ensure cleanliness of the building. Although the risk of fugitive dust during transport of coarse ore material off-site is considered to be low due to its large size, this risk will be further reduced as all trucks will be equipped with a hard covers.. Trucks will undergo an undercarriage and side wash prior to exiting the facility to reduce the potential for ore dust migration from the property.

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

8.1.7.3 Air Emissions During Reclamation

Once underground mining and ore transfer activities are completed at the site, reclamation will commence in accordance with R 425.204. Similar to activities described above, there is a moderate risk fugitive dust emissions could be released during certain re-vegetation activitiesand during temporary storage of materials in stockpiles. Similar to 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 fugitive dust is identified as an issue, corrective action will determine the cause of the problem and appropriate action will occur.

8.1.8 Spills of Hazardous Substances

Since secondary mineral processing is not planned on-site, the primary chemical reagents used are associated with the WTP. Table 8-1 includes a list of reagents planned for use at the WTP along with the storage volumes and physical state of each chemical.

Table 8-1
Chemical Reagents Used at the Water Treatment Plant

Chemical name	Trade name	CAS no.	Storage Volumes	Physical State
sodium hydroxide	caustic soda; Hydrex 1565	1310-73-2	5,000 gal	Liquid
sodium carbonate anhydrous	soda ash; Hydrex 1564	497-19-8	2000#/bag 2 bags	Solid
iron (III) chloride solution	Hydrex 3250	7705-08-0	275 gal	Liquid
phosphonic acid, sodium salt	hydrex 4114 (antiscalent)	20592-85-2	30 gal	Liquid
hydrochloric acid	Hydrex 4507	7647-01-0	5,000 gal	Liquid
polyalkylene glycol monobutyl ether	hydrex 9240 (defoamer)	9038953	5 gal	Liquid
sulfuric Acid	Hydrex 1925	7664-93-9	275 gal	Liquid
polymer	Hydrex 6511	-	275 gal	Liquid
Citric Acid	Hydrex 4702	-	400-1600 lb	Solid
RO Membrane Cleaner - Basic (Hydrex 4501)	Hydrex 4501	-	50-800 lbs	Solid

Chemical storage and delivery systems follow current standards that are designed to prevent and to contain spills. All use areas and indoor storage areas were designed, constructed and/or protected to prevent run-on and run-off to surface or groundwater. This includes development of secondary containment areas for liquids. 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, such that 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. Response to a major spill will be in compliance with the PIPP.

Spill containment measures for chemical storage and handling will reduce the risk of a spill from 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. It is therefore anticipated that management and handling of WTP reagents will not pose a significant risk to human health or the environment.

8.1.9 Other Natural Risks

Earthquakes – The Upper Peninsula of Michigan is in a seismically stable area. The 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. Section 4 and Section 7 also discuss the proposed handling of surface water runoff to control erosion during each phase of mine construction, operation and reclamation. High precipitation could also lead to the failure of erosion control structures. The impacts 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 the event of 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. Triple A Road has been upgraded to accommodate the increased vehicle trafficwhich allows access to the mine during the worst of winter weather. KEMC and the MCRC have an arrangement for maintenance of the County Roads during winter conditions. If road conditions deteriorate beyond the capability of the maintenance equipment, KEMC will have arrangements to keep workers on-site for extended periods.

Forest Fires – Forest fires were discussed in Section 8.1.4.

8.1.10 Power Disruption

Facility electric power is provided by Alger-Delta Electric Cooperative, as well as, a backup generator capable of delivering 1825 kW of power. The electrical distribution system provides power to the main surface facilities, the backfill surface facilities, the potable well, and underground facilities. In the unlikely event that more than one unit will be down at any given time, KEMC would have to reduce operations so as to keep critical equipment in operation with the reduced power. The details of this will be part of the operating procedures for the facility.
In the event the WTP would need to be temporarily shut down during power disruptions, the CWBs were designed with significantly larger capacity than required in daily operations. The CWBs can hold 11,500,000 gallons of mine inflow water which would be sufficient enough in size to store water for an extended period of time if necessary. .

8.1.11 Unplanned Subsidence

The blast hole mining method proposed for the Eagle Project 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. Mining will start with a small number of stopes near the middle elevation of the ore body. Mining will 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 will be backfilled using an engineered cemented aggregate fill. A Portland cement binder is planned to be used to prepare the backfill. The quantity of binder required is estimated at approximately 4.0% by weight. The secondary stopes will be backfilled with limestone amended development rock from the TDRSA or local uncemented fill material obtained from on-site or local 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 crown pillar and surface subsidence was completed as part of the mine design and is provided in Appendix C. 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.

The contingency measures to be taken in the event unanticipated surface subsidence occurs will be initiated based on subsidence monitoring. Subsidence monitoring is being performed at two locations above the ore body, adjacent to the overlying wetland. 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.

8.1.12 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 preventative measure to minimize the potential for leaks from these facilities, leak location surveys will be completed to identify potential leaks that would go undetected during construction QA/QC.

8.2 Emergency Procedures

This section includes the emergency notification procedures and contacts for the Eagle Project Site. In accordance with 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 MDEQ.

<u>Emergency Notification Procedures</u> – An emergency will be defined as any unusual event or circumstance that endangers life, health, property or the environment. KEMC has adopted an Incident Command System (ICS) structure to respond to such emergencies. The ICS structure 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 ICS structure is as follows:

- <u>Incident Commander (IC)</u>: The General Manager at the facility will be designated the IC and will be responsible to ensure that emergency response actions are carried out in an appropriate and timely manner. The IC will ensure that appropriate resources are available, ensure the incident is secured, and release resources in an orderly manner. The IC will also ensure appropriate notification is made to all required regulatory agencies and necessary emergency response agencies.

- <u>Safety Officer</u>: The facility safety officer and staff are responsible for ongoing review of ICS structures and will monitor activities in response to any emergencies. During an emergency, the safety officer will manage special situations that expose responders to hazards, coordinate emergency response personnel, mine rescue teams, fire response, and ensure relevant emergency equipment is available for emergency service. This individual will also work with the IC to ensure appropriate personnel are made available to respond to the situation.

- <u>Environmental Officer</u>: The facility environmental manager will be responsible for managing any environmental aspects of an emergency situation. This individual will coordinate with the IC to ensure environmental impact is minimized, determine the type of response that is needed and act as a liaison between environmental agencies and mine site personnel.

- Public Relations Officer: The facility human relations manager will be responsible for managing all contacts with the public and will coordinate with the IC and the safety and environmental officers to provide appropriate information to the general public. This individual will also meet all arriving outside response agencies and pass on instructions from the IC. This individual will also immediately notify families of employees injured or affected.

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

In the event evacuation of mine personnel is required, KEMC has developed emergency response procedures for underground facilities as well as surface faculties. All evacuation procedures were developed in compliance with MSHA regulations.

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

- ABC Rechargeable fire extinguishers
- Telephone mine communication system
- Radios
- First aid kits, stretchers, backboards, and appropriate medical supplies
- 30 minute air packs
- BG 4 breathers, RZ testers
- Cap lamps
- Self rescuers
- Portable Refuge Stations
- Mine elevator
- Spill Kits (hydrocarbon and chemical)
- Water truck and fire hoses
- HAZMAT response equipment

This equipment is located both underground and at the surface facilities. Fire extinguishers are located at appropriate locations throughout the facility, in accordance with MSHA requirements. Mine and surface facility personnel are also be equipped with radios for general communications and emergencies. Other emergency response equipment is located at appropriate and convenient locations for easy access for response personnel.

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:

- Operator and Emergency Management Coordinator: Adam Burley – (906) 486-1257
- Local Ambulance Services: 911
- Hospitals: Marquette General Hospital – (906) 225-3560
  Bell Hospital – (906) 485-2200
- Local Fire Departments: Powell Township - 911
  Marquette Township – 911
  - Due to the location of the Eagle Project, Powell Township will be the first contact as they are the closest responder.
- Local Police: Marquette County Central Dispatch – 911
  Marquette County Sheriff Department – (906) 225-8435
  Michigan State Police – (906) 475-9922 (direct line)
- MDEQ Gwinn Office – (906) 346-8300
- Pollution Emergency Alerting System (in Michigan) - 1-800-292-4706
- Federal Agencies: EPA Region 5 Environmental Hotline – 1-800-621-8431
  EPA National Response Center – 1-800-424-8802
  MSHA North Central District – (218) 720-5448
- MDNR Marquette Field Office – (906) 228-6561
- Michigamme Township Supervisor: John Olson – (906) 323-6547

8.3 Testing of Contingency Plan

During the course of each year, the facility will test the effectiveness of the Contingency Plan. Conducting an effective test will be comprised of two components. The first component will include participation in adequate training programs on emergency response procedures for those individuals that will be involved in responding to emergencies. These individuals will include the Incident Commander, Safety Officer, Environmental Officer, Public Relations Officer and other individuals designated to respond to fires and participate in mine rescue. Individuals will receive appropriate information with respect to their specific roles, including procedures and use of certain emergency response equipment.

The second component of an effective Contingency Plan will be to conduct mock field tests. At least one mock field test will be performed each year. The Safety Officer will work with the Environmental Officer and the Incident Commander to first define the situation that will be tested. The types of test situations may include responding to a release of a hazardous substance, responding to a fire (aboveground or underground) or responding to a natural disaster such as a tornado. A list of objectives will be developed for planning and evaluating each identified test situation. A date and time will then be established to carry out the test. Local emergency response officials may be involved, depending on the type of situation selected.

Once the test is completed, members of the ICS team and other KEMC officials 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.

Appendix O

Financial Assurance

Rio Tinto
Reclamation Project (Mine Site)
Marquette, Michigan

8-Mar-12

Item	Units	UM	Cost/Unit	Annual Cost	Years	Total Cost	Escalation	Totals
Years 1 and 2 (Site Construction)								
1 Regrading	16.0	ac	$ 1,000.00	$ 16,000	1	$ 16,000		
2 Install Erosion Control Devices (Silt Fence) + Maintanance	10,500.0	lf	$ 6.00	$ 63,000	1	$ 63,000		
3 Seed / Mulch	16.0	ac	$ 2,500.00	$ 40,000	1	$ 40,000		
4 Plantings (Trees / Shrubs)	200.0	ea	$ 100.00	$ 20,000	1	$ 20,000		
Totals				$ 139,000		$ 139,000	$ 4,170	$ 143,170
Year 8 (TDRSA)								
1 TDRSA Removal								
a) Remove Salvageable Materials	1.0	ls	$ 50,000.00	$ 50,000	1	$ 50,000		
b) Remove 12" Drainage Layer	10,000.0	cy	$ 3.50	$ 35,000	1	$ 35,000		
c) Remove Geosynthetic Components (HDPE/GCL/Geotextile)	262,000.0	sf	$ 0.15	$ 39,300	1	$ 39,300		
2 Remove Underground Equipment (1 pump)	1.0	ea	$ 500.00	$ 500	1	$ 500		
3 Remove Site Uitilities and Generators (1)	1.0	lot	$ 1,000.00	$ 1,000	1	$ 1,000		
4 Backfill Non Contact Basins 1-4	45,384.0	cy	$ 8.00	$ 363,072	1	$ 363,072		
5 Remove Asphalt Paving (Phase 1)	28,261.0	sy	$ 6.00	$ 169,566	1	$ 169,566		
6 Demo Concrete	250.0	cy	$ 600.00	$ 150,000	1	$ 150,000		
7 Regrade Area (Phase I)	50.0	ac	$ 1,000.00	$ 50,000	1	$ 50,000		
8 Topsoil (Phase 1)	50.0	ac	$ 2,000.00	$ 100,000	1	$ 100,000		
9 Install Silt Fence + Maintenance	2,500.0	lf	$ 6.00	$ 15,000	1	$ 15,000		
10 Seed / Fertilize / Mulch	50.0	ac	$ 2,500.00	$ 125,000	1	$ 125,000		
Totals				$ 1,098,438		$ 1,098,438	$ 263,625	$ 1,362,063
Year 9 (Closure)								
1 Remove Salvageable Material from Buildings	1.0	ls	$ 25,000.00	$ 25,000	1	$ 25,000		
2 Remove Site Utilities	1.0	ls	$ 25,000.00	$ 25,000	1	$ 25,000		
3 Demolish Buildings	10.0	ea	$ 10,000.00	$ 100,000	1	$ 100,000		
4 Remove Asphalt Paving (Phase II)	28,261.0	sy	$ 6.00	$ 169,566	1	$ 169,566		
5 Remove Gravel Roads	24,719.0	cy	$ 6.00	$ 148,314	1	$ 148,314		
6 Demo Concrete Paving	6,797.0	cy	$ 450.00	$ 3,058,650	1	$ 3,058,650		
7 Dispose of Regulated Materials	2,000.0	tons	$ 40.00	$ 80,000	1	$ 80,000		
8 Parking Lot Removal	7,000.0	sy	$ 6.00	$ 42,000	1	$ 42,000		
9 Fence Removal	11,500.0	lf	$ 2.00	$ 23,000	1	$ 23,000		
10 Backfill of Contact Basins 1 & 2	41,854.0	cy	$ 8.00	$ 334,832	1	$ 334,832		
11 Regrade Building Sites	3.0	ac	$ 5,000.00	$ 15,000	1	$ 15,000		
12 Topsoil (Phase II)	50.0	ac	$ 2,000.00	$ 100,000	1	$ 100,000		
13 Regrade Site (Phase II)	50.0	ac	$ 1,000.00	$ 50,000	1	$ 50,000		
14 Seed / Mulch Disturbed Areas	50.0	ac	$ 2,500.00	$ 125,000	1	$ 125,000		
15 Install Silt Fence + Maintenance	2,000.0	lf	$ 6.00	$ 12,000	1	$ 12,000		
Totals				$ 4,308,362		$ 4,308,362	$ 1,163,258	$ 5,471,620
Year 10 (Closure)								
1 Remove Surface Salvageable Materials	1.0	ls	$ 50,000.00	$ 50,000	1	$ 50,000		
2 Backfill Surface Raises and Cap	6,000.0	cy	$ 12.00	$ 72,000	1	$ 72,000		
3 Install Mine Plugs	1,000.0	cy	$ 100.00	$ 100,000	1	$ 100,000		
4 Remove Site Utilities	1.0	ls	$ 150,000.00	$ 150,000	1	$ 150,000		
5 Demolish Buildings (Completed)	1.0	ls	$ 100,000.00	$ 100,000	1	$ 100,000		
6 Dispose of Regulated Materials	500.0	tons	$ 40.00	$ 20,000	1	$ 20,000		
7 Regrade Building Sites	10.0	ac	$ 1,000.00	$ 10,000	1	$ 10,000		
8 Seed / Mulch Distributed Areas	20.0	ac	$ 2,500.00	$ 50,000	1	$ 50,000		
9 Install Erosion Control Devices (Silt Fence)	2,000.0	lf	$ 2.00	$ 4,000	1	$ 4,000		
10 Backfill Mine Portal	15,300.0	cy	$ 12.00	$ 183,600	1	$ 183,600		
11 Remove Salvageable Material from Underground	1.0	ls	$ 100,000.00	$ 100,000	1	$ 100,000		
12 TDRSA Backfilling	250,000.0	cy	$ 8.00	$ 2,000,000	1	$ 2,000,000		
13 Backfilling Stopes (Note 1 & 2)	50,000.0	cy	$ 20.00	$ 1,000,000	1	$ 1,000,000		
14 Install Reflooding Wells	1.0	ls	$ 50,000.00	$ 50,000	1	$ 50,000		
Totals				$ 3,889,600		$ 3,889,600	$ 1,166,880	$ 5,056,480
Year 11 (Closure)								
1 Regrading of remaining Disturbed areas	10.0	ac	$ 1,000.00	$ 10,000	1	$ 10,000		
2 Seed / Mulch Distributed Areas	10.0	ac	$ 2,500.00	$ 25,000	1	$ 25,000		
3 Excavate TWIS	19,620.0	cy	$ 2.00	$ 39,240	1	$ 39,240		
4 Backfill TWIS (New Topsoil)	19,620.0	cy	$ 8.00	$ 156,960	1	$ 156,960		
5 WWT Building (Includes Equipment)	1.0	ea	$ 30,000.00	$ 30,000	1			
6 Powerhouse (Includes Electrical Equipment)	1.0	ea	$ 30,000.00	$ 30,000	1	$ 30,000		
7 Remove Underground Electrical (Wire & Conduit)	1.0	lot	$ 5,000.00	$ 5,000	1	$ 5,000		
8 Asphalt parking @ Mine Office	2,550.00	sy	$ 6.00	$ 15,300	1	$ 15,300		
9 Asphalt parking @ Guard House (visitors parking)	625.00	sy	$ 6.00	$ 3,750	1	$ 3,750		
10 Install Erosion Control Devices (Silt Fence) + Maintenance	2,000.0	lf	$ 6.00	$ 12,000	1	$ 12,000		
Totals				$ 327,250		$ 297,250	$ 98,093	$ 395,343
Year 17								
1 Closure of WWTP /Generator / CWB's	1.0	ls	$ 50,000.00	$ 50,000	1	$ 50,000		
2 Removal of Salvageable Materials	1.0	ls	$ 50,000.00	$ 50,000	1	$ 50,000		
3 Dispossal of Non-Salvageable Materials	50.0	tons	$ 40.00	$ 2,000	1	$ 2,000		
8 Regrading Disturbed Areas	25,000.0	cy	$ 3.00	$ 75,000	1	$ 75,000		
9 Seed / Mulch / Disturbed Areas	6.0	ac	$ 1,000.00	$ 6,000	1	$ 6,000		
Totals				$ 183,000		$ 183,000	$ 93,330	$ 276,330

Rio Tinto
Reclamation Project (Mine Site)
Marquette, Michigan

8-Mar-12

Item	Units	UM	Cost/Unit	Annual Cost	Years	Total Cost	Escalation	Totals
Year 20								
1 Installation of Wells	1.0	ls	$ 200,000.00	$ 200,000	1	$ 200,000		
Totals				$ 200,000		$ 200,000	$ 120,000	$ 320,000
Years 12 - 37 (Post Closure)								
1 Grading	5.0	ac	$ 1,000.00	$ 5,000	1	$ 5,000		
2 Install Silt Fence + Maintenance	1,000.0	lf	$ 6.00	$ 6,000	1	$ 6,000		
3 Seed / Mulch	5.0	ac	$ 2,500.00	$ 12,500	1	$ 12,500		
Totals				$ 23,500		$ 23,500	$ 16,920	$ 40,420
Post Closure Monitoring								
1 Groundwater					1			
a) Years 12-27 / quarterly (15 Well Locations) (15 YRS	15.0	yr	$ 60,000.00	$ 900,000	1	$ 900,000		
b) Years 27-37 / annually (9 Well Locations)	10.0	yr	$ 9,000.00	$ 90,000	1	$ 90,000		
2 Surface Water (5 Sampling Locations)		yr		$ -	1	$ -		
a) Years 12-27 / quarterly	15.0	yr	$ 20,000.00	$ 300,000	1	$ 300,000		
b) Years 27-37 / annually	5.0	yr	$ 15,000.00	$ 75,000	1	$ 75,000		
3 Biological Monitoring Transects (Note 3)	5.0	ea	$ 15,000.00	$ 75,000	1	$ 75,000		
Totals				$ 1,440,000		$ 1,440,000	$ 1,036,800	$ 2,476,800
SUB TOTALS							$ 3,963,075	$ 15,542,225
CONTINGENCY								$ 1,554,223
MANAGEMENT OF RECLAMATION 12% OF TOTAL								$ 2,051,574
GRAND TOTAL								$ 19,148,022

Note 1: Based upon the Mine design no more than 4 stopes will be open at any point in time. Measuring 30 m by 30 m by 10 n
Note 2: Cost per unit includes cost for material procurement, transportation and backfillin
Note 3: Threatened and endangered species monitoring will be performed in conjunction with wetlant monitoring

Rio Tinto
Reclamation Project (Mill Site)
Marquette, Michigan

8-Mar-12

	Item	Units	UM	Cost/Unit	Annual Cost	Years	Total Cost	Escalation	Totals
Year 3(Site Construction)									
1	Regrading	22.0	ac	$ 1,000.00	$ 22,000	1	$ 22,000		
2	Install Erosion Control Devices (Silt Fence)+ Maintenance	4,500.0	lf	$ 6.00	$ 27,000	1	$ 27,000		
3	Seed / Mulch	22.0	ac	$ 2,500.00	$ 55,000	1	$ 55,000		
4	Planting (Trees / Shrubs)	60.0	ea	$ 100.00	$ 6,000	1	$ 6,000		
	Totals				$ 110,000		$ 110,000	$ 9,900	$ 119,900
Year 11 (Closure)									
1	Decommissioning of Mill Equipment / Buildings	1.0	ls	$ 1,500,000.00	$ 1,500,000	1	$ 1,500,000		
2	HTDF Dike Removal	1.0	ls	$ 30,000.00	$ 30,000	1	$ 30,000		
3	Regrading of Disturbed Areas	4.0	ac	$ 1,000.00	$ 4,000	1	$ 4,000		
4	Seed / Mulch Disturbed Areas	4.0	ac	$ 2,500.00	$ 10,000	1	$ 10,000		
	Totals				$ 1,544,000		$ 1,544,000	$ 509,520	$ 2,053,520
Year 12 (Closure)									
1	Regrading of Remaining Disturbed Areas	2.0	ac	$ 1,000.00	$ 2,000	1	$ 2,000		
2	Seed / Mulch Disturbed Areas	2.0	ac	$ 2,500.00	$ 5,000	1	$ 5,000		
3	Install Erosion Control Devices (Silt Fence)+ Maintenance	1,000.0	lf	$ 6.00	$ 6,000	1	$ 6,000		
	Totals				$ 13,000		$ 13,000	$ 4,680	$ 17,680
Year 16 (Closure)									
1	WWTP Removal	1.0	ls	$ 100,000.00	$ 100,000	1	$ 100,000		
2	Seed / Mulch Disturbed Areas	1.0	ac	$ 2,500.00	$ 2,500	1	$ 2,500		
	Totals				$ 102,500		$ 102,500	$ 49,200	$ 151,700
Year 20 (Post-Closure)									
1	Grading	2.0	ac	$ 1,000.00	$ 2,000	1	$ 2,000		
2	Install Silt Fence + Maintenance	1,000.0	lf	$ 6.00	$ 6,000	1	$ 6,000		
3	Seed / Mulch	2.0	ac	$ 2,500.00	$ 5,000	1	$ 5,000		
4	Inspections	2.0	per yr	$ 2,000.00	$ 4,000	1	$ 4,000		
5	Fence Repair	100.0	lf	$ 50.00	$ 5,000	1	$ 5,000		
6	Electriacl Demand	1.0	ls	$ 20,000.00	$ 20,000	1	$ 20,000		
	Totals				$ 42,000		$ 42,000	$ 25,200	$ 67,200
Post Closure Monitoring									
1	Groundwater (5 Monitoring Wells)								
	a) Quarterly Sampling, Years 12-16 - Note 1	20.0	per yr	$ 1,000.00	$ 20,000	5	$ 100,000		
	b) Semi-Annual Sampling, Years 16-36	10.0	per yr	$ 1,000.00	$ 10,000	20	$ 200,000		
	c) Labor	50.0	hr per yr	$ 75.00	$ 3,750	20	$ 75,000		
2	Surface Water (8 Sampling Locations)								
	a) Quarterly Sampling, Years 12-16 - Note 1	32.0	per yr	$ 1,000.00	$ 32,000	5	$ 160,000		
	b) Semi-Annual Sampling, Years 16-36	16.0	per yr	$ 1,000.00	$ 16,000	20	$ 320,000		
	c) Labor	60.0	hr per yr	$ 75.00	$ 4,500	20	$ 90,000		
	Totals				$ 86,250		$ 945,000	$ 680,400	$ 1,625,400
	SUB TOTALS							$ 1,278,900	$ 4,035,400
	CONTINGENCY								$ 403,540
	MANAGEMENT OF RECLAMATION 12% OF TOTAL								$ 532,673
	GRAND TOTAL								$ 4,971,613

Note 1: First 5 Years, Years 12-16

Appendix P

Organizational Chart

Rio Tinto

Kennecott Eagle Minerals
504 Spruce Street
Ishpeming, MI 49849
T 906-486-1257
F 906-486-1053

Organization Information

Kennecott Eagle Minerals Company

March 14, 2012

Registered Address: Kennecott Eagle Minerals Company
2711 Centerville Road, Suite 400
Wilmington, DE 19808

Business Address: Kennecott Eagle Minerals Company
504 Spruce Street
Ishpeming, MI 49849

Board Positions

Adam J. Burley	Director	504 Spruce Street Ishpeming, MI 49849
Steve Felice	Director	4700 West Daybreak View Parkway South Jordan, UT 84095
W. David Hofeling	Director	4700 Daybreak Parkway South Jordan, UT 84095
Jean-Sébastien Jacques	Chairman of the Board Director	2 Eastbourne Terrace London W2 6LG United Kingdom

Officers

Bernd Beyer	Treasurer	1188 Sherbrooke Street West Montreal, Quebec H3A 3G2 CANADA
Adam J. Burley	President & Chief Executive Officer	504 Spruce Street Ishpeming, MI 49849
Steve Felice	Chief Operating Officer	4700 West Daybreak View Parkway South Jordan, UT 84095

Rio Tinto

Organization Information

Kennecott Eagle Minerals Company

March 14, 2012

Officers (continued)

Cheree N. Finan	Secretary	4700 Daybreak Parkway South Jordan, UT 84095
Sharon Gorman	Tax Officer	4700 Daybreak Parkway South Jordan, UT 84095
John Haan	Vice President	504 Spruce Street Ishpeming, MI 49849
Diane Hryshko	Assistant Secretary	1188 Sherbrooke Street West Montreal, Quebec H3A 3G2 CANADA
Karin Jonsson	Assistant Treasurer	1188 Sherbrooke Street West Montreal, Quebec H3A 3G2 CANADA
Brent D. Roper	Tax Officer	4700 Daybreak Parkway South Jordan, UT 84095
Ben Rose	Chief Financial Officer	504 Spruce Street Ishpeming, MI 49849
Oliver Wolfensberger	Assistant Treasurer	2 Eastbourne Terrace London W2 6LG United Kingdom