Eagle Mine
lundin mining

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Monday, March 14, 2016

Mr. Joe Maki
Michigan Department of Environmental Quality
1504 W. Washington St.
Marquette, MI 49855

Subject: Annual Mining and Reclamation Report, Eagle Mine, LLC
Nonferrous Metallic Mineral Mining Permit (MP 01 2010), Humboldt Mill

Dear Mr. Maki:

Eagle Mine, LLC has an approved Mining Permit (MP 01 2010) dated February 9, 2010. General Permit Condition F-2 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 material mined, and amount of metallic product by weight."

Please find enclosed, the 2015 Annual Mining and Reclamation Report for the Humboldt Mill.

Should you have any questions about this report, please do not hesitate to contact me at 906-339-7075.

Sincerely,

Amanda Zeidler
Compliance Supervisor

Cc: Humboldt Township

enclosure

Eagle Mine
a subsidiary of lundin mining

2015 Annual Mining and Reclamation Report
Humboldt Mill
Mine Permit MP 01 2010

March 15, 2016

Contents

Appendices

Acronyms and Abbreviations

AEM	Advanced Ecological Management
BMPs	best management practices
CN	Canadian National
DO	dissolved oxygen
Eagle	Eagle Mine LLC.
Golder	Golder Associates
gpm	gallons per minute
HDPE	high-density polyethylene
HTDF	Humboldt Tailings Disposal Facility
KME	King and MacGregor Environmental
LEPC	Local Emergency Planning Committee
MBER	Middle Branch Escanaba River
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
MG	million gallons
MGPD	million gallons per day
MRR	Mining and Reclamation Report
µg/L	micrograms per liter
mg/L	milligrams per liter
MNFI	Michigan Natural Features Inventory
MSL	mean sea level
NPDES	National Pollution Discharge Elimination System
NREPA	Natural Resources & Environmental Protection Act
NTU	Nephelometric Turbidity Units
ORP	Oxidation Reduction Potential
Q1	Quarter 1
QAL	quaternary unconsolidated formation
SESC	Soil Erosion and Sedimentation Control
SERC	State Emergency Response Commission
SU	standard units
SWPPP	Storm water Pollution Prevention Plan
t	metric ton (tonne)
TDS	total dissolved solids
UFB	upper fractured bedrock
UPL	upper prediction limit
WBR	Black River
WTP	Water Treatment Plant
yd^3	cubic yards

1. Document Preparers and Qualifications

This Mining and Reclamation Report (MRR) was prepared by the Eagle Mine-Humboldt Mill Environmental Department and incorporates information prepared by other qualified professionals. Table 1 provides a listing of the individuals and organizations who were responsible for the preparation of this MRR as well as those who contributed information for inclusion in the report.

Table 1. Document Preparation – List of Contributors

Organization	Name	Title
Individuals responsible for the preparation of the report		
Eagle Mine LLC	Kristen Mariuzza	Manager – Environment, Health & Safety
Eagle Mine LLC	Amanda Zeidler	Environmental Compliance Supervisor
Report contributors		
Advanced Ecological Management, LLC.	Doug Workman	Aquatic Scientist
Eagle Mine LLC	Jason Evans	Land & Information Management Specialist
Eagle Mine LLC	Travis Hansen	Metallurgical Accountant
Eagle Mine LLC	Jennifer Nutini	Environmental Engineer
Eagle Mine LLC	Roger Olson	Water Systems Superintendent
Eagle Mine LLC	Bill Scarffe	Mill Superintendent
Eagle Mine LLC	Darby Stacey	Mill Manager
Eagle Mine LLC	Hugo Stanton	Senior Metallurgist
Eagle Mine LLC	David Tornberg	Environmental Field Technician
Golder Associates	Gary Daniels	Senior Engineer
King & MacGregor Environmental, Inc.	Matt MacGregor	Wetland Scientist/Biologist

2. Introduction

Eagle Mine officially began the remediation and reconstruction of the Humboldt Mill located in Humboldt Township in October 2008. Processing of ore from the Eagle Mine commenced in September 2014. Due to the commencement of milling operations, Eagle Mine is required per Part 632 to submit an annual Mining and Reclamation Report 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 processed, 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 MRR will also memorialize the decisions and/or modifications that have been approved throughout the process.

3. Construction

Construction of all production related facilities was completed in 2014, however, construction of one ancillary building and site grading and paving continued into 2015.

Construction of the cold storage building began in late 2014 and was completed in April 2015. This facility is used for storage of supplies and equipment that do not require a temperature controlled environment. Final grading and construction of roadways was completed in the spring of 2015 to aide in storm water control. A map of the Humboldt Mill site is available in Appendix A.

Cold Storage Building, February 2016

4. Site Modifications and Amendments

No permit modifications or amendments were submitted to the Department in 2015. Table 4a. below summarizes the required submittals and approvals that were provided to the Department in 2015 as required under the 632 Mining Permit. Table 4b. lists the submittals to the MDEQ as required by the Air Permit to Install (405-08A) and National Pollutant Discharge Elimination System (NPDES) permit (MI0058649).

Table 4a Submittals and Approvals Required Under Part 632

Date	Description	Approval
3/13/15	Submitted 2014 Annual Mining and Reclamation Report	
5/15/15	Submitted Q1 groundwater and surface water monitoring data	
7/10/15	Submitted Q2 groundwater and surface water monitoring data	
7/9/15	Submitted revised financial assurance values	7/13/15
10/15/15	Submitted Q3 groundwater and surface water monitoring data	
12/29/15	Submitted Q4 groundwater and surface water monitoring data	

Table 4b Submittals and Approvals Required Under Other Permits

Date	Description	Approval
3/23/15	Submitted stack test & visual emissions results (Air permit)	
	Received revised NPDES permit	4/7/15
6/3/15	Submitted Outfall 003 construction approval request (NPDES permit)	9/24/15
5/29/15	Submitted wetland hydrologic study plan (NPDES permit)	
8/24/15	Submitted WTP certified operator form (NPDES permit)	
	Received revised NPDES permit for addition of Outfall 003	9/24/15
Jan – Dec	Submitted monthly WTP effluent discharge results (NPDES permit)	

5. Processing Activities and Data Report

As of September 23, 2014, the mill was officially operating and producing concentrate. The commencement of milling activities initiated all monitoring programs per the Part 632 Mining Permit. A description of the monitoring activities can be found in Section 8 of this report.

5.1. Processing Report

In 2015, 741,368 dry metric tonnes (t) of ore was transported from the Eagle Mine to the mill by over the road haul trucks. Table 5.1 below summarizes the dry tonnes of ore crushed and milled and the total volume of nickel and copper concentrate produced in 2015.

Ball Mills, June 2015

Table 5.1 Volume of Ore Crushed, Milled, and Concentrate Produced in 2015

Month	Ore Crushed (dry tonnes)	Ore Milled (dry tonnes)	Copper Concentrate Produced (dry tonnes)	Nickel Concentrate Produced (dry tonnes)
January	59,300	62,400	5,100	19,000
February	60,200	58,500	4,200	14,600
March	66,600	65,200	4,700	21,700
April	58,500	58,700	5,100	17,800
May	65,800	66,600	4,400	16,700
June	60,200	59,400	4,100	13,300
July	58,900	60,200	4,300	15,500
August	60,500	62,400	4,400	14,300
September	70,900	71,400	5,700	16,900
October	59,900	59,300	4,500	16,400
November	63,500	62,700	5,600	16,700
December	59,000	59,900	4,100	12,900
2015 Annual Total	***743,300***	***746,700***	***56,200***	***195,800***

Source: Mill Operations Year End Reconciled Report - Numbers have been rounded to the nearest hundred tonnes as there are small tonnage adjustments that occur after the final assays and weights come in from the smelter. The final results may not be received for 8-10 months after delivery of the product to the smelter.

In 2015, approximately 56,400 dry tonnes of copper and 196,000 dry tonnes of nickel were shipped offsite via rail. Mineral Range manages rail shipments from the Humboldt Mill to the Ishpeming Rail Yard and from that point Canadian National (CN) transports the material to its final destination.

Railcars being loaded with concentrate in CLO, June 2015

5.1.1. Tailings

Tailings are the waste material that is generated when processing ore. At the Humboldt Mill, tailings are subaqueously disposed in the Humboldt Tailings Disposal Facility (HTDF) which is an industry best

practice to minimize the risk of oxidation of sulfide bearing material. The tailings slurry is comprised of finely ground waste rock, water, and process effluents and is deposited in the HTDF via a double-walled high density polyethylene (HDPE) pipeline. At the shoreline of the HTDF, the pipeline splits and the tailings can be routed to one of three subaqueous outfalls located in either the north, middle, or southern portion of the HTDF. Multiple outfalls allow for better control of the thickness of tailings in an area and optimizes the storage volume that is available. On November 1st, the tailings line being utilized was switched from the northern most line to the middle line. This switch was necessary as the tailings were nearing the currently permitted limit of 1420 feet mean sea level (MSL). The switch was required sooner than originally scheduled as the angle of repose of the settled tails was higher than anticipated. In 2015, 336,134,694 gallons of tailings slurry was subaqueously disposed in the HTDF at an average rate of 640 gallons per minute.

The Metallic Minerals Lease (No. M-00589) requires the lessee to furnish a mill waste reject report on an annual basis. In 2015, 4,433 dry metric tonnes of nickel and 751 dry metric tonnes of copper were deposited in the HTDF as tailings.

In accordance with permit condition, F-7, an annual bathymetry survey is required to be conducted in order to accurately monitor tailings placement and calculate changes in HTDF water storage. Since 2015 marked the first year of operations, three surveys were completed to better understand how the tailings were settling out. The surveys were conducted in April, July, and September and focused on the northern section of the HTDF as this was the area in which the tailings were being placed. Copies of the bathymetry surveys are available in Appendix B.

6. Site Water Usage, Treatment and Discharge

Three separate water sources supply the facility with either potable or process water which is necessary for operational activities to occur. The site water balance is comprised of process water, precipitation, groundwater infiltration, and stormwater runoff all of which is captured in the HTDF and treated by the water treatment plant (WTP) before discharging to a nearby wetland.

6.1. Supply Water Sources and Use

Three separate sources supply water to the mill site to support various operational activities. These sources include the potable well, industrial well, and reclaim water from the HTDF. Utilizing the detailed water use logs maintained on site, the following summary of average water use from each source has been compiled.

The potable well is mainly used to supply potable water to the facility, but may also be utilized to replenish the fire water tank and supplement process water requirements if necessary. In 2015, approximately 1.1 million gallons (MG) of water was drawn from the potable water well which is down significantly from 2014 when over 6.6 million gallons of water was withdrawn.

The industrial well is primarily used to replenish the fire water tank and to supplement process water requirements. In 2015, approximately 7.6 million gallons of water was utilized from the industrial well, this is an increase from the 4.3 million gallons that was withdrawn in 2014. 34,000 gallons of the water withdrawn from the industrial well in 2015 was provided to the Humboldt and Republic Fire Departments to help extinguish a forest fire in late July.

The third source of water at the mill site is the reclaim water which is pumped from the HTDF. This water is used throughout the process with the volume not consumed being recycled back to the HTDF via tailings. Reclaim water is used whenever possible in the process as it encourages recycling, reduces reliance on well water, and minimizes the volume of new water entering the HTDF which helps maintain the site water balance. In 2015, approximately 270 million gallons of reclaim water was pumped from the HTDF for use in processing ore. With the exception of approximately 6.4 million gallons of water that was contained in the concentrate and shipped offsite, the remainder of the water was recycled back to the HTDF for eventual reuse or treatment by the WTP.

6.2. Storm Water Control

A site grading plan was developed with the purpose of keeping all storm water onsite and directing run-off to one of two locations; the HTDF or storm water retention basin. In the spring of 2015, final site grading, paving, and curbing was completed to direct water to the series of catch basins that were installed along the length of the main facility from the rail spur to the security building in 2014. These catch basins direct storm water from the main mill facility to the HTDF. Water which falls south of the main site access road, is directed to the storm water retention pond via a drainage ditch or series of catch basins in the administrative building parking lot. A copy of the Humboldt Mill Storm Water Drainage map is included in Appendix C.

Historically, storm water control at the Humboldt Mill was managed under two separate storm water general permits; one for the main mill facility (MIS0058649) and a second which covered the HTDF (MIS2100034). In September 2015, the requirements for these two areas were consolidated into the revised NPDES permit (MI00058649) and the individual permits were terminated.

A storm water pollution prevention plan (SWPPP) has been developed as required under Part I.B of Michigan's NPDES General Permit for Storm Water Discharges and in accordance with good engineering practices. The SWPPP describes the Humboldt Mill site and its operations, identifies potential sources of storm water pollution at the facility, recommends appropriate best management practices (BMPs) or pollution control measures to reduce the discharge of pollutants in storm water runoff, and provides for periodic inspections of pollution control measures. The plan must be reviewed, and updated if necessary, on an annual basis and a written report of the review must be maintained and submitted to the Michigan Department of Environmental Quality (MDEQ) on or before January 10th of each year. The 2015 SWPP annual review was completed and submitted to the Department on December 10, 2015. A copy of the plan is available upon request.

6.3. Water Treatment Plant Operations and Discharge

Effluent discharges to the wetland are regulated under the NPDES permit MI0058649 with analytical results and discharge volume reported to the MDEQ on a monthly basis through the MiWaters electronic reporting system. In late 2014, Outfall 002 was constructed and provides a means of routing discharge flow away from the main wetland area to a location closer to the Escanaba River during times of heavy rainfall or snowmelt events. Outfall 002 became functional upon receipt of the revised NPDES permit in April 2015. In response to an NPDES requirement to install a discharge outfall in the location of the post-closure water release location, Outfall 003 was constructed and permitted for use in September 2015. Outfall 003 not only met the NPDES permit requirement, but allows for a more even distribution of water in the adjacent wetland.

In 2015, over 342 million gallons of water was treated and discharged from the water treatment plant to the adjacent wetland. Table 6.3 below summarizes the monthly flow rate from the WTP to the wetland in 2015.

Table 6.3 Volume of Water Discharged from the WTP in 2015

Month	Outfall 001 Volume of Water Discharged (MG)	Outfall 002 Volume of Water Discharged (MG)	Outfall 003 Volume of Water Discharged (MG)
January	25.1	0	0
February	22.7	0	0
March	24.7	0	0
April	16.8	14.1	0
May	25.4	12.4	0
June	23.4	10.6	0
July	37.1	0.98	0
August	37.6	1.1	0
September	17.1	8.4	0.51
October	0	4.3	17.8
November	0	6.4	13.5
December	0	8.4	13.4
Total	**229.9**	**66.68**	**45.21**

Source: WTP Operators log

The water treatment process generates one waste stream; filter press. The filter press waste stream is dewatered solids from the clarifier and is primarily comprised of aluminum, iron, calcium, and magnesium. Waste characterization samples are required by the landfill prior to acceptance of the material. Samples from the filter press waste stream were sent to ALS Laboratory for analysis and results indicate the waste stream is non-hazardous. In 2015, approximately 18 tonnes of filter press waste was disposed at the Marquette County Landfill.

Water Treatment Plant Ultrafiltration Units, August 2015

6.4. Water Balance

The main components of the water balance are process water, well water, precipitation, groundwater infiltration, and storm water runoff all of which is captured in the HTDF and treated by the WTP before discharging to a nearby wetland. Permit condition F-2 requires that the site water balance is updated on a quarterly basis to ensure the water level of the HTDF is managed in a manner that minimizes risk to the environment. The target operating water elevation of the HTDF is 1529.5 MSL which is significantly lower than originally planned during the permitting process. The lower operating level mitigates risks associated with overflow situations and provides excess capacity to manage various operational situations. In addition, a new NPDES permit was received in April 2015 which increased the allowable discharge volume from 0.82 million gallons per day (MGPD) to 1.4 MGPD. This also provides the ability to optimally manage the water level of the HTDF.

In 2015, operational changes were made which significantly reduced the use of well water in mill operations. In Q1 2015, approximately 47.5 gallons per minute (gpm) of well water was used in the milling process and by Q4 it was reduced to approximately 1.9 gpm. This is a significant improvement not only because less fresh water is being withdrawn from the well but it also results in less water being added into the water balance where it would eventually need to be treated and discharged.

The water balance is tracked through a series of flow meters that report results to a database. The database is queried on a routine basis and results transferred to a spreadsheet that calculates quarterly inputs and outputs of the HTDF. The balance includes dry tailings volume and therefore the calculations are more representative of the HTDF volume balance rather than a pure water balance. This information is used to track HTDF water elevations, predict seasonal fluctuations and to help determine if operational adjustments are necessary. Copies of the 2015 HTDF water level summary and supporting graph and quarterly water balance diagrams are included in Appendix D.

HTDF at sunrise, August 2015

7. Materials Handling

7.1. Fuel Handling

In March 2015, a mobile fuel truck, owned and operated by Eagle, began to be utilized to fuel mobile equipment onsite. The truck has a storage capacity of approximately 4,000 gallons and is refueled as necessary by an offsite fuel provider.

7.2. Bulk Chemical Handling and Storage

It is the goal of Eagle Mine to create a culture of environmental awareness throughout the workforce. Therefore, all employees and subcontractors are trained to immediately respond and report any spills that occur. In 2015, the Humboldt Mill had zero reportable spills under the Part 5 Rules of Part 31, Water Resources Protection of NREPA, 1994 PA 451 as amended (Spillage of Oil and Polluting Materials).

The Michigan SARA Title III Program requires reporting of onsite chemicals being stored above certain threshold quantities. Due to the volume of chemicals stored/used at the site for processing and water treatment, a Tier II Report was submitted in January 2016 via the online Tier II Reporting System to the State Emergency Response Commission (SERC). Copies of the report were also mailed to the Marquette County Local Emergency Planning Committee (LEPC) and Humboldt Township Fire Department.

8. Monitoring Activities

8.1. Water Quality Monitoring

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

8.1.1. Quarterly Groundwater Quality Monitoring

Groundwater quality is monitored through a network of monitoring wells located inside the perimeter fence line of the mill site. A map of the well locations can be found in Appendix E. Four rounds of quarterly sampling were completed in March, May, August, and November 2015. The Eagle Mine Permit prescribes both a long parameter list for annual monitoring events (conducted in Q3 2015) and a short list to be used quarterly (Q1, Q2, Q4 2015). 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 benchmarks in the tables found in Appendix F.

Two sets of benchmarks were calculated for all mine permit groundwater monitoring locations based on the guidance provided by the Mine Permit and Part 632. It should be noted that due to the required statistical nature of these benchmark values, the accuracy will improve over time as the quantity of data that becomes available increases.

Monitoring Results

Twenty-four monitoring well samples were collected by Golder Associates during each of the four quarterly sampling events. 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 following is a summary of field observations that occurred in 2015:

- Due to turbidity levels that exceeded 3 NTU, twenty three of the twenty four monitoring locations required field filtering for at least one quarter in 2015 and therefore the values are reported as dissolved concentrations. The remaining locations/quarters reported turbidity below 3 NTU and are reported as total concentrations. The sample summary denotes whether the sample values are total or dissolved.
- Four of the monitoring locations (i.e. MW-702 UFB, MW-703 UFB, HW-1L, and HW-1U LLA) are very slow to recharge and are pumped down in advance of sampling in order to ensure that the samples collected are representative of the groundwater at the monitoring location. Locations MW-702, MW-703, and HW-1L take approximately one month to recover while HW-1U takes approximately four months to fully recover due to the tight formation in which it is located. Samples from these locations are taken immediately and do not follow low-flow sampling procedures due to the limited volume of water available and slow re-charge rates.

The majority of the metals and anion parameters analyzed reported values below the analytical reporting limit and calculated benchmark, and are listed as non-detect. The cation parameters analyzed were detected at all locations with the majority of the detections below the calculated benchmarks. A summary of wells that have had one or more parameters exceed a benchmark value can be found in Appendix F.

In accordance with Part 632, R426.406 (6) when a result is greater than a benchmark for two consecutive sampling events, at a compliance monitoring location, the permittee is required to notify the MDEQ and determine the potential source or cause resulting in the deviation from the benchmark. Following is a summary of the 2015 events that occurred:

- Per the Part 632 Regulation (Rule 7(b)), an action level was reached for pH at locations MW-702 UFB and MW-703 QAL as the pH was greater than the average long-term average by 0.5 units for two consecutive sampling events (i.e. Q2 & Q3 2015). No additional action was required, as the pH results in Q4 returned to levels that were consistent with the long-term average.
- HYG-1, located on the north side of the cut-off wall, reported several parameters above calculated benchmarks, however to date no parameters have exceeded an action level. A site walk found that the well cap at HYG-1 was not securely fastened which exposed the well to precipitation and external influences which may account for the elevated results. A new well cap was installed in Q4 and should prevent any future impact from outside influences. In addition, HYG-1 is a very shallow well with a total depth of 25 feet and depth to water of approximately 13.5 feet. A comparison of monitoring results from leachate wells, MW-701 QAL and MW-702 QAL, to HYG-1 does not indicate a correlation as all results detected at HYG-

1 were greater than results detected at the leachate monitoring wells. This indicates that HYG-1 is not being influenced by the HTDF and since no other mining or milling activities are occurring within a close proximity of HYG-1 the elevated results are most likely related to the well being compromised in some way due its age or precipitation events as previously suggested. The location will continue to be closely monitored in 2016.

- The majority of the rest of the monitoring locations reported results that were just outside of the calculated benchmark values. The benchmarks are based on a small sample set of three to five results, most of which were collected in 2014 during monthly sampling events that occurred after well construction was completed. As such, the majority of the benchmarks do not currently take into account seasonal variation or natural variability that may occur after well installation. In many cases, the benchmark is set at the default of four times the reporting limit due to all non-detect results. All locations will continue to be closely monitored and benchmarks updated as more data becomes available.

A Mann-Kendall trend analysis was conducted on a quarterly basis for all groundwater locations. A parameter was considered to be trending if analysis determined a minimum confidence of 95%. Possible trends, either positive or negative, were identified for one or more parameters at thirteen compliance locations, four leachate monitoring wells and five background monitoring locations using data collected from baseline sampling events (2014) through December 2015. Sulfate, hardness, and potassium were the most frequently noted as possibly trending. It should be noted that due to the small sample size, the current trending results should all be considered preliminary.

A trend analysis will continue to be conducted after each quarterly monitoring event in 2016 and results reviewed to determine if the trends are attributable to milling operations. A table summarizing the potential groundwater trends can be found in Appendix G. For compliance monitoring locations in which results were outside of established benchmarks for at least two consecutive quarters and a potential trend was identified, the trend charts are also provided in Appendix G. A full report outlining groundwater trending results for all parameters and locations is available upon request.

8.1.2. Quarterly Surface Water Quality Monitoring

Surface water sampling was conducted on a quarterly basis in 2015 at eight surface water locations by Golder Associates. Four locations are associated with surface water resources in the subwatershed containing the HTDF and four are associated with the subwatershed of the milling facility. The samples collected represent winter base flow, spring snowmelt/runoff, summer base flow, and the fall rain season. Samples were collected in February, May, August, and November in 2015. A map of the surface water sampling locations is found in Appendix H. Samples are 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 benchmarks (i.e. upper prediction limit (UPL)) and are located in the tables found in Appendix I.

Similar to the groundwater benchmarks discussed in section 9.1.1, two sets of benchmarks were calculated for all mine permit surface water monitoring locations based on the guidance provided by the Mine Permit and Part 632. MP 01 2010 L2 also requires that seasonal variation be accounted for when calculating surface water benchmarks. To date, a large enough sample set has not been

collected during each of the four seasons and therefore are not incorporated into the current benchmarks. As additional samples are collected, the benchmarks will be recalculated to account for seasonal variation as required by MP 01 2010 L2. Until that time, benchmarks are based on baseline data collected in February, May, July, and October 2008 and May, July, and September 2014.

Monitoring Results

Grab samples were collected from each location during the quarterly sampling events completed in February, May, August, and November in 2015. Samples were unable to be collected from monitoring location HMP-009 in Q1, Q2, and Q3 and HMWQ-004 in Q1, Q2, and Q4 as water was not present. HMP-009 is located within the wetland that is strongly influenced by WTP discharge. As noted in section 7.2 above, Outfall 003 was installed in the fall of 2015 and will provide better water distribution in the wetland which includes the area monitored by HMP-009. The addition of the outfall should result in more consistent sampling opportunities at this location. HMWQ-004 is located in an area in which the only contributions are related to precipitation and stormwater run-off from the adjacent roadway, therefore sampling from this location is dependent upon precipitation. In addition, location WBR-002 was unable to be sampled in Q1 as it was inaccessible due to snow conditions.

The Humboldt Mill Surface Water and Sediment Monitoring Plan prescribes a long parameter list that is collected annually (conducted in Q3 2015) and a short list to be used quarterly (Q1, Q2, and Q4 2014). In addition to the grab samples, field measurements (DO, pH, specific conductivity, temperature) were collected and determined through the use of an YSI probe. Flow measurements were obtained, where conditions allowed, using a wading rod and current meter. Flow rates for location MER-002 were recorded from the USGS website for the station located adjacent to the monitoring location (i.e. 04057800 Middle Brach Escanaba River Humboldt Mill location). All water quality samples were shipped overnight to TriMatrix Laboratories in Grand Rapids, Michigan, for analysis.

Following is a summary of the 2015 events that occurred.

- Total Dissolved Solids (TDS) was reported above the calculated benchmark in Q3 and Q4 at locations MER-002 and MER-003. Elevated TDS values were also reported at the Escanaba River reference monitoring location MER-001 and therefore the deviations are not likely due to mill operations.
- Sulfate was found to be outside of calculated benchmarks at the Black River compliance monitoring locations WBR-002 and WBR-003. Again, the Black River reference location, WBR-001 also reported sulfate at similar levels to those reported at the compliance monitoring locations and therefore the results are not likely attributable to mill operations.
- Monitoring location MER-003 and WBR-002 reported results for zinc that were greater than established benchmarks. Zinc was also detected at reference locations for both the Escanaba River and Black River and therefore not likely the result of mill operations.
- pH was reported to be below calculated benchmarks at WBR-002 and WBR-003 for at least two sampling quarters in 2015. The Black River reference location also experienced lower pH levels during Q3 which indicates that there is a possible trend that that is being observed throughout the river system.

It is very likely that a number of the benchmark deviations that were reported in 2015 are not actually excursions from natural conditions. As reported above, the benchmarks were calculated using all baseline data available and do not take into account seasonal variation at this time. A large enough sample set was not available to complete the statistical analysis for each of the four seasons. As additional samples are collected, the benchmarks will be recalculated to account for seasonal variation as required by MP 01 2010 L2. Until that time, benchmarks are based on all baseline data available for the monitoring location and therefore should be considered estimated values.

A complete list of results and applicable benchmarks are found in Appendix H.

A Mann-Kendall trend analysis was also conducted for the surface water monitoring locations on a quarterly basis. The trend analysis does not currently take into account seasonal variations, but will be modified once sufficient data has been collected to complete the analysis. Possible trends, positive or negative, were identified for one or more parameters at three of the eight monitoring locations using data collected from baseline sampling events (May 2014) through December 2015 and are summarized in Appendix J. A parameter was considered to be trending if analysis determined a minimum confidence of 95%.

A trend analysis will continue to be conducted after each quarterly monitoring event in 2016 and results reviewed to determine if the trends are attributable to milling operations. For compliance monitoring locations in which results were outside of established benchmarks for at least two consecutive quarters and a potential trend was identified, the trend charts are also provided in Appendix G. In 2015, only potassium at MER003 was identified as being outside of benchmarks for at least two sampling events and identified as potentially trending. A full report outlining surface water trending results for all parameters and locations is available upon request.

8.2. Sediment Sampling

No sediment sampling was conducted in 2015 as it is only required to be completed on a biennial basis. The next sampling event is scheduled for 2016.

8.3. Regional Hydrologic Monitoring

8.3.1. Continuous Groundwater Elevations

Monitoring wells MW-701, MW-702, MW-703, MW-704, MW-705, HYG-1, HW-2, HW-1U, HW-1L, HW-8U are instrumented with continuous water level meters and downloaded quarterly by Golder Associates field technicians. Permit condition F-9 requires that water levels are continuously monitored in Wetland EE and the HTDF. For the majority of 2015, HTDF water level readings were recorded on a weekly basis using a staff gage installed on the north end of the HTDF. In the fall of 2015, a stilling well containing a pressure transducer was installed in the HTDF to collect continuous water level measurements. To ensure accurate readings in the winter, an “ice eater” was installed to prevent the water surrounding the stilling well from freezing. Continuous water level were initially recorded in December 2015. A map of monitoring locations can be found in Appendix E.

Special Condition F-9a requires continuous monitoring of water levels on each side of the cutoff wall and a comparison of the gradient changes actually measured versus earlier predictions. As previously reported in 2014, the operating level of the HTDF was lowered from what was originally planned

resulting in the HTDF water level being less than the wetland located outside of the cut-off wall. Therefore, the predicted gradient measurements originally calculated with a high HTDF elevation can no longer be used as measurement of effectiveness of the cutoff wall. In addition, the water elevation cannot be compared in the reverse direction due to outside influences on the water levels in the wetland. If at any time during operations the water level rises to levels above the elevation of the downstream wetland, gradient changes will again be measured and discussed.

In 2015, the determination was made to begin reporting continuous monitoring data by water year (October 1, 2014 - September 30, 2015) rather than calendar year. Water year is the preferred approach for reporting continuous readings, especially water levels, because the hydrographs demonstrate the effect of late fall and winter precipitation, which melts and drains in spring, in one 12-month hydrologic cycle. Copies of groundwater hydrographs are located in Appendix K. A review of the hydrographs found the following:

- The hydrographs clearly illustrate when the wells are pumped down in advance of, or during, sampling and the rate in which they recharge.
- Due to an equipment malfunction, continuous water level readings were only collected through August 5, 2015 at monitoring location MW-702 UFB. The meter was repaired and re-installed in the monitoring well in February 2016.
- HW-1L, HW-1U LLA, MW-702 UFB, and MW-703 UFB are located in a tight formation and are very slow to recharge. HW-1L, MW-702 UFB, and MW-703 UFB took approximately one month to recharge and HW-1U LLA took almost four months to fully recharge. The slow recharge rates are an indication that the integrity of the cut-off wall is intact. If the cut-off wall was compromised one would expect to see the wells recharge more quickly.
- As expected, HTDF surface water elevations were consistently lower than water elevations for monitoring wells located on the opposite side of the cut-off wall. The exceptions are HW-1L and HW-1U LLA that are located in a tight formation and are very slow to recharge.
- Some of the shallower, quaternary aquifer wells displayed signs of seasonal influence as groundwater elevations decreased as frozen conditions set-in and increased again in April with the onset of spring melt.

8.3.2. Continuous Surface Water Monitoring

In accordance with permit condition F-9, Wetland EE is required to be instrumented with a meter to continuously monitor water levels. However, due to the construction of the cut-off wall, recharge is now primarily based on WTP discharge and precipitation (i.e. rain and snow melt). With the onset of WTP discharge into Wetland EE in the fall of 2015, the water levels in Wetland EE are a function of operational decisions and only minimally impacted by natural conditions (i.e. precipitation). The purpose of the continuous water level measurements is to monitor the effectiveness of the cut-off wall and record seasonal variations. Due to the operational influence of the WTP discharge, the monitoring objective can no longer be met and therefore continuous readings are not being collected. However, surface water grab samples and field parameters will be collected quarterly when possible although results will be strongly influenced by effluent discharge water quality.

8.4. Cut-Off Wall Water Quality Review

In accordance with permit condition F-9, Eagle is required to monitor the effectiveness of the cut-off wall in terms of hydraulic containment. This is best accomplished by review of water levels and chemical signatures between the leachate (i.e. MW-701 and MW-702) and compliance monitoring wells (MW-703, MW-704). Focus of the review is on water levels in the quaternary unconsolidated formation (QAL) and chemical signature in the upper fractured bedrock zone (UFB).

Leachate wells are located on the south side of the containment wall and should show similar water levels and chemical signatures of the HTDF. The compliance wells are downgradient of the leachate wells and are located on the north side of the containment wall and should be outside the influence of the HTDF. Results from leachate monitoring location MW-701 are compared to compliance location MW-704 and results from leachate monitoring location MW-702 are compared to compliance location MW-703.

Chemical Signature Review

- The majority of the metals and anion parameters were consistently non-detect at both the compliance and leachate monitoring locations, therefore, chemical signature comparisons were focused on iron, manganese, and cation parameters as these were the most frequently detected.
- In the quaternary unconsolidated formation, the iron and manganese results were significantly higher at compliance location MW-704 than were reported at leachate well MW-701. The opposite is true when reviewing results from the upper fracture bedrock zone where iron and manganese were significantly higher at MW-701. Although the results for iron and manganese are opposite between the QAL and UFB zones, they still indicate there is a distinct difference between the leachate and compliance locations. If the containment wall was compromised, the results at the MW-701 and MW-704 would be similar.
- At leachate location MW-702 QAL manganese, calcium, sodium, chloride, sulfate, and hardness were greater than results reported at compliance location MW-703 QAL. These results indicate that the containment wall is functioning as expected as the results would be similar otherwise.
- Iron and manganese were greater at compliance location MW-703 UFB than compared to compliance monitoring location MW-702 UFB. Again, the differences between the leachate and compliance wells show that the containment wall has not been compromised as results would be similar if it was not functioning properly.

Water Level Review

- There is a distinct difference in groundwater elevations between MW-702 QAL and MW-703 QAL. As expected due to the operating level of the HTDF, compliance monitoring location MW-703 QAL, has a groundwater elevation that is approximately five feet greater than leachate well MW-702 QAL. The groundwater elevation at MW-702 QAL closely mimics the groundwater elevation of the HTDF.

- As predicted due to the operating level of the HTDF, compliance monitoring location MW-703 UFB has a groundwater elevation that is slightly greater than leachate well MW-702 UFB. Groundwater elevations at MW-702 UFB trend closely with HTDF water levels.

- The groundwater elevations at MW-704 QAL and UFB mirrored the elevations reported at MW-701 QAL and UFB during the winter months, but deviated from MW-701 during the remainder of the year. This indicates that MW-704 is strongly influenced by natural infiltration (i.e. rain and snow melt) which is lacking in the winter due to frozen conditions. Although the elevations mirrored one another in the winter, there is a distinct difference which begins in late summer and continues into the fall where the groundwater elevation at MW-701 closely followed the downward trend of the HTDF water level while the groundwater elevation at MW-704 had a less significant decrease. As predicted, these trends show that the leachate monitoring wells are strongly influenced by the HTDF water level while the compliance wells are more dependent upon natural conditions.

Based on the review of the chemical signature and groundwater elevations of the leachate and compliance monitoring wells there is sufficient evidence to show that the cut-off wall is functioning as expected. The variability in the detected parameters, difference in reported results, and groundwater elevations all demonstrate that the effectiveness and integrity of the containment wall are intact.

8.5. Biological Monitoring

Biological monitoring events conducted in 2015 included surveys of birds, large and small mammals, frogs, toads, fish and macro invertebrates. Results from each survey have been compiled into annual reports which are available upon request. A brief summary of each survey is provided below.

8.5.1. Flora and Fauna Report

The 2015 flora, fauna, and wetland vegetation surveys were conducted by King & MacGregor Environmental, Inc. (KME). Table 8.5.1 below outlines the type and duration of the surveys that were conducted in 2015.

Table 8.5.1 Type and Duration of 2015 Ecological Investigation

Survey Type	Survey Date
Birds	June 15-16, September 22-23
Small Mammals	September 22-24
Large Mammals	April - September
Toads/Frogs	April 16-17, June 3 & 30
Threatened and Endangered Species	April – September

The wildlife and plant species identified during the 2015 surveys within the Study Area are similar to those identified during previous KME surveys. Following is a summary of the survey results:

- A combined total of 531 birds representing 49 species were observed during the 2015 (June and September) surveys. In June, the white-throated sparrow, American crow, and red-eyed vireo were the most abundant birds observed, while the blue jay, rock pigeon, and American

crow was the most abundant species observed during the September 2015 survey. The bird species identified during the 2015 bird surveys are similar to those bird species identified in previous surveys conducted within the Study Area and are consistent with the bird species expected to be found in the habitats present. The reduction in count by over 200 individuals from September 2014 to those from September 2015 was due to the reduced number of Canada geese observed in September 2015.

- Seventeen small mammals representing eight species were collected during the September survey period. The most common small mammal identified during the survey was the deer mouse. No threatened, endangered, or special concern small mammals were observed during any of the surveys. The small mammals encountered within the Study Area during the 2015 surveys are typical of those expected in the habitats present and are consistent with previous survey results.
- Whitetail deer tracks were observed throughout the study area and coyote scat was observed near the fence east of the railroad track during the 2015 threatened and endangered plant survey. The large mammal species detected during the 2015 surveys are two regionally common large mammal species and are expected to utilize the habitats present.
- Five frog species were observed during the survey; none of which are threatened or endangered. Breeding frog calls were observed at four of the five sampling points. Heavy operations noise was noted each time no calls were observed and may explain the lack of calls recorded at the sampling point. The most frequently heard species in 2015 was the northern spring peeper. The frog species identified are typical of those expected in the habitats present in the Study Area. The 2015 survey results are similar to those of previous years.

8.5.2. Threatened and Endangered Species

The Michigan Natural Features Inventory (MNFI) maintains a database of rare plants and animals in Michigan. KME requested a Rare Species Review to determine if any protected species had been found within 1.5 miles of the Study Area. Table 8.5.2 lists the species identified during the MNFI review process.

Table 8.5.2 MNFI Review Results of Study Area

Species	Classification
Canada rice grass	State threatened species
American bittern	State special concern species
Bald eagle	State special concern species
osprey	State special concern species
Great blue heron rookery	Rare natural feature

In accordance with Michigan Department of Natural Resources (MDNR) guidelines (MDNR 2001), KME surveyed for any MNFI listed species and their habitats during the appropriate season. Following are the results of the threatened and endangered species survey:

- Canada grass was not observed in 2015 and is not expected to occur in the study area due to the lack of suitable habitat.

- One American bittern observation was made during the 2015 bird surveys at Survey point 5.
- In June 2015, the bald eagle nest on the north shore of Lake Lory was occupied by two adults and one chick.
- Although suitable habitat for osprey is present in the study area, no birds were directly observed in 2014 or 2015.
- In June 2015, approximately 17 active nests were identified in the heron rookery. This is an increase of seven breeding pairs compared to ten observed in 2014. The great blue heron rookery appears to be robust and unaffected by the presence of the mill.

Canada Rice Survey Point, June 2015

A copy of the 2015 Humboldt Mill flora and fauna report is available upon request.

8.5.3. Fisheries and Macro Invertebrate Report

The 2015 Fisheries and Macro-Invertebrate annual surveys were conducted by Advanced Ecological Management (AEM). A total of six stations were surveyed in June 2015, including two stations on the Middle Branch of the Escanaba River (MBER), one station on a tributary of the Middle Branch of the Escanaba, one station on an unnamed tributary of the Black River (WBR), one station in Wetland Complex EE located northeast of the HTDF, and Lake Lory.

Stream Stations

A total of 44 fish representing 12 species were collected in 2015 from all stream stations, down from 68 fish in 2014. The largest difference was the number of northern redbelly dace that were captured at Station 1, where 13 were captured in 2014 and none were collected in 2015. Also, fewer northern pike and yellow perch were captured in 2015 at MBER1 compared to 2014. Pearl dace (Margariscus margarita) was the most frequently collected species followed by the central mudminnow (Umbra limi). No threatened, endangered, or special concern fish species were observed at any of the stream stations in 2015. The following is a summary of the findings:

- Although fewer fish were collected in 2015 compared to 2014, the community composition was generally consistent both years.
- Fish populations at Station 1 have varied substantially through the years and appear to be sensitive to beaver activity. A small beaver dam was observed in a portion of Station 1 that was not present in 2014 and may have impacted the number or fish collected at that location.
- Station 5 typically doesn't contain many fish. The single specimen collected in 2015 was consistent with previous studies.
- Although the number of fish collected at MBER1 & 2 were down from 2014, they are consistent with numbers collected during previous surveys. Fish totals are typically 20 fish or less with the exception of 2007 when 50 fish were collected. The surveys conducted to date have determined that the segments of stream associated with MBER 1&2 are not productive fisheries.

Using the P-51 protocol, a total of 801 macro-invertebrates, representing 36 taxa, were collected from all four stream stations that were investigated in 2015. The total number of macro-invertebrates collected in 2015 is down by 318 specimens compared to the total number collected in 2014. The largest deviation was at Station MBER2 where 257 flies (Dipteria) were collected in 2014 and only 31 were collected in 2015. Although fewer were collected, the community composition was generally consistent between 2014 and 2015. No threatened, endangered, or special concern macroinvertebrate species were observed at any of the stream stations in 2015.

A summary of the fish, macroinvertebrate, and habitat ratings for the four stream stations are displayed in Table 8.5.3 below. Ratings were similar to previous baseline studies with all four stations being reported as "poor" fish communities and "acceptable" macroinvertebrate communities. Stream habitat was considered "excellent" in stations MBER1 and MBER2 and "good" at station 1 and 5.

Table 8.5.3 2015 Habitat Ratings

	Station 1	Station 5	Station MBER1	Station MBER2
Fish Community	Poor	Poor	Poor	Poor
Macroinvertebrate Community	Acceptable	Acceptable	Acceptable	Acceptable
Stream Habitat	Good	Good	Excellent	Excellent

Lake Lory

A total of 155 fish representing 12 taxa were collected from Lake Lory in 2015 which is fewer than the 227 fish that were captured in 2014. Although fewer were collected, the community composition was generally consistent between 2014 and 2015 with bluegills (Lepomis macrochirus) representing the most frequently observed species followed by largemouth bass (Micropterus salmoides) and yellow perch (Perca flavescens). The decline in the number of fish collected may be attributed to the exceptionally cold winters that plagued the area in 2013 and 2014. The excessively cold temperatures may have resulted in fish kills and/or decreased spring water temperatures which may have negatively impacted the reproductive success of fish over the past two years.

A total of 206 macroinvertebrates were collected from Lake Lory which is greater than the 87 specimens that were collected in 2014. Snails, true flies, and dragonflies were the most abundant species identified during the 2015 surveys. No threatened, endangered, or special concern macroinvertebrate species were observed at Lake Lory in 2015.

Wetland EE

No fish were collected from Wetland EE in 2015 while a total of 17 fathead minnows (Pimephales promelas) were collected during the 2014 aquatic survey.

A total of four macroinvertebrates were collected in 2015. Two snails, one beetle, and one water strider (Gerridae) were collected in 2015 compared to a total of 79 in 2014. No threatened, endangered, or special concern macroinvertebrate species were observed in Wetland EE in 2015.

The lack of fish and macroinvertebrates that were observed during the 2015 aquatic survey at Wetland EE is likely due to the discharge outfalls utilized by the Humboldt Mill Water Treatment Plant (i.e. Outfall 001 and 002) during the majority of 2015. These outfalls diverted water east of Wetland Complex EE and did not provide adequate water distribution to the entire wetland complex. In September 2015, a third outfall (i.e. Outfall 003) was constructed in the southern portion of Wetland Complex EE which facilitates water distribution to the entire wetland.

A copy of the 2015 Humboldt Mill Aquatic Survey Report is available upon request.

Station 1 Upstream Extent, June 2015

8.5.4. Fish Tissue Survey

No fish tissue survey was conducted in 2015. Surveys are only required once every three years, with the next survey scheduled for 2017.

8.6. Miscellaneous Monitoring

8.6.1. Soil Erosion Control Measures

During construction, Soil Erosion and Sediment Control (SESC) measures were fully implemented in accordance with Part 91 (NREPA, 1994 PA 451, as amended). Best management practices included

grading; roughening, seeding, and mulching; silt fencing or straw waddles around the site perimeter; and water on travel ways to control dust. In the spring of 2015, final grading, paving, seeding, and mulching was completed around site to minimize erosion and enhance storm water control. In accordance with Part 91 and to ensure the integrity of the installed controls, inspections occurred 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. Eagle Mine staff conducts the inspections and maintains the proper SESC and storm water certifications. Inspections are recorded in a logbook maintained by the Environmental Department.

Final paving, seeding, and mulching, June 2015

Since site grading and re-vegetation activities were successful, erosion control measures were removed from the majority of the site in the fall of 2015. Although no work is currently being conducted, silt fence remains along the HTDF where additional work on the cut-off wall is scheduled to occur in the future. In December of 2015, the Marquette County Soil Erosion Permits were officially closed which now gives Part 632 jurisdiction over the program.

8.6.1. Impermeable Surface Inspections

The impermeable surfaces monitoring plan outlines the requirements of integrity monitoring of surfaces exposed to contact storm water. Areas inspected in 2015 include sumps and floors of the coarse ore storage area, concentrator building, concentrate load out building, and WTP which are exposed to ore, process water, and chemicals.

Monitoring was conducted on a monthly basis as required by the Impermeable surfaces monitoring plan. Floors are inspected for cracks and general condition and the sumps are evaluated for any areas of cracking, piting, or other surface deficiencies, and accumulation of material. All inspection results are recorded on the impermeable surface inspection form by Environmental Department staff and stored in the compliance binder at the Humboldt Mill administrative office. 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. The following issues were identified in 2015:

- In January 2015, Class 1 and class 2 cracks (per the Impermeable Surface Inspection and Surface Repair Plan) were discovered in the WTP floor. In February 2015, the cracks were sealed with epoxy. No issues have been noted since the repairs were completed.

- In August 2015, minor cracks (level 1 or less) were noted in the middle level of the concentrator building. Consultation with operations and maintenance deemed these cracks to be cosmetic and determined that they pose no threat to the environment. This area will continue to be closely monitored.

8.6.2. Tailings Line Inspection

In accordance with Mining Permit Condition E-12, the double-walled HDPE pipeline is monitored by mill operators and Environmental Department staff. Any concerns identified during the inspections would be immediately reported to the Mill operations and maintenance departments who would complete any necessary repairs. The following items were identified in 2015:

- A leak was detected on November 1, 2015, when the tailings line was being switched from the northern most line to the middle line. A faulty valve resulted in a tailings leak which lasted approximately ten minutes. All tailings were contained within the sump of the shore vault building as designed and the valve was replaced.
- Minor freezing issues occurred at the tailings thickeners during the winter of 2015. The lines were quickly thawed and did not result in any negative environmental or operational impact.

Tailings line, shore vault building and HTDF, August 2015

8.6.3. Geochemistry Program

In accordance with permit condition F-1, Eagle retained Hatch Associates' Water and Tailings Management Division of Lakewood, Colorado, to design a comprehensive HTDF geochemistry monitoring program. The purpose of the program is to assess changes in tailings composition, temporal changes in HTDF properties, spatial changes in lake properties, and to predict changes in water quality of the WTP influent. In June 2015, Eagle completed the first round of stratified sampling of the water column in the HTDF to assess changes in water quality and chemistry. These sampling events will be repeated annually as a part of the monitoring program. Tailings water chemistry is also analyzed at least quarterly as a component of the study.

The preliminary data indicates that the HTDF is strongly stratified and stable during the summer months as well as in winter when ice is covering the HTDF. During spring when ice melts, and in the

fall during strong weather conditions, portions of the liquid tailings slurry rises as a result of buoyancy differences which results in periodic partial mixing with the surface water. Metal concentrations of the WTP influent have been found to oscillate seasonally, but remain at levels that are within the treatment capacity of the water treatment plant.

The tailings study, conducted in accordance with permit condition J-22, that began in 2014 was completed in late December 2015. Results from this study are being used in geochemical modelling that is currently being completed. The study confirmed that even under partially oxygenated conditions pH remained within the neutral range (pH 6.0-9.0 SU), nickel leaching essentially ceases, and sulfate leaching is low.

9. Reclamation Activities

No reclamation activities occurred in 2015 and there are currently no plans to conduct any reclamation activities in 2016. The Department will be notified, in advance, if any activities do commence in 2016.

10. Contingency Plan Update

One element of the contingency plan is to test the effectiveness on an annual basis. Testing is comprised of two components. The first component is participation in adequate training programs for individuals involved in responding to emergencies and the second component is a mock field test.

In 2015, the Humboldt Mill Emergency Response Team was formed to assist in emergency response situations should they arise. This team is not required by MSHA but was established to help ensure the safety of employee while at work. The team is comprised of 26 individuals that are divided into four teams each of which includes at least one licensed EMS professional and one NFPA certified firefighter. Training occurs on a monthly basis with the first training being completed in December 2015 and included site familiarization and blood borne pathogen training. Training in 2016 will include first aid, rapid trauma assessments, emergency shutdown procedures for equipment, industrial firefighting, and vehicle and building extrications.

In addition to the Emergency Response Team, security personnel are EMTs and paramedics who are trained in accordance with state and federal regulations. This allows for immediate response to medical emergency situations.

A mock field test was conducted in September 2015 and was a desktop exercise which tested the emergency response measures of the contingency plan and crisis management plan in place at Eagle Mine. With the assistance of Eagle Mine employees, a third-party consultant developed an emergency scenario which in 2015 was related to an underground mine fire. The crisis management team was aware that a test would occur, but were unaware of the nature of the emergency. Two rooms were utilized during the exercise, the first contained the crisis management team and the second contained the “actors” playing roles of employees, regulators, local politicians, media outlets, and concerned citizens and family members. The actors had a loose script developed by the consultant which ensured that certain elements were included and that the scenario progressed at a pre-determined pace. During the crisis management exercise, the third party consultant observed the activity to identify strengths, weaknesses and opportunities for improvement. Once the exercise

is complete, the consultant and crisis management team held a debrief session to capture feedback from each participant. Following this session, the consultant captured the overall feedback and prepared a report with actions for improvement. Throughout the following 12-month period, the crisis management team meets on a quarterly basis to review and update the status on those actions in preparation for the annual exercise.

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

11. Financial Assurance Update

Updated reclamation costs were submitted in the 2014 Annual Report and approved by the Department in July 2015. The updated bond will be in place by April 1st as required. In accordance with Part 632, the financial assurance will be reviewed every three years with the next review required in 2018.

12. Organizational Information

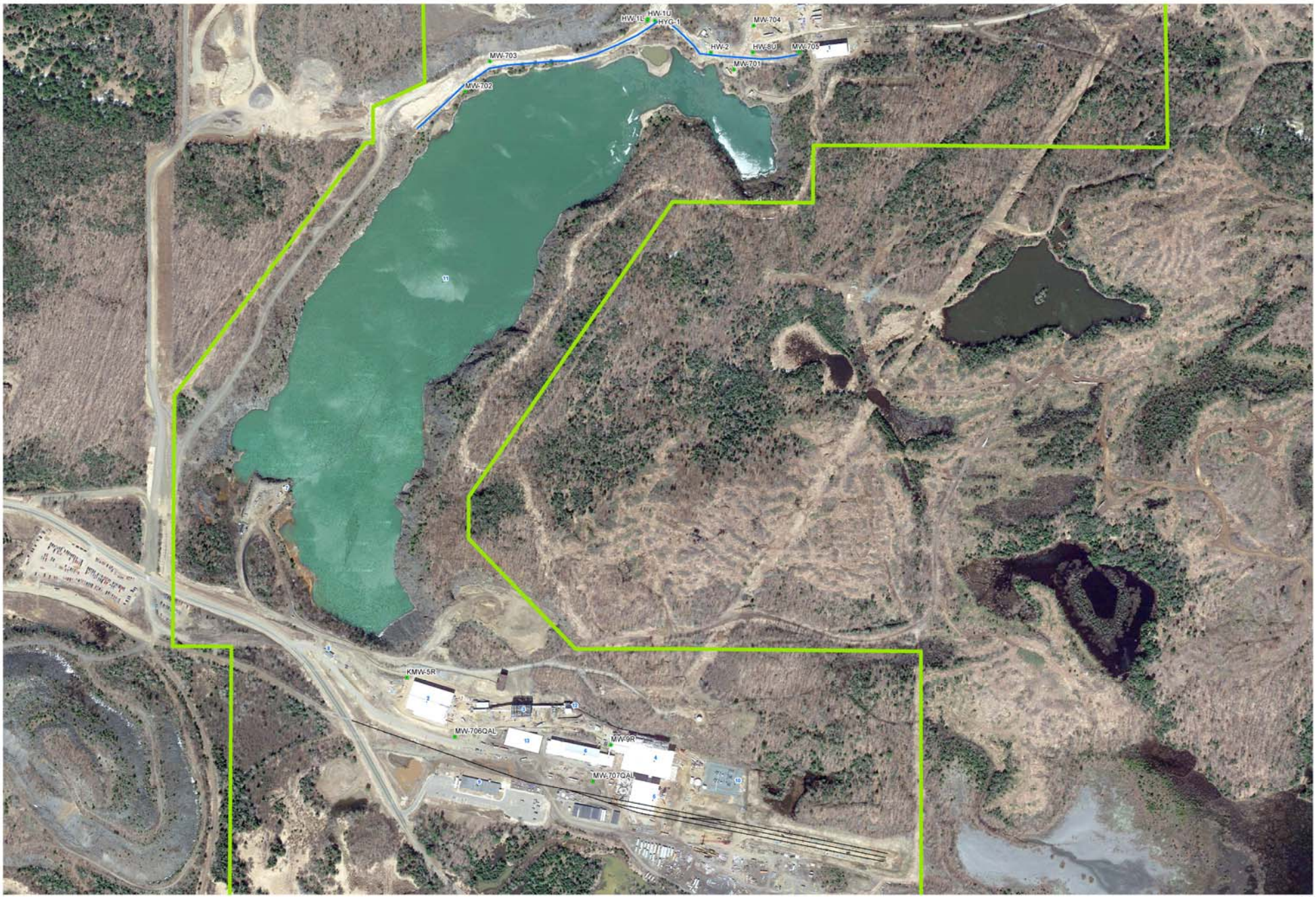
An updated organization report can be found in Appendix M.

Appendix A

Humboldt Mill

Site Map

Eagle Mine LLC Humboldt Mill Monitoring Map



Date: 2/4/2016

Legend

- RailSpur
- Cut Off Wall
- Eagle Mine LLC Ownership
- Humboldt Mill Part 632 Wells

- 1 - Water Treatment Plant
- 2 - Coarse Ore Storage Building
- 3 - Secondary Crusher
- 4 - Concentrator
- 5 - Concentrate Loadout Facility
- 6 - Mill Services Building
- 7 - Tailings Pump House
- 8 - Guardhouse
- 9 - Administration Building
- 10 - UPPCO Powerstation
- 11 - Humboldt Tailings Disposal Facility
- 12 - Transfer Building
- 13 - Cold Storage Building

0 0.05 0.1 0.2 0.3 0.4 0.5 Miles

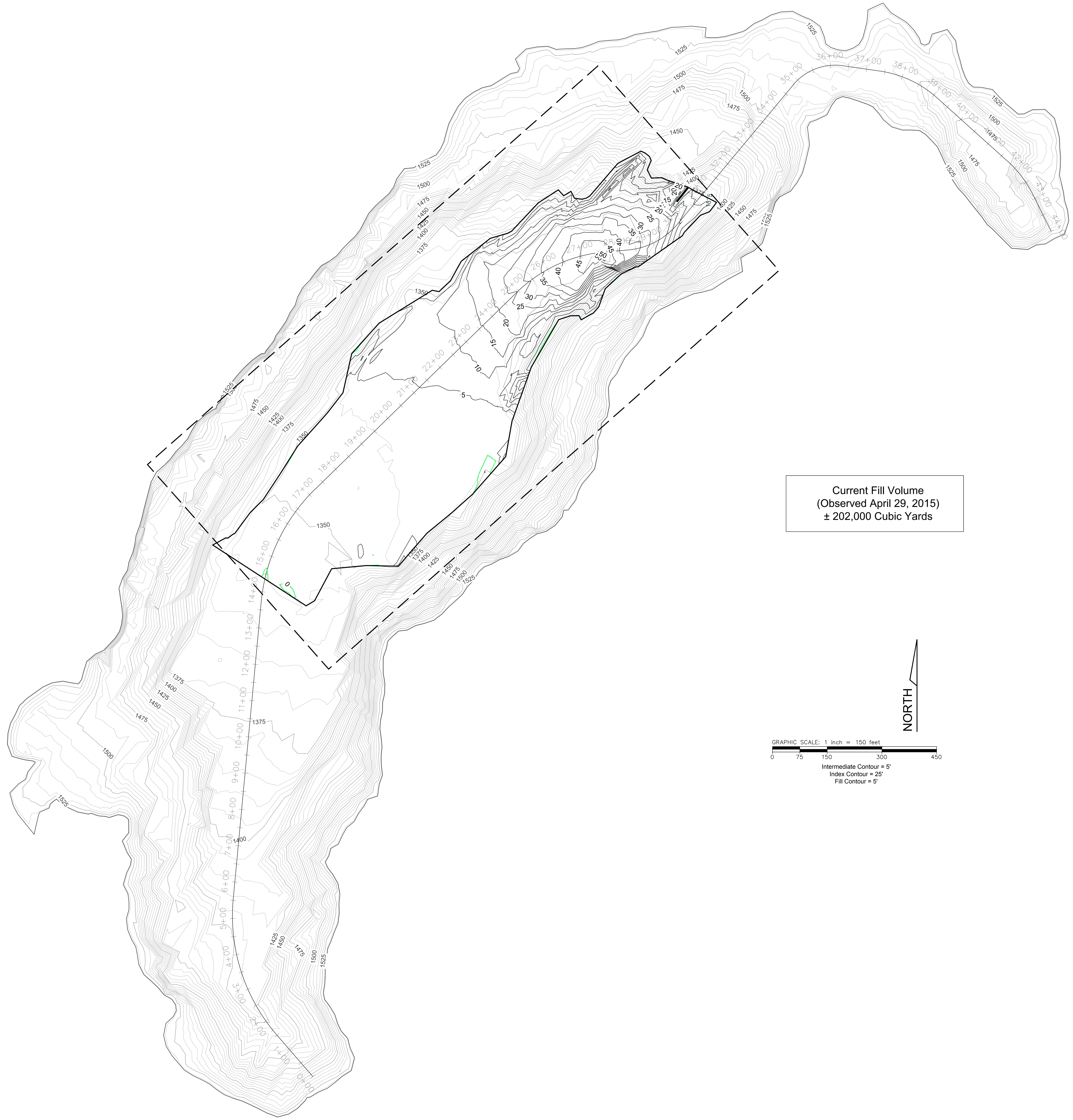
N W E S

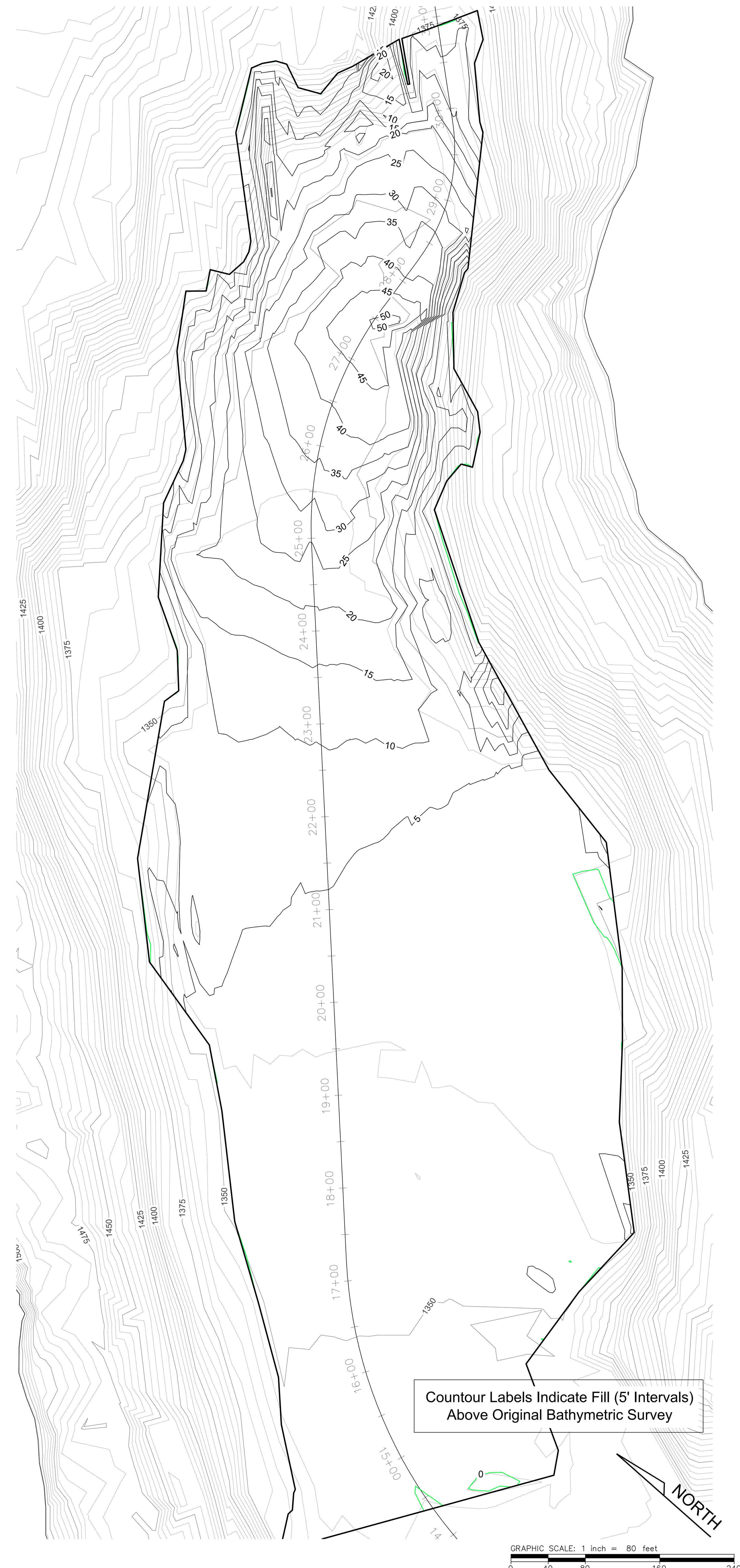
Appendix B

Humboldt Mill

Humboldt Tailings Disposal Facility

Bathymetry Maps





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TRIMEDIA
ENVIRONMENTAL & ENGINEERING

Eagle Mine - Humboldt Mill
April 29, 2015 Bathymetric Survey
Champion, MI

DATE	DESCRIPTION	ISSUED

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CHECKED: PGC
APPROVED: GWM

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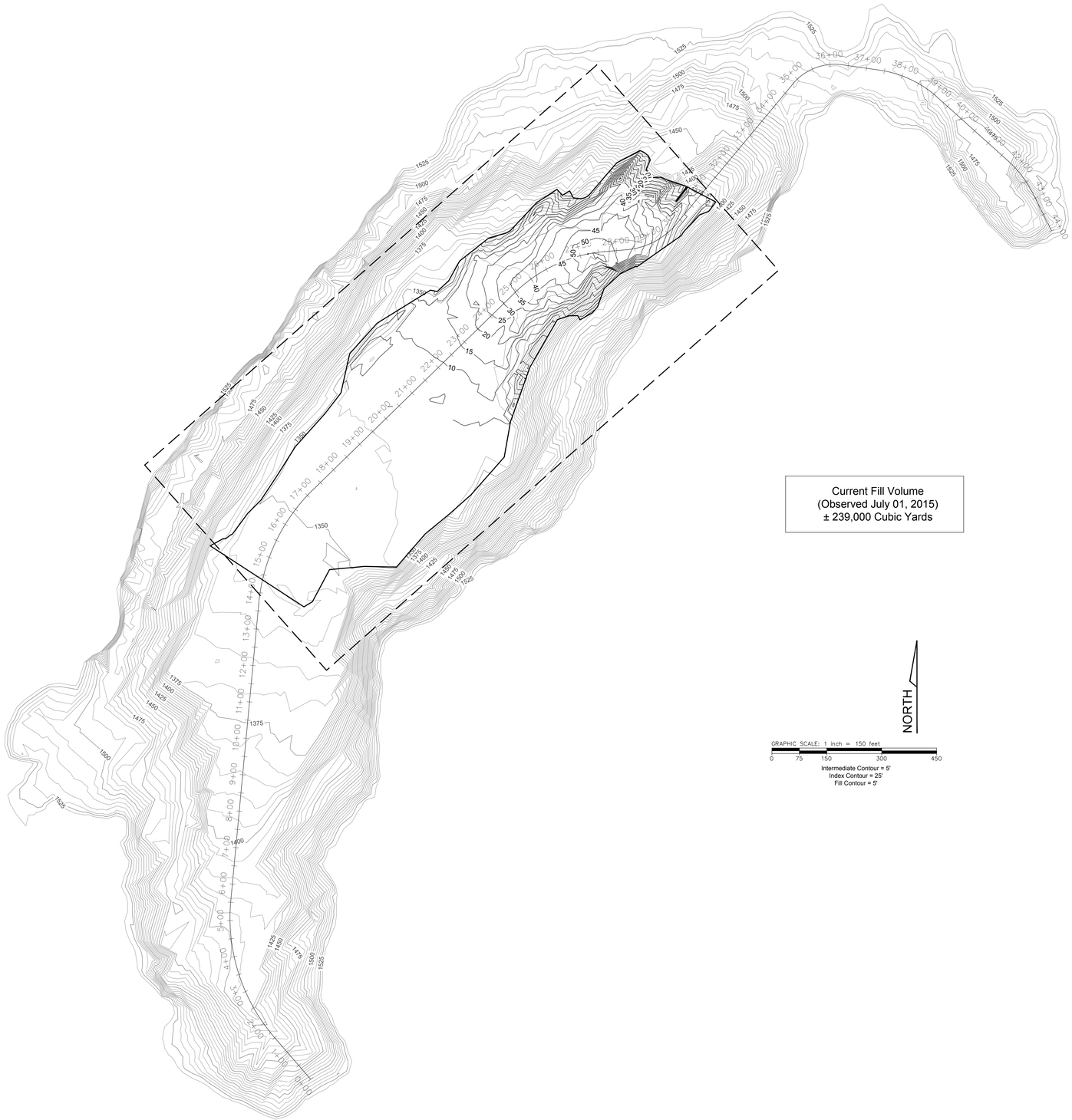

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July 1, 2015 Bathymetric Survey
Champion, MI

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CHECKED: PGC
APPROVED: GWM

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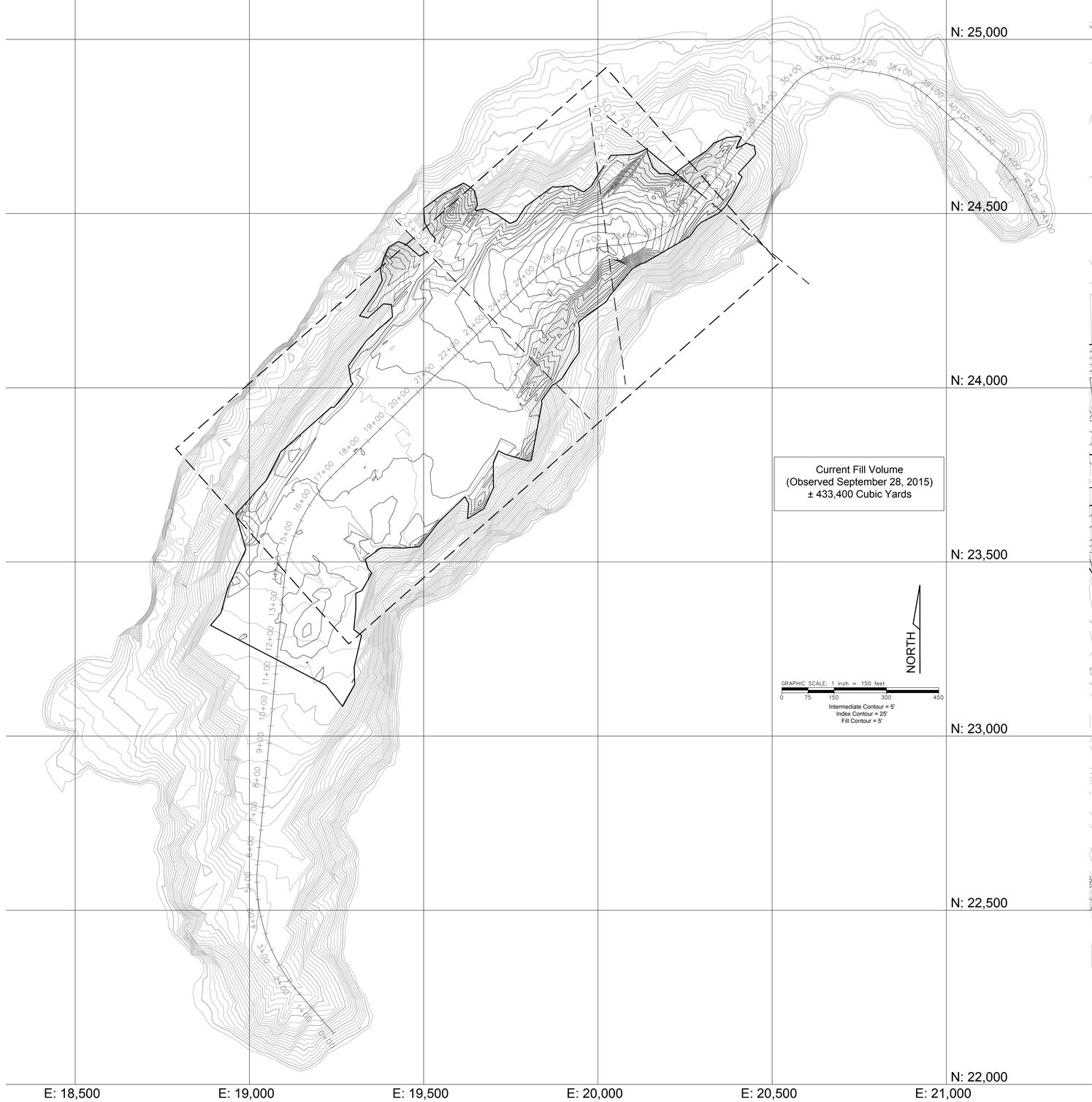

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Eagle Mine - Humboldt Mill
September 28, 2015 Bathymetric Survey
Champion, MI

	DESCRIPTION	ISSUED
	DATE	

DESIGNED:
DRAWN: JWM
CHECKED: PGC
APPROVED: GWM

TRIMEDIA
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2014-100

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Product Fill Map

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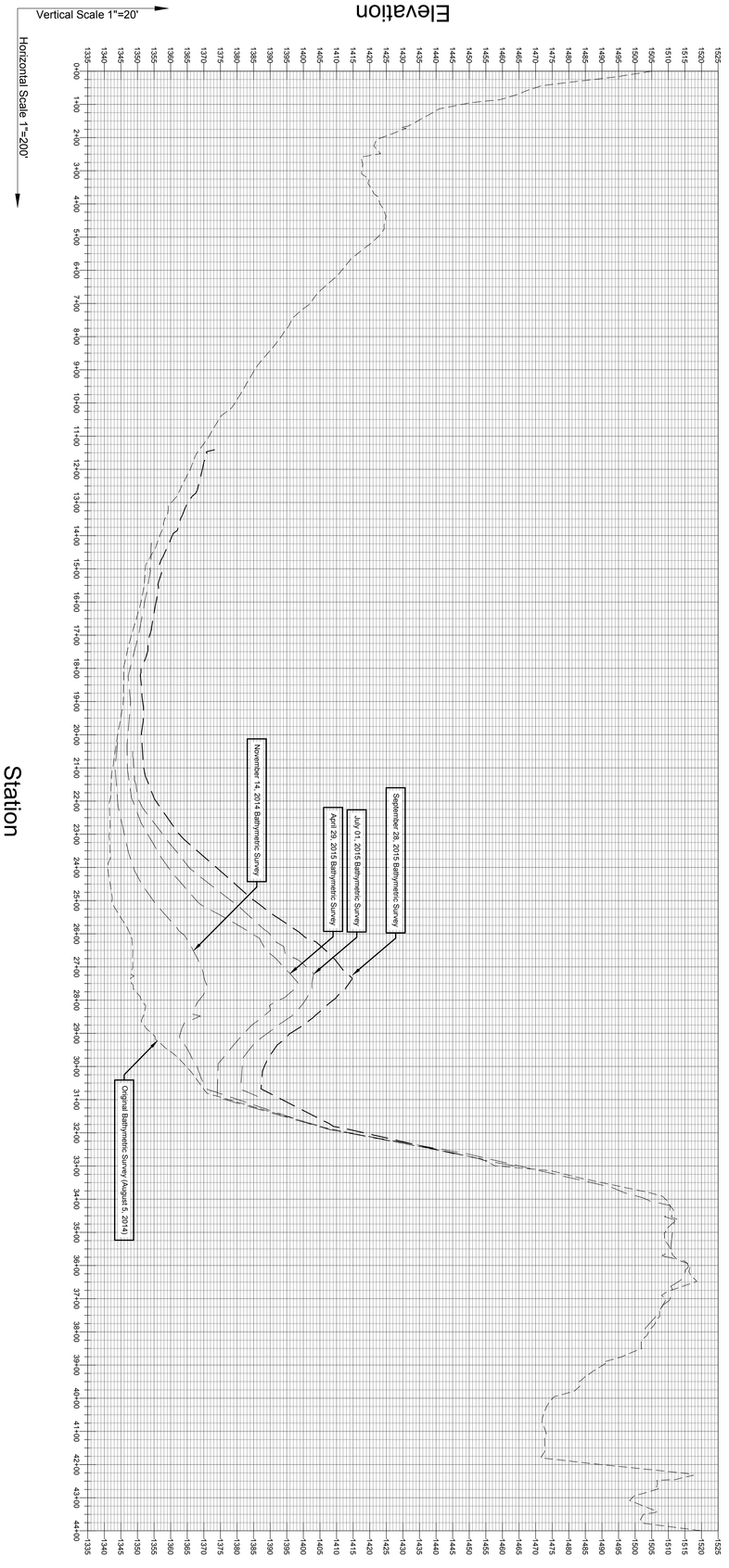

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TRIMEDIA
JOB NUMBER: 2014-100
SHEET TITLE: Tailings Basin 2015 Profile
SHEET NUMBER: 2.0

DESIGNED:
DRAWN: JWM
CHECKED: PGC
APPROVED: GWM

DATE	DESCRIPTION	ISSUED

Eagle Mine - Humboldt Mill
September 28, 2015 Bathymetric Survey
Champion, MI

TRIMEDIA ENVIRONMENTAL & ENGINEERING

Appendix C

Humboldt Mill

Storm Water Drainage Map

0 0.05 0.1 0.2 0.3 0.4 Miles

Legend

- Cut Off Wall
- Eagle Mine Property Boundary
- Catch Basins
- Berm
- Stormwater Conduit
- Surface Water Flow
- Contours 10ft
- Humboldt Facilities
- Humboldt Tailings Disposal Facility
- Main Roads

Humboldt Mill Site Map

Figure 1

Created on September 10, 2015

Locations and Coordinates based on UTM Zone 16N NAD83

Eagle Mine
a subsidiary of lundin mining

Author: JRE

Appendix D

Humboldt Mill

HTDF Surface Water Elevations

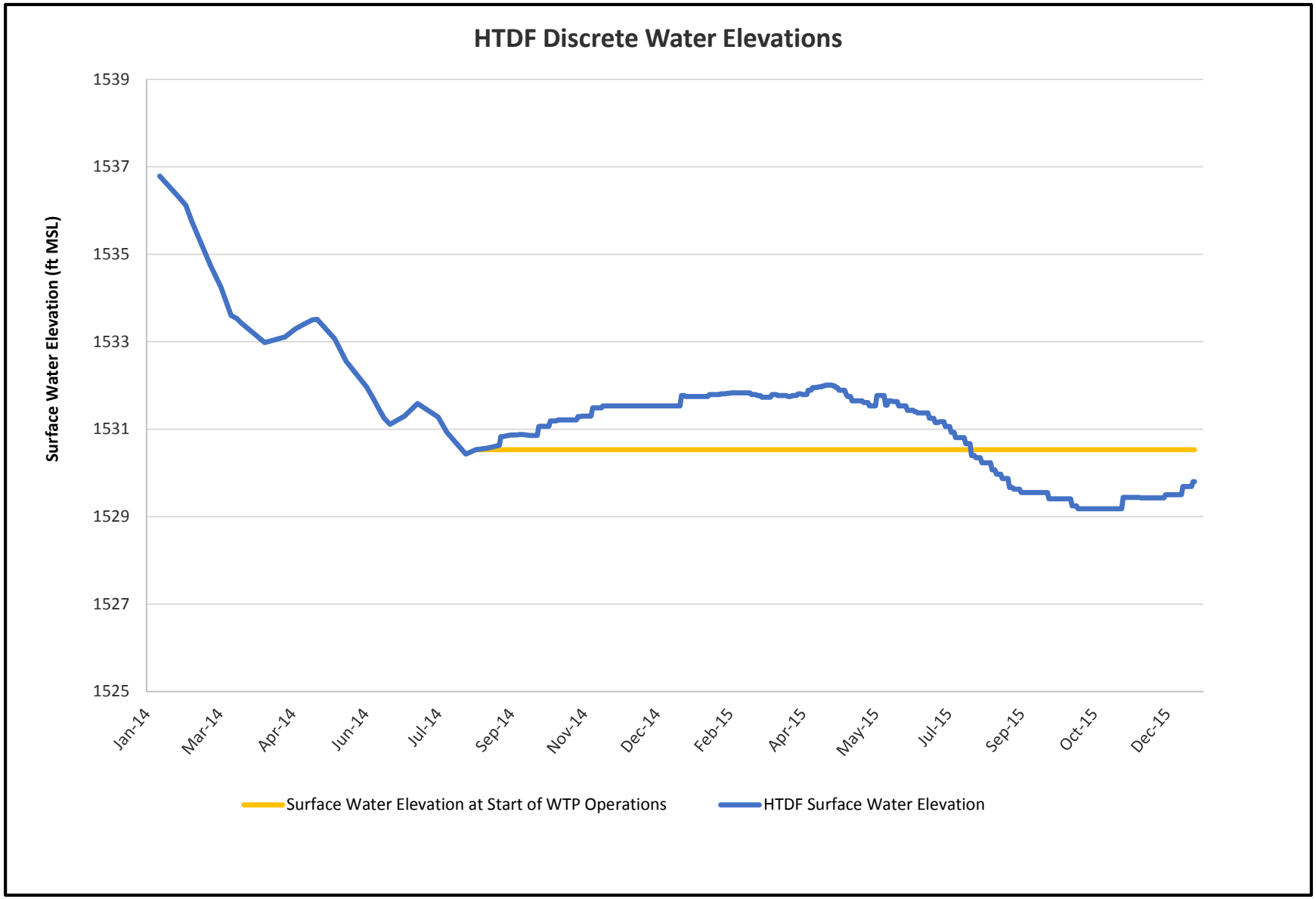
&

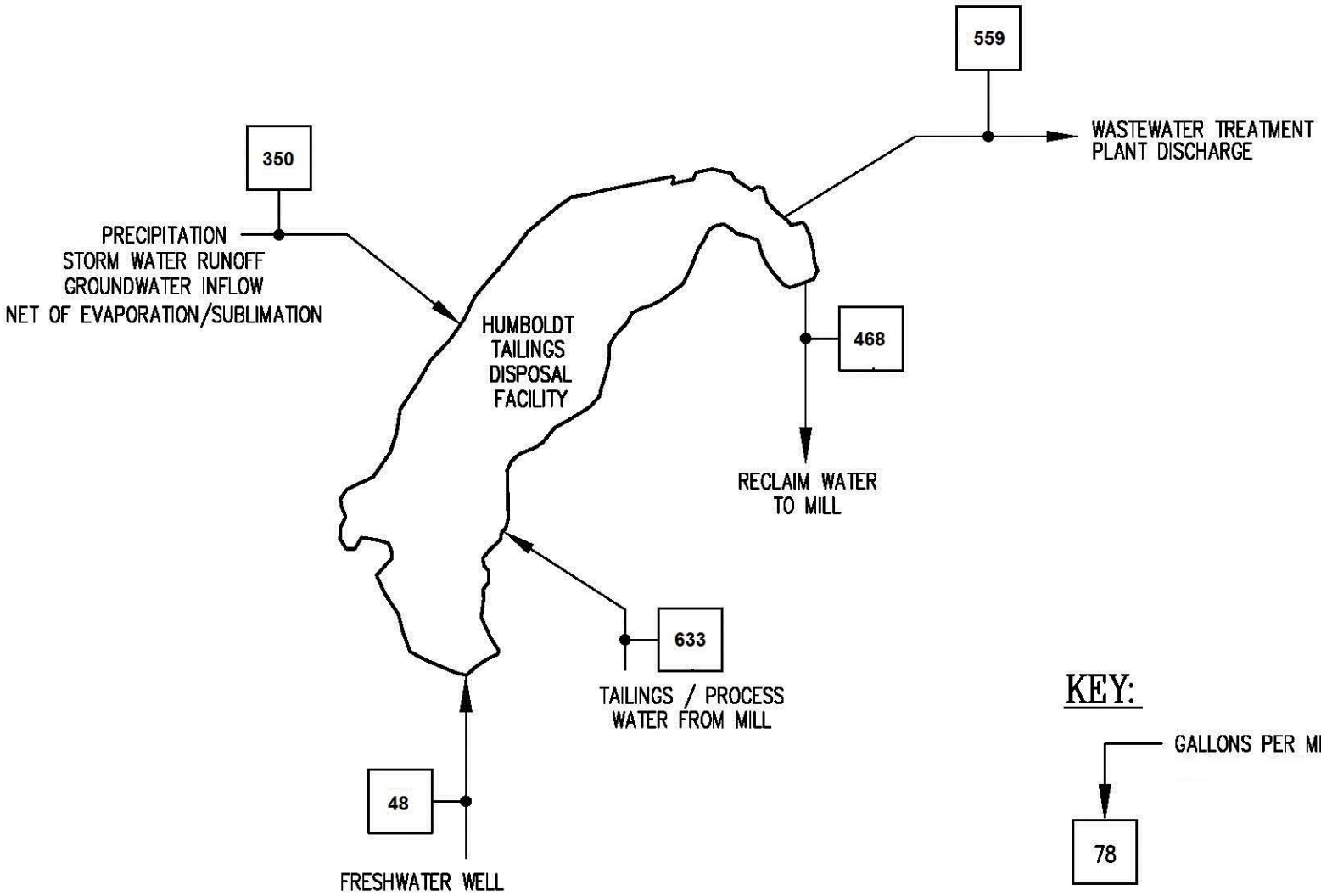
Water Balance Graphs

HTDF Water Elevation Data
2015 Discrete Measurements
Humboldt Mill

Date	HTDF Water Elevation (MSL)
1/13/2015	1531.77
1/16/2015	1531.75
1/19/2015	1531.75
1/26/2015	1531.77
1/30/2015	1531.79
2/2/2015	1531.79
2/6/2015	1531.79
2/9/2015	1531.81
2/13/2015	1531.82
2/16/2015	1531.83
2/20/2015	1531.83
2/23/2015	1531.83
3/2/2015	1531.79
3/6/2015	1531.77
3/9/2015	1531.73
3/16/2015	1531.79
3/20/2015	1531.77
3/27/2015	1531.75
3/30/2015	1531.77
4/3/2015	1531.81
4/6/2015	1531.79
4/10/2015	1531.89
4/13/2015	1531.95
4/15/2015	1531.95
4/17/2015	1531.97
4/20/2015	1531.99
4/22/2015	1532.01
4/27/2015	1531.99
4/29/2015	1531.95
5/1/2015	1531.89
5/6/2015	1531.8
5/7/2015	1531.75
5/10/2015	1531.65
5/18/2015	1531.61
5/22/2015	1531.53
5/26/2015	1531.53
5/27/2015	1531.77
6/1/2015	1531.55
6/4/2015	1531.65
6/7/2015	1531.63
6/9/2015	1531.63

Date	HTDF Water Elevation (MSL)
6/11/2015	1531.53
6/17/2015	1531.43
6/22/2015	1531.4
6/24/2015	1531.37
7/2/2015	1531.25
7/6/2015	1531.15
7/9/2015	1531.17
7/13/2015	1531.06
7/17/2015	1530.93
7/20/2015	1530.81
7/27/2015	1530.67
7/31/2015	1530.4
8/3/2015	1530.35
8/7/2015	1530.23
8/13/2015	1530.07
8/16/2015	1529.97
8/20/2015	1529.87
8/21/2015	1529.87
8/26/2015	1529.67
8/29/2015	1529.63
9/3/2015	1529.55
9/21/2015	1529.41
9/24/2015	1529.4
10/2/2015	1529.29
10/8/2015	1529.25
10/9/2015	1529.23
10/12/2015	1529.18
10/16/2015	1529.17
10/23/2015	1529.1
10/30/2015	1529.25
11/6/2015	1529.45
11/12/2015	1529.44
11/13/2015	1529.52
11/20/2015	1529.6
11/24/2015	1529.43
11/25/2015	1529.43
12/4/2015	1529.43
12/11/2015	1529.5
12/23/2015	1529.69
12/30/2015	1529.8


HTDF Discrete Water Elevations
Surface Water Elevation (ft MSL)
1539
1537
1535
1533
1531
1529
1527
1525
Jan-14
Mar-14
Apr-14
Jun-14
Jul-14
Sep-14
Nov-14
Dec-14
Feb-15
Apr-15
May-15
Jul-15
Sep-15
Oct-15
Dec-15
Surface Water Elevation at Start of WTP Operations
HTDF Surface Water Elevation



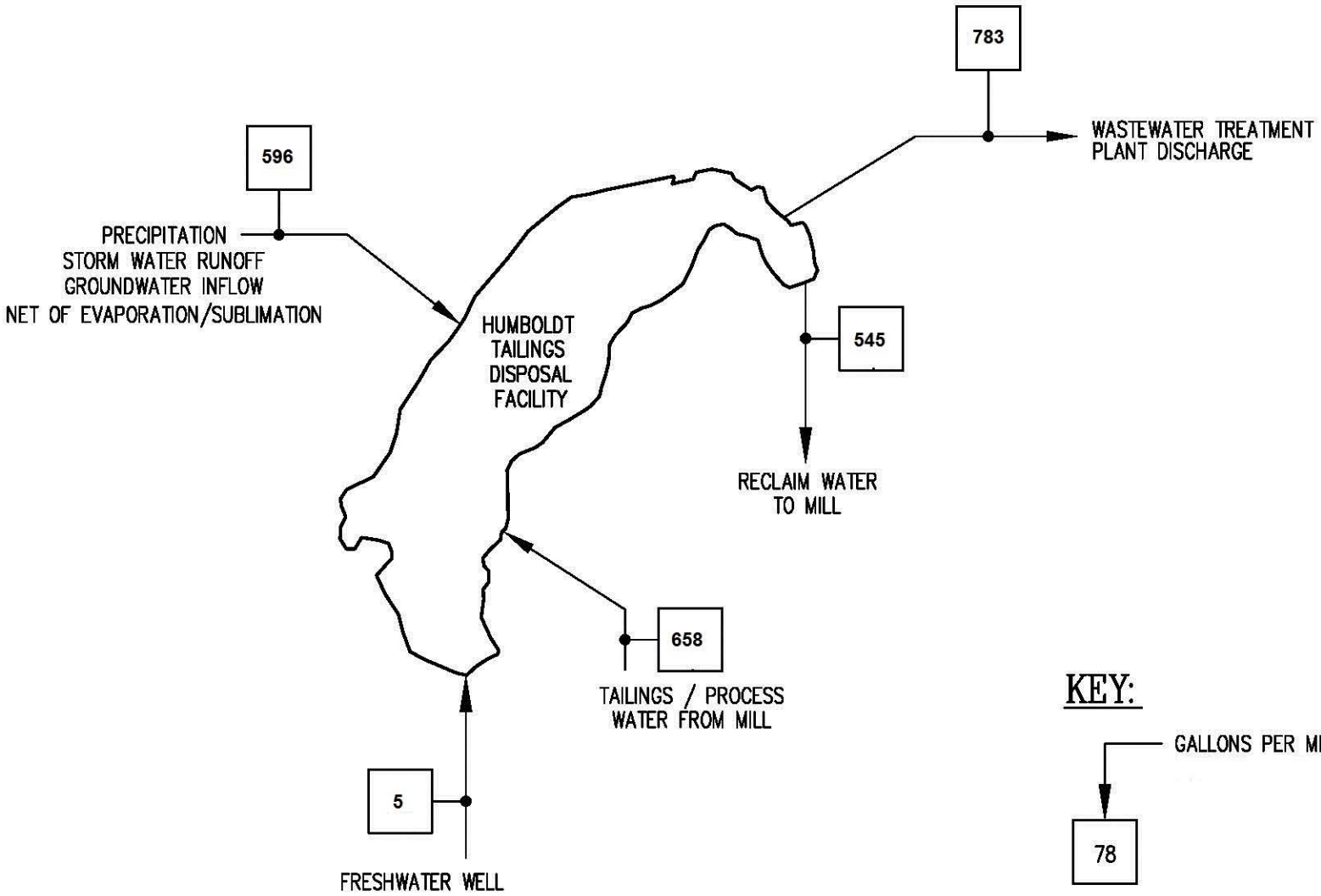
Tailings total includes the dry tailings volume. As such, this diagram illustrates a volume balance rather than a pure water balance.

PROJECT NUMBER: KEX–0102

Eagle Mine, LLC - Humboldt Mill Facility
Humboldt Township, Marquette County, Michigan

WATER BALANCE
HUMBOLDT TAILINGS DISPOSAL FACILTY
(January 1 - March 31, 2015)

FIGURE:
1



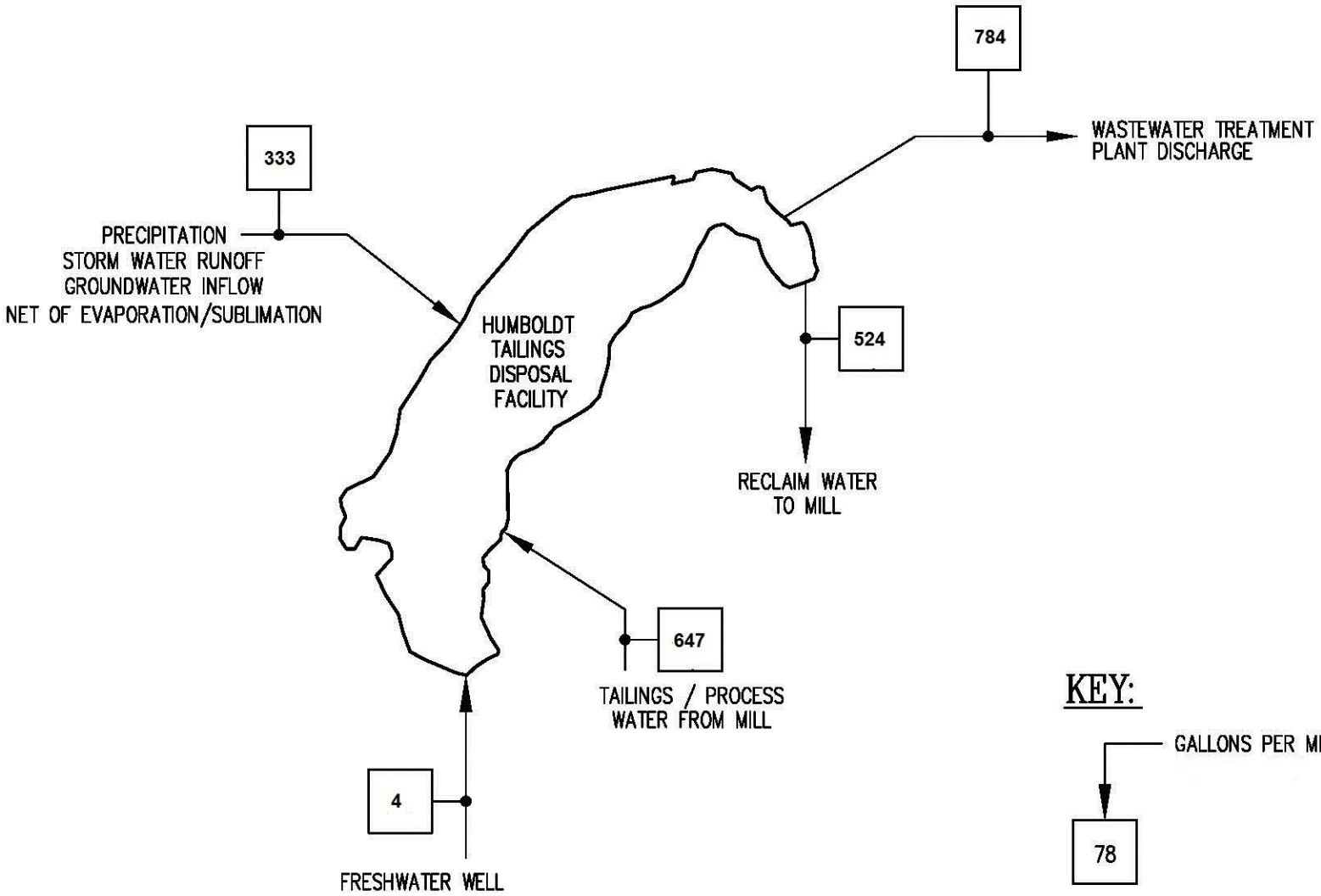
Tailings total includes the dry tailings volume. As such, this diagram illustrates a volume balance rather than a pure water balance.

PROJECT NUMBER: KEX–0102

Eagle Mine, LLC - Humboldt Mill Facility
Humboldt Township, Marquette County, Michigan

WATER BALANCE
HUMBOLDT TAILINGS DISPOSAL FACILTY
(April 1 - June 30, 2015)

FIGURE:
1



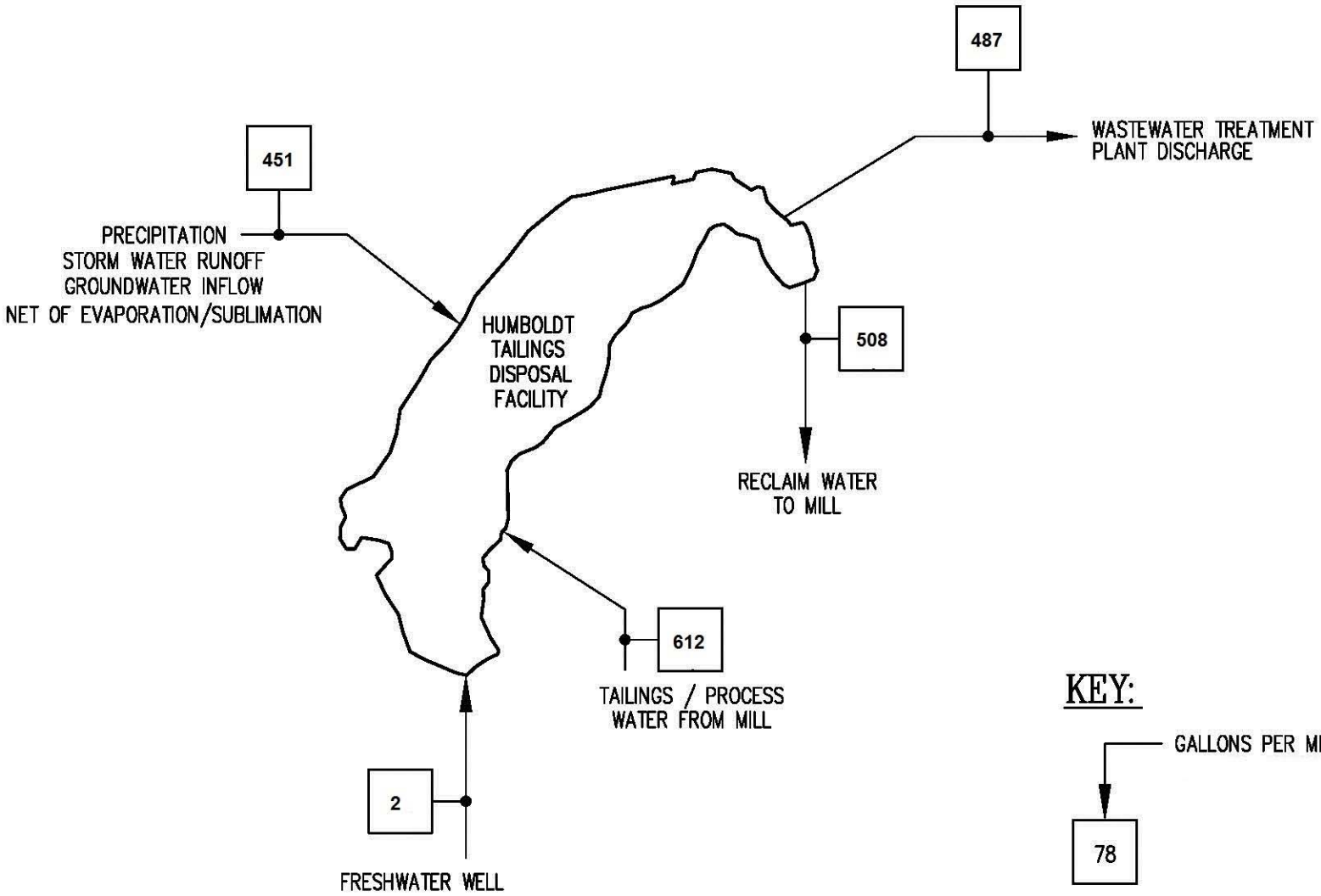
Tailings total includes the dry tailings volume. As such, this diagram illustrates a volume balance rather than a pure water balance.

PROJECT NUMBER: KEX–0102

Eagle Mine, LLC - Humboldt Mill Facility
Humboldt Township, Marquette County, Michigan

WATER BALANCE
HUMBOLDT TAILINGS DISPOSAL FACILTY
(July 1, 2015 - September 30, 2015)

FIGURE:
1



Tailings total includes the dry tailings volume. As such, this diagram illustrates a volume balance rather than a pure water balance.

PROJECT NUMBER: KEX-0102

Eagle Mine, LLC - Humboldt Mill Facility
Humboldt Township, Marquette County, Michigan

WATER BALANCE
HUMBOLDT TAILINGS DISPOSAL FACILTY
(October 1 - December 31, 2015)

FIGURE:
1

Appendix E

Humboldt Mill

Groundwater Monitoring Well Location Map

CUT-OFF WALL MONITORING WELL NETWORK LOCATIONS

Legend

- Monitoring Well
- Leachate Monitoring Well per R425.406(5)(a)
- Compliance Monitoring Well per R425.406(5)(b)
- Containment Wall
- Estimated Limit of Aquifer
- Flow Divide
- Highway
- Bedrock Outcrop

Reference

Data provided by: Eagle Mine and North Jackson Company
Projection & Datum: UTM NAD 83 Zone 16N
Aerial Photo: 2006

0 200 400 Feet

1:3,500

Eagle Mine
a subsidiary of lundin mining

North Jackson Company
ENVIRONMENTAL SCIENCE & ENGINEERING

LEGEND

New Compliance Monitoring Wells

NOTES

1. SCALE OF AERIAL IMAGERY IS APPROXIMATE.
2. THIS FIGURE HAS BEEN TRANSLATED AND SCALED TO THE HORIZONTAL DATUM NAD83 MICHIGAN STATE PLANE COORDINATE SYSTEM.
3. FOR REFERENCE PURPOSES ONLY. NOT TO BE USED FOR REPORTING.

REFERENCE

1. BASE MAP TAKEN FROM GOOGLE EARTH, 2014

CLIENT
EAGLE MINE
HUMBOLDT MILL

PROJECT
GROUNDWATER MONTIORING

TITLE
EAGLE MINE HUMBOLDT MILL
COMPLIANCE MONITORING LOCATIONS

DRAFT

CONSULTANT
Golder Associates

YYYY-MM-DD	2014-08-14
PREPARED	CJS
DESIGN	CJS
REVIEW	MAC
APPROVED	GJD

PROJECT 1401484 | Rev. 0 | FIGURE **01**

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM:
1 in
0

Path: C:\Users\CSlacey\Documents\Eagle\1401484 Eagle Mill Monitoring\GIS\Eagle Mill MW Location Map Portrait.mxd

Appendix F

Humboldt Mill

Groundwater Monitoring Well Results

&

Benchmark Summary Table

Humboldt Mill
2015 Mine Permit Groundwater Monitoring
Benchmark Comparison Summary

Location	Location Classification	Q1	Q2	Q3	Q4
HW-1L	Monitoring	pH	**pH**	**pH**, sodium	**pH**, chloride, **sodium**
HW-1U LLA	Monitoring	pH, sodium	**pH**	sodium	pH, **sodium**
HW-1U UFB	Monitoring	alkalinity bicarbonate, sulfide	**sulfide**	alkalinity carbonate	
HW-2	Monitoring	**sodium**	pH, ammonia, **sodium**		
HW-8U	Monitoring	**sulfate**	**sulfate**	**sulfate**	**sulfate**
HYG-1	Monitoring	**alkalinity bicarbonate, chloride, sodium**	**alkalinity bicarbonate, chloride,** mercury**, sodium**	**alkalinity bicarbonate,** ammonia**, chloride, mercury,** potassium**, sodium,** hardness	**alkalinity bicarbonate, ammonia, chloride,** manganese**, mercury, potassium, sodium, hardness**
KMW-5R	COSA	**chloride,** mercury	**chloride**	pH, **chloride**	**chloride**, nitrate
MW-701 QAL	Leachate			pH	
MW-701 UFB	Leachate	pH	**pH**	**pH**	
MW-702 QAL	Leachate	**pH,** chloride	**pH, chloride**	**pH, chloride**	**pH**, nitrite
MW-702 UFB	Leachate		pH	**pH,** sulfate	
MW-703 QAL	Compliance	nitrate	pH, **nitrate**	**pH, nitrate**	**pH, nitrate,** zinc
MW-703 UFB	Compliance			pH	
MW-703 LLA	Compliance			alkalinity carbonate	alkalinity bicarbonate
MW-703-DBA	Compliance	**potassium**	**potassium,** sulfide	alkalinity carbonate, **potassium,** sodium	pH, **alkalinity carbonate,** nitrate, **potassium, sodium**
MW-704 QAL	Compliance	chloride, **ammonia**	pH, **ammonia,** iron, mercury,	chloride, **mercury**	
MW-704 UFB	Compliance	manganese, **hardness**	pH, magnesium, potassium, zinc, **hardness**	**magnesium,** manganese, **potassium, hardness**	calcium, **magnesium, manganese, hardness**
MW-704 LLA	Compliance	**potassium**	alkalinity carbonate, **potassium,** sodium	**potassium, sodium**	alkalinity carbonate, **potassium, sodium**
MW-704 DBA	Compliance		pH	**pH**	**pH**
MW-705 QAL	Cut-off Wall Key in Well		pH, sulfate		sulfate
MW-705 UFB	Cut-off Wall Key in Well	pH, alkalinity bicarbonate		pH	iron, sodium
MW-706 QAL	Mill Services Building/Secondary Crusher	**pH**			
MW-707 QAL	Concentrator/CLO	**alkalinity bicarbonate, hardness**	**alkalinity bicarbonate, hardness**	**alkalinity bicarbonate,** sulfate, **hardness**	pH, **alkalinity bicarbonate, sulfate, hardness**
MW-9R	Concentrator	**pH,** copper, mercury, nickel, zinc		nickel	copper, nitrate

Parameters listed in this table had values reported that were equal to or greater than a site-specific benchmark. Parameters in **BOLD** are instances in which the Department was notified because benchmark deviations were identified at compliance monitoring locations for two consecutive quarters. If the location is classified as background, Department notification is not required for an exceedance.

Blank data cells indicate that no benchmark deviations occurred at the location during the specified sampling quarter.

2015
Mine Permit Groundwater Quality Monitoring Data
HW-1L (Monitoring)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/9/15[D]		Q2 2015 5/18/15[D]		Q3 2015 8/18/15[D]		Q4 2015 11/30/15[D]	
Field										
D.O.[1]	ppm	--	**7.1**		**1.2**		**0.4**		**2.5**	
ORP	mV	--	**82**		**-185**		**85**		**221**	
pH	SU	8.97-9.97	**7.5**		**8.9**		**8.4**		**8.9**	
Specific Conductance	µS/cm	--	**223**		**388**		**256**		**517**	
Temperature	°C	--	**7.8**		**9.5**		**10**		**7.2**	
Turbidity	NTU	--	**5.5**		**76**		**73**		**43.0**	
Water Elevation	ft MSL	--	**1517.09**		**1473.84**		**1504.70**		**1463.27**	
Metals										
Aluminum	ug/L	200 (p)	--		--		< 50		--	
Antimony	ug/L	8.0 (p)	--		--		< 2.0		--	
Arsenic	ug/L	20 (p)	< 5.0		< 5.0		< 5.0		< 5.0	
Barium	ug/L	400 (p)	--		--		< 100		--	
Beryllium	ug/L	4.0 (p)	--		--		< 1.0		--	
Boron	ug/L	1200 (p)	--		--		**650**		--	
Cadmium	ug/L	4.0 (p)	--		--		< 1.0		--	
Chromium	ug/L	40 (p)	--		--		< 10		--	
Cobalt	ug/L	80 (p)	--		--		< 20		--	
Copper	ug/L	16 (p)	< 4.0		< 4.0		< 4.0		< 4.0	
Iron	ug/L	1134	**570**		**420**		**540**		**500**	
Lead	ug/L	12 (p)	< 3.0		< 3.0		< 3.0		< 3.0	
Lithium	ug/L	40 (p)	--		--		**19**		--	
Manganese	ug/L	23	< 50		< 50		< 50		< 50	
Mercury	ng/L	4.0 (p)	< 1.0		< 1.0		< 1.0		< 1.0	
Molybdenum	ug/L	200 (p)	--		--		< 50		--	
Nickel	ug/L	80 (p)	< 20		< 20		< 20		< 20	
Selenium	ug/L	20 (p)	--		--		< 5.0		--	
Silver	ug/L	0.8 (p)	--		--		< 0.2		--	
Thallium	ug/L	8.0 (p)	--		--		< 2.0		--	
Vanadium	ug/L	16 (p)	--		--		< 4.0		--	
Zinc	ug/L	11	< 10		< 10		< 10		< 10	
Major Anions										
Alkalinity, Bicarbonate	mg/L	117	**87**		**79**		**81**		**81**	
Alkalinity, Carbonate	mg/L	14	< 2.0		< 2.0		< 2.0		< 2.0	
Chloride	mg/L	52	**48**		**51**		**51**		**53**	
Fluoride	mg/L	4.0 (p)	< 1.0		< 1.0		< 1.0		< 1.0	
Nitrogen, Ammonia	mg/L	0.04	<0.03		<0.03		<0.03		<0.03	
Nitrogen, Nitrate	mg/L	0.40 (p)	< 0.1		< 0.1		< 0.1		< 0.1	
Nitrogen, Nitrite	mg/L	0.40 (p)	< 0.1		< 0.1		< 0.1		< 0.1	
Sulfate	mg/L	24	**19**		**19**		**21**		**21**	
Sulfide	mg/L	0.80 (p)	< 0.20		< 0.20		< 0.20		< 0.40	
Major Cations										
Calcium	mg/L	35	**25**		**22**		**26**		**29**	
Magnesium	mg/L	17	**10**		**9.1**		**11**		**11**	
Potassium	mg/L	11	**1.8**		**1.7**		**1.9**		**1.9**	
Sodium	mg/L	27	**26**		**24**		**28**		**28**	
General										
Hardness	mg/L	157	**106**		**111**		**112**		**113**	

2015
Mine Permit Groundwater Quality Monitoring Data
HW-1U LLA (Monitoring)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/9/15[D]	Q2 2015 5/18/15[D]	Q3 2015 8/18/15[D]	Q4 2015 11/20/15[D]
Field						
D.O.[1]	ppm	--	**3.2**	**0.30**	**4.8**	**0.12**
ORP	mV	--	**18**	**-27**	**-31**	**-152**
pH	SU	8.55-9.55	**8.0**	**8.4**	**8.6**	**7.8**
Specific Conductance	µS/cm	--	**239**	**421**	**259**	**399**
Temperature	°C	--	**6.9**	**10**	**10**	**13**
Turbidity	NTU	--	**4.2**	**19**	**6.7**	**5.9**
Water Elevation	ft MSL	--	**1512.38**	**1496.17**	**1493.35**	**1493.10**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	20 (p)	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	400 (p)	--	--	< 100	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	16 (p)	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	800 (p)	< 200	< 200	< 200	< 200
Lead	ug/L	12 (p)	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)	--	--	**14**	--
Manganese	ug/L	200 (p)	< 50	< 50	< 50	< 50
Mercury	ng/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	40 (p)	< 10	< 10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	125	**120**	**110**	**110**	**110**
Alkalinity, Carbonate	mg/L	66	< 2.0	< 2.0	**2.0**	**2.1**
Chloride	mg/L	40 (p)	**28**	**29**	**25**	**25**
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	**1.9**	< 1.0
Nitrogen, Ammonia	mg/L	0.1 (p)	**0.04**	**0.04**	**0.06**	**0.08**
Nitrogen, Nitrate	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Nitrogen, Nitrite	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	58	**38**	**41**	**44**	**45**
Sulfide	mg/L	0.36	**0.31**	< 0.20	**0.23**	< 0.20
Major Cations						
Calcium	mg/L	29	**27**	**22**	**23**	**22**
Magnesium	mg/L	15	**11**	**8.9**	**9.9**	**8.9**
Potassium	mg/L	50	**5.1**	**5.2**	**5.4**	**3.9**
Sodium	mg/L	33	**34**	**31**	**34**	**44**
General						
Hardness	mg/L	132	**113**	**110**	**102**	**92**

2015
Mine Permit Groundwater Quality Monitoring Data
HW-1U UFB (Monitoring)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/9/15[D]	Q2 2015 5/18/15[D]	Q3 2015 8/18/15[D]	Q4 2015 11/20/15[D]
Field						
D.O.[1]	ppm	--	**1.1**	**0.12**	**3.2**	**1.9**
ORP	mV	--	**-252**	**-159**	**115**	**9.2**
pH	SU	8.37-9.37	**9.1**	**9.0**	**8.7**	**9.3**
Specific Conductance	µS/cm	--	**301**	**297**	**215**	**314**
Temperature	°C	--	**7.0**	**13**	**14**	**4.1**
Turbidity	NTU	--	**6.1**	**5.9**	**5.7**	**9.8**
Water Elevation	ft MSL	--	**1531.53**	**1532.24**	**1531.45**	**1531.53**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	11	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	400 (p)	--	--	< 100	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	16 (p)	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	800 (p)	< 200	< 200	< 200	< 200
Lead	ug/L	12 (p)	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)	--	--	< 10	--
Manganese	ug/L	75	< 50	< 50	< 50	< 50
Mercury	ng/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	40 (p)	< 10	< 10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	127	**140**	**84**	**73**	**92**
Alkalinity, Carbonate	mg/L	14	< 2.0	< 2.0	**20**	**7.2**
Chloride	mg/L	121	**67**	**26**	**22**	**22**
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	0.12 (p)	**0.06**	<0.03	**0.07**	**0.03**
Nitrogen, Nitrate	mg/L	0.67	< 0.1	< 0.1	< 0.1	< 0.1
Nitrogen, Nitrite	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	76	**13**	**17**	**18**	**20**
Sulfide	mg/L	1.3	**2.1**	**2.0**	< 0.20	< 0.20
Major Cations						
Calcium	mg/L	46	**12**	**9.1**	**11**	**13**
Magnesium	mg/L	17	**9.2**	**3.8**	**4.7**	**5.7**
Potassium	mg/L	22	**16**	**5.5**	**6.0**	**6.3**
Sodium	mg/L	91	**58**	**32**	**38**	**39**
General						
Hardness	mg/L	189	**71**	**45**	**49**	**45**

2015
Mine Permit Groundwater Quality Monitoring Data
HW-2 (Monitoring)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/12/15[D]	Q2 2015 5/20/15[D]	Q3 2015 8/19/15[D]	Q4 2015 11/17/15[D]
Field						
D.O.[1]	ppm	--	**0.80**	**0.20**	**0.45**	**0.26**
ORP	mV	--	**-175**	**122**	**-120**	**-122**
pH	SU	7.73-8.73	**8.3**	**7.5**	**8.1**	**7.9**
Specific Conductance	µS/cm	--	**266**	**442**	**394**	**520**
Temperature	°C	--	**6.8**	**5.7**	**15**	**9.3**
Turbidity	NTU	--	**69**	**53**	**27**	**17**
Water Elevation	ft MSL	--	**1532.11**	**1532.00**	**1530.66**	**1530.45**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	20 (p)	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	400 (p)	--	--	**120**	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	16 (p)	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	3401	**1100**	**500**	**940**	**1900**
Lead	ug/L	12 (p)	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)	--	--	< 10	--
Manganese	ug/L	324	**130**	<50	**120**	**140**
Mercury	ng/L	1.3	< 1.0	< 1.0	< 1.0	< 1.0
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	40 (p)	< 10	< 10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	145	**110**	**90**	**130**	**130**
Alkalinity, Carbonate	mg/L	8.0 (p)	< 2.0	< 2.0	< 2.0	< 2.0
Chloride	mg/L	25	**14**	**17**	**15**	**15**
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	0.05	**0.04**	**0.07**	**0.04**	<0.03
Nitrogen, Nitrate	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Nitrogen, Nitrite	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	135	**110**	**97**	**120**	**120**
Sulfide	mg/L	0.47	< 0.20	< 0.20	< 0.20	< 0.20
Major Cations						
Calcium	mg/L	72	**46**	**36**	**54**	**55**
Magnesium	mg/L	28	**23**	**24**	**23**	**20**
Potassium	mg/L	7.1	**4.7**	**5.2**	**4.1**	**3.3**
Sodium	mg/L	15	**15**	**19**	**14**	**13**
General						
Hardness	mg/L	277	**204**	**190**	**238**	**243**

2015
Mine Permit Groundwater Quality Monitoring Data
HW-8U (Monitoring)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/10/15[D]		Q2 2015 5/18/15[D]		Q3 2015 8/18/15[T]		Q4 2015 11/17/15[T]	
Field										
D.O.[1]	ppm	--	**3.2**		**1.8**		**4.9**		**2.5**	
ORP	mV	--	**-74**		**-70**		**-59**		**108**	
pH	SU	6.44-7.44	**6.7**		**7.1**		**6.7**		**7.2**	
Specific Conductance	µS/cm	--	**194**		**329**		**220**		**334**	
Temperature	°C	--	**8.0**		**9.1**		**12**		**8.2**	
Turbidity	NTU	--	**12**		**3.4**		**0.53**		**1.7**	
Water Elevation	ft MSL	--	**1532.71**		**1533.85**		**1532.35**		**1532.60**	
Metals										
Aluminum	ug/L	200 (p)	--		--		< 50		--	
Antimony	ug/L	8.0 (p)	--		--		< 2.0		--	
Arsenic	ug/L	20 (p)	< 5.0		< 5.0		< 5.0		< 5.0	
Barium	ug/L	400 (p)	--		--		< 100		--	
Beryllium	ug/L	4.0 (p)	--		--		< 1.0		--	
Boron	ug/L	1200 (p)	--		--		< 300		--	
Cadmium	ug/L	4.0 (p)	--		--		< 1.0		--	
Chromium	ug/L	40 (p)	--		--		< 10		--	
Cobalt	ug/L	80 (p)	--		--		< 20		--	
Copper	ug/L	16 (p)	< 4.0		< 4.0		< 4.0		< 4.0	
Iron	ug/L	27125	**12000**		**12000**		**14000**		**13000**	
Lead	ug/L	12 (p)	< 3.0		< 3.0		< 3.0		< 3.0	
Lithium	ug/L	40 (p)	--		--		< 10		--	
Manganese	ug/L	5498	**3500**		**3000**		**3300**		**3800**	
Mercury	ng/L	4.0 (p)	< 1.0		< 1.0		< 1.0		< 1.0	
Molybdenum	ug/L	200 (p)	--		--		< 50		--	
Nickel	ug/L	80 (p)	< 20		< 20		< 20		< 20	
Selenium	ug/L	20 (p)	--		--		< 5.0		--	
Silver	ug/L	0.8 (p)	--		--		< 0.2		--	
Thallium	ug/L	8.0 (p)	--		--		< 2.0		--	
Vanadium	ug/L	16 (p)	--		--		< 4.0		--	
Zinc	ug/L	26	< 10		< 10		< 10		< 10	
Major Anions										
Alkalinity, Bicarbonate	mg/L	237	**140**		**130**		**130**		**130**	
Alkalinity, Carbonate	mg/L	8.0 (p)	< 2.0		< 2.0		< 2.0		< 2.0	
Chloride	mg/L	40 (p)	< 10		< 10		< 10		< 10	
Fluoride	mg/L	4.0 (p)	< 1.0		< 1.0		< 1.0		< 1.0	
Nitrogen, Ammonia	mg/L	0.04	<0.03		<0.03		<0.03		<0.03	
Nitrogen, Nitrate	mg/L	0.10	< 0.1		< 0.1		< 0.1		< 0.1	
Nitrogen, Nitrite	mg/L	0.40 (p)	< 0.1		< 0.1		< 0.1		< 0.1	
Sulfate	mg/L	2.6	**4.9**		**5.0**		**4.3**		**5.1**	
Sulfide	mg/L	0.80 (p)	< 0.20		< 0.20		< 0.20		< 0.20	
Major Cations										
Calcium	mg/L	53	**29**		**29**		**32**		**31**	
Magnesium	mg/L	22	**12**		**11**		**13**		**12**	
Potassium	mg/L	4.1	**2.5**		**2.6**		**2.9**		**2.8**	
Sodium	mg/L	4.4	**2.7**		**2.7**		**3.1**		**3.1**	
General										
Hardness	mg/L	224	**136**		**129**		**127**		**138**	

2015
Mine Permit Groundwater Quality Monitoring Data
HYG-1 (Monitoring)
Humboldt Mill

Parameter	Unit	Recommended Benchmark 2014	Q1 2015 3/12/15[D]	Q2 2015 5/20/15[T]	Q3 2015 8/19/15[T]	Q4 2015 11/20/15[T]
Field						
D.O.[1]	ppm	--	**0.90**	**0.20**	**0.34**	**0.1**
ORP	mV	--	**23**	**97**	**11**	**20**
pH	SU	6.25-7.25	**6.8**	**7.0**	**6.8**	**7.1**
Specific Conductance	µS/cm	--	**273**	**503**	**493**	**732**
Temperature	°C	--	**7.8**	**6.4**	**11**	**7.9**
Turbidity	NTU	--	**5.5**	**0.81**	**1.3**	**2.6**
Water Elevation	ft MSL	--	**1531.53**	**1532.48**	**1532.80**	**1533.48**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	**7.7**	--
Arsenic	ug/L	20 (p)	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	400 (p)	--	--	< 100	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	4.4	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	800 (p)	< 200	< 200	< 200	< 200
Lead	ug/L	12 (p)	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)	--	--	< 10	--
Manganese	ug/L	286	**81**	<50	**180**	**350**
Mercury	ng/L	6.2	**5.7**	**10.2**	**25.7**	**36.7**
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	19	< 10	< 10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	157	**160**	**170**	**260**	**330**
Alkalinity, Carbonate	mg/L	8.0 (p)	< 2.0	< 2.0	< 2.0	< 2.0
Chloride	mg/L	12	**17**	**17**	**13**	15
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	0.38	**0.19**	**0.31**	**0.41**	**0.57**
Nitrogen, Nitrate	mg/L	0.26	< 0.1	< 0.1	< 0.1	< 0.1
Nitrogen, Nitrite	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	98	**49**	**59**	**86**	**66**
Sulfide	mg/L	0.80 (p)	< 0.20	< 0.20	< 0.20	< 0.20
Major Cations						
Calcium	mg/L	52	**42**	**45**	**50**	**61**
Magnesium	mg/L	28	**20**	**23**	**27**	**32**
Potassium	mg/L	8.4	**6.6**	**7.3**	**9.2**	**9.9**
Sodium	mg/L	14	**19**	**24**	**51**	**49**
General						
Hardness	mg/L	230	**184**	**214**	**238**	**310**

2015
Mine Permit Groundwater Quality Monitoring Data
KMW-5R (COSA)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/13/15[D]	Q2 2015 5/20/15[D]	Q3 2015 8/20/15[D]	Q4 2015 11/23/15[D]
Field						
D.O.[1]	ppm	--	**7.8**	**6.7**	**6.4**	**6.3**
ORP	mV	--	**112**	**72**	**67**	**114**
pH	SU	6.70-7.70	**6.8**	**6.9**	**6.3**	**7.1**
Specific Conductance	µS/cm	--	**707**	**1280**	**774**	**1093**
Temperature	°C	--	**6.1**	**9.0**	**8.9**	**6.0**
Turbidity	NTU	--	**84**	**74**	**244**	**273**
Water Elevation	ft MSL	--	**1557.32**	**1559.13**	**1559.00**	**1556.96**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	6.0	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	400 (p)	--	--	< 100	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	15	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	33432	**350**	**220**	**240**	<200
Lead	ug/L	4.8	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)	--	--	**16**	--
Manganese	ug/L	2815	**2400**	< 2500	**2300**	**2000**
Mercury	ng/L	2.1	**2.4**	< 1.0	< 1.0	< 1.0
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	19	< 10	< 10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	486	**360**	**350**	**350**	**350**
Alkalinity, Carbonate	mg/L	3.3	< 2.0	< 2.0	< 2.0	< 2.0
Chloride	mg/L	139	**150**	**170**	**160**	**150**
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	0.76	<0.03	<0.03	**0.03**	<0.03
Nitrogen, Nitrate	mg/L	0.11	< 0.1	< 0.1	< 0.1	**0.12**
Nitrogen, Nitrite	mg/L	0.06	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	123	**81**	**82**	**92**	**94**
Sulfide	mg/L	3.9	**0.03**	< 0.20	< 0.20	< 0.20
Major Cations						
Calcium	mg/L	169	**150**	**160**	**150**	**160**
Magnesium	mg/L	67	**58**	**65**	**65**	**63**
Potassium	mg/L	9.1	**7.7**	**7.7**	**8.2**	**8.3**
Sodium	mg/L	50	**3.3**	**3.3**	**3.7**	**3.8**
General						
Hardness	mg/L	800	**632**	**630**	**594**	**634**

2015
Mine Permit Groundwater Quality Monitoring Data
MW-701 QAL (Leachate)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/11/15[D]	Q2 2015 5/19/15[T]	Q3 2015 8/19/15[T]	Q4 2015 11/17/15[T]
Field						
D.O.[1]	ppm	--	**4.8**	**2.6**	**8.5**	**6.0**
ORP	mV	--	**96**	**49**	**44**	**103**
pH	SU	5.82-6.82	**6.1**	**6.5**	**5.6**	**6.2**
Specific Conductance	µS/cm	--	**184**	**307**	**136**	**152**
Temperature	°C	--	**7.7**	**5.0**	**15**	**9.3**
Turbidity	NTU	--	**6.7**	**0.75**	**1.8**	**1.6**
Water Elevation	ft MSL	--	**1532.13**	**1532.38**	**1530.99**	**1530.52**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	20 (p)	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	400 (p)	--	--	< 100	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	16 (p)	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	459	< 200	< 200	< 200	< 200
Lead	ug/L	12 (p)	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)	--	--	< 10	--
Manganese	ug/L	4801	**1400**	<50	**190**	<50
Mercury	ng/L	11	<1.0	**2.0**	**1.6**	**1.2**
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	40 (p)	< 10	< 10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	189	**73**	**60**	**39**	**36**
Alkalinity, Carbonate	mg/L	8.0 (p)	< 2.0	< 2.0	< 2.0	< 2.0
Chloride	mg/L	19	**17**	**14**	< 10	< 10
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	0.39	<0.03	<0.03	**0.03**	<0.03
Nitrogen, Nitrate	mg/L	3.1	**0.68**	**0.79**	**0.54**	**0.55**
Nitrogen, Nitrite	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	110	**46**	**45**	**27**	**29**
Sulfide	mg/L	0.22	< 0.20	< 0.20	< 0.20	< 0.20
Major Cations						
Calcium	mg/L	57	**25**	**23**	**13**	**12**
Magnesium	mg/L	26	**10**	**9.8**	**5.2**	**4.8**
Potassium	mg/L	9.2	**6.0**	**5.7**	**4.0**	**4.5**
Sodium	mg/L	14	**9.4**	**11**	**7.0**	**6.7**
General						
Hardness	mg/L	272	**112**	**101**	**57**	**51**

2015
Mine Permit Groundwater Quality Monitoring Data
MW-701 UFB (Leachate)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/11/15[D]	Q2 2015 5/19/15[D]	Q3 2015 8/19/15[D]	Q4 2015 11/17/15[D]
Field						
D.O.[1]	ppm	--	**2.5**	**0.30**	**0.18**	**0.23**
ORP	mV	--	**-115**	**-1.1**	**-121**	**-101**
pH	SU	7.18-8.18	**7.1**	**6.5**	**7.0**	**7.3**
Specific Conductance	µS/cm	--	**212**	**560**	**261**	**377**
Temperature	°C	--	**6.7**	**5.6**	**13**	**8.5**
Turbidity	NTU	--	**15**	**1.3**	**20**	**18**
Water Elevation	ft MSL	--	**1532.26**	**1533.88**	**1531.15**	**1530.76**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	20 (p)	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	400 (p)	--	--	**120**	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	30	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	27405	**14000**	**17000**	**18000**	**19000**
Lead	ug/L	12 (p)	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)	--	--	< 10	--
Manganese	ug/L	6881	**2500**	<50	**2400**	**2500**
Mercury	ng/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	26	< 10	< 10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	172	**160**	**140**	**140**	**140**
Alkalinity, Carbonate	mg/L	18	< 2.0	< 2.0	< 2.0	< 2.0
Chloride	mg/L	43	< 10	< 10	< 10	< 10
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	1.6	**0.04**	< 0.03	< 0.03	< 0.03
Nitrogen, Nitrate	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Nitrogen, Nitrite	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	80	**11**	**11**	**13**	**26**
Sulfide	mg/L	1.7	< 0.20	< 0.20	< 0.20	< 0.20
Major Cations						
Calcium	mg/L	40	**31**	**33**	**31**	**34**
Magnesium	mg/L	16	**13**	**14**	**13**	**15**
Potassium	mg/L	13	**3.5**	**4.0**	**3.2**	**2.8**
Sodium	mg/L	56	**5.3**	**5.4**	**4.7**	**4.6**
General						
Hardness	mg/L	163	**146**	**143**	**141**	**156**

2015
Mine Permit Groundwater Quality Monitoring Data
MW-702 QAL (Leachate)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/11/15[D]	Q2 2015 5/20/15[D]	Q3 2015 8/20/15[D]	Q4 2015 11/23/15[D]
Field						
D.O.[1]	ppm	--	**4.7**	**1.8**	**2.4**	**1.3**
ORP	mV	--	**58**	**94**	**119**	**40**
pH	SU	9.76-10.76	**9.7**	**9.6**	**9.7**	**7.6**
Specific Conductance	µS/cm	--	**263**	**483**	**319**	**471**
Temperature	°C	--	**6.6**	**7.0**	**9.3**	**6.2**
Turbidity	NTU	--	**11**	**10**	**5.5**	**6.1**
Water Elevation	ft MSL	--	**1531.81**	**1531.59**	**1529.97**	**1529.41**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	7.5	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	155	--	--	**100**	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	16 (p)	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	386	< 200	< 200	< 200	< 200
Lead	ug/L	12 (p)	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)	--	--	< 10	--
Manganese	ug/L	717	**260**	<50	**130**	**240**
Mercury	ng/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	40 (p)	**11**	< 10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	194	**98**	**25**	**65**	**110**
Alkalinity, Carbonate	mg/L	54	< 2.0	**5.9**	**4.0**	< 2.0
Chloride	mg/L	12	**12**	**18**	**14**	< 10
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	0.03	<0.03	<0.03	<0.03	<0.03
Nitrogen, Nitrate	mg/L	1.8	**0.45**	**0.69**	**0.89**	**0.43**
Nitrogen, Nitrite	mg/L	0.12	< 0.1	< 0.1	< 0.1	**0.13**
Sulfate	mg/L	148	**93**	**96**	**110**	**100**
Sulfide	mg/L	0.80 (p)	< 0.20	< 0.20	< 0.20	< 0.20
Major Cations						
Calcium	mg/L	99	**46**	**58**	**51**	**48**
Magnesium	mg/L	17	**8.3**	**7.6**	**9.9**	**13**
Potassium	mg/L	36	**6.5**	**7.1**	**6.0**	**4.7**
Sodium	mg/L	42	**17**	**27**	**27**	**20**
General						
Hardness	mg/L	286	**167**	**180**	**171**	**170**

2015
Mine Permit Groundwater Quality Monitoring Data
MW-702 UFB (Leachate)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/9/15[D]	Q2 2015 5/18/15[D]	Q3 2015 8/18/15[D]	Q4 2015 11/30/15[D]
Field						
D.O.[1]	ppm	--	**2.4**	**0.18**	**0.40**	**3.3**
ORP	mV	--	**-141**	**-100**	**155**	**237**
pH	SU	8.51-9.51	**8.6**	**7.0**	**7.0**	**8.8**
Specific Conductance	µS/cm	--	**158**	**270**	**199**	**261**
Temperature	°C	--	**7.8**	**7.6**	**8.1**	**6.2**
Turbidity	NTU	--	**29**	**27**	**21**	**14**
Water Elevation	ft MSL	--	**1532.46**	**1524.85**	**1530.61**	**1527.62**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	20 (p)	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	400 (p)	--	--	< 100	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	16 (p)	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	2484	**810**	**600**	**630**	**730**
Lead	ug/L	12 (p)	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)	--	--	< 10	--
Manganese	ug/L	126	**94**	**86**	**110**	**81**
Mercury	ng/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	66	**11**	< 10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	125	**96**	**91**	**95**	**96**
Alkalinity, Carbonate	mg/L	15	< 2.0	< 2.0	< 2.0	< 2.0
Chloride	mg/L	40 (p)	< 10	< 10	< 10	< 10
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	0.12 (p)	<0.03	<0.03	<0.03	<0.03
Nitrogen, Nitrate	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Nitrogen, Nitrite	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	36	**34**	**34**	**36**	**34**
Sulfide	mg/L	0.80 (p)	< 0.20	< 0.20	< 0.20	< 0.20
Major Cations						
Calcium	mg/L	49	**31**	**27**	**30**	**30**
Magnesium	mg/L	14	**9.0**	**8.3**	**9.8**	**8.9**
Potassium	mg/L	22	**2.7**	**2.6**	**3.3**	**2.8**
Sodium	mg/L	8.0	**2.8**	**2.7**	**3.1**	**3.2**
General						
Hardness	mg/L	160	**115**	**119**	**118**	**115**

2015
Mine Permit Groundwater Quality Monitoring Data
MW-703 QAL (Compliance)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/11/15[D]		Q2 2015 5/20/15[T]		Q3 2015 8/20/15[D]		Q4 2015 11/20/15[D]	
Field										
D.O.[1]	ppm	--	**12**		**6.4**		**6.5**		**5.3**	
ORP	mV	--	**48**		**106**		**129**		**113**	
pH	SU	7.19-8.19	**7.8**		**6.1**		**6.0**		**6.9**	
Specific Conductance	µS/cm	--	**108**		**184**		**117**		**180**	
Temperature	°C	--	**8.8**		**6.0**		**8.3**		**5.6**	
Turbidity	NTU	--	**9.4**		**2.4**		**4.2**		**5.9**	
Water Elevation	ft MSL	--	**1533.83**		**1534.75**		**1535.07**		**1534.06**	
Metals										
Aluminum	ug/L	200 (p)	--		--		< 50		--	
Antimony	ug/L	8.0 (p)	--		--		< 2.0		--	
Arsenic	ug/L	20 (p)	< 5.0		< 5.0		< 5.0		< 5.0	
Barium	ug/L	400 (p)	--		--		< 100		--	
Beryllium	ug/L	4.0 (p)	--		--		< 1.0		--	
Boron	ug/L	1200 (p)	--		--		< 300		--	
Cadmium	ug/L	4.0 (p)	--		--		< 1.0		--	
Chromium	ug/L	40 (p)	--		--		< 10		--	
Cobalt	ug/L	80 (p)	--		--		< 20		--	
Copper	ug/L	16 (p)	< 4.0		< 4.0		< 4.0		< 4.0	
Iron	ug/L	255	< 200		< 200		< 200		< 200	
Lead	ug/L	12 (p)	< 3.0		< 3.0		< 3.0		< 3.0	
Lithium	ug/L	40 (p)	--		--		< 10		--	
Manganese	ug/L	105	< 50		**91**		**90**		< 50	
Mercury	ng/L	4.0 (p)	< 1.0		< 1.0		< 1.0		< 1.0	
Molybdenum	ug/L	200 (p)	--		--		< 50		--	
Nickel	ug/L	80 (p)	< 20		< 20		< 20		< 20	
Selenium	ug/L	20 (p)	--		--		< 5.0		--	
Silver	ug/L	0.8 (p)	--		--		< 0.2		--	
Thallium	ug/L	8.0 (p)	--		--		< 2.0		--	
Vanadium	ug/L	16 (p)	--		--		< 4.0		--	
Zinc	ug/L	40 (p)	< 10		< 10		< 10		**170**	
Major Anions										
Alkalinity, Bicarbonate	mg/L	100	**71**		**67**		**58**		**60**	
Alkalinity, Carbonate	mg/L	8.0 (p)	< 2.0		< 2.0		< 2.0		< 2.0	
Chloride	mg/L	40 (p)	< 10		< 10		< 10		< 10	
Fluoride	mg/L	131	< 1.0		< 1.0		< 1.0		< 1.0	
Nitrogen, Ammonia	mg/L	0.12 (p)	<0.03		<0.03		<0.03		<0.03	
Nitrogen, Nitrate	mg/L	0.22	**0.27**		**0.35**		**0.50**		**0.55**	
Nitrogen, Nitrite	mg/L	0.40 (p)	< 0.1		< 0.1		< 0.1		< 0.1	
Sulfate	mg/L	50	**19**		**20**		**25**		**22**	
Sulfide	mg/L	0.30	< 0.20		< 0.20		< 0.20		< 0.20	
Major Cations										
Calcium	mg/L	40	**20**		**19**		**18**		**19**	
Magnesium	mg/L	11	**6.9**		**6.6**		**7.3**		**7.9**	
Potassium	mg/L	3.1	**1.8**		**1.9**		**1.8**		**1.6**	
Sodium	mg/L	10	**3.6**		**3.7**		**3**		**4.7**	
General										
Hardness	mg/L	136	**78**		**80**		**78**		**76**	

2015
Mine Permit Groundwater Quality Monitoring Data
MW-703 UFB (Compliance)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/9/15[D]	Q2 2015 5/18/15[D]	Q3 2015 8/18/15[D]	Q4 2015 11/23/15[D]
Field						
D.O.[1]	ppm	--	**3.0**	**0.42**	**4.5**	**0.90**
ORP	mV	--	**-137**	**-181**	**160**	**40**
pH	SU	8.28-9.28	**8.4**	**8.3**	**7.6**	**8.4**
Specific Conductance	µS/cm	--	**170**	**285**	**286**	**296**
Temperature	°C	--	**7.8**	**6.8**	**7.4**	**5.9**
Turbidity	NTU	--	**6.8**	**13**	**3.3**	**8.4**
Water Elevation	ft MSL	--	**1532.79**	**1533.02**	**1532.73**	**1528.56**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	20 (p)	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	400 (p)	--	--	< 100	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	16 (p)	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	2441	**1100**	**720**	**1400**	**680**
Lead	ug/L	12 (p)	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)	--	--	< 10	--
Manganese	ug/L	194	**160**	**150**	**160**	**160**
Mercury	ng/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	14	< 10	< 10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	127	**91**	**78**	**83**	**85**
Alkalinity, Carbonate	mg/L	28	< 2.0	< 2.0	< 2.0	< 2.0
Chloride	mg/L	40 (p)	< 10	< 10	< 10	< 10
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	0.47	<0.03	<0.03	<0.03	**0.46**
Nitrogen, Nitrate	mg/L	0.4 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Nitrogen, Nitrite	mg/L	0.4 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	53	**42**	**44**	**44**	**45**
Sulfide	mg/L	0.80 (p)	< 0.20	< 0.20	< 0.20	< 0.20
Major Cations						
Calcium	mg/L	53	**31**	**31**	**31**	**35**
Magnesium	mg/L	17	**9.9**	**9.8**	**10**	**11**
Potassium	mg/L	5.9	**2.6**	**2.4**	**2.5**	**2.5**
Sodium	mg/L	35	**2.9**	**2.7**	**3.2**	**3.0**
General						
Hardness	mg/L	193	**121**	**127**	**123**	**129**

2015
Mine Permit Groundwater Quality Monitoring Data
MW-703 LLA (Compliance)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/10/15[D]	Q2 2015 5/18/15[D]	Q3 2015 8/18/15[T]	Q4 2015 11/20/15[D]
Field						
D.O.[1]	ppm	--	**1.0**	**0.34**	**0.20**	**0.07**
ORP	mV	--	**290**	**-268**	**-268**	**-213**
pH	SU	8.21-9.21	**8.7**	**8.9**	**9.1**	**8.9**
Specific Conductance	µS/cm	--	**236**	**368**	**311**	**298**
Temperature	°C	--	**7.6**	**8.8**	**8.4**	**5.4**
Turbidity	NTU	--	**13**	**6.4**	**2.9**	**3.8**
Water Elevation	ft MSL	--	**1532.40**	**1533.27**	**1532.53**	**1531.72**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	20 (p)	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	400 (p)	--	--	< 100	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	16 (p)	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	2966	**610**	**460**	**830**	**670**
Lead	ug/L	12 (p)	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	30	--	--	**11**	--
Manganese	ug/L	101	**50**	< 50	< 50	**79**
Mercury	ng/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	40+	< 10	< 10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	84	**77**	**82**	**79**	**87**
Alkalinity, Carbonate	mg/L	4.0	< 2.0	< 2.0	**8.1**	< 2.0
Chloride	mg/L	124	**55**	**48**	**40**	**22**
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	0.08	<0.03	<0.03	<0.03	<0.03
Nitrogen, Nitrate	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Nitrogen, Nitrite	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	44	**21**	**16**	**10**	**19**
Sulfide	mg/L	0.80 (p)	< 0.20	< 0.20	< 0.20	< 0.20
Major Cations						
Calcium	mg/L	39	**23**	**20**	**24**	**26**
Magnesium	mg/L	13	**9.4**	**8.3**	**10**	**10**
Potassium	mg/L	9.7	**5.7**	**4.7**	**5.4**	**4.1**
Sodium	mg/L	67	**28**	**21**	**24**	**12**
General						
Hardness	mg/L	138	**105**	**100**	**96**	**105**

2015
Mine Permit Groundwater Quality Monitoring Data
MW-703 DBA (Compliance)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/10/15[D]	Q2 2015 5/18/15[T]	Q3 2015 8/18/15[T]	Q4 2015 11/20/15[D]
Field						
D.O.[1]	ppm	--	**1.4**	**1.0**	**0.90**	**0.22**
ORP	mV	--	**-101**	**-74**	**22**	**10**
pH	SU	8.67-9.67	**9.5**	**9.1**	**9.2**	**10.6**
Specific Conductance	µS/cm	--	**149**	**245**	**238**	**260**
Temperature	°C	--	**7.2**	**9.6**	**13**	**2.4**
Turbidity	NTU	--	**4.7**	**0.70**	**0.67**	**5.0**
Water Elevation	ft MSL	--	**1532.49**	**1532.65**	**1532.06**	**1531.67**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	20 (p)	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	400 (p)	--	--	< 100	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	16 (p)	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	2738	< 200	< 200	< 200	< 200
Lead	ug/L	12 (p)	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	17	--	--	**16**	--
Manganese	ug/L	60	< 50	< 50	< 50	< 50
Mercury	ng/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	22	< 10	< 10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	74	**51**	**61**	**45**	**30**
Alkalinity, Carbonate	mg/L	27	**26**	**18**	**32**	**38**
Chloride	mg/L	20	**18**	**19**	**17**	**18**
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	0.12	<0.03	<0.03	<0.03	<0.03
Nitrogen, Nitrate	mg/L	0.11	< 0.1	< 0.1	< 0.1	**0.5**
Nitrogen, Nitrite	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	91	**14**	**1.6**	**1.7**	**5.1**
Sulfide	mg/L	0.80 (p)	0.74	**1.4**	**0.38**	**0.36**
Major Cations						
Calcium	mg/L	29	**7.9**	**8.4**	**5.9**	**4.1**
Magnesium	mg/L	17	**9.1**	**9.5**	**6.9**	**4.2**
Potassium	mg/L	15	**20**	**17**	**27**	**29**
Sodium	mg/L	14	**13**	**12**	**15**	**15**
General						
Hardness	mg/L	137	**57**	**61**	**44**	**29**

2015
Mine Permit Groundwater Quality Monitoring Data
MW-704 QAL (Compliance)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/12/15[D]	Q2 2015 5/20/15[T]	Q3 2015 8/19/15[T]	Q4 2015 11/17/15[T]
Field						
D.O.[1]	ppm	--	**1.5**	**0.30**	**0.94**	**0.45**
ORP	mV	--	**26**	**-1.1**	**22**	**42**
pH	SU	5.49-6.49	**5.9**	**6.5**	**5.8**	**6.2**
Specific Conductance	µS/cm	--	**193**	**560**	**281**	**264**
Temperature	°C	--	**6.4**	**5.6**	**16**	**9.6**
Turbidity	NTU	--	**6.1**	**1.3**	**2.5**	**2.3**
Water Elevation	ft MSL	--	**1531.88**	**1532.74**	**1532.99**	**1534.27**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	24	**12**	**20**	**21**	< 5.0
Barium	ug/L	400 (p)	--	--	< 100	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	16 (p)	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	37038	**12000**	**44000**	**21000**	**4000**
Lead	ug/L	12 (p)	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)	--	--	< 10	--
Manganese	ug/L	7914	**4400**	<50	**5600**	**1500**
Mercury	ng/L	6.0	**4.5**	**15**	**6.1**	**1.3**
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	44 (p)	< 10	< 10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	241	**120**	**160**	**130**	**87**
Alkalinity, Carbonate	mg/L	8.0 (p)	< 2.0	< 2.0	< 2.0	< 2.0
Chloride	mg/L	18	**20**	**15**	**27**	**15**
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	0.04	**0.06**	**0.06**	<0.03	<0.03
Nitrogen, Nitrate	mg/L	0.17	< 0.1	< 0.1	< 0.1	< 0.1
Nitrogen, Nitrite	mg/L	0.40 (p)	< 0.1	**0.11**	< 0.1	< 0.1
Sulfate	mg/L	23	**11**	**16**	**12**	**13**
Sulfide	mg/L	0.80 (p)	< 0.20	< 0.20	< 0.20	< 0.20
Major Cations						
Calcium	mg/L	51	**28**	**32**	**27**	**26**
Magnesium	mg/L	9.0	**5.7**	**7.5**	**6.8**	**8.0**
Potassium	mg/L	3.1	**2.3**	**2.6**	**2.7**	**2.1**
Sodium	mg/L	27	**13**	**25**	**18**	**5.4**
General						
Hardness	mg/L	185	**104**	**125**	**103**	**102**

2015
Mine Permit Groundwater Quality Monitoring Data
MW-704 UFB (Compliance)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/11/15[D]	Q2 2015 5/17/15[D]	Q3 2015 8/19/15[D]	Q4 2015 11/17/15[D]
Field						
D.O.[1]	ppm	--	**0.88**	**0.30**	**0.92**	**0.40**
ORP	mV	--	**-121**	**-158**	**-55**	**-29**
pH	SU	6.39-7.39	**7.1**	**7.9**	**6.9**	**6.6**
Specific Conductance	µS/cm	--	**1880**	**326**	**226**	**435**
Temperature	°C	--	**7.7**	**6.3**	**10**	**8.6**
Turbidity	NTU	--	**27**	**22**	**5.0**	**8.1**
Water Elevation	ft MSL	--	**1532.08**	**1533.04**	**1533.06**	**1534.59**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	20 (p)	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	400 (p)	--	--	< 100	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	5.0	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	23040	**3400**	**2000**	**4000**	**11000**
Lead	ug/L	4.0	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)	--	--	**11**	--
Manganese	ug/L	618	**650**	**490**	**850**	**1100**
Mercury	ng/L	2.0+	< 1.0	< 1.0	< 1.0	< 1.0
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	15	< 10	**210**	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	181	**140**	**140**	**150**	**150**
Alkalinity, Carbonate	mg/L	8.0 (p)	< 2.0	< 2.0	< 2.0	< 2.0
Chloride	mg/L	18	< 10	< 10	< 10	**17**
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	0.27	**0.05**	**0.03**	**0.04**	**0.03**
Nitrogen, Nitrate	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Nitrogen, Nitrite	mg/L	0.14	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	38	**5.1**	**6.9**	**9.9**	**10**
Sulfide	mg/L	0.80 (p)	**0.39**	**0.38**	**0.26**	< 0.20
Major Cations						
Calcium	mg/L	38	**28**	**31**	**36**	**54**
Magnesium	mg/L	7.0	**6.6**	**7.9**	**9.4**	**8.6**
Potassium	mg/L	4.0	**3.7**	**4.8**	**4.0**	**3.3**
Sodium	mg/L	65	**14**	**11**	**10**	**6.5**
General						
Hardness	mg/L	106	**106**	**116**	**136**	**170**

2015
Mine Permit Groundwater Quality Monitoring Data
MW-704 LLA (Compliance)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/10/15[D]	Q2 2015 5/19/15[D]	Q3 2015 8/19/15[D]	Q4 2015 11/17/15[D]
Field						
D.O.[1]	ppm	--	**1.1**	**0.5**	**1.3**	**1.9**
ORP	mV	--	**-266**	**116**	**103**	**39**
pH	SU	8.24-9.24	**9.0**	**8.6**	**8.6**	**8.7**
Specific Conductance	µS/cm	--	**128**	**221**	**148**	**208**
Temperature	°C	--	**8.1**	**5.3**	**13**	**3.5**
Turbidity	NTU	--	**23**	**12**	**9.5**	**3.2**
Water Elevation	ft MSL	--	**1532.16**	**1533.41**	**1532.82**	**1534.11**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	20 (p)	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	400 (p)	--	--	< 100	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	16 (p)	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	4974	**400**	**510**	**230**	< 200
Lead	ug/L	12 (p)	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)	--	--	**22**	--
Manganese	ug/L	90	< 50	< 50	< 50	< 50
Mercury	ng/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	11	< 10	< 10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	132	**100**	**82**	**84**	**84**
Alkalinity, Carbonate	mg/L	10	< 2.0	**12**	**6.1**	**14**
Chloride	mg/L	40 (p)	< 10	< 10	< 10	< 10
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	0.12 (p)	<0.03	<0.03	<0.03	<0.03
Nitrogen, Nitrate	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Nitrogen, Nitrite	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	23	**10**	**9.3**	**8.4**	**5.0**
Sulfide	mg/L	0.80 (p)	< 0.20	< 0.20	< 0.20	< 0.20
Major Cations						
Calcium	mg/L	33	**14**	**22**	**13**	**13**
Magnesium	mg/L	17	**11**	**9.2**	**11**	**10**
Potassium	mg/L	5.0	**6.9**	**5.3**	**10**	**9.5**
Sodium	mg/L	5.0	**4.6**	**25**	**5.4**	**5.0**
General						
Hardness	mg/L	149	**85**	**76**	**73**	**80**

Explanations of abbreviations are included on the final page of this table.

2015
Mine Permit Groundwater Quality Monitoring Data
MW-704 DBA (Compliance)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/10/15[T]	Q2 2015 5/19/15[T]	Q3 2015 8/18/15[T]	Q4 2015 11/17/15[T]
Field						
D.O.[1]	ppm	--	**2.6**	**0.52**	**1.1**	**0.30**
ORP	mV	--	**-56**	**-62**	**-53**	**-6**
pH	SU	8.63-9.63	**9.1**	**7.6**	**8.5**	**8.5**
Specific Conductance	µS/cm	--	**138**	**267**	**176**	**234**
Temperature	°C	--	**6.7**	**4.3**	**13**	**8.0**
Turbidity	NTU	--	**2.8**	**1.4**	**2.1**	**1.6**
Water Elevation	ft MSL	--	**1532.56**	**1533.83**	**1533.52**	**1533.47**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	20 (p)	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	400 (p)	--	--	< 100	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1480	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	16 (p)	< 4.0	**4.5**	< 4.0	< 4.0
Iron	ug/L	9645	**520**	**530**	**630**	**630**
Lead	ug/L	12 (p)	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)	--	--	**12**	--
Manganese	ug/L	58	< 50	< 50	< 50	< 50
Mercury	ng/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	11	< 10	< 10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	129	**120**	**120**	**120**	**110**
Alkalinity, Carbonate	mg/L	32	< 2.0	**12**	**8.1**	**12**
Chloride	mg/L	40 (p)	< 10	< 10	< 10	< 10
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	0.04	< 0.03	< 0.03	< 0.03	< 0.03
Nitrogen, Nitrate	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Nitrogen, Nitrite	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	6.0	**1.9**	**1.3**	< 1.0	< 1.0
Sulfide	mg/L	0.80 (p)	< 0.20	< 0.20	< 0.20	< 0.20
Major Cations						
Calcium	mg/L	27	**19**	**20**	**22**	**21**
Magnesium	mg/L	14	**10**	**11**	**11**	**10**
Potassium	mg/L	4.0	**2.7**	**2.7**	**2.8**	**2.8**
Sodium	mg/L	14	**11**	**11**	**12**	**11**
General						
Hardness	mg/L	111	**97**	**106**	**101**	**96**

2015
Mine Permit Groundwater Quality Monitoring Data
MW-705 QAL (Cutoff Wall Key-In)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/11/15[D]	Q2 2015 5/19/15[T]	Q3 2015 8/19/15[T]	Q4 2015 11/20/15[T]
Field						
D.O.[1]	ppm	--	**1.4**	**0.18**	**0.22**	**0.20**
ORP	mV	--	**7.1**	**-4.3**	**9.6**	**24**
pH	SU	5.62-6.62	**6.0**	**6.7**	**5.9**	**6.6**
Specific Conductance	µS/cm	--	**131**	**266**	**188**	**316**
Temperature	°C	--	**5.5**	**5.2**	**13**	**8.1**
Turbidity	NTU	--	**6.9**	**1.1**	**1.5**	**2.5**
Water Elevation	ft MSL	--	**1534.09**	**1536.05**	**1534.56**	**1534.30**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	20 (p)	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	400 (p)	--	--	< 100	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	16 (p)	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	14081	**8100**	**7700**	**8000**	**9800**
Lead	ug/L	12 (p)	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)	--	--	< 10	--
Manganese	ug/L	1674	**880**	< 50	**830**	< 1200
Mercury	ng/L	1.0	< 1.0	< 1.0	< 1.0	< 1.0
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	174	<10	<10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	94	**63**	**46**	**56**	**54**
Alkalinity, Carbonate	mg/L	8.0 (p)	< 2.0	< 2.0	< 2.0	< 2.0
Chloride	mg/L	66	**23**	**32**	**34**	**32**
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	0.10	**0.06**	**0.08**	**0.09**	**0.07**
Nitrogen, Nitrate	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Nitrogen, Nitrite	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	6.0	**4.7**	**6.8**	**2.8**	**33**
Sulfide	mg/L	0.80 (p)	< 0.20	< 0.20	< 0.20	< 0.20
Major Cations						
Calcium	mg/L	27	**17**	**15**	**17**	**20**
Magnesium	mg/L	13	**7.3**	**6.7**	**7.1**	**8.4**
Potassium	mg/L	3.0	**2.2**	**2.1**	**2.6**	**2.8**
Sodium	mg/L	17	**8.9**	**9.6**	**12**	**12**
General						
Hardness	mg/L	115	**76**	**71**	**74**	**93**

2015
Mine Permit Groundwater Quality Monitoring Data
MW-705 UFB (Cutoff Wall Key-In)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/11/15[D]	Q2 2015 5/19/15[D]	Q3 2015 8/20/15[D]	Q4 2015 11/17/15[D]
Field						
D.O.[1]	ppm	--	**5.5**	**0.87**	**0.80**	**0.44**
ORP	mV	--	**-27**	**-41**	**134**	**31**
pH	SU	6.72-7.72	**6.5**	**7.0**	**8.8**	**7.0**
Specific Conductance	µS/cm	--	**132**	**264**	**172**	**269**
Temperature	°C	--	**6.3**	**6.2**	**8.0**	**6.1**
Turbidity	NTU	--	**35**	**14**	**9.9**	**6.6**
Water Elevation	ft MSL	--	**1533.98**	**1536.16**	**1534.17**	**1534.65**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	20 (p)	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	400 (p)	--	--	< 100	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	16 (p)	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	11214	**7400**	**8600**	**8600**	**12000**
Lead	ug/L	12 (p)	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)	--	--	**10**	--
Manganese	ug/L	866	**780**	**550**	**700**	**810**
Mercury	ng/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	17	< 10	< 10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	103	**140**	**92**	**88**	**85**
Alkalinity, Carbonate	mg/L	8.0 (p)	< 2.0	< 2.0	< 2.0	< 2.0
Chloride	mg/L	40 (p)	< 10	< 10	**12**	**15**
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	0.12 (p)	<0.03	<0.03	<0.03	<0.03
Nitrogen, Nitrate	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Nitrogen, Nitrite	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	15	**9.8**	**7.2**	**5.6**	**5.2**
Sulfide	mg/L	0.80 (p)	< 0.20	< 0.20	< 0.20	< 0.20
Major Cations						
Calcium	mg/L	26	**20**	**21**	**21**	**22**
Magnesium	mg/L	12	**9.8**	**11**	**11**	**11**
Potassium	mg/L	4.0	**3.4**	**3.3**	**3.7**	**3.8**
Sodium	mg/L	3.0	**2.5**	**2.7**	**2.8**	**3.1**
General						
Hardness	mg/L	111	**100**	**98**	**100**	**98**

2015
Mine Permit Groundwater Quality Monitoring Data
MW-706 QAL (MSB & Crusher)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/12/15[D]	Q2 2015 5/20/15[T]	Q3 2015 8/20/15[T]	Q4 2015 11/23/15[D]
Field						
D.O.[1]	ppm	--	**6.7**	**0.24**	**0.44**	**0.21**
ORP	mV	--	**21**	**-4.7**	**17**	**74**
pH	SU	6.24-7.24	**6.2**	**6.9**	**6.5**	**6.4**
Specific Conductance	µS/cm	--	**581**	**787**	**648**	**843**
Temperature	°C	--	**7.3**	**8.7**	**12**	**6.6**
Turbidity	NTU	--	**6.6**	**1.4**	**1.3**	**3.0**
Water Elevation	ft MSL	--	**1559.05**	**1561.11**	**1561.17**	**1558.84**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	16	**7.2**	**6.0**	**6.4**	**5.9**
Barium	ug/L	400 (p)	--	--	< 100	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	**24**	--
Copper	ug/L	16 (p)	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	10846	**6300**	**6200**	**4700**	**5600**
Lead	ug/L	12 (p)	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)	--	--	< 10	--
Manganese	ug/L	27225	**18000**	< 25000	**15000**	**14000**
Mercury	ng/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	**23**	**22**	**21**	**25**
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	55	< 10	< 10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	153	**100**	**94**	**93**	**89**
Alkalinity, Carbonate	mg/L	8.0 (p)	< 2.0	< 2.0	< 2.0	< 2.0
Chloride	mg/L	105	**95**	**96**	**86**	**100**
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	1.4	**0.37**	**0.42**	**0.38**	**0.39**
Nitrogen, Nitrate	mg/L	0.4 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Nitrogen, Nitrite	mg/L	0.4 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	479	**280**	**250**	**220**	**210**
Sulfide	mg/L	0.80 (p)	< 0.20	< 0.20	< 0.20	< 0.20
Major Cations						
Calcium	mg/L	183	**100**	**97**	**86**	**88**
Magnesium	mg/L	56	**33**	**33**	**28**	**31**
Potassium	mg/L	6.0	**4.3**	**4.5**	**4.2**	**4.5**
Sodium	mg/L	234	**39**	**33**	**24**	**27**
General						
Hardness	mg/L	609	**7**	**414**	**14**	**188**

2015
Mine Permit Groundwater Quality Monitoring Data
MW-707 QAL (Concentrator & CLO)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/12/15[D]	Q2 2015 5/20/15[T]	Q3 2015 8/20/15[T]	Q4 2015 11/23/15[T]
Field						
D.O.[1]	ppm	--	**5.2**	**0.32**	**0.44**	**0.30**
ORP	mV	--	**-69**	**-102**	**-50**	**-55**
pH	SU	6.30-7.30	**6.9**	**7.0**	**6.8**	**7.5**
Specific Conductance	µS/cm	--	**175**	**342**	**240**	**340**
Temperature	°C	--	**5.1**	**8.2**	**12**	**6.5**
Turbidity	NTU	--	**7.9**	**1.8**	**1.6**	**2.9**
Water Elevation	ft MSL	--	**1582.70**	**1582.71**	**1582.24**	**1581.94**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	20 (p)	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	400 (p)	--	--	< 100	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	< 20	--
Copper	ug/L	16 (p)	< 4.0	< 4.0	< 4.0	< 4.0
Iron	ug/L	7493	**6100**	**6000**	**5800**	**5700**
Lead	ug/L	12 (p)	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)	--	--	< 10	--
Manganese	ug/L	1189	**990**	<50	**1000**	**1000**
Mercury	ng/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	< 20	< 20	< 20	< 20
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	19	< 10	< 10	< 10	< 10
Major Anions						
Alkalinity, Bicarbonate	mg/L	150	**160**	**150**	**160**	**160**
Alkalinity, Carbonate	mg/L	8.0 (p)	< 2.0	< 2.0	< 2.0	< 2.0
Chloride	mg/L	40 (p)	< 10	< 10	< 10	< 10
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	0.34	**0.27**	**0.31**	**0.29**	**0.28**
Nitrogen, Nitrate	mg/L	0.40 (p)	< 0.1	**0.13**	< 0.1	< 0.1
Nitrogen, Nitrite	mg/L	0.40 (p)	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	8.0	**6.4**	**7.2**	**8.1**	**9.8**
Sulfide	mg/L	0.80 (p)	< 0.20	<0.02	< 0.20	< 0.20
Major Cations						
Calcium	mg/L	51	**39**	**39**	**41**	**42**
Magnesium	mg/L	15	**12**	**11**	**12**	**12**
Potassium	mg/L	3.0	**2.5**	**2.4**	**2.4**	**2.4**
Sodium	mg/L	4.0	**3.0**	**3.2**	**3.0**	**3.0**
General						
Hardness	mg/L	149	**150**	**153**	**153**	**154**

2015
Mine Permit Groundwater Quality Monitoring Data
MW-9R (Concentrator)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 3/13/15[D]	Q2 2015 5/20/15[T]	Q3 2015 8/20/15[D]	Q4 2015 11/23/15[T]
Field						
D.O.[1]	ppm	--	**8.9**	**0.49**	**6.0**	**0.67**
ORP	mV	--	**158**	**67**	**77**	**89**
pH	SU	5.44-6.44	**5.4**	**6.1**	**6.2**	**5.9**
Specific Conductance	µS/cm	--	**555**	**322**	**393**	**733**
Temperature	°C	--	**4.7**	**7.2**	**13**	**11**
Turbidity	NTU	--	**11**	**1.6**	**84**	**2.4**
Water Elevation	ft MSL	--	**1596.09**	**1596.25**	**1591.49**	**1595.27**
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	8.0 (p)	--	--	< 2.0	--
Arsenic	ug/L	25	< 5.0	< 5.0	< 5.0	< 5.0
Barium	ug/L	400 (p)	--	--	< 100	--
Beryllium	ug/L	4.0 (p)	--	--	< 1.0	--
Boron	ug/L	1200 (p)	--	--	< 300	--
Cadmium	ug/L	4.0 (p)	--	--	< 1.0	--
Chromium	ug/L	40 (p)	--	--	< 10	--
Cobalt	ug/L	80 (p)	--	--	**28**	--
Copper	ug/L	5.0	**32**	< 4.0	< 4.0	**9.6**
Iron	ug/L	25558	**1100**	**670**	< 200	**1800**
Lead	ug/L	0.04	< 3.0	< 3.0	< 3.0	< 3.0
Lithium	ug/L	40 (p)		--	< 10	--
Manganese	ug/L	1694	**520**	< 250	**930**	**750**
Mercury	ng/L	1.0	**8.3**	< 1.0	< 1.0	< 1.0
Molybdenum	ug/L	200 (p)	--	--	< 50	--
Nickel	ug/L	80 (p)	**240**	**23**	**94**	< 100
Selenium	ug/L	20 (p)	--	--	< 5.0	--
Silver	ug/L	0.8 (p)	--	--	< 0.2	--
Thallium	ug/L	8.0 (p)	--	--	< 2.0	--
Vanadium	ug/L	16 (p)	--	--	< 4.0	--
Zinc	ug/L	25	**41**	**16**	**21**	**23**
Major Anions						
Alkalinity, Bicarbonate	mg/L	137	**5.9**	**22**	**62**	**35**
Alkalinity, Carbonate	mg/L	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Chloride	mg/L	711	**190**	**30**	**22**	**24**
Fluoride	mg/L	4.0 (p)	< 1.0	< 1.0	< 1.0	< 1.0
Nitrogen, Ammonia	mg/L	0.36	<0.03	<0.03	<0.03	**0.07**
Nitrogen, Nitrate	mg/L	1.0	**4.0**	**0.82**	< 0.1	**2.5**
Nitrogen, Nitrite	mg/L	0.07	< 0.1	< 0.1	< 0.1	< 0.1
Sulfate	mg/L	343	**160**	**64**	**140**	**280**
Sulfide	mg/L	1.0	**0.06**	<0.2	< 0.20	
Major Cations						
Calcium	mg/L	123	**85**	**24**	**44**	**78**
Magnesium	mg/L	48	**30**	**9.1**	**18**	**29**
Potassium	mg/L	8.0	**4.2**	**2.1**	**3.2**	**4.4**
Sodium	mg/L	289	**36**	**13**	**20**	**26**
General						
Hardness	mg/L	510	**410**	**111**	**188**	**317**

Explanations of abbreviations are included on the final page of this table.

2015
Mine Permit Groundwater Quality Monitoring Data
Abbreviations & Data Qualifiers
Humboldt Mill

Notes:
Benchmarks are calculated based on guidance from Eagles Mine's Development of Site Specific Benchmarks for Mine Permit Water Quality Monitoring.
Results in **bold** text indicate that the parameter was detected at a level greater than the laboratory reporting limit.
Highlighted Cell = Value is equal to or above site-specific benchmark. An exceedance occurs if there are 2 consecutive sampling events with a value equal to or greater than the benchmark at a compliance monitoring location.
(p) = Due to less than two detections in baseline dataset, benchmark defaulted to four times the reporting limit.
--Denotes no benchmark required or parameter was not required to be collected during the sampling quarter.
T = Sample was not filtered and all values are total concentrations.
D = Samples for metals and major cation parameters were filtered and values are dissolved concentrations.

Appendix G

Humboldt Mill

Groundwater Trend Analysis Summary

2015
Groundwater Trend Analysis Summary
Humboldt Mill

Location	Classification	Parameter	Unit	Count (n)	Number of Non-Detects	Mean	UCL	Median	Standard Deviation	Coefficient of Variation	Skewness	Minimum	Maximum	Man-Kendall S	Sen Slope	Positive or Negative Trend (Minimum 95% Confidence)
HW-1L	Monitoring	Boron	µg/L	4	1	513	701	550	160	0.31	-0.94	300	650	6	0.017	Positive
HW-1L	Monitoring	Calcium	mg/L	8	0	21.6	26.5	23.0	7.2	0.34	-2.0	5.0	29.0	21	0.017	Positive
HW-1L	Monitoring	Chloride	mg/L	8	0	46.0	50.1	46.5	6.2	0.13	-0.96	34.0	53.0	25	0.024	Positive
HW-1L	Monitoring	Hardness	mg/L	8	0	95.1	116	107	31.1	0.33	-2.4	22.0	113	25	0.032	Positive
HW-1L	Monitoring	Potassium	mg/L	8	0	3.1	4.6	1.9	2.3	0.74	1.8	1.7	8.0	-17	-0.004	Negative
HW-1L	Monitoring	Sodium	mg/L	8	0	25.1	26.5	24.5	2.1	0.08	0.28	22.0	28.0	16	0.008	Positive
HW-1L	Monitoring	Sulfate	mg/L	8	0	16.0	20.4	19.0	6.6	0.42	-1.8	1.6	21.0	24	0.018	Positive
HW-1U UFB	Monitoring	Calcium	mg/L	10	0	19.9	26.0	16.0	10.4	0.52	0.93	9.1	39.0	-33	-0.045	Negative
HW-1U UFB	Monitoring	Chloride	mg/L	10	0	54.8	71.0	59.5	28.0	0.51	0.14	22.0	98.0	-26	-0.109	Negative
HW-1U UFB	Monitoring	Hardness	mg/L	10	0	91.4	116	85.5	41.9	0.46	0.53	45.0	165	-34	-0.182	Negative
HW-1U UFB	Monitoring	Magnesium	mg/L	10	0	10.3	12.9	11.5	4.4	0.42	-0.37	3.8	16.0	-34	-0.020	Negative
HW-1U UFB	Monitoring	Potassium	mg/L	10	0	14.1	17.5	16.5	5.8	0.41	-0.77	5.5	21.0	-31	-0.025	Negative
HW-1U UFB	Monitoring	Sulfate	mg/L	10	0	39.9	52.5	44.0	21.7	0.55	0.05	13.0	73.0	-27	-0.107	Negative
HW-2	Monitoring	Chloride	mg/L	10	0	14.9	17.0	14.0	3.5	0.24	2.2	12.0	24.0	23	0.006	Positive
HW-2	Monitoring	Potassium	mg/L	10	0	4.6	5.2	4.5	0.92	0.20	0.19	3.3	6.2	-25	-0.003	Negative
HW-8U	Monitoring	Alkalinity Bicarbonate	mg/L	10	0	167	187	165	34.7	0.21	0.32	130	220	-42	-0.179	Negative
HW-8U	Monitoring	Calcium	mg/L	10	0	36.1	40.1	34.0	6.9	0.19	0.93	29.0	49.0	-29	-0.028	Negative
HW-8U	Monitoring	Hardness	mg/L	10	0	161	178	164	29.0	0.18	0.50	127.0	211	-36	-0.129	Negative
HW-8U	Monitoring	Iron	µg/L	10	0	16,200	18,641	14,500	4,211	0.26	0.64	12,000	23,000	-31	-20.067	Negative
HW-8U	Monitoring	Magnesium	mg/L	10	0	14.6	16.4	13.5	3.0	0.21	0.60	11.0	19.0	-30	-0.012	Negative
HW-8U	Monitoring	Manganese	µg/L	10	0	4,300	4,800	4,450	863	0.20	-0.26	3,000	5,400	-32	-4.709	Negative
HW-8U	Monitoring	Sodium	mg/L	10	0	3.3	3.6	3.2	0.49	0.15	0.62	2.7	4.3	-24	-0.002	Negative
HW-8U	Monitoring	Sulfate	mg/L	10	4	2.8	3.9	2.6	1.8	0.64	0.20	1.0	5.1	35	0.008	Positive
HYG-1	Monitoring	Alkalinity Bicarbonate	mg/L	10	0	194	235	155	71.1	0.37	1.2	140	330	35	0.145	Positive
HYG-1	Monitoring	Ammonia	µg/L	10	0	287	365	290	136	0.47	0.77	85.0	570	32	0.634	Positive
HYG-1	Monitoring	Chloride	mg/L	10	0	13.4	14.6	12.0	2.1	0.16	1.2	12.0	17.0	21	0.002	Positive
HYG-1	Monitoring	Mercury	ng/L	10	0	12.4	19.0	5.8	11.4	0.92	1.4	4.2	36.7	35	0.022	Positive
HYG-1	Monitoring	Sodium	mg/L	10	0	25.5	35.3	16.5	16.9	0.66	0.88	12.0	51.0	31	0.034	Positive
HYG-1	Monitoring	Sulfate	mg/L	10	0	77.6	88.7	87.5	19.1	0.25	-0.61	49.0	95.0	-24	-0.049	Negative
KMW-5R	COSA	Calcium	mg/L	9	0	140	153	150	20.9	0.15	-1.6	93.0	160	27	0.069	Positive
KMW-5R	COSA	Chloride	mg/L	9	0	124	145	110	34.4	0.28	-0.10	69.0	170	28	0.152	Positive
KMW-5R	COSA	Hardness	mg/L	9	0	551	631	594	130	0.24	-2.5	220	634	28	0.304	Positive
KMW-5R	COSA	Lithium	µg/L	9	1	14.6	18.3	15.0	3.8	0.26	0.33	10.0	20.0	8	0.045	Positive
KMW-5R	COSA	Magnesium	mg/L	9	0	56.8	61.3	58.0	7.3	0.13	-0.62	43.0	65.0	24	0.032	Positive
KMW-5R	COSA	Sulfate	mg/L	9	0	79.1	85.0	80.0	9.5	0.12	0.42	67.0	94.0	34	0.047	Positive
MW-701 QAL	Leachate	Alkalinity Bicarbonate	mg/L	10	0	80.1	104	67.0	41.2	0.51	1.0	36.0	150	-38	-0.202	Negative
MW-701 QAL	Leachate	Ammonia	µg/L	10	5	123	191	49.0	118	0.96	0.52	25.0	300	-31	-0.526	Negative
MW-701 QAL	Leachate	Calcium	mg/L	10	0	29.2	36.5	25.0	12.6	0.43	0.19	12.0	48.0	-42	-0.064	Negative
MW-701 QAL	Leachate	Hardness	mg/L	10	0	133	168	119	60.9	0.46	0.37	51.0	228	-43	-0.290	Negative
MW-701 QAL	Leachate	Iron	µg/L	10	7	238	280	200	72.8	0.31	1.7	200	380	-24	-0.071	Negative
MW-701 QAL	Leachate	Magnesium	mg/L	10	0	12.4	15.8	10.0	5.9	0.48	0.40	4.8	21.0	-41	-0.030	Negative
MW-701 QAL	Leachate	Manganese	µg/L	10	2	2,069	3,005	2,150	1,614	0.78	-0.11	50.0	4,100	-38	-7.745	Negative
MW-701 QAL	Leachate	Mercury	ng/L	10	1	3.3	5.0	2.0	2.8	0.85	1.2	1.0	9.0	-25	-0.006	Negative
MW-701 QAL	Leachate	Potassium	mg/L	10	0	6.5	7.4	6.5	1.5	0.23	-0.45	4.0	8.3	-35	-0.007	Negative
MW-701 QAL	Leachate	Sodium	mg/L	10	0	9.5	10.7	9.5	2.0	0.21	0.20	6.7	13.0	-28	-0.008	Negative
MW-701 QAL	Leachate	Sulfate	mg/L	10	0	58.3	72.2	52.5	23.9	0.41	0.30	27.0	93.0	-43	-0.125	Negative
MW-701 UFB	Leachate	Chloride	mg/L	10	7	14.7	20.1	10.0	9.3	0.63	2.2	10.0	38.0	-24	-0.012	Negative
MW-701 UFB	Leachate	Potassium	mg/L	10	0	5.1	6.6	4.0	2.6	0.51	1.5	2.8	11.0	-36	-0.010	Negative
MW-701 UFB	Leachate	Sodium	mg/L	10	0	14.5	22.9	6.7	14.4	0.99	1.7	4.6	48.0	-42	-0.047	Negative
MW-701 UFB	Leachate	Sulfate	mg/L	10	0	25.8	36.7	19.0	18.8	0.73	1.8	11.0	71.0	-26	-0.048	Negative
MW-702 QAL	Leachate	Alkalinity Carbonate	mg/L	10	3	13.5	22.1	8.0	14.8	1.10	1.7	2.0	49.0	-25	-0.040	Negative

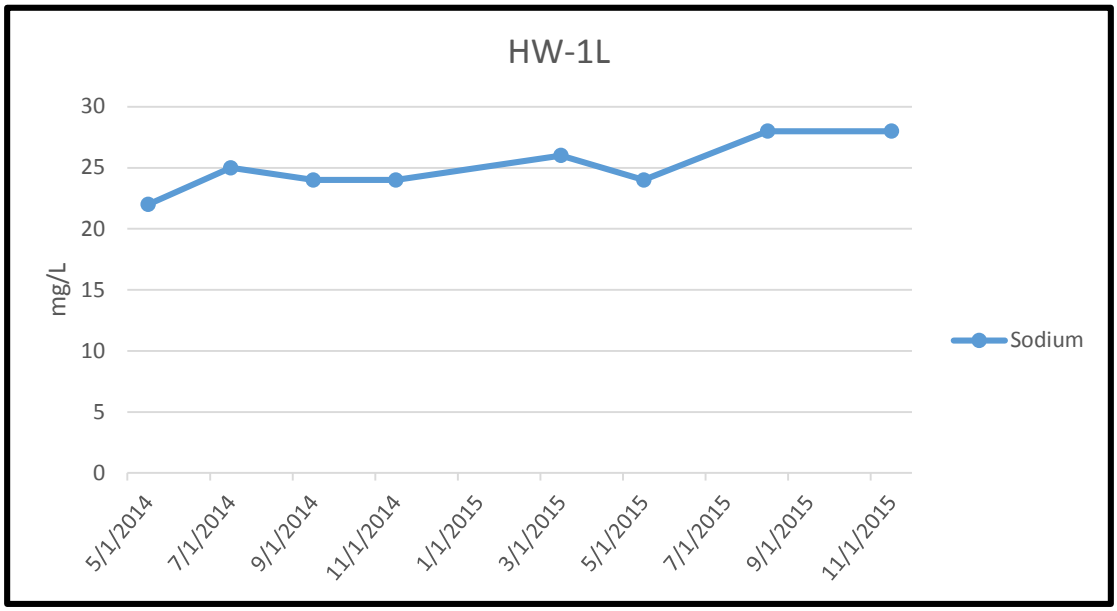
2015
Groundwater Trend Analysis Summary
Humboldt Mill

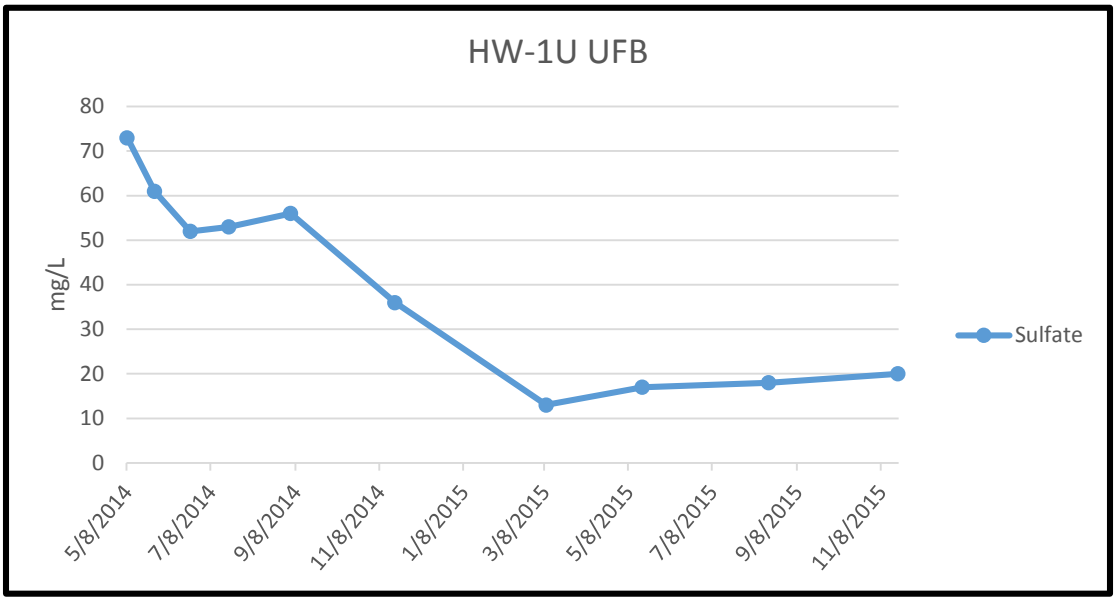
Location	Classification	Parameter	Unit	Count (n)	Number of Non-Detects	Mean	UCL	Median	Standard Deviation	Coefficient of Variation	Skewness	Minimum	Maximum	Man-Kendall S	Sen Slope	Positive or Negative Trend (Minimum 95% Confidence)
MW-702 QAL	Leachate	Hardness	mg/L	10	0	195	214	180	32.9	0.17	1.5	167	270	-25	-0.080	Negative
MW-702 QAL	Leachate	Manganese	µg/L	10	0	306.00	375.14	255.00	119.28	0.39	0.85	130.0	550.00	-23	-0.298	Negative
MW-702 QAL	Leachate	Potassium	mg/L	10	0	13.4	18.7	9.0	9.1	0.68	0.94	4.7	29.0	-39	-0.036	Negative
MW-702 QAL	Leachate	Sulfate	mg/L	10	0	111	120	105	15.5	0.14	0.35	93.0	130	-25	-0.055	Negative
MW-702 UFB	Leachate	Alkalinity Bicarbonate	mg/L	9	0	88.2	97.5	92.0	14.9	0.17	-2.8	49.0	96.0	19	0.014	Positive
MW-703 DBA	Compliance	Ammonia	µg/L	10	7	37.3	52.0	25.0	25.3	0.68	2.2	25.0	100	-24	-0.019	Negative
MW-703 DBA	Compliance	Calcium	mg/L	10	0	15.7	20.7	16.5	8.6	0.55	-0.13	4.1	25.0	-40	-0.043	Negative
MW-703 DBA	Compliance	Chloride	mg/L	10	0	18.7	19.2	19.0	0.8	0.04	-0.81	17.0	20.0	-23	-0.002	Negative
MW-703 DBA	Compliance	Hardness	mg/L	10	0	87.7	109.2	97.5	37.1	0.42	-0.39	29.0	130	-43	-0.183	Negative
MW-703 DBA	Compliance	Iron	µg/L	10	5	558	972	205	715	1.28	1.8	200	2,100	-23	-0.051	Negative
MW-703 DBA	Compliance	Magnesium	mg/L	10	0	11.6	13.9	12.5	4.0	0.35	-0.69	4.2	16.0	-38	-0.019	Negative
MW-703 DBA	Compliance	Potassium	mg/L	10	0	18.1	21.3	15.5	5.5	0.31	1.4	14.0	29.0	33	0.021	Positive
MW-703 DBA	Compliance	Sulfate	mg/L	10	0	36.7	54.3	37.0	30.3	0.82	0.09	1.6	80.0	-39	-0.181	Negative
MW-703 LLA	Compliance	Chloride	mg/L	10	0	56.7	70.9	58.0	24.4	0.43	0.08	22.0	100	-25	-0.090	Negative
MW-703 LLA	Compliance	Hardness	mg/L	10	0	116	123	118	13.4	0.12	-0.10	96.0	135	-35	-0.074	Negative
MW-703 LLA	Compliance	Sodium	mg/L	10	0	29.8	37.5	29.0	13.2	0.44	0.33	12.0	53.0	-25	-0.051	Negative
MW-703 LLA	Compliance	Sulfate	mg/L	10	0	28.1	34.4	32.0	10.8	0.38	-0.44	10.0	42.0	-38	-0.062	Negative
MW-703 QAL	Compliance	Alkalinity Bicarbonate	mg/L	10	0	76.8	84.3	76.5	12.9	0.17	-0.12	58.0	95.0	-41	-0.065	Negative
MW-703 QAL	Compliance	Calcium	mg/L	10	0	24.6	28.2	22.0	6.2	0.25	0.48	18.0	33.0	-37	-0.030	Negative
MW-703 QAL	Compliance	Hardness	mg/L	10	0	95.7	106	91.5	18.4	0.19	0.41	76.0	123	-40	-0.084	Negative
MW-703 QAL	Compliance	Magnesium	mg/L	10	0	8.1	8.8	8.0	1.1	0.13	0.07	6.6	9.7	-21	-0.004	Negative
MW-703 QAL	Compliance	Nitrate	µg/L	10	0	266	355	205	153	0.58	1.1	110	550	33	0.667	Positive
MW-703 QAL	Compliance	Potassium	mg/L	10	0	2.1	2.4	2.0	0.42	0.19	0.38	1.6	2.7	-36	-0.002	Negative
MW-703 QAL	Compliance	Sodium	mg/L	10	0	5.7	6.8	4.9	2.1	0.37	0.55	3.3	9.2	-35	-0.010	Negative
MW-703 QAL	Compliance	Sulfate	mg/L	10	0	29.1	34.3	25.5	8.9	0.31	0.52	19.0	43.0	-33	-0.040	Negative
MW-703 UFB	Compliance	Alkalinity Bicarbonate	mg/L	9	0	74.8	88.7	80.0	22.4	0.30	-2.8	16.0	91.0	21	0.012	Positive
MW-703 UFB	Compliance	Manganese	µg/L	9	1	134	157	150	37.7	0.28	-1.7	50.0	160	28	0.100	Positive
MW-703 UFB	Compliance	Potassium	mg/L	9	0	3.1	3.6	2.6	0.92	0.30	2.1	2.4	5.3	-29	-0.003	Negative
MW-703 UFB	Compliance	Sodium	mg/L	9	0	6.4	11.7	3.2	8.5	1.33	2.9	2.7	29.0	-23	-0.005	Negative
MW-704 DBA	Compliance	Alkalinity Bicarbonate	mg/L	11	0	96	110	100	24.6	0.26	-1.2	39.0	120	40	0.097	Positive
MW-704 DBA	Compliance	Alkalinity Carbonate	mg/L	11	1	12.8	16.7	12.0	7.2	0.57	1.1	2.0	29.0	-27	-0.026	Negative
MW-704 DBA	Compliance	Calcium	mg/L	11	0	18.5	20.8	20.0	4.1	0.22	-1.3	8.9	23.0	24	0.010	Positive
MW-704 DBA	Compliance	Hardness	mg/L	11	0	87.8	96.7	96.0	16.2	0.18	-1.6	48.0	106	35	0.055	Positive
MW-704 DBA	Compliance	Iron	µg/L	11	0	2,513	3,981	630	2,687	1.07	0.66	340	5,900	-22	-9.295	Negative
MW-704 DBA	Compliance	Sulfate	mg/L	11	2	3.0	3.8	3.2	1.6	0.54	0.12	1.0	5.5	-48	-0.008	Negative
MW-704 LLA	Compliance	Alkalinity Bicarbonate	mg/L	11	0	100	108	100	14.4	0.14	0.55	82.0	130	-30	-0.051	Negative
MW-704 LLA	Compliance	Calcium	mg/L	11	0	20.5	23.7	21.0	6.0	0.29	0.42	13.0	32.0	-35	-0.025	Negative
MW-704 LLA	Compliance	Hardness	mg/L	11	0	104	117	113	23.7	0.23	0.30	73.0	149	-45	-0.112	Negative
MW-704 LLA	Compliance	Magnesium	mg/L	11	0	12.5	13.6	12.0	2.1	0.17	-0.06	9.2	15.0	-40	-0.010	Negative
MW-704 LLA	Compliance	Manganese	µg/L	11	5	58.4	64.8	52.0	11.8	0.20	1.2	50.0	80.0	-35	-0.022	Negative
MW-704 LLA	Compliance	Potassium	mg/L	11	0	5.8	7.0	4.9	2.2	0.38	1.2	3.8	10.0	39	0.010	Positive
MW-704 LLA	Compliance	Sodium	mg/L	11	0	6.4	9.7	4.5	6.2	0.98	3.3	3.8	25.0	24	0.002	Positive
MW-704 LLA	Compliance	Sulfate	mg/L	11	0	13.5	16.3	14.0	5.1	0.38	-0.04	5.0	22.0	-50	-0.024	Negative
MW-704 QAL	Compliance	Chloride	mg/L	10	4	14.8	18.0	14.5	5.5	0.37	1.3	10.0	27.0	26	0.015	Positive
MW-704 UFB	Compliance	Calcium	mg/L	10	0	28.9	36.3	29.5	12.7	0.44	0.39	10.0	54.0	32	0.053	Positive
MW-704 UFB	Compliance	Hardness	mg/L	10	0	104	123	103	32.9	0.32	0.73	68.0	170	36	0.146	Positive
MW-704 UFB	Compliance	Magnesium	mg/L	10	0	5.7	7.2	6.1	2.7	0.47	-0.25	1.8	9.4	35	0.010	Positive
MW-704 UFB	Compliance	Manganese	µg/L	10	0	497	682	495	320	0.64	0.52	89.0	1,100	35	1.373	Positive
MW-704 UFB	Compliance	Potassium	mg/L	10	0	2.7	3.5	3.3	1.4	0.52	-0.18	0.8	4.8	34	0.007	Positive
MW-704 UFB	Compliance	Sodium	mg/L	10	0	22.2	31.3	14.5	15.7	0.70	0.76	6.5	50.0	-27	-0.054	Negative
MW-704 UFB	Compliance	Sulfate	mg/L	10	0	13.3	18.5	10.5	9.0	0.68	1.4	5.1	31.0	-24	-0.032	Negative

2015
Groundwater Trend Analysis Summary
Humboldt Mill

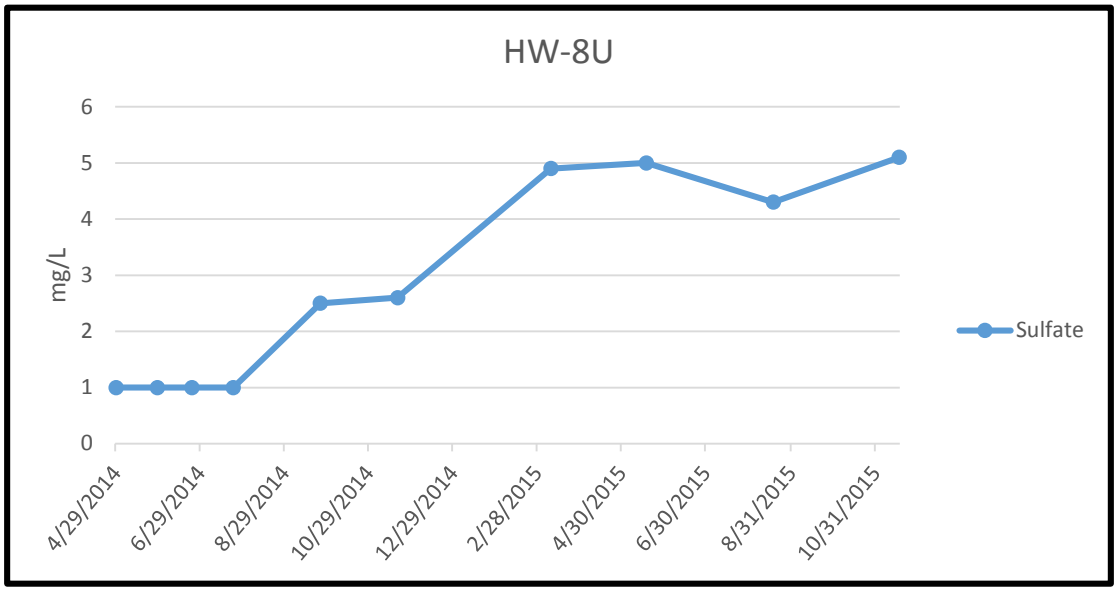
Location	Classification	Parameter	Unit	Count (n)	Number of Non-Detects	Mean	UCL	Median	Standard Deviation	Coefficient of Variation	Skewness	Minimum	Maximum	Man-Kendall S	Sen Slope	Positive or Negative Trend (Minimum 95% Confidence)
MW-705 QAL	Compliance	Alkalinity Bicarbonate	mg/L	10	0	63.2	70.1	63.0	11.8	0.19	1.2	46.0	90.0	-28	-0.035	Negative
MW-705 QAL	Compliance	Ammonia	µg/L	10	0	69.7	78.4	69.0	15.1	0.22	-0.59	39.0	92.0	23	0.052	Positive
MW-705 QAL	Compliance	Calcium	mg/L	10	0	19.3	21.1	18.5	3.1	0.16	0.24	15.0	24.00	-23	-0.013	Negative
MW-705 QAL	Compliance	Hardness	mg/L	10	0	88.8	96.7	90.5	13.6	0.15	0.05	71.0	109.00	-31	-0.072	Negative
MW-705 QAL	Compliance	Magnesium	mg/L	10	0	8.6	9.5	8.1	1.6	0.19	0.55	6.7	11.0	-28	-0.008	Negative
MW-705 QAL	Compliance	Sulfate	mg/L	10	0	6.9	12.3	4.1	9.3	1.36	3.00	1.8	33.0	25	0.012	Positive
MW-705 UFB	Compliance	Alkalinity Bicarbonate	mg/L	11	0	96.6	105	94.0	15.2	0.16	2.68	85.0	140	-31	-0.023	Negative
MW-705 UFB	Compliance	Chloride	mg/L	11	9	10.6	11.5	10.0	1.6	0.15	2.65	10.0	15.0	19	0.0000	Positive
MW-705 UFB	Compliance	Hardness	mg/L	11	0	101	103	100	4.5	0.04	-0.14	92.0	109	-32	-0.015	Negative
MW-705 UFB	Compliance	Iron	µg/L	11	0	7,135	8,792	7,400	3,033	0.43	-0.86	680	12,000	39	11.340	Positive
MW-705 UFB	Compliance	Sulfate	mg/L	11	0	9.9	11.5	10.0	2.9	0.29	-0.57	5.2	13.0	-48	-0.015	Negative
MW-706 QAL	Mill Services	Alkalinity Bicarbonate	mg/L	9	0	106	117	100	16.8	0.16	1.15	89.0	140	-32	-0.066	Negative
MW-706 QAL	Mill Services	Ammonia	µg/L	9	0	522	689	420	268	0.51	2.50	370	1,200	-25	-0.470	Negative
MW-706 QAL	Mill Services	Arsenic	µg/L	9	0	8.3	9.9	7.4	2.6	0.31	1.46	5.9	14.0	-20	-0.005	Negative
MW-706 QAL	Mill Services	Nickel	µg/L	9	4	21.3	22.4	21.0	1.7	0.08	1.38	20.0	25.00	23	0.006	Positive
MW-706 QAL	Mill Services	Potassium	mg/L	9	0	4.8	5.2	4.6	0.6	0.12	1.51	4.2	6.1	-24	-0.002	Negative
MW-706 QAL	Mill Services	Sodium	mg/L	9	0	69.7	105	39.0	57.4	0.82	1.39	24.0	190	-32	-0.224	Negative
MW-706 QAL	Mill Services	Sulfate	mg/L	9	0	319	371	330	83.4	0.26	0.008	210	430	-28	-0.410	Negative
MW-707 QAL	Concentrator/CLO	Hardness	mg/L	9	0	149	151	149	3.2	0.02	0.25	145	154	26	0.013	Positive
MW-707 QAL	Concentrator/CLO	Iron	µg/L	9	0	6,222	6,499	6,100	447	0.07	1.32	5,700	7,200	-25	-1.534	Negative

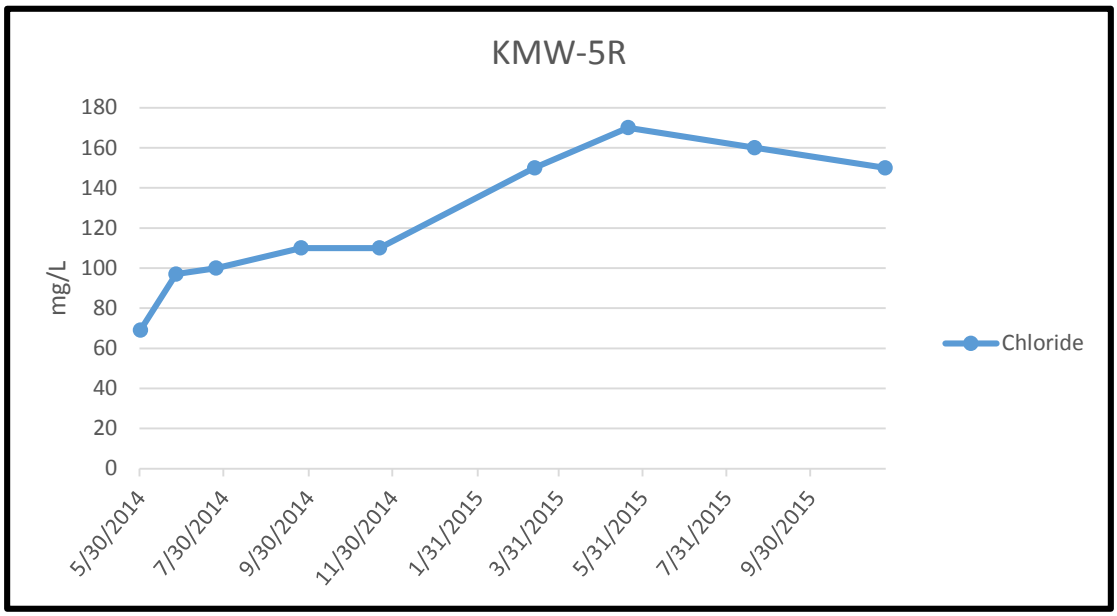
2015
Groundwater Trend Analysis Summary Charts
Humboldt Mill



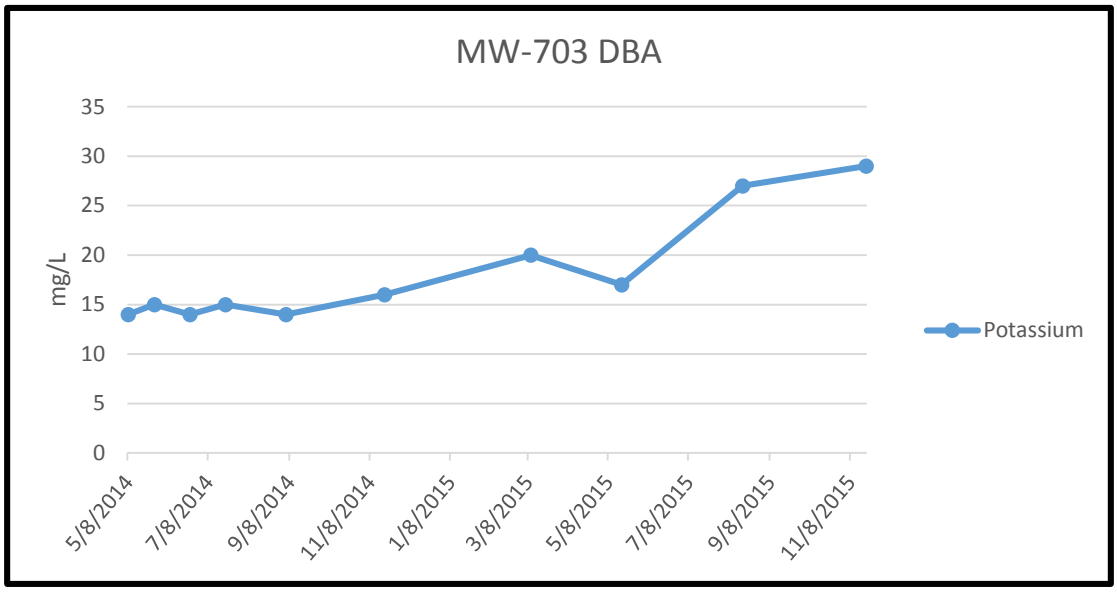


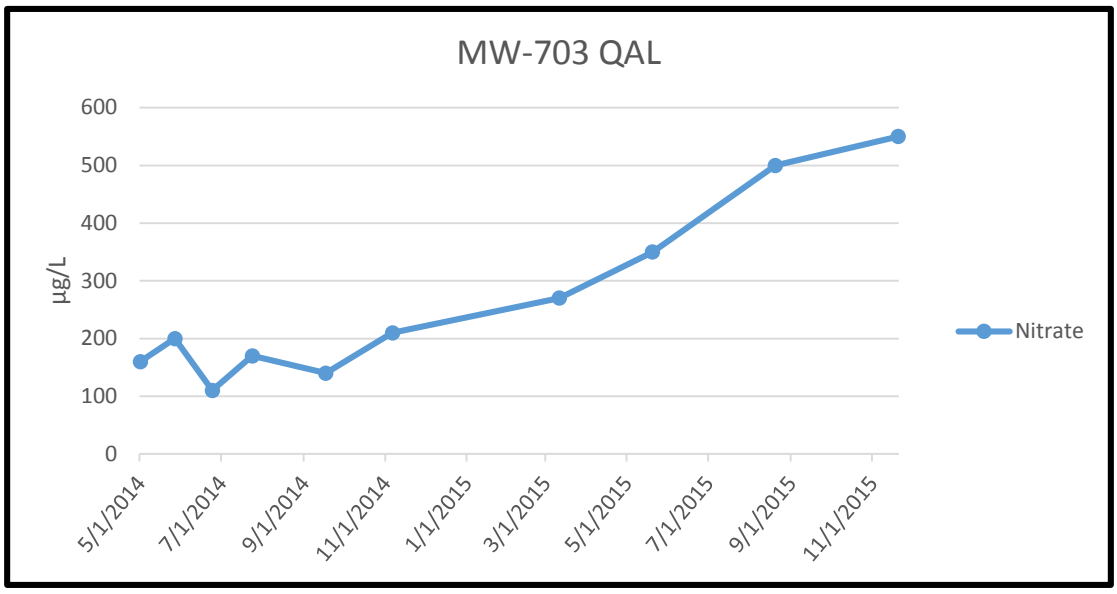
2015
Groundwater Trend Analysis Summary Charts
Humboldt Mill



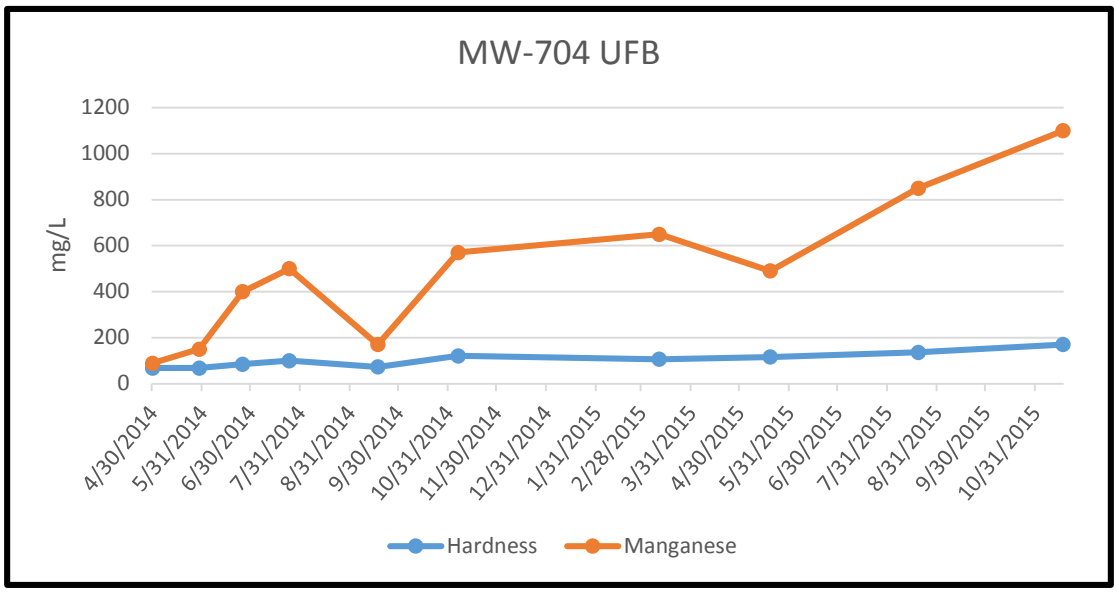


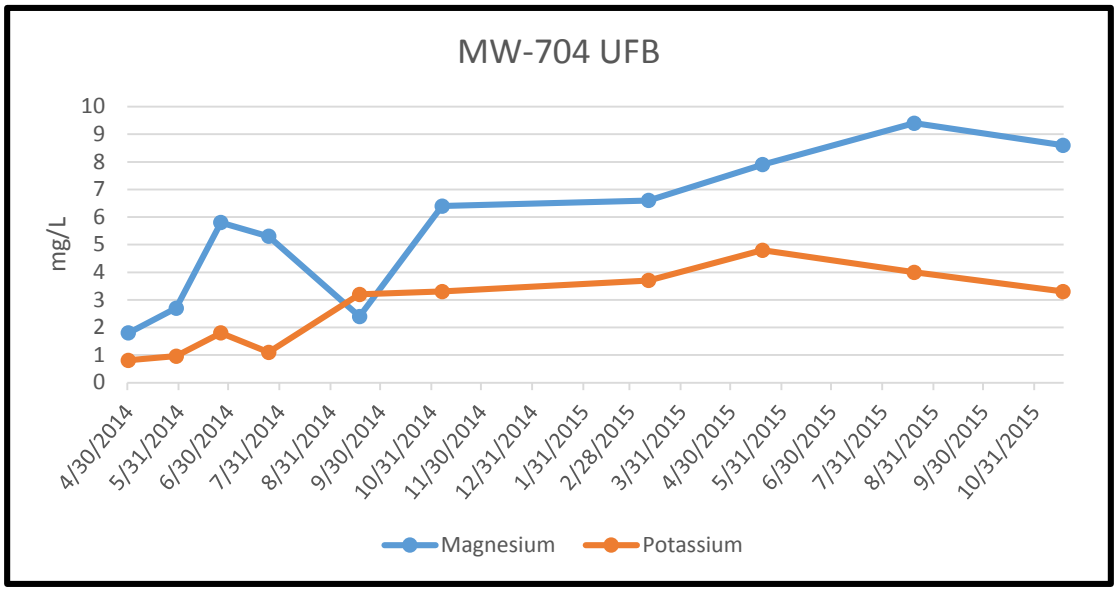
2015
Groundwater Trend Analysis Summary Charts
Humboldt Mill



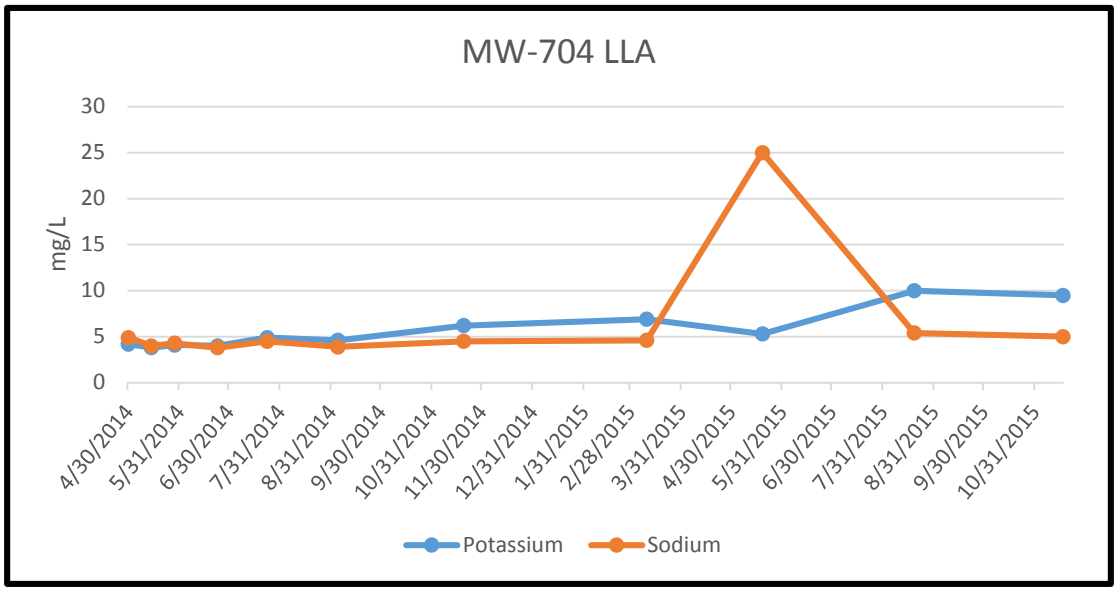


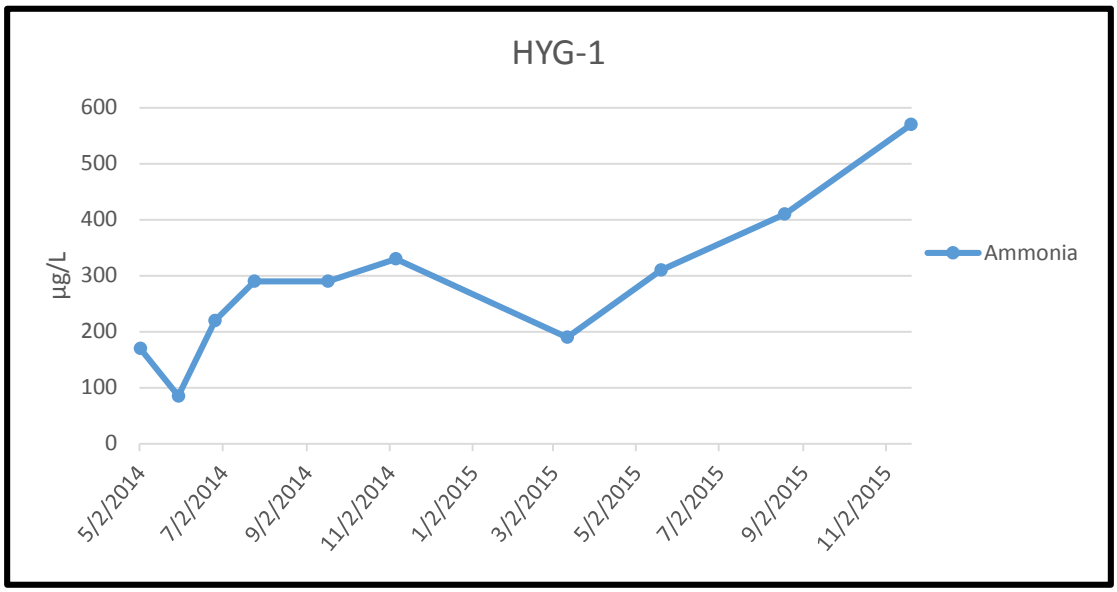
2015
Groundwater Trend Analysis Summary Charts
Humboldt Mill



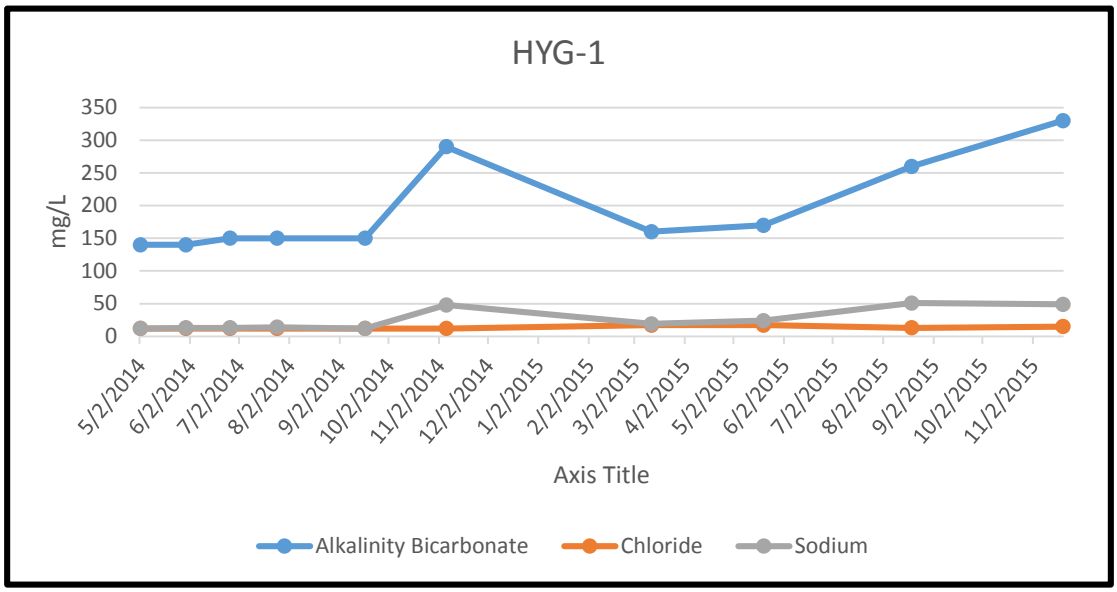


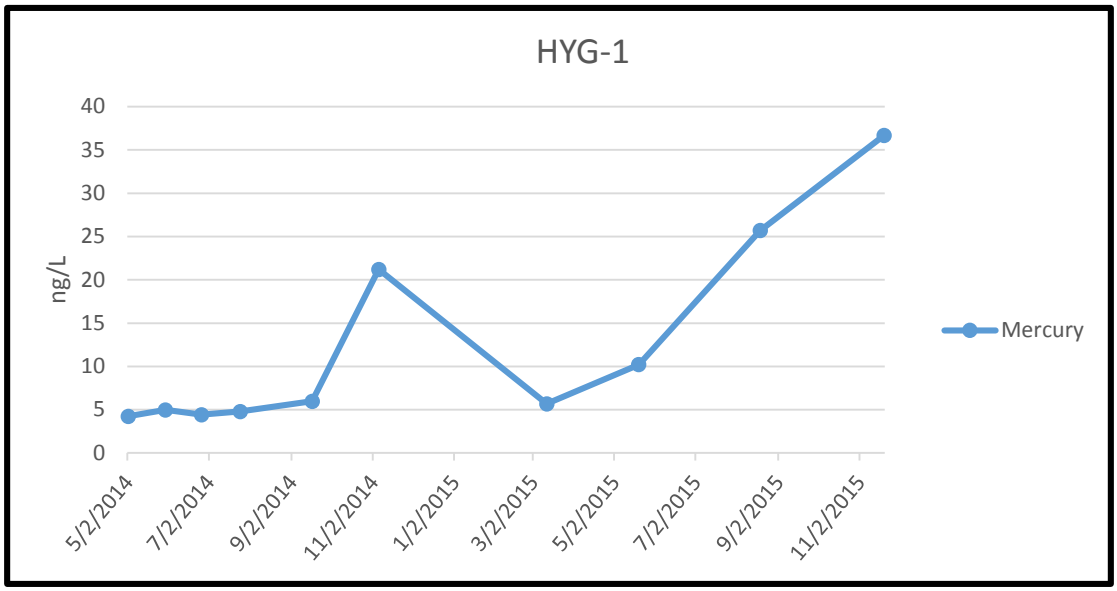
2015
Groundwater Trend Analysis Summary Charts
Humboldt Mill



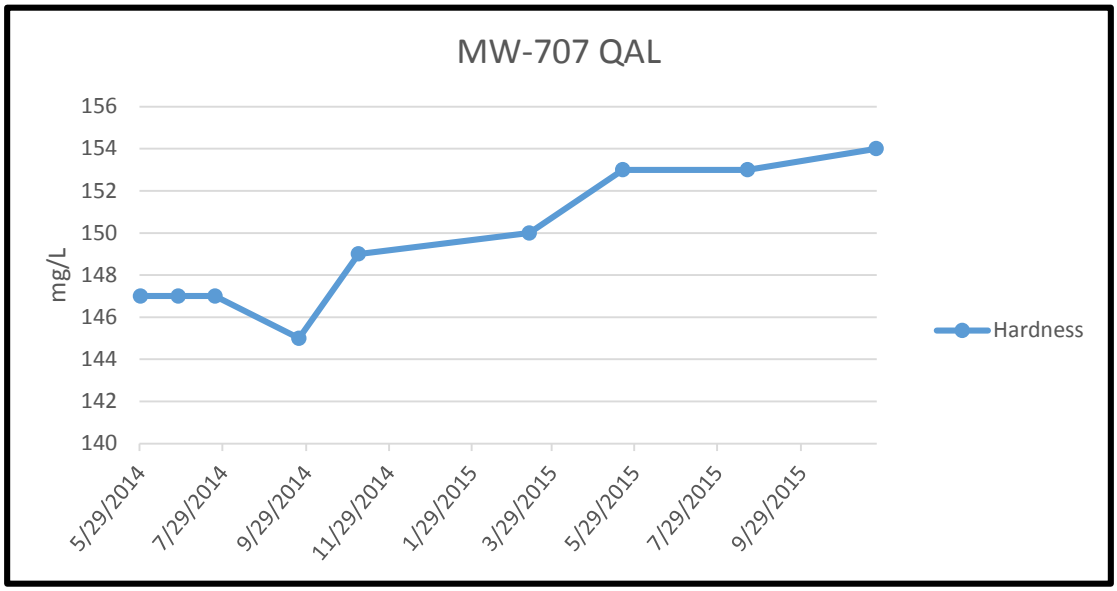


2015
Groundwater Trend Analysis Summary Charts
Humboldt Mill





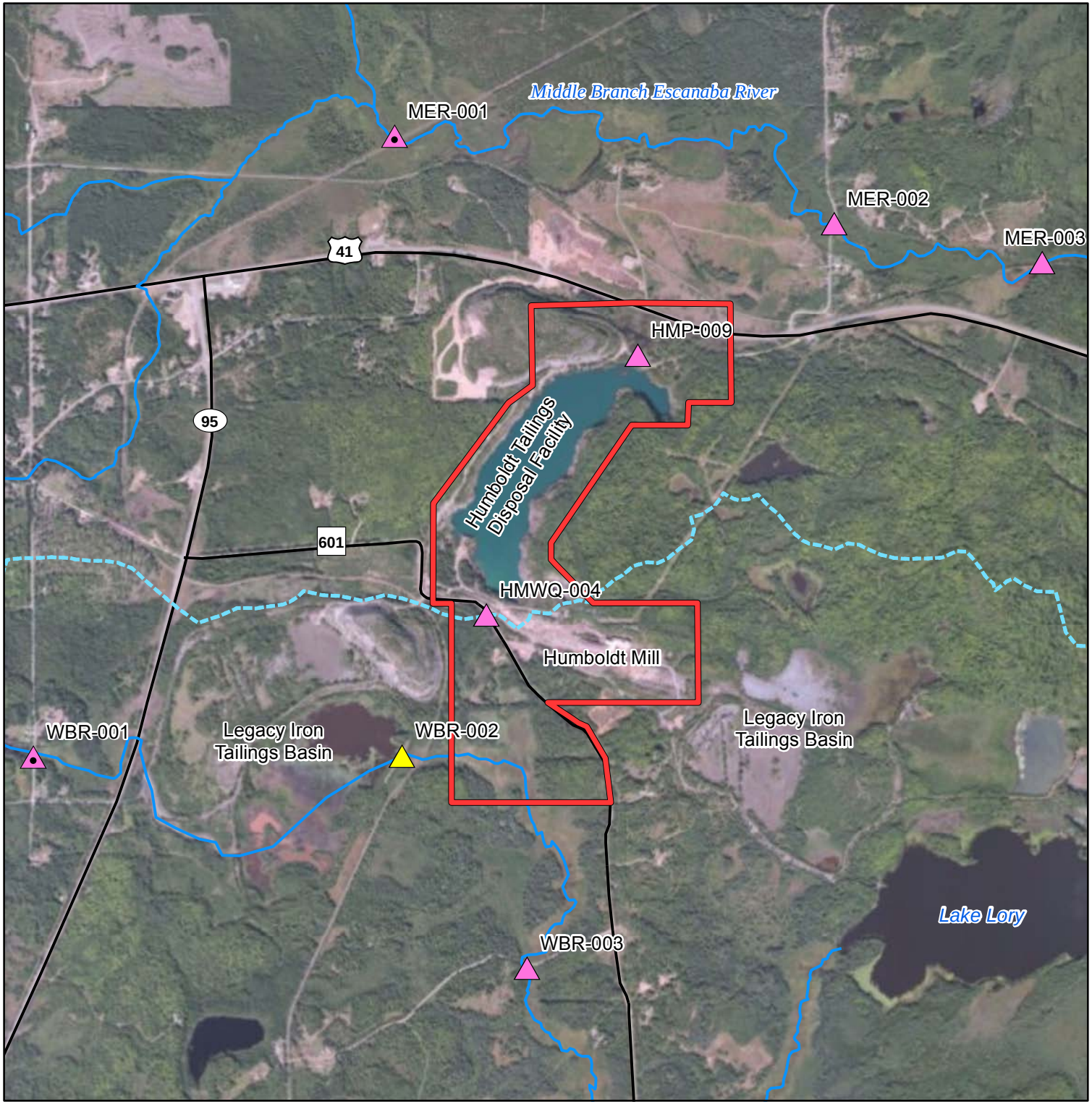
2015
Groundwater Trend Analysis Summary Charts
Humboldt Mill



Appendix H

Humboldt Mill

Surface water Location Map



HUMBOLDT MILL PROPOSED SURFACE WATER AND SEDIMENT MONITORING LOCATIONS

Legend

- Reference Monitoring Station
- Proposed Surface Water Monitoring Location
- Proposed Surface Water and Sediment Monitoring Location
- Road
- River
- Watershed Boundary
- Humboldt Mill Property

Reference:

Data provided by: Eagle Mine, ESRI, and North Jackson Company

Projection & Datum: NAD 1927 UTM Zone 16N

Aerial Photo: 2010

0 2,000 4,000 Feet

1:32,000

Eagle Mine
a subsidiary of lundin mining

North Jackson Company
ENVIRONMENTAL SCIENCE & ENGINEERING

Figure 1

Appendix I

Humboldt Mill

Surface Water Results

&

Benchmark Summary Table

Humboldt Mill
2015 Mine Permit Surface Water Monitoring
Benchmark Comparison Summary

Location	Location Classification	Q1	Q2	Q3	Q4
HMP-009	Compliance - HTDF subwatershed				pH, chloride, mercury, sodium, total dissolved solids
HMWQ-004	Compliance - Mill subwatershed		copper		
MER-001	Reference - HTDF subwatershed		zinc	chloride, selenium, sodium, total dissolved solids	potassium, **total dissolved solids**
MER-002	Compliance - HTDF subwatershed	copper	zinc	chloride, selenium, total dissolved solids	potassium, **total dissolved solids**
MER-003	Compliance - HTDF subwatershed	copper, total dissolved solids, **zinc**	pH, total suspended solids, **zinc**	chloride, potassium, selenium, total dissolved solids	**potassium, total dissolved solids,** total suspended solids
WBR-001	Reference - Mill subwatershed			pH, selenium, sulfate	**sulfate**
WBR-002	Compliance - Mill subwatershed		**copper, lead,** nickel, zinc	pH, cobalt, selenium, sulfate, total suspended solids, **zinc**	**pH**, copper, lead, nickel, **sulfate,** total suspended solids
WBR-003	Compliance - Mill subwatershed	**pH**		pH, alkalinity carbonate, arsenic, barium, calcium, cobalt, iron, magnesium, manganese, nickel, selenium, sulfate, total dissolved solids, total suspended solids, hardness	**pH**, lead, potassium, **sulfate**

Parameters listed in this table had values reported that were equal to or greater than a site-specific benchmark. Parameters in **BOLD** are instances in which the Department was notified because benchmarks deviations were identified at compliance monitoring locations for two consecutive sampling events. If the location is classified as background, Department notification is not required for an exceedance.

2015
Mine Permit Surface Water Quality Monitoring Data
HMP-009 (Compliance)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 2/16/15	Q2 2015 5/13/15	Q3 2015 8/24/15	Q4 2015 11/12/15
Field						
D.O.[1]	ppm	--	NM	NM	NM	9.8
ORP	mV	--	NM	NM	NM	150
pH	SU	7.03-8.03	NM	NM	NM	**6.6**
Specific Conductance	µS/cm	--	NM	NM	NM	326
Temperature	°C	--	NM	NM	NM	7.4
Turbidity	NTU	--	NM	NM	NM	3.5
Flow	cfs	--	NM	NM	NM	NM
Metals						
Aluminum	ug/L	200 (p)	--	--	NM	--
Antimony	ug/L	11.5	--	--	NM	--
Arsenic	ug/L	2.2	NM	NM	NM	< 1.0
Barium	ug/L	27	--	--	NM	--
Beryllium	ug/L	0.67	--	--	NM	--
Boron	ug/L	113	--	--	NM	--
Cadmium	ug/L	0.1	--	--	NM	--
Chromium	ug/L	1.3	--	--	NM	--
Cobalt	ug/L	3.0	--	--	NM	--
Copper	ug/L	7.9	NM	NM	NM	5.3
Iron	ug/L	1620	NM	NM	NM	220
Lead	ug/L	1.0	NM	NM	NM	0.06
Lithium	ug/L	5.3	--	--	NM	--
Manganese	ug/L	337	NM	NM	NM	25
Mercury	ng/L	1.1	NM	NM	NM	**2.2**
Molybdenum	ug/L	13	--	--	NM	--
Nickel	ug/L	17	NM	NM	NM	9.2
Selenium	ug/L	0.36	--	--	NM	--
Silver	ug/L	0.12	--	--	NM	--
Thallium	ug/L	0.68	--	--	NM	--
Vanadium	ug/L	1.7	--	--	NM	--
Zinc	ug/L	6.1	NM	NM	NM	1.0
Major Anions						
Alkalinity, Bicarbonate	mg/L	124	NM	NM	NM	89
Alkalinity, Carbonate	mg/L	2.0	NM	NM	NM	< 2.0
Chloride	mg/L	15	NM	NM	NM	**23**
Fluoride	mg/L	0.41	NM	NM	NM	**0.12**
Nitrogen, Ammonia	mg/L	2.0 (P)	NM	NM	NM	< 0.5
Nitrogen, Nitrate	mg/L	2.5	NM	NM	NM	< 2.5
Nitrogen, Nitrite	mg/L	0.34	NM	NM	NM	< 0.5
Sulfate	mg/L	138	NM	NM	NM	**130**
Sulfide	mg/L	3.0	NM	NM	NM	< 5.0
Major Cations						
Calcium	mg/L	68	NM	NM	NM	**45**
Magnesium	mg/L	26	NM	NM	NM	**20**
Potassium	mg/L	9.4	NM	NM	NM	**6.8**
Sodium	mg/L	15	NM	NM	NM	**16**
General						
Hardness	mg/L	251	NM	NM	NM	**199**
Total Dissolved Solids	mg/L	361	NM	NM	NM	**386**
Total Suspended Solids	mg/L	13	NM	NM	NM	< 3.3

2015
Mine Permit Surface Water Quality Monitoring Data
HMWQ-004 (Compliance)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 2/16/15	Q2 2015 5/13/15	Q3 2015 8/24/15	Q4 2015 11/12/15
Field						
D.O.[1]	ppm	--	NM	**6.0**	NM	NM
ORP	mV	--	NM	**85**	NM	NM
pH	SU	5.69-6.69	NM	**6.4**	NM	NM
Specific Conductance	µS/cm	--	NM	**5.1**	NM	NM
Temperature	°C	--	NM	**7.9**	NM	NM
Turbidity	NTU	--	NM	NM	NM	NM
Flow	cfs	--	NM	NM	NM	NM
Metals						
Aluminum	ug/L	200 (p)	--	--	NM	NM
Antimony	ug/L	2.3	--	--	NM	NM
Arsenic	ug/L	35	NM	**1.7**	NM	NM
Barium	ug/L	118	--	--	NM	NM
Beryllium	ug/L	4.0 (p)	--	--	NM	NM
Boron	ug/L	36	--	--	NM	NM
Cadmium	ug/L	0.10	--	--	NM	NM
Chromium	ug/L	14	--	--	NM	NM
Cobalt	ug/L	3.0	--	--	NM	NM
Copper	ug/L	11	NM	**11**	NM	NM
Iron	ug/L	73,409	NM	**7100**	NM	NM
Lead	ug/L	2.1	NM	**1.4**	NM	NM
Lithium	ug/L	16	--	--	NM	NM
Manganese	ug/L	2541	NM	**170**	NM	NM
Mercury	ng/L	43	NM	**34**	NM	NM
Molybdenum	ug/L	4.7	--	--	NM	NM
Nickel	ug/L	5.6	NM	**4.3**	NM	NM
Selenium	ug/L	0.44	--	--	NM	NM
Silver	ug/L	0.35	--	--	NM	NM
Thallium	ug/L	4.0 (P)	--	--	NM	NM
Vanadium	ug/L	39	--	--	NM	NM
Zinc	ug/L	44	**33**	**33**	NM	NM
Major Anions						
Alkalinity, Bicarbonate	mg/L	68	NM	**13**	NM	NM
Alkalinity, Carbonate	mg/L	8.0 (P)	NM	< 2.0	NM	NM
Chloride	mg/L	68	NM	**6.4**	NM	NM
Fluoride	mg/L	0.23	NM	< 0.10	NM	NM
Nitrogen, Ammonia	mg/L	1.9	NM	**0.81**	NM	NM
Nitrogen, Nitrate	mg/L	2.0 (P)	NM	< 0.50	NM	NM
Nitrogen, Nitrite	mg/L	2.0 (P)	NM	< 0.50	NM	NM
Sulfate	mg/L	4.0 (P)	NM	< 1.0	NM	NM
Sulfide	mg/L	20 (P)	NM	< 5.0	NM	NM
Major Cations						
Calcium	mg/L	21	NM	**4.9**	NM	NM
Magnesium	mg/L	8.1	NM	**1.8**	NM	NM
Potassium	mg/L	3.3	NM	**1.9**	NM	NM
Sodium	mg/L	49	NM	**2.6**	NM	NM
General						
Hardness	mg/L	88	NM	**20**	NM	NM
Total Dissolved Solids	mg/L	209	NM	**130**	NM	NM
Total Suspended Solids	mg/L	353	NM	**15**	NM	NM

2015
Mine Permit Surface Water Quality Monitoring Data
MER-001 (Reference)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 2/16/15	Q2 2015 5/13/15	Q3 2015 8/24/15	Q4 2015 11/12/15
Field						
D.O.[1]	ppm	--	**10**	**8.1**	**7.4**	**9.8**
ORP	mV	--	**120**	**112**	**138**	**105**
pH	SU	6.11-7.11	**6.9**	**6.2**	**6.4**	**6.8**
Specific Conductance	µS/cm	--	**60**	**80**	**146**	**153**
Temperature	°C	--	**0.8**	**7.2**	**14**	**6.4**
Turbidity	NTU	--	**5.3**	NM	**17**	**6.2**
Flow	cfs	--	NM	NM	NM	NM
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	0.73	--	--	< 1.0	--
Arsenic	ug/L	3.4	**<1.0**	**<1.0**	**2.2**	**1.4**
Barium	ug/L	12	--	--	**11**	--
Beryllium	ug/L	0.73	--	--	< 1.0	--
Boron	ug/L	14.8	--	--	< 10	--
Cadmium	ug/L	0.10	--	--	< 0.008	--
Chromium	ug/L	1.2	--	--	< 1.0	--
Cobalt	ug/L	0.42	--	--	**0.19**	--
Copper	ug/L	0.86	**0.47**	**0.72**	**0.24**	**0.48**
Iron	ug/L	3255	**1300**	**880**	**2300**	**1300**
Lead	ug/L	0.35	**0.15**	**0.15**	**0.10**	**0.19**
Lithium	ug/L	5.7	--	--	< 8.0	--
Manganese	ug/L	226	**77**	**55**	**180**	**99**
Mercury	ng/L	8.5	**2.0**	**4.5**	**2.7**	**3.9**
Molybdenum	ug/L	1.0	--	--	< 1.0	--
Nickel	ug/L	1.0	**0.55**	**0.63**	**0.58**	**0.57**
Selenium	ug/L	0.19	--	--	**0.57**	--
Silver	ug/L	0.12	--	--	< 0.20	--
Thallium	ug/L	0.75	--	--	< 1.0	--
Vanadium	ug/L	1.5	--	--	< 1.0	--
Zinc	ug/L	2.6	**5.1**	**2.3**	**0.81**	**2.2**
Major Anions						
Alkalinity, Bicarbonate	mg/L	50	**25**	**16**	**41**	**22**
Alkalinity, Carbonate	mg/L	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Chloride	mg/L	13	**9.0**	**6.2**	**15**	**12**
Fluoride	mg/L	0.19	< 0.10	< 0.10	< 0.10	< 0.10
Nitrogen, Ammonia	mg/L	2.0 (P)	< 0.50	< 0.50	< 0.50	< 0.50
Nitrogen, Nitrate	mg/L	0.34	< 0.50	< 0.50	< 0.50	< 0.50
Nitrogen, Nitrite	mg/L	0.36	< 0.50	< 0.50	< 0.50	< 0.50
Sulfate	mg/L	10	**1.7**	< 1.0	< 1.0	**6.4**
Sulfide	mg/L	3.2	< 5.0	< 5.0	< 5.0	< 5.0
Major Cations						
Calcium	mg/L	15	**8.1**	**6.2**	**13**	**9.1**
Magnesium	mg/L	4.1	**2.4**	**1.7**	**3.6**	**2.7**
Potassium	mg/L	1.0	**0.62**	**0.60**	**0.94**	**1.2**
Sodium	mg/L	6.9	**4.7**	**3.4**	**7.9**	**5.7**
General						
Hardness	mg/L	56	**35**	**26**	**48**	**39**
Total Dissolved Solids	mg/L	111	**64**	**60**	**122**	**115**
Total Suspended Solids	mg/L	4.0	<1.0	<1.0	< 3.3	< 3.3

Explanations of abbreviations are included on the final page of this table.

2015
Mine Permit Surface Water Quality Monitoring Data
MER-002 (Compliance)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 2/16/15	Q2 2015 5/13/15	Q3 2015 8/24/15	Q4 2015 11/12/15
Field						
D.O.[1]	ppm	--	**11**	**9.0**	**7.3**	**9.8**
ORP	mV	--	**123**	**93**	**144**	**134**
pH	SU	5.95-6.95	**6.1**	**6.0**	**6.4**	**6.1**
Specific Conductance	µS/cm	--	**0.049**	**73**	**124**	**101**
Temperature	°C	--	**-0.2**	**7.3**	**14**	**5.5**
Turbidity	NTU	--	**6.9**	NM	**9.9**	**7.0**
Flow	cfs	--	**NM**	**85**	**21**	NM
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	0.72	--	--	< 1.0	--
Arsenic	ug/L	5.1	**1.4**	<1.0	**2.2**	**1.6**
Barium	ug/L	20	--	--	**12**	--
Beryllium	ug/L	0.73	--	--	< 1.0	--
Boron	ug/L	14	--	--	< 10	--
Cadmium	ug/L	0.09	--	--	**0.01**	--
Chromium	ug/L	1.2	--	--	< 1.0	--
Cobalt	ug/L	0.65	--	--	**0.32**	--
Copper	ug/L	0.90	**1.1**	**0.75**	**0.29**	**0.61**
Iron	ug/L	6440	**2600**	**1100**	**2400**	**2300**
Lead	ug/L	0.37	**0.14**	**0.16**	**0.10**	**0.15**
Lithium	ug/L	5.7	--	--	< 8.0	--
Manganese	ug/L	560	**140**	**71**	**230**	**260**
Mercury	ng/L	7.5	**2.6**	**4.7**	**3.0**	**3.1**
Molybdenum	ug/L	0.73	--	--	< 1.0	--
Nickel	ug/L	1.2	**0.61**	**0.66**	**0.73**	**0.65**
Selenium	ug/L	0.19	--	--	**0.55**	--
Silver	ug/L	0.12	--	--	< 0.20	--
Thallium	ug/L	0.73	--	--	< 1.0	--
Vanadium	ug/L	3.0	--	--	< 1.0	--
Zinc	ug/L	3.0	**2.5**	**3.7**	**1.5**	**1.8**
Major Anions						
Alkalinity, Bicarbonate	mg/L	53	**28**	**17**	**45**	**28**
Alkalinity, Carbonate	mg/L	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Chloride	mg/L	16	**7.9**	**6.0**	**16**	**14**
Fluoride	mg/L	0.19	< 0.10	< 0.10	< 0.10	< 0.10
Nitrogen, Ammonia	mg/L	2.0 (P)	< 0.50	< 0.50	< 0.50	< 0.50
Nitrogen, Nitrate	mg/L	0.40	< 0.50	< 0.50	< 0.50	< 0.50
Nitrogen, Nitrite	mg/L	0.37	< 0.50	< 0.50	< 0.50	< 0.50
Sulfate	mg/L	14	**8.0**	< 1.0	**8.8**	**11**
Sulfide	mg/L	3.2	< 5.0	< 5.0	< 5.0	< 5.0
Major Cations						
Calcium	mg/L	18	**9.8**	**6.5**	**16**	**12**
Magnesium	mg/L	4.9	**2.8**	**1.9**	**4.3**	**3.4**
Potassium	mg/L	1.2	**0.70**	**0.55**	**1.1**	**1.2**
Sodium	mg/L	9.4	**5.1**	**3.6**	**8.8**	**7.2**
General						
Hardness	mg/L	67	**38**	**24**	**60**	**46**
Total Dissolved Solids	mg/L	125	**78**	**52**	**138**	**125**
Total Suspended Solids	mg/L	12	**4.7**	< 1.0	< 3.3	**4.8**

2015
Mine Permit Surface Water Quality Monitoring Data
MER-003 (Compliance)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 2/16/15	Q2 2015 5/13/15	Q3 2015 8/24/15	Q4 2015 11/12/15
Field						
D.O.[1]	ppm	--	**15**	**9.2**	**7.2**	**9.9**
ORP	mV	--	**109**	**93**	**147**	**143**
pH	SU	5.97-6.97	**6.1**	**5.9**	**6.4**	**6.1**
Specific Conductance	µS/cm	--	**61.000**	**84**	**151**	**115**
Temperature	°C	--	**-0.1**	**7.3**	**14**	**5.1**
Turbidity	NTU	--	**5.3**	NM	**8.9**	**7.4**
Flow	cfs	--	NM	**116**	**11.4**	27.8
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	0.70	--	--	< 1.0	--
Arsenic	ug/L	3.3	< 1.0	< 1.0	**2.3**	**1.4**
Barium	ug/L	15	--	--	**14**	--
Beryllium	ug/L	0.73	--	--	< 1.0	--
Boron	ug/L	15	--	--	**14**	--
Cadmium	ug/L	0.09	--	--	**0.01**	--
Chromium	ug/L	0.85	--	--	< 1.0	--
Cobalt	ug/L	0.65	--	--	**0.29**	--
Copper	ug/L	0.92	**2.6**	**0.79**	**0.29**	**0.46**
Iron	ug/L	4268	**1600**	**1100**	**2300**	**2100**
Lead	ug/L	0.35	**0.31**	**0.21**	**0.08**	**0.13**
Lithium	ug/L	5.7	--	--	< 8.0	--
Manganese	ug/L	280	**110**	**75**	**210**	**270**
Mercury	ng/L	7.6	**2.0**	**5.2**	**2.9**	**3.0**
Molybdenum	ug/L	0.80	--	--	< 1.0	--
Nickel	ug/L	1.3	**1.1**	**0.80**	**1.0**	**1.0**
Selenium	ug/L	0.20	--	--	**0.74**	--
Silver	ug/L	0.12	--	--	< 0.20	--
Thallium	ug/L	0.70	--	--	< 1.0	--
Vanadium	ug/L	1.2	--	--	< 1.0	--
Zinc	ug/L	2.9	**4.1**	**3.1**	**1.2**	**2.2**
Major Anions						
Alkalinity, Bicarbonate	mg/L	56	**32**	**20**	**50**	**30**
Alkalinity, Carbonate	mg/L	2.0	<2.0	<2.0	< 2.0	< 2.0
Chloride	mg/L	19	**9.8**	**7.4**	**20**	**16**
Fluoride	mg/L	0.29	<0.10	<0.10	< 0.10	< 0.10
Nitrogen, Ammonia	mg/L	2.0 (P)	< 0.50	< 0.50	< 0.50	< 0.50
Nitrogen, Nitrate	mg/L	0.34	< 0.50	< 0.50	< 0.50	< 0.50
Nitrogen, Nitrite	mg/L	0.37	< 0.50	< 0.50	< 0.50	< 0.50
Sulfate	mg/L	16	**15**	< 1.0	**14**	**15**
Sulfide	mg/L	3.2	< 5.0	< 5.0	< 5.0	< 5.0
Major Cations						
Calcium	mg/L	19	**11**	**7.2**	**16**	**12**
Magnesium	mg/L	5.3	**3.5**	**2.2**	**5.1**	**3.7**
Potassium	mg/L	1.4	**0.89**	**0.70**	**1.4**	**1.4**
Sodium	mg/L	11	**5.9**	**4.4**	**10**	**8.2**
General						
Hardness	mg/L	71	**50**	**28**	**66**	**47**
Total Dissolved Solids	mg/L	141	**148**	<50	**166**	**162**
Total Suspended Solids	mg/L	3.1	< 3.3	**6.0**	< 3.3	**3.5**

2015
Mine Permit Surface Water Quality Monitoring5Data
WBR-001 (Reference)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 2/16/15	Q2 2015 5/13/15	Q3 2015 8/24/15	Q4 2015 11/12/15
Field						
D.O.[1]	ppm	--	**12**	**7.5**	**4.7**	**10**
ORP	mV	--	**143**	**135**	**138**	**153**
pH	SU	4.98-5.98	**5.3**	**5.6**	**7.4**	**5.6**
Specific Conductance	µS/cm	--	**42**	**91**	**226**	**88**
Temperature	°C	--	**-0.2**	**7.4**	**14**	**5.1**
Turbidity	NTU	--	**4.8**	NM	**13**	**2.3**
Flow	cfs	--	NM	NM	NM	NM
Metals						
Aluminum	ug/L	200 (p)	--	--	**160**	--
Antimony	ug/L	0.70	--	--	< 1.0	--
Arsenic	ug/L	8.7	< 1.0	**1.5**	**1.9**	< 1.0
Barium	ug/L	26	--	--	**13**	--
Beryllium	ug/L	0.73	--	--	< 1.0	--
Boron	ug/L	12.7	--	--	< 10	--
Cadmium	ug/L	0.06	--	--	**0.03**	--
Chromium	ug/L	2.7	--	--	< 1.0	--
Cobalt	ug/L	0.85	--	--	**0.47**	--
Copper	ug/L	1.0	**0.68**	**0.82**	**0.86**	**0.64**
Iron	ug/L	11056	**2000**	**1600**	**2500**	**1200**
Lead	ug/L	1.8	**1.5**	**0.90**	**0.96**	**0.79**
Lithium	ug/L	8.6	--	--	< 8.0	--
Manganese	ug/L	641	**110**	**76**	**190**	**96**
Mercury	ng/L	17.0	**7.3**	**9.0**	**10**	**7.4**
Molybdenum	ug/L	8.1	--	--	< 1.0	--
Nickel	ug/L	1.9	**0.77**	**0.86**	**0.92**	**0.70**
Selenium	ug/L	0.33	--	--	**0.41**	--
Silver	ug/L	0.12	--	--	< 0.20	--
Thallium	ug/L	0.70	--	--	< 1.0	--
Vanadium	ug/L	4.2	--	--	**1.2**	--
Zinc	ug/L	9.2	**8.9**	**7.7**	**8.6**	**6.5**
Major Anions						
Alkalinity, Bicarbonate	mg/L	15	**4.4**	**2.9**	**7.6**	**4.5**
Alkalinity, Carbonate	mg/L	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Chloride	mg/L	24	**19**	**18**	**18**	**21**
Fluoride	mg/L	0.26	< 0.10	< 0.10	< 0.10	< 0.10
Nitrogen, Ammonia	mg/L	0.78	< 0.50	< 0.50	< 0.50	< 0.50
Nitrogen, Nitrate	mg/L	0.34	< 0.50	< 0.50	< 0.50	< 0.50
Nitrogen, Nitrite	mg/L	0.37	< 0.50	< 0.50	< 0.50	< 0.50
Sulfate	mg/L	9.3	< 1.0	< 1.0	**28**	**30**
Sulfide	mg/L	3.2	< 5.0	< 5.0	< 5.0	< 5.0
Major Cations						
Calcium	mg/L	8.3	**4.3**	**3.7**	**5.4**	**5.2**
Magnesium	mg/L	3.3	**1.8**	**1.5**	**2.2**	**2.3**
Potassium	mg/L	2.6	**0.58**	**0.86**	**0.84**	**1.4**
Sodium	mg/L	11	**7.8**	**8.1**	**8.9**	**9.7**
General						
Hardness	mg/L	38	**22**	**18**	**27**	**28**
Total Dissolved Solids	mg/L	204	**110**	**98**	**164**	**140**
Total Suspended Solids	mg/L	34	< 3.3	<1.0	**4.5**	< 3.3

Explanations of abbreviations are included on the final page of this table.

2015
Mine Permit Surface Water Quality Monitoring Data
WBR-002 (Compliance)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 2/16/15	Q2 2015 5/13/15	Q3 2015 8/24/15	Q4 2015 11/12/15
Field						
D.O.[1]	ppm	--	NM	**6.9**	**3.0**	**11**
ORP	mV	--	NM	**89**	**169**	**160**
pH	SU	6.26-7.26	NM	**6.6**	**5.6**	**5.9**
Specific Conductance	µS/cm	--	NM	**169**	**174**	**166**
Temperature	°C	--	NM	**9.3**	**16**	**6.2**
Turbidity	NTU	--	NM	NM	**84**	**65**
Flow	cfs	--	NM	NM	NM	NM
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	0.72	--	--	< 1.0	--
Arsenic	ug/L	10	NM	**2.7**	**6.9**	**3.6**
Barium	ug/L	19	--	--	**15**	--
Beryllium	ug/L	0.73	--	--	< 1.0	--
Boron	ug/L	18	--	--	**14**	--
Cadmium	ug/L	0.09	--	--	< 0.008	--
Chromium	ug/L	10	--	--	< 1.0	--
Cobalt	ug/L	0.80	--	--	**0.87**	--
Copper	ug/L	1.3	NM	**1.7**	**0.61**	**2.0**
Iron	ug/L	15593	NM	**4100**	**12000**	**7200**
Lead	ug/L	0.25	NM	**0.30**	**0.17**	**0.89**
Lithium	ug/L	5.6	--	--	< 8.0	--
Manganese	ug/L	1295	NM	**200**	**660**	**190**
Mercury	ng/L	4.3	NM	**2.5**	**2.0**	**2.3**
Molybdenum	ug/L	2.8	--	--	< 1.0	--
Nickel	ug/L	1.9	NM	**1.9**	**1.5**	**3.1**
Selenium	ug/L	0.18	--	--	**0.55**	--
Silver	ug/L	0.12	--	--	< 0.20	--
Thallium	ug/L	0.72	--	--	< 1.0	--
Vanadium	ug/L	0.8	--	--	< 1.0	--
Zinc	ug/L	4.5	NM	**19**	**6.2**	**3.1**
Major Anions						
Alkalinity, Bicarbonate	mg/L	41	NM	**12**	**28**	**16**
Alkalinity, Carbonate	mg/L	2.0	NM	< 2.0	< 2.0	< 2.0
Chloride	mg/L	56	NM	**37**	**45**	**49**
Fluoride	mg/L	0.31	NM	< 0.10	< 0.10	< 0.10
Nitrogen, Ammonia	mg/L	0.61	NM	< 0.50	< 0.50	< 0.50
Nitrogen, Nitrate	mg/L	0.36	NM	< 0.50	< 0.50	< 0.50
Nitrogen, Nitrite	mg/L	0.37	NM	< 0.50	< 0.50	< 0.50
Sulfate	mg/L	10	NM	**3.4**	**26**	**11**
Sulfide	mg/L	3.2	NM	< 5.0	< 5.0	< 5.0
Major Cations						
Calcium	mg/L	13	NM	**6.1**	**9.5**	**9.2**
Magnesium	mg/L	5.8	NM	**3.0**	**4.3**	**4.7**
Potassium	mg/L	2.7	NM	**1.7**	**1.3**	**1.9**
Sodium	mg/L	28	NM	**19**	**23**	**25**
General						
Hardness	mg/L	56	NM	**28**	**42**	**41**
Total Dissolved Solids	mg/L	182	NM	**94**	**172**	**208**
Total Suspended Solids	mg/L	9.8	NM	**8.9**	**27**	**8.8**

2015
Mine Permit Surface Water Quality Monitoring Data
WBR-003 (Compliance)
Humboldt Mill

Parameter	Unit	Recom-mended Benchmark 2014	Q1 2015 2/16/15	Q2 2015 5/13/15	Q3 2015 8/24/15	Q4 2015 11/12/15
Field						
D.O.[1]	ppm	--	**9.3**	**6.3**	**2.3**	**8.6**
ORP	mV	--	**131**	**9.1**	**146**	**156**
pH	SU	6.05-7.05	**5.6**	**6.5**	**5.9**	**5.8**
Specific Conductance	µS/cm	--	**92**	**271**	**190**	**95**
Temperature	°C	--	**-0.04**	**8.5**	**15**	**5.3**
Turbidity	NTU	--	**18**	NM	**79**	**6.8**
Flow	cfs	--	NM	NM	NM	NM
Metals						
Aluminum	ug/L	200 (p)	--	--	< 50	--
Antimony	ug/L	0.70	--	--	< 1.0	--
Arsenic	ug/L	4.4	**1.5**	**1.4**	**5.4**	**1.3**
Barium	ug/L	19	--	--	**24**	--
Beryllium	ug/L	0.70	--	--	< 1.0	--
Boron	ug/L	19	--	--	< 10	--
Cadmium	ug/L	0.09	--	--	< 0.008	--
Chromium	ug/L	0.74	--	--	< 1.0	--
Cobalt	ug/L	1.2	--	--	**2.0**	--
Copper	ug/L	1.0	**0.54**	**0.60**	**0.20**	**0.35**
Iron	ug/L	11315	**6000**	**2800**	**18000**	**3000**
Lead	ug/L	0.44	**0.20**	**0.17**	**0.15**	**0.56**
Lithium	ug/L	5.5	--	--	< 8.0	--
Manganese	ug/L	2101	**1000**	**160**	**2500**	**190**
Mercury	ng/L	6.0	**1.7**	**2.7**	**3.1**	**5.8**
Molybdenum	ug/L	1.9	--	--	< 1.0	--
Nickel	ug/L	1.8	**1.5**	**1.2**	**2.3**	**0.66**
Selenium	ug/L	0.19	--	--	**0.64**	--
Silver	ug/L	0.12	--	--	< 0.20	--
Thallium	ug/L	0.72	--	--	< 1.0	--
Vanadium	ug/L	0.82	--	--	< 1.0	--
Zinc	ug/L	10	**3.1**	**5.1**	**2.0**	**2.9**
Major Anions						
Alkalinity, Bicarbonate	mg/L	56	**35**	**18**	**80**	**19**
Alkalinity, Carbonate	mg/L	2.0	< 2.0	< 2.0	< 2.0	< 2.0
Chloride	mg/L	43	**36**	**27**	**30**	**22**
Fluoride	mg/L	0.34	< 0.10	< 0.10	**0.17**	**0.17**
Nitrogen, Ammonia	mg/L	2.0 (P)	< 0.50	< 0.50	< 0.50	< 0.50
Nitrogen, Nitrate	mg/L	0.30	< 0.50	< 0.50	< 0.50	< 0.50
Nitrogen, Nitrite	mg/L	0.37	< 0.50	< 0.50	< 0.50	< 0.50
Sulfate	mg/L	14	< 1.0	< 1.0	**24**	**28**
Sulfide	mg/L	3.2	< 5.0	< 5.0	< 5.0	< 5.0
Major Cations						
Calcium	mg/L	16	**10**	**7.1**	**22**	**8.0**
Magnesium	mg/L	6.6	**4.9**	**3.2**	**9.0**	**3.7**
Potassium	mg/L	2.0	**1.5**	**1.5**	**1.7**	**2.3**
Sodium	mg/L	21	**18**	**14**	**14**	**10**
General						
Hardness	mg/L	69	**54**	**32**	**98**	**35**
Total Dissolved Solids	mg/L	184	**134**	**96**	**262**	**160**
Total Suspended Solids	mg/L	15	**4.8**	<1.0	**20**	<3.3

2015
Mine Permit Surface Water Quality Monitoring Data
Abbreviations & Data Qualifiers
Humboldt Mill

Notes:
Benchmarks are calculated based on guidance from Eagles Mine's Development of Site Specific Benchmarks for Mine Permit Water Quality Monitoring.
Results in **bold** text indicate that the parameter was detected at a level greater than the laboratory reporting limit.
Highlighted Cell = Value is equal to or above site-specific benchmark. An exceedance occurs if there are 2 consecutive sampling events with a value equal to or greater than the benchmark at a compliance monitoring location.
(p) = Due to less than two detections in baseline dataset, benchmark defaulted to four times the reporting limit.
--Denotes no benchmark required or parameter was not required to be collected during the sampling quarter.
e = estimated value. The laboratory statement of data qualifications indicates that a quality control limit for this parameter was exceeded.
NM = Not measured.

Appendix J

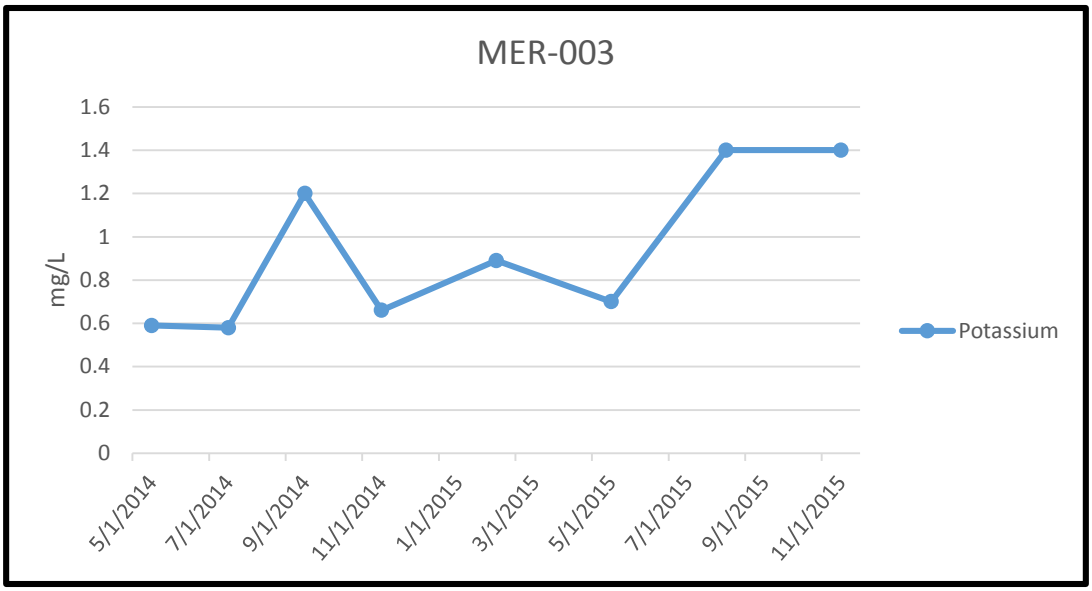
Humboldt Mill

Surface Water Trend Analysis Summary

2015
Surface Water Trend Analysis Summary
Humboldt Mill

Location	Classification	Parameter	Unit	Count (n)	Number of Non-Detects	Mean	UCL	Median	Standard Deviation	Coefficient of Variation	Skewness	Minimum	Maximum	Mann-Kendall S	Sen Slope	Positive or Negative Trend (Minimum 95% Confidence)
MER-002	Monitoring	Mercury	ng/L	8	0	4.0	4.8	3.9	1.2	0.29	0.20	2.6	5.7	-16	-0.005	Negative
MER-002	Monitoring	Sulfate	mg/L	8	4	4.8	7.6	3.7	4.2	0.89	0.34	1.0	11.0	16	0.011	Positive
MER-003	Monitoring	Barium	ug/L	4	0	11.0	14.5	11.5	3.0	0.27	-0.97	6.9	14.0	6	--	Positive
MER-003	Monitoring	Nickel	ug/L	11	6	0.96	1.1	1.0	0.21	0.22	-2.68	0.37	1.1	26	0.0002	Positive
MER-003	Monitoring	Potassium	mg/L	8	0	0.93	1.2	0.80	0.35	0.38	0.51	0.58	1.4	17	0.0009	Positive
WBR-003	Monitoring	Potassium	mg/L	8	0	1.4	1.7	1.4	0.51	0.37	0.00	0.50	2.3	22	0.002	Positive

2015
Surface Water Trend Analysis Summary Charts
Humboldt Mill

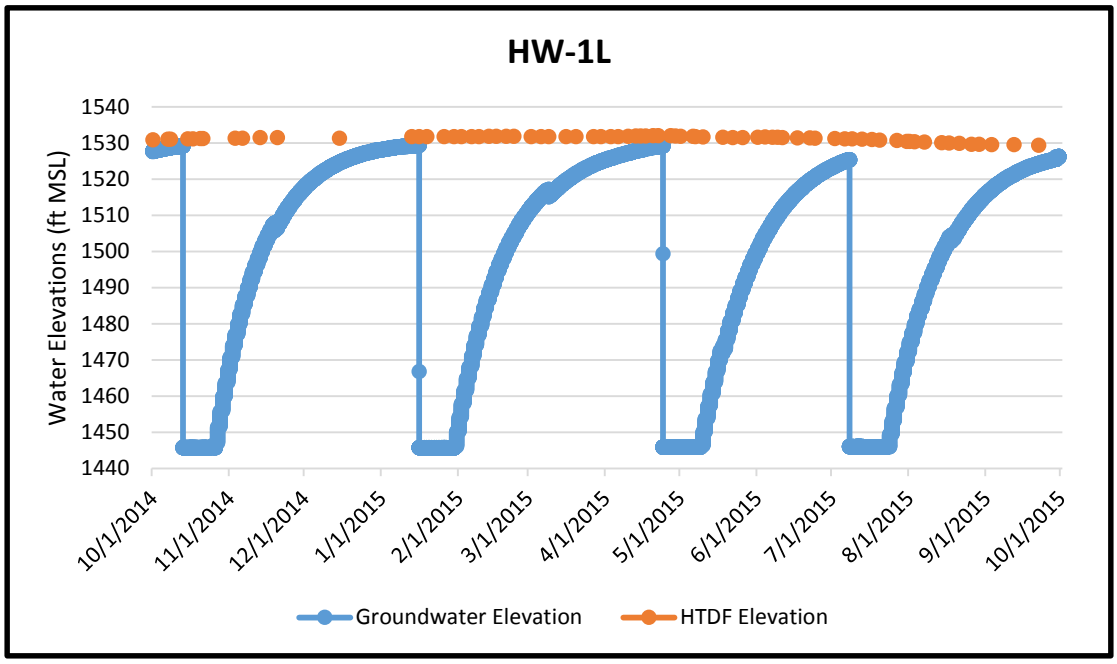


Appendix K

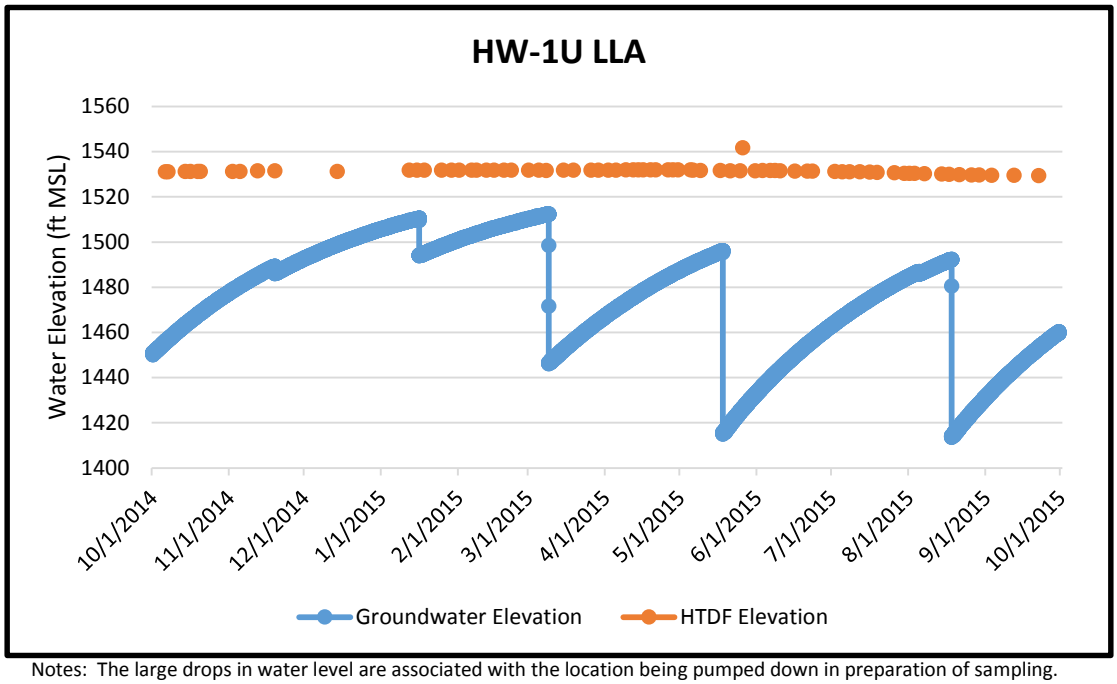
Humboldt Mill

Groundwater Hydrographs

2015 Groundwater Hydrographs
Humboldt Mill

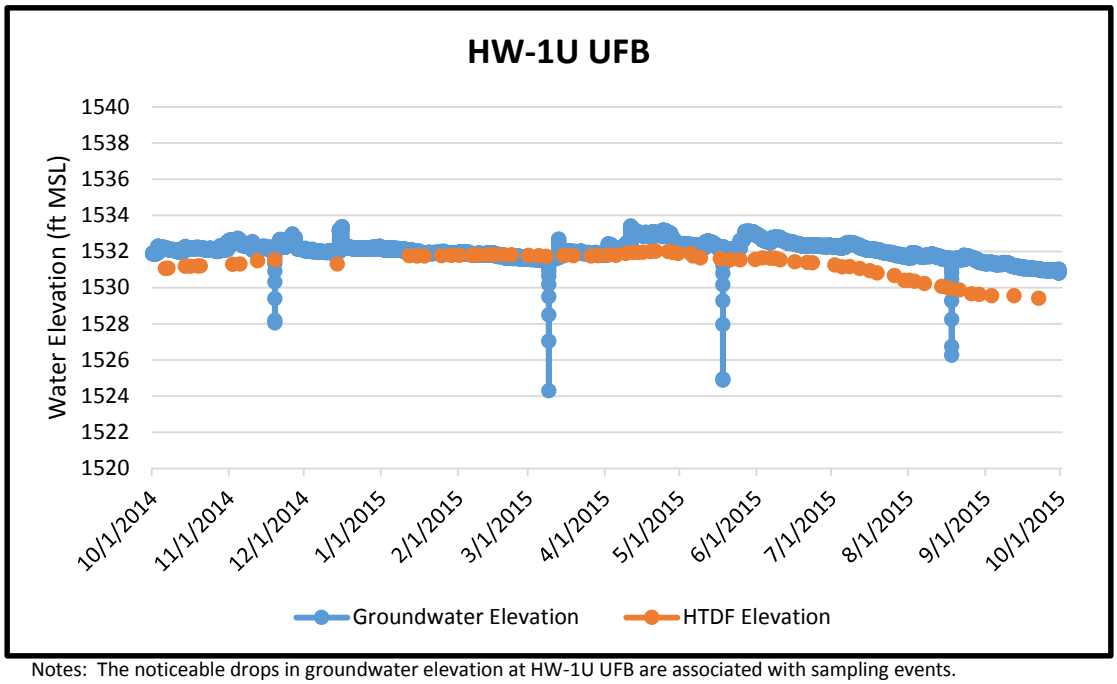


Notes: The large drops in water level are associated with the location being pumped down in preparation of sampling.

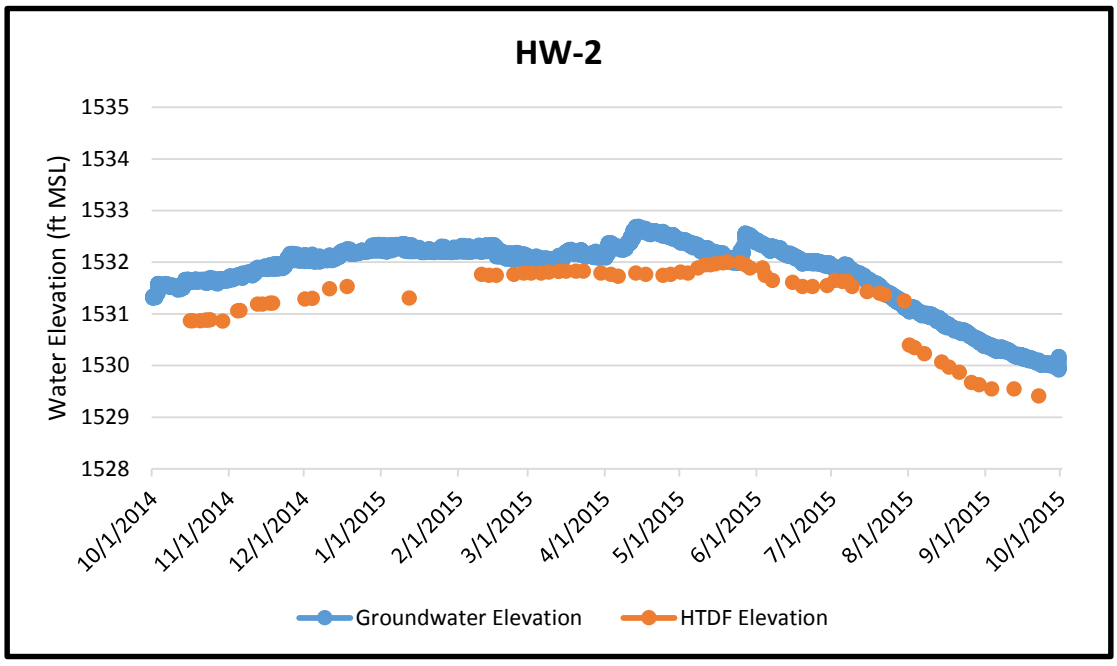


Notes: The large drops in water level are associated with the location being pumped down in preparation of sampling.

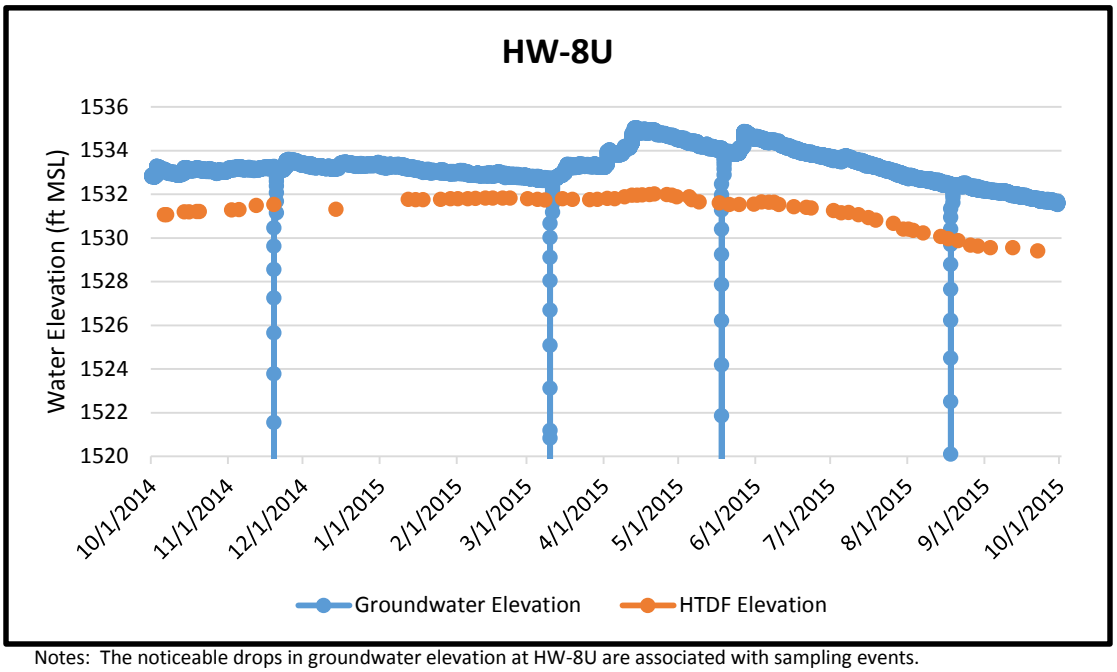
2015 Groundwater Hydrographs
Humboldt Mill



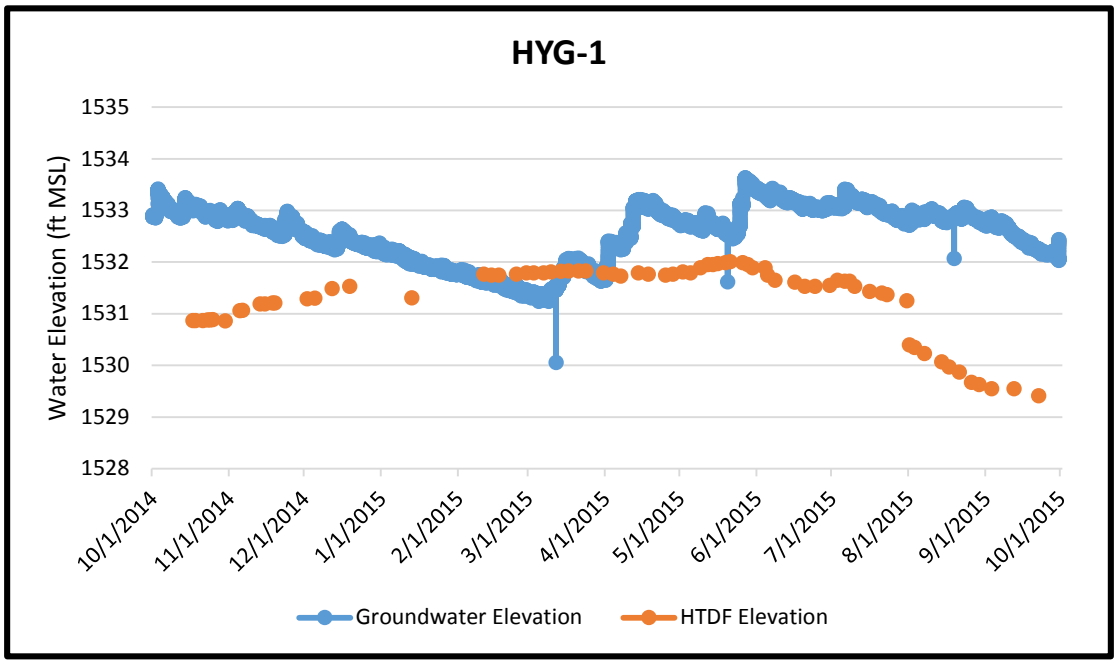
Notes: The noticeable drops in groundwater elevation at HW-1U UFB are associated with sampling events.



2015 Groundwater Hydrographs
Humboldt Mill

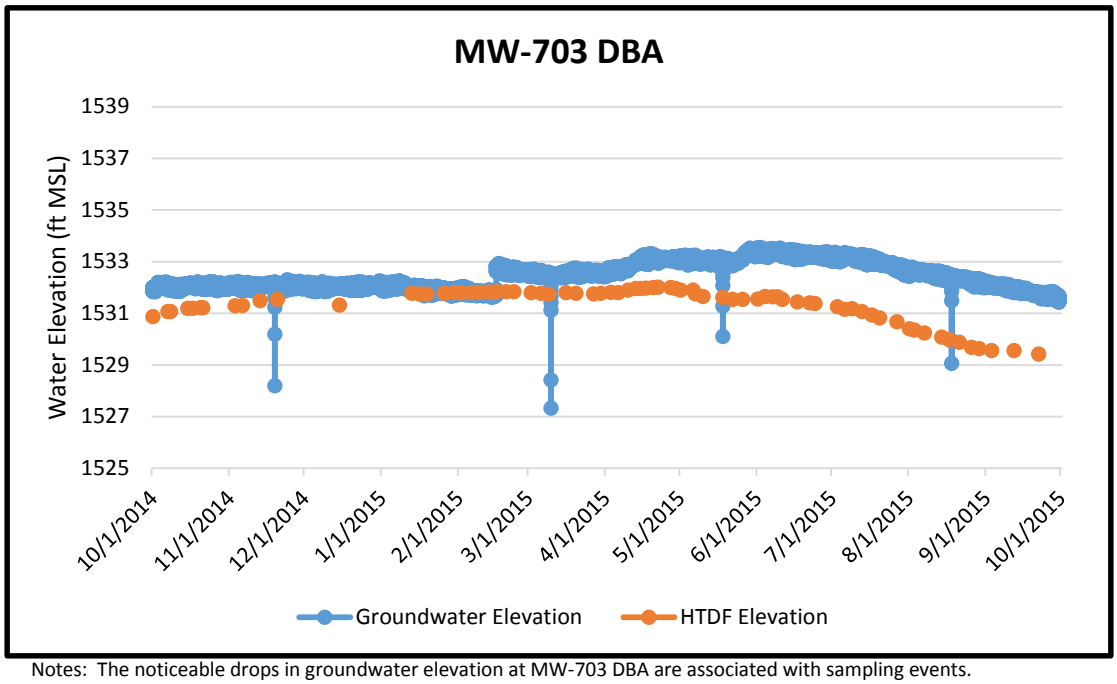


Notes: The noticeable drops in groundwater elevation at HW-8U are associated with sampling events.

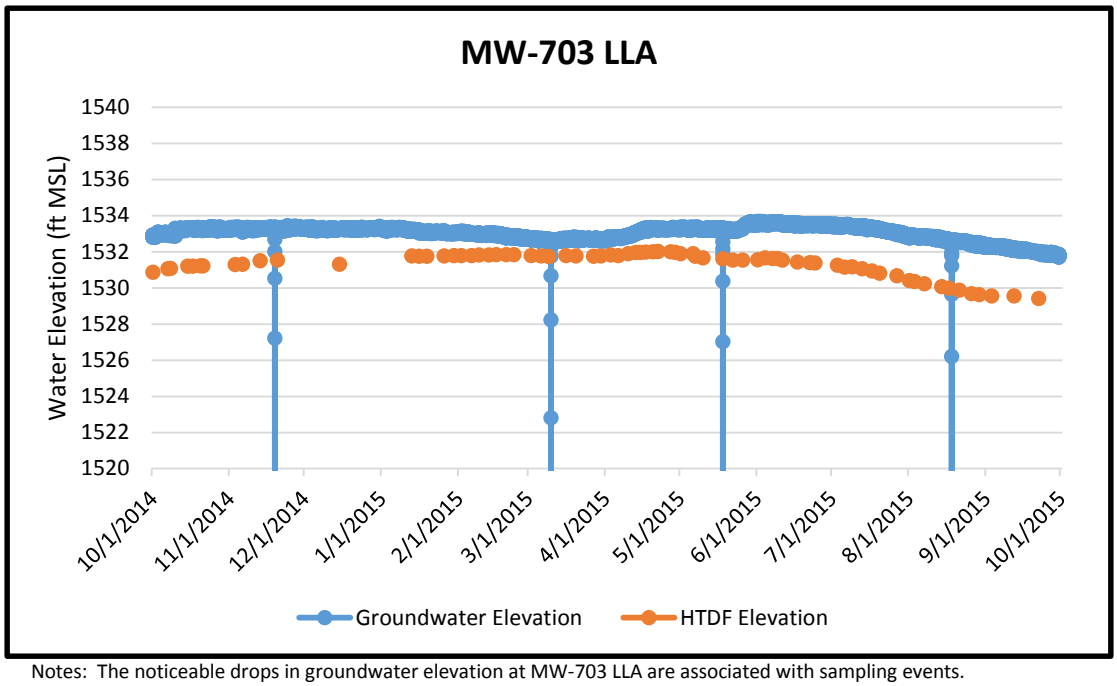


Notes: The noticeable drops in groundwater elevation at HYG-1 are associated with sampling events.

2015 Groundwater Hydrographs
Humboldt Mill

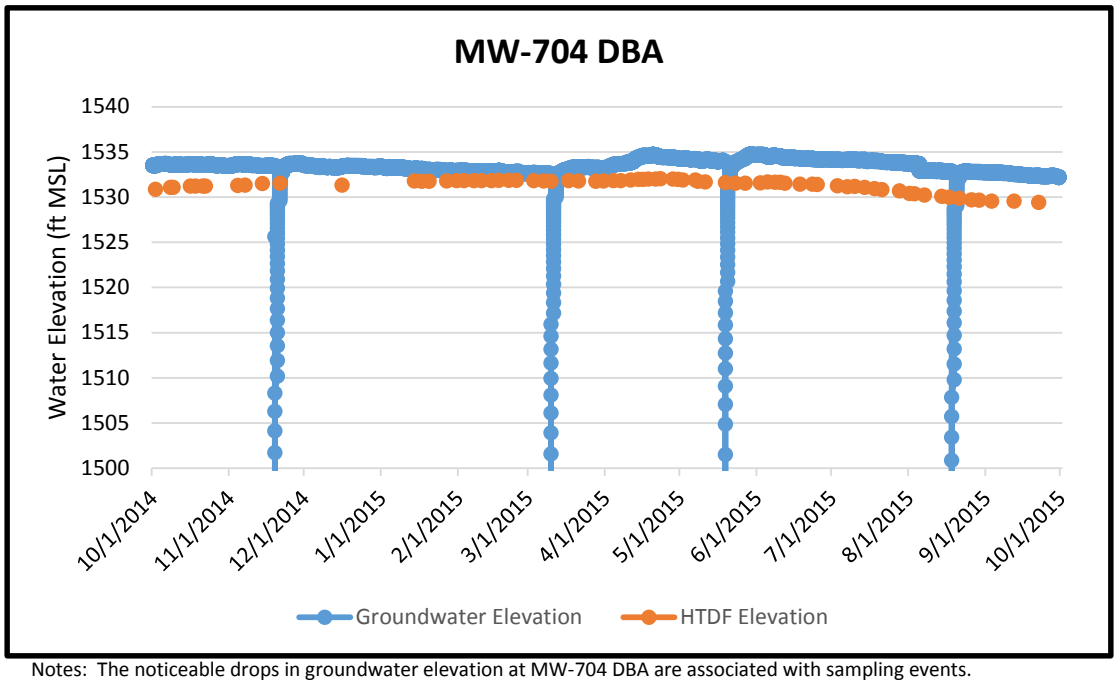


Notes: The noticeable drops in groundwater elevation at MW-703 DBA are associated with sampling events.

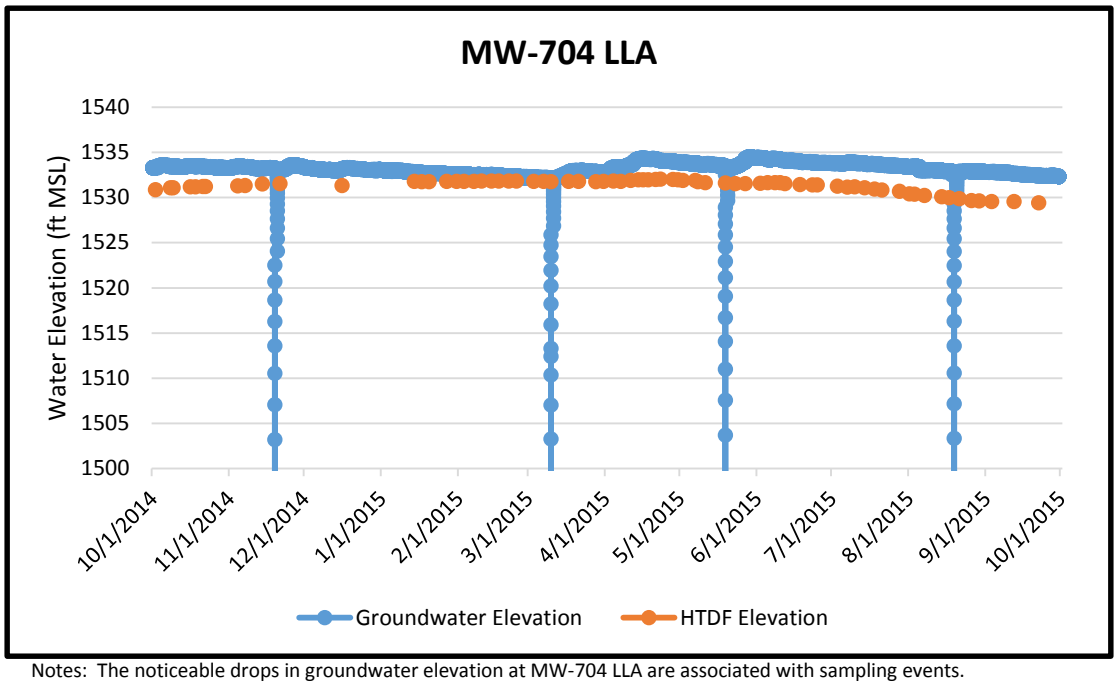


Notes: The noticeable drops in groundwater elevation at MW-703 LLA are associated with sampling events.

2015 Groundwater Hydrographs
Humboldt Mill

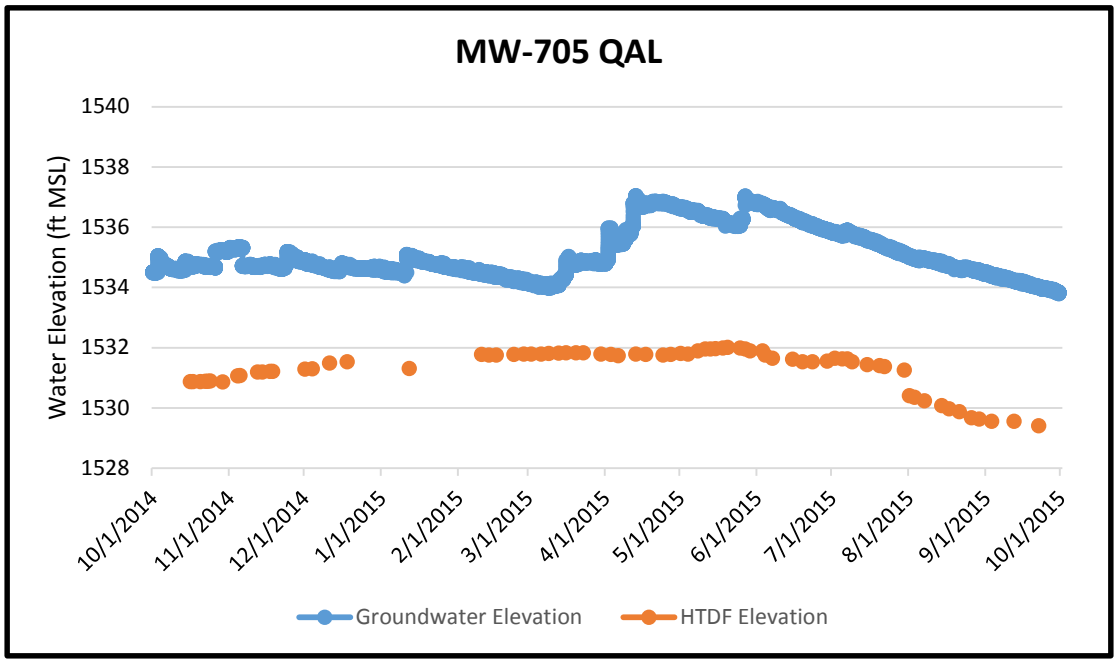


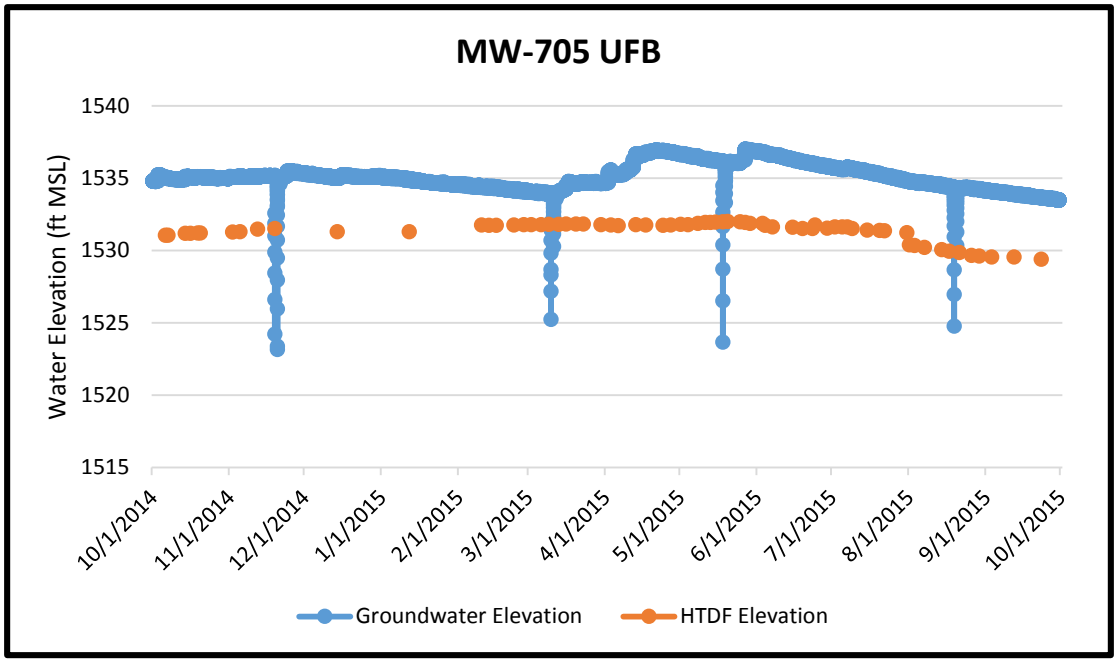
Notes: The noticeable drops in groundwater elevation at MW-704 DBA are associated with sampling events.



Notes: The noticeable drops in groundwater elevation at MW-704 LLA are associated with sampling events.

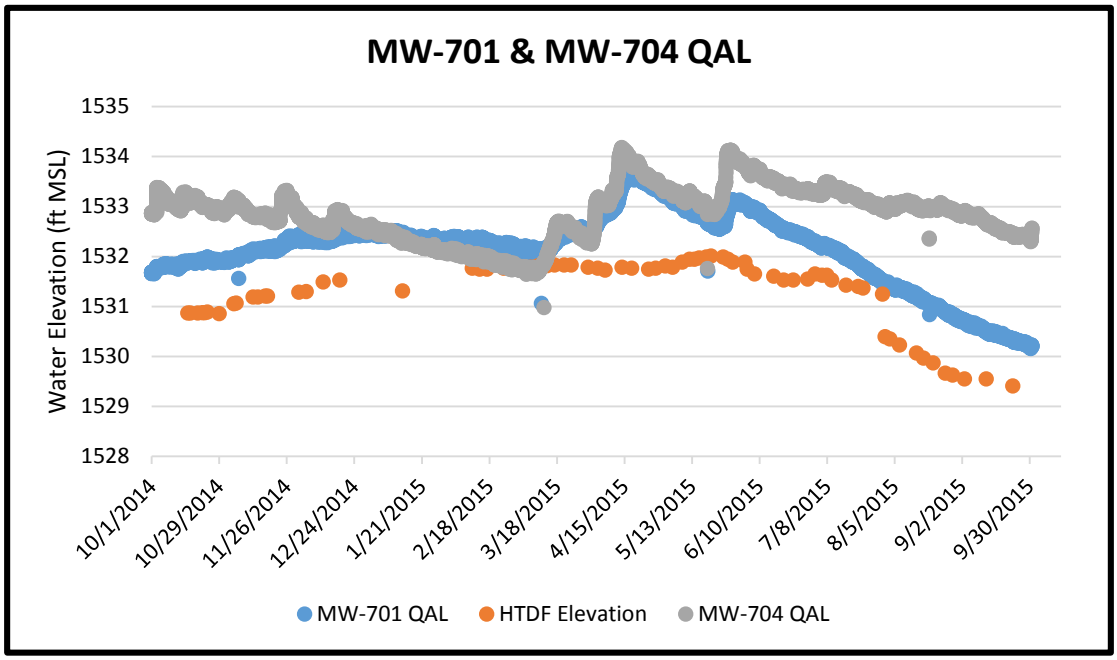
2015 Groundwater Hydrographs
Humboldt Mill

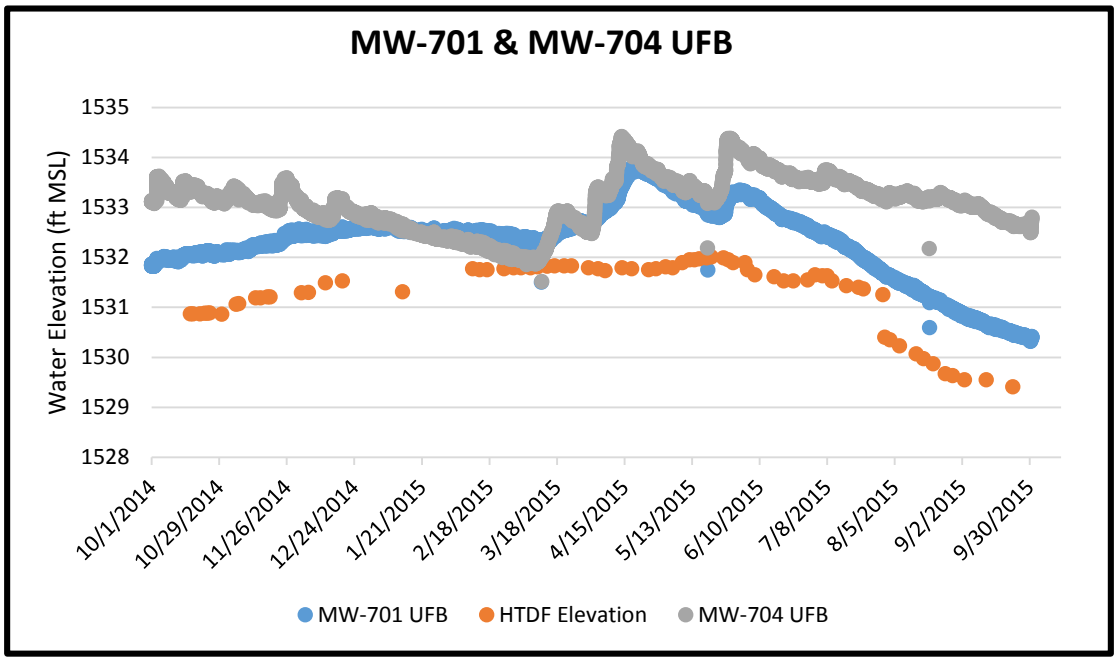




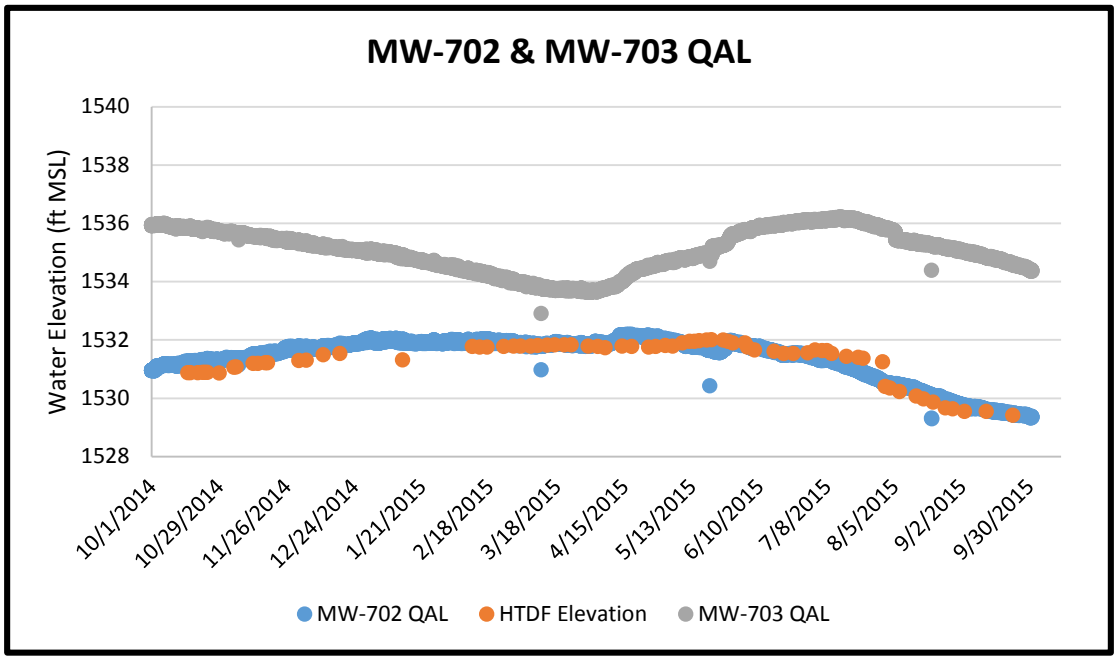
Notes: The noticeable drops in groundwater elevation at MW-705 UFB are associated with sampling events.

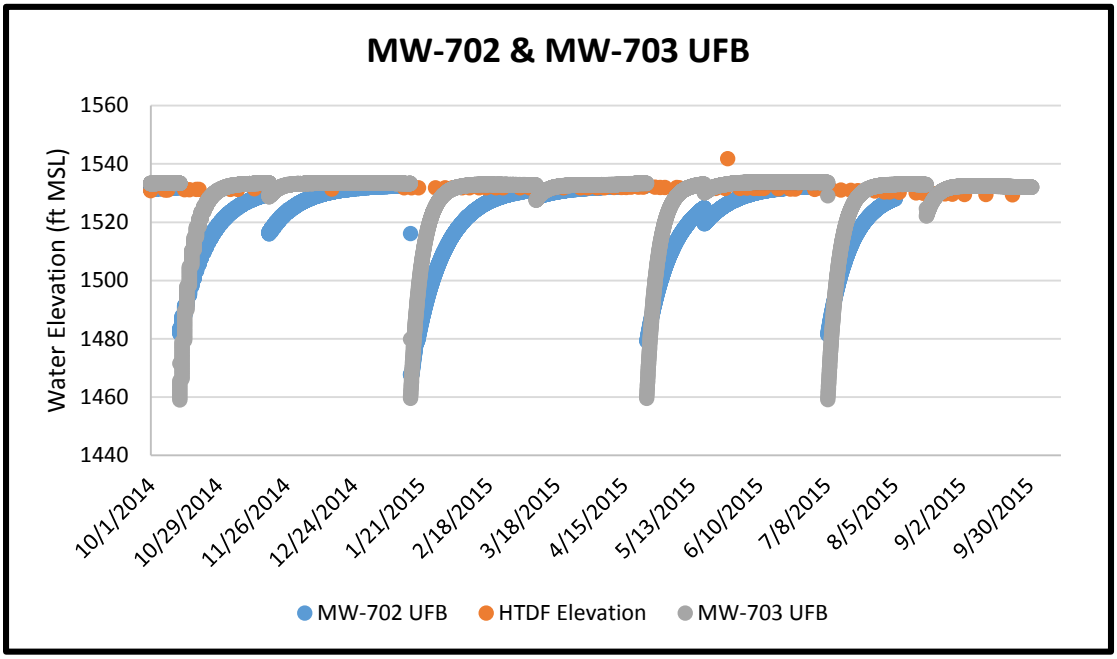
2015 Groundwater Hydrographs
Humboldt Mill





2015 Groundwater Hydrographs
Humboldt Mill





Notes: The large drops in water level are associated with the locations being pumped down in preparation of sampling. The water level meter was removed for repair from MW-702 UFB on August 5, 2015.

Appendix L

Humboldt Mill

Updated Contingency Plan

Eagle Mine
a subsidiary of lundin mining

1 Contingency Plan – Humboldt Mill

This contingency plan addresses 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 Eagle Mine through HSE procedures in accordance with Occupational Safety and Health Administration (OSHA) and Mine Safety and Health Administration (MSHA) requirements.

The Humboldt Mill involves processing ore, as well as storing and treating by-products of that process. The milling, storage, and treatment facilities have been designed, constructed, and are operated in a manner that is protective of the environment through the use of proven technologies and engineering practices.

1.1 Contingency Items

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

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

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

1.1.1 Release of Toxic or Acid-Forming Materials

Potentially reactive materials generated as a result of processing operations include ore concentrate and tailings. Both materials have the potential to leach metals constituents when exposed to air and water. As described in the following sub-sections, handling and temporary storage of both the ore concentrate and tailings have been carefully considered in the design of the Humboldt Mill so as to prevent the uncontrolled release of acid rock drainage (ARD).

1.1.1.1 Coarse Ore Storage Area (COSA) and Concentrate Load-Out (CLO) Areas

Potential environmental risks associated with the COSA is the release of contact water to the environment via cracks in the floor areas or collection sumps. The COSA is a steel sided building with a full roof that is used for temporary storage of stockpiled coarse ore that has been transported from the mine and is awaiting crushing. The COSA has a concrete floor that is sloped to keep any water associated with the ore inside the facility. The lower level of the facility is equipped with an epoxy lined sump and any water collected is pumped to the Humboldt Tailings Disposal Facility (HTDF) for eventual treatment by the water treatment plant.

Contingency planning for this facility includes timely repair of cracks in the floors and walls that could allow the release of material into the environment. An impermeable surface inspection plan has been developed and describes procedures for routine impermeable surface inspections, preventative and remedial actions as well as documentation procedures. Also, in accordance with Air Permit (No. 405-08) all overhead doors must be closed during loading or unloading of ore and a watering program is in place to minimize the generation of dust.

1.1.1.2 Concentrate Load-Out (CLO)

Potential environmental risks associated with the CLO is the release of acid generating material via track out and fugitive emissions. The CLO is a steel sided building with a full roof that is used for temporary storage of stockpiled nickel and copper concentrate prior to loading the material into railcars destined for customers. The CLO has concrete floors and does not contain any floor drains as water use is discouraged in this area.

Contingency planning for this facility includes timely repair of cracks in the floors and walls that could allow the release of material into the environment. An impermeable surface inspection plan has been developed and describes procedures for routine impermeable surface inspections, preventative and remedial actions as well as documentation procedures. Also, in accordance with Air Permit (No. 405-08) all overhead doors must be closed during loading operations and a sweeping program in place to minimize the generation of dust and track out of material. Track out is also managed in accordance with procedures outlined in the facilities Standard operating procedures and includes inspecting and removing any residual concentrate from the exterior of the railcars prior to leaving the facility.

1.1.1.3 Humboldt Tailings Disposal Facility (HTDF)

Potential contaminant release from the HTDF could be waters having elevated metal concentrations that impact surface water or groundwater quality. The HTDF is a former open pit mine that was allowed to fill with water. Process tailings are sub-aqueously disposed which is industry best practice for materials that could be potentially acid generating. The anoxic environment minimizes the potential for generation of ARD. The HTDF was originally comprised of bedrock walls on three sides and alluvial soils on the north end in which water was allowed to naturally flow into the nearby wetland. A cut-off wall has been installed on the north end to prevent the release of water from the HTDF through the alluvial soils. Therefore, groundwater quality surrounding the HTDF will not be influenced by HTDF operations. Natural discharges from the HTDF have been essentially eliminated and any water that leaves the HTDF must now pass through the water treatment plant prior to discharge into the environment. Surface water discharge from the HTDF will be treated through the water treatment plant prior to discharge to a nearby wetland. In addition, the installation of the cut-off wall in the alluvial soils along the north perimeter of the HTDF will prevent release to the groundwater.

Groundwater seeps from the HTDF will not occur due to the low permeability of the surrounding Precambrian geologic formation. Furthermore, groundwater and surface water quality and elevations/flow will be routinely monitored in accordance with the Part 632 Mining and NPDES permits and will quickly identify changes to surrounding water quality that would be indicative of groundwater release from the HTDF. Contingency planning from an unlikely groundwater release from the HTDF includes:

- Identify the nature and extent of the release,
- Implement additional monitoring to ascertain extent of release,
- Develop a remedial action plan to bring facility back into compliance,
- Implement remedial action plan.

Specific details of the remedial action plan would be developed based upon the nature of the release and with agreements with the MDEQ.

As a further contingency against groundwater seepage from the HTDF, the operating level has been lowered to a level below that of the adjacent wetland creating a reverse gradient that does not facilitate the movement of water from the HTDF to the adjoining wetlands. The lower operating level of the HTDF also provides for additional freeboard in the event of a significant weather event or operational situation that results in the inability to operate the WTP and discharge water.

Eagle will monitor water quality in the HTDF during operations and post-closure. The WTP and associated infrastructure will remain in place for five years after tailings disposal has ceased. If monitoring indicated that there are elevated metals in the HTDF that could impact surface water one of the following treatment options may be implemented:

- Continue the treatment of the HTDF water through the WTP until water quality conditions in the HTDF meet surface water standards; and/or
- Amend the HTDF with appropriate reagents to reduce elevated metal parameters in order to meet surface water standards.

Specific reagents and application rate(s) would be identified upon determination of elevated metal parameters of concern. Past phosphate seeding of HTDF by previous owners was shown to be effective for nickel concentration reduction. Alum could also be used as a flocculent to enhance metal precipitation thereby improving water quality.

1.1.1.4 Tailings Transport System

Tailings are transported to the HTDF via slurry contained within a double-cased HDPE pipe conveyance system. The pipe conveyance system consists of a 4-in diameter carrier pipe within an 8-in outer containment pipe. Two tailings lines are available for use, but only one is utilized at a time. In addition, the tailings lines are equipped with a leak detection system; any water released into the outer piping would drain to the shore vault and trigger an alarm, notifying operations of a potential system breach. The shore vault is also visually inspected twice per day (once per shift) by operators and the Environmental Department checks the tailings lines for signs of leakage once per week.

If a breach is identified, the slurry pumps will be shut-down until the source of breach is identified and repaired. The contingency plan for moving tailings to the HTDF facility is to use the second set of tailings lines that are already in place. In the event both lines were down, they could either be pumped into a truck with a sealed cargo area or the tailings will be held within the plant thickener vessel until the pipeline is repaired.

1.1.2 Storage, Transportation and Handling of Chemicals

Potential risks associated with chemical use include surface and groundwater quality impacts. Chemicals are brought to the site by certified chemical haulers, meeting MDOT transportation requirements. Storage of these chemicals are provided in secure locations within building(s) or outdoor bulk storage silos designed for that application. Transferring chemicals is conducted by qualified site personnel. Bulk granular products are conveyed pneumatically to the storage silos. Specific procedures for chemical storage and emergency response procedures are included in the facilities Pollution Incident Prevention Plan (PIPP).

Because chemicals will be stored in secure areas, the potential for release into the environment is very remote. If a breach of contaminant vessel does occur, the chemical will be contained within the secondary containment area. The spill or release will be immediately cleaned using appropriate methods specified in the Safety Data Sheets (SDS). SDS are maintained on-site for all chemicals.

1.1.3 Fuel Storage and Distribution

There is currently one 4,000 gallon diesel mobile fueling truck located onsite. This truck is used to fuel all mobile equipment onsite. A fuel provider refills this fuel truck on an as needed basis. The fuel truck is parked on an asphalt surface in which any spills or leaks would be captured in a catch basin and routed to the HTDF.

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

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

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

Diesel fuel and propane (fuels) are 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. 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 Mine.

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

Bulk Tank Failure – A release may result from a failure of the storage tank on the fuel truck. This type of release is judged to be low probability as the vehicle is inspected on a daily basis prior to use for signs of leakage or potential failure. In addition, as stated above the fuel truck is parked and utilized in locations in which asphalt is present and any spills would be directed to catch basins or sumps in which the fuel would be directed to the HTDF and not to an offsite or unprotected surface location. In addition, a spill

response trailer is located onsite and contains spill containment and clean-up equipment in the event of a spill. Eagle also has a spill response contractor on call to immediately respond to situations that cannot be handled by onsite personnel.

Mishandling/Leaking Hoses - 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 and all tanks are required to have secondary containment. As with mishandling or leaking hoses, these small spills will be cleaned up by using on-site spill response equipment such as absorbent materials and/or removing impacted soils.

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

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.

1.1.4 Fires

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

Because the Humboldt Mill is situated in a forested region, forest fires started off-site could potentially impact the mill site. The cleared area in the vicinity of the surface facilities serves 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. All vehicles/equipment are required to be equipped with fire extinguishers and all personnel trained in their

use. Water pipelines and network of fire hydrants have been installed throughout the site and additional fire extinguishers are also located in high risk areas. On-site firefighting equipment includes an above ground water storage tank and distribution system for fire suppression. At Humboldt Mill a Wildfire Response Guideline has been developed in conjunction with Michigan DNR Fire Division to ensure the best possible response to a wildland fire.

Contingency planning for managing materials that oxidize includes training equipment operators on the material characteristics. Because the concentrate is only present for short periods of time in either the mill building or concentrate load-out building, and given that the concentrate will have a moisture content of at least 15%, the likelihood of an oxidation is very remote. The temperature of the material is routinely measured and any material exhibiting signs of self-heating is immediately compacted or exposed and spread out depending on the situation.

1.1.5 Wastewater Collection and Treatment

The major source of water from the facility requiring treatment is process water and tailings, groundwater infiltration into the HTDF, precipitation, and storm water runoff. The HTDF is sized to provide wastewater storage and equalization capacity. Water from the HTDF is conveyed to the WTP which is comprised of several unit processes, including: metals precipitation and ultra-filtration. The final product water is discharged to a nearby wetland area. This discharge is authorized by the State of Michigan under an NPDES permit.

The water treatment system is designed to handle various process upset conditions such as power disruption (Section 1.1.9) 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 HTDF for re-treatment. The water level of the HTDF is maintained at a level that provides ample storage capacity that would allow for sufficient time to correct a process upset condition. Potential hazards and chemical reagents associated with the WTP are discussed in Section 1.1.7.

1.1.6 Air Emissions

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

1.1.6.1 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 (No. 405-08). These controls include use of building enclosures for material handling, installation of dust collection or suppression systems such as baghouses or water sprays to control dust during ore crushing and transfer operations and following prescribed preventive maintenance procedures for the facility. Tailings generated during the milling process are slurried to the HTDF and therefore will not generate particulate matter. Ore brought from off-site is 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.

To minimize dust emissions from the COSA and concentrate load-out building, these areas are fully enclosed. Ore transported from the mine site may only be dumped in the COSA when the doors are closed to minimize dust emissions from the building. Water sprays are used at the primary crusher, rock breaker, and conveyor transfer points located in the conveyor transfer station and mill building.

Fabric filter baghouses are used throughout the facility to minimize emissions of dust. Bag houses are located in the Secondary Crusher building and the Fine Ore Bins. Two insertable filter systems are installed in the transfer building. Baghouse malfunction is a possibility and can include a bag break or offset and excessive dust loading. These potential malfunctions are addressed in the malfunction prevention and abatement plan. The plan includes regular inspections and maintenance activities of dust collection and suppression systems which is accomplished through monitoring of pressure drop across the bags, monitoring of gas flow, and visual observations of stack emissions to assess opacity per permit conditions. In the event the monitoring program indicates a malfunction, a thorough investigation of the cause will occur. If necessary, ore processing operations will be shut down until the problem is corrected.

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

1.1.6.2 Air Emissions during Reclamation

Once milling operations are completed at the site, reclamation will commence in accordance with R 425.204. Similar to construction activities, there is a moderate risk fugitive dust emissions could be released during certain re-vegetation activities and 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.

1.1.7 Spills of Hazardous Substances

Chemical reagents onsite are primarily used for the ore flotation and water treatment plant processes. Table 1.1.8 includes a list of reagents being used onsite along with the approximate usage rates, method of transportation to the site, and the type of shipping container.

Table 1.1.7 Chemical Reagents Used at the Water Treatment Plant & Mill Building

Item No.	Chemical Name	Trade Name	CAS No.	Storage Volumes	Storage Areas
1	Ferric Chloride 40%	Hydrex 3250	7705-08-0	1500 gal	WTP chemical storage Bldg lines C4
2	Hydrochloric acid 35%	Muratic Acid	7647-01-0	450 gal	WTP chemical storage Bldg lines D6
5	Sodium bisulfite 30%	sodium bisulfite	7631-90-5	300 gal	WTP chemical storage Bldg lines D4
3	Sodium hypochlorite	Chlorine Bleach	7681-52-9	500 gal	WTP chemical storage Bldg lines D4
4	Sodium hydroxide 25%	sodium hydroxide	1310-73-2	4,000 gal	WTP chemical storage Bldg lines D5
5	Aluminum Chloride Hydroxide Sulfate	Nalco 8136	39290-78-3	1500 gal	WTP chemical storage Bldg lines C5
6	Sodium sulfide/Sodium Hydroxide	Nalmet 1689	1313-82-2, 1310-73-2	550 gal	WTP chemical storage Bldg lines C5
7	Hydrotreated Light Distillate	Naclear 7766 Plus	64742-47-8	60 gal	WTP chemical storage Bldg lines C5
8	Deparim	CMC	9004-32-4	20 tons	Reagent storage area
9	Calcium Oxide	High Calcium Quick Lime	1305-78-8	39 tons	Lime silo
10	Magnafloc 338	Flocculant	Unknown	2 tons	Reagent storage area
11	Methyl isobutyl carbinol (MIBC)	Flomin F500 Frother	108-11-2	2.2 tons	MIBC tank
12	Sodium isopropyl xanthane (SIPX)	SIPX	140-93-2	15 tons	Reagent storage area
13	Sodium carbonate	Soda Ash	497-19-8	54 tons	Soda ash silo
14	Sodium sulfite	Disodium sulfite	7757-83-7	25 tons	Reagent storage area

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. A release in the WTP or concentrator building from the associated piping would be contained within the contained plant area, neutralized, and sent to the HTDF for disposal. Absorbent materials are available to contain acid or caustic spills. Eagle Mine has an emergency response contractor on call to immediately respond to environmental incidents, assist with clean-up efforts, and conduct environmental monitoring associated with any spills.

Spill containment measures for chemical storage and handling will reduce the risk of a spill from impacting the environment. Due to the low volatility of these chemicals, fugitive emissions from the WTP or concentrator building 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 and processing reagents will not pose a significant risk to human health or the environment.

1.1.8 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 the section that describes the HTDF. 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 Eagle Mine and Humboldt Mill. 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 mill site will be designed to accommodate the winter conditions anticipated in the Upper Peninsula of Michigan. The Marquette County Road Commission is responsible for maintaining roadways near the Humboldt Mill. If road conditions deteriorate beyond the capability of the county or township maintenance equipment, Eagle will have provisions to keep workers housed on-site for extended periods, as needed.

Forest Fires – Forest fires were discussed in Section 1.1.4.

1.1.9 Power Disruption

Electrical power for the project is provided by the Upper Peninsula Power Company. The facility is presently served by a 34 kV overhead electric utility feeder. In the unlikely event that power is disrupted, a back-up generator is on-site to power essential facilities needs including the tailings slurry pump and concentrate and tailings thickeners.

In the event the WTP would need to be temporarily shut down during power disruptions, the water level of the HTDF is maintained at a level that provides enough capacity to store water for an extended period of time if necessary.

1.2 Emergency Procedures

This section includes the emergency notification procedures and contacts for the Humboldt Mill 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.

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

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

- Health & Safety Officer: The facility H&S manager and H&S staff are responsible for monitoring activities in response to any emergencies. During an emergency, H&S representatives will manage special situations that expose responders to hazards, coordinate emergency response personnel, mine rescue teams, fire response, and ensure relevant emergency equipment is available for emergency service. This individual will also ensure appropriate personnel are made available to respond to the situation.

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

- Public Relations Officer: The facility external relations manager will be responsible for managing all contacts with the public and will coordinate with the safety and environmental officers to provide appropriate information to the general public.

In addition to the emergency response structure cited above, a Crisis Management Team (CMT) has also been established for situations that may result in injuries, loss of life, environmental damage, property or asset loss, or business interruption. If a situation is deemed a “crisis” the CMT immediately convenes to actively manage the situation. The following is a description of the core members and their roles:

Crisis Management Team – Core Members and Roles

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

Evacuation Procedures – While the immediate surrounding area is sparsely populated, if it is necessary to evacuate the 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 H&S and environmental officers.

In the event evacuation of mill personnel is required, Eagle Mine has developed emergency response procedures for all surface facilities. All evacuation procedures were developed in compliance with MSHA regulations. In addition, an Emergency Response Team was formed to assist in emergency response situations should they arise. This team is not required by MSHA but was established to help ensure the safety of employee while at work. The team is comprised of 26 individuals that are divided into four teams each of which includes at least one licensed EMS professional and one NFPA certified firefighter. Training occurs on a monthly basis and may include first aid, rapid trauma assessments, emergency shutdown procedures for equipment, industrial firefighting, and vehicle and building extrications.

In addition to the Emergency Response Team, security personnel are EMTs and paramedics who are trained in accordance with state and federal regulations. This allows for immediate response to medical emergency situations.

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

- ABC Rechargeable fire extinguishers
- Radios
- First aid kits, stretchers, backboards, and appropriate medical supplies
- Gas detection monitors that detect 5 gases and LEL.
- Spill Kits (hydrocarbon and chemical)
- Certified EMT's Basic and Paramedics are on site at all times to respond in the event of an emergency.
- A trained Emergency Response Team consisting of 6-8 members on every shift with specialized training in fire, EMS and rescue.

This equipment is located at the surface facilities. Fire extinguishers are located at appropriate locations throughout the facility, in accordance with MSHA requirements. Surface facility personnel are also 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:

- Mill Security: (906) 339-7017
- Local Ambulance Services: UP Health Systems Bell. Contact Security at Extension 7017, or by radio using the Emergency Channel to alert on site responders. Dial 911.
- Hospitals: Marquette General Hospital – (906) 225-3560
  Bell Hospital – (906) 485-2200
- Local Fire Departments: Humboldt Township, Ishpeming Township – 911
- Local Police: Marquette County Central Dispatch – 911
  Marquette County Sheriff Department – (906) 225-8435
  Michigan State Police – (906) 475-9922
- Trimedia 24-hr emergency spill response: (906) 360-1545
- MDEQ Marquette Office: (906) 228-4853
- Michigan Pollution Emergency Alerting System: (800) 292-4706
- Federal Agencies: EPA Region 5 Environmental Hotline: (800) 621-8431
  EPA National Response Center: (800) 424-8802
  MSHA North Central District: (218) 720-5448
- MDNR Marquette Field Office: (906) 228-6561
- Humboldt Township Supervisor: Tom Prophet, (906) 339-4477

1.3 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 Eagle Mine 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 M

Humboldt Mill

Organizational Information

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Organizational Information

Eagle Mine LLC

March 1, 2016

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