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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 2007), Eagle Mine

Dear Mr. Maki:

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

Please find enclosed, the 2015 Annual Mining and Reclamation Report for the Eagle Mine.

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: Michigamme Township

enclosure

Eagle Mine
a subsidiary of lundin mining

2015 Annual Mining and Reclamation Report
Mine Permit MP 01 2007

March 15, 2016

Contents

Appendices

Acronyms and Abbreviations

AEM	Advanced Ecological Management
COSA	Coarse Ore Storage Area
CRF	Cemented Rock Fill
CWB	Contact Water Basin
DO	dissolved oxygen
Eagle	Eagle Mine LLC.
gal	gallon
gpd	gallons per day
gpm	gallons per minute
GWDP	Groundwater Discharge Permit
KME	King and MacGregor Environmental
LEPC	Local Emergency Planning Committee
m	meter
m^3	cubic meters
MDEQ	Michigan Department of Environmental Quality
MDNR	Michigan Department of Natural Resources
µg/L	micrograms per liter
µS/cm	micro-Siemens per centimeter
mg/L	milligrams per liter
MNFI	Michigan Natural Features Inventory
MRR	Mining and Reclamation Report
MSHA	Mine Safety Health Administration
NCWIB	Non-contact Water Infiltration Basin
NJC	North Jackson Company
NLG	Narrow-Leaved Gentian
No.	number
NREPA	Natural Resources & Environmental Protection Act
ORP	Oxidation Reduction Potential
Q1	Quarter 1
SESC	Soil Erosion and Sedimentation Control
SERC	State Emergency Response Commission
SU	standard units
t	metric ton (tonne)
TDRSA	Temporary Development Rock Storage Area
TDS	total dissolved solids
TWIS	Treated Water Infiltration System
UPL	Upper Prediction Limit
VOC	Volatile Organic Compound
WTP	Water Treatment Plant

1. Document Preparers and Qualifications

This Mining and Reclamation Report (MRR) was prepared by the Eagle Mine 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 – Environmental, Health & Safety
Eagle Mine LLC	Amanda Zeidler	Environmental Compliance Supervisor
Report contributors		
Advanced Ecological Management, LLC.	Doug Workman	Aquatic Scientist
Eagle Mine LLC	Dave Bertucci	Environmental Field Technician
Eagle Mine LLC	Jason Evans	Land & Information Management Specialist
Eagle Mine LLC	Kristie Grimes	Water Treatment Plant Lab Technician
Eagle Mine LLC	Tucker Jensen	Mine Planner
Eagle Mine LLC	Josh Lam	Senior Mine Engineer
Eagle Mine LLC	Margo Longo	Underground Senior Geologist
Eagle Mine LLC	Jennifer Nutini	Environmental Engineer
King & MacGregor Environmental, Inc.	Matt MacGregor	Wetland Scientist/Biologist
North Jackson Company	Dan Wiitala	Professional Geologist
North Jackson Company	Jessica Bleha	Geologist

2. Introduction

Surface construction of the Eagle Mine, an underground nickel and copper mine in Michigamme Township, began in May 2010, followed by the start of underground development in September 2011. Upon commencement of underground operations, per Michigan's Nonferrous Metallic Mining Regulations and the Eagle Mine Part 632 Mining Permit (MP 01 2007), Eagle Mine is required to submit an annual Mining and Reclamation Report.

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

3. Site Modifications and Amendments

No permit modifications or amendments were submitted to the Department in 2015. Table 3a below lists the required submittals and approvals that were provided to the Department in 2015 as required under the 632 Mining Permit. Table 3b lists the submittals to the MDEQ as required by the Groundwater Discharge Permit (GWDP) No. GW1810162. A copy of the current site map is provided in Appendix A.

Table 3a. Submittals and Approvals Required Under Part 632

Date	Description	Approval
March 2015	Submitted Q1 groundwater and surface water monitoring data	
3/13/15	Submitted 2014 Annual Mining and Reclamation Report	
4/17/15	Submitted QAL071A nitrate summary report	4/27/15
July 2015	Submitted Q2 groundwater and surface water monitoring data	
7/9/15	Submitted revised financial assurance values	7/13/15
October 2015	Submitted Q3 groundwater and surface water monitoring data	
12/10/15	Submitted Crown Pillar – Phase 3 engineering assessment	
December 2015	Submitted Q4 groundwater and surface water monitoring data	

Table 3b. Submittals and Approvals Required Under the GWDP

Date	Description	Approval
	Received revised Groundwater Discharge Permit (GWDP)	3/25/15
4/29/15	Submitted an updated Sampling and Analysis Plan (GWDP)	
4/29/15	Submitted work plan for the installation of a monitoring well cluster (GWDP)	5/1/15
7/10/15	Submitted final report of monitoring well installation and sampling results (GWDP)	10/16/15
8/31/15	Submitted a work plan to address elevated vanadium concentrations in TWIS monitoring wells (GWDP)	10/16/15
Jan – Dec	Submitted monthly WTP effluent discharge results (GWDP)	

4. Mining Activities and Data Report

Underground activities began in September 2011, with drilling operations in preparation for blasting. On September 22, 2011, blasting at the Eagle Mine commenced and the project was officially "mining." The commencement of mining activities initiated all monitoring programs per the Part 632 Mining Permit. A description of the monitoring activities can be found in Section 5 of this MRR.

4.1. Underground Operations

2015 marked the first full year of production mining which is being conducted by underground mining contractor, Cementation. The mining method being utilized at the Eagle Mine is longhole open stoping. The stopes are mined in an alternating sequence of primary and secondary stopes with cemented rock fill (CRF) being used in the primary and uncemented rock fill in the secondary. Only primary stopes were mined in 2015. All CRF is made onsite at the batch plant and is transported underground using underground haul trucks. The CRF is currently comprised of development rock, cement, water, and a concrete admixture.

In accordance with special condition E-8 of the mining permit, a review of the rock stability was completed to ensure that the modeling provided in the permit application is still valid. A letter certifying the rock stability, signed by the Mine Manager can be found in Appendix B.

To ensure the safety of miners in the event of an emergency, three 12 person, 36-hour self-contained, Mine Arc refuge chambers remained underground in 2015. They are currently located in muckbay No. 5, muckbay No. 10, and 215 level stope access 1585. Two four-person refuge chambers are also used underground. The locations of the chambers change as mining progresses with locations being updated on the mine map as required by the Mine Safety and Health Administration (MSHA). Each unit is inspected on a weekly basis with a more robust inspection completed three times per year.

Interior view of Mine Arc Refuge Chamber, June 2015

4.1.1. Underground Development Progress

In 2015, an additional 1,555 meters of development occurred. This included 313 meters of sill development which is required in order to access the stopes, 24 meters of vertical development for internal ventilation or escape raises, and 1,218 meters of general or horizontal development which included the up-ramp to the 294 level, down-ramp to the 145 level, and stope accesses. Table 4.1.1 below summarizes the 2015 development meters by type.

Table 4.1.1 2015 Underground Development Totals

Type of Development	Meters
Vertical	24
Sills	313
General/Horizontal	1,218
Total	**1,555**

Source: Mine Engineering Department – Dec. 2015 End of Month Report

As in previous years, Lundin continued the underground definition drilling program of the Eagle ore body throughout 2015. This program, as well as changes in economic parameters that are used in the reserve calculations, has increased the minable geologic resource to 4.6 million tonnes. This increased resource is at a significant depth within the lower workings of the mine and does not impact the overall findings in the mine site Environmental Impact Assessment or the geotechnical analyses. Mining these reserves will not result in facility changes or modifications to the EIA.

Underground mucker and haul truck, June 2015

4.1.2. Underground Ore Production – Stoping & Backfilling

In 2015, ore was encountered and mined in two ways; blasting of primary stopes and while developing stope access levels. Forty-five primary stopes were at least partially mined in 2015. Forty-two of the forty-five stopes were fully mined and backfilled. One stope was in the process of being backfilled while ore was still being removed from the remaining two stopes at the end of 2015. Primary stopes are backfilled with cemented rock fill as soon as possible after all ore has been removed from the area. In 2015, 354,587 tonnes (t) of backfill was produced at the onsite batch plant and returned to primary stopes by underground haul trucks. Table 4.1.2a summarizes the number of primary stopes that were mined and/or backfilled in 2015. In addition, the total tonnes of ore mined in 2015 is listed in Table 4.1.2b and is categorized as either sill, bench, or stope. Ore categorized as sill is excavated using horizontal drill holes and is the material that is removed in order to access a stope. The stope is the main area of ore that is excavated using vertical drill holes and bench is the ore located between levels that cannot be removed using stoping methods. This ore is drilled either horizontally or vertically depending upon the situation. Appendix C illustrates the current configuration of each mining level and production mining progress through 2015.

Table 4.1.2a. Primary Stopes Mined or Backfilled in 2015

Activity/Status	Total (number)
Fully Mined Stopes	43
Partially Mined Stopes	2
Fully Backfilled Stopes	42
Partially Backfilled Stopes	1

Source: Mine Engineering Department

Table 4.1.2b. Volume of Ore Mined in 2015

Ore Mined	Tonnage of ore mined (tonnes)
Bench	37,561
Sills	205,080
Stopes	508,663
Total	**751,304**

Source: Mine Engineering Department – Dec. 2015 End of Month Report

Underground Haul Truck Filled with CRF

4.1.3. Dewatering Volume and Quality

Water is required underground in order to complete drilling, bolting, and dust suppression activities, and to knock down loose material that remains suspended after a stope blast. In 2015, the mine services well supplied all of the water needed to complete underground mining and development activities.

The lines supplying and removing water from the underground are equipped with totalizer meters. These meters are monitored daily by the Environmental Department with the flows recorded in an electronic spreadsheet maintained by Environmental staff.

Water use was fairly consistent in 2015 with underground operations continuing throughout the entire year. The amount of water supplied for underground operations in 2015 ranged from an average of 34,777 gallons per day (gpd) (24 gallons per minute (gpm)) in January to 59,552 gpd (41 gpm) in August. The total water pumped from the mine to the surface, including water supplied to the underground and natural inflow into the mine, ranged from an average of 35,381 gpd (25 gpm) in January to 61,896 gpd (43 gpm) in August.

The dewatering volume is calculated by subtracting the volume of water provided to the underground from the volume of water pumped to the surface. The difference between the two numbers is indicative of the volume of groundwater that is naturally infiltrating the mine. Inspections of the underground found only a few areas in which groundwater infiltration is visible and is significantly less than was predicted during the permit application process. In fact, the calculated dewatering volume was actually negative during the majority of 2015. To ensure that the negative values were not the result of an instrument malfunction, maintenance was notified and the flow meters were tested and found to be functioning properly. Additional research determined that the negative values were likely the result of the relatively low groundwater infiltration rates coupled with the fact that a portion of the water supplied to the underground is retained in the fine particles in the roadways where dust suppression occurs and within the ore and development rock as piles are wetted before transporting to the surface to minimize dust. Table 4.1.3 below summarizes the average daily volume of water supplied and pumped to the surface for each month in 2015.

Table 4.1.3 Average Monthly Water Volume Provided to Underground and Dewatering Volume

Month	Average Water Supplied Underground (gpd)	Average Water Pumped from Underground (gpd)	Average Dewatering Volume* (gpd)	Average Dewatering Volume* (gpm)
January	34,777	35,381	604	0.42
February	42,645	41,067	-1,578	-1.10
March	43,544	39,422	-4,122	-2.86
April	49,670	46,210	-3,460	-2.40
May	49,915	48,536	-1,379	-0.96
June	52,810	51,459	-1,351	-0.94
July	43,777	47,215	3,437	2.39
August	59,552	61,896	2,345	1.63
September	52,850	54,498	1,648	1.14
October	45,703	41,566	-4,136	-2.87
November	50,962	47,132	-3,830	-2.66
December	58,922	56,316	-2,607	-1.81

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

4.2. Temporary Development Rock Storage Area (TDRSA)

Crushing of development rock for use in cemented rock fill continued on the TDRSA in 2015. In June 2015, Eagle contracted Associated Constructors, to crush the development rock on the TDRSA to a size of three inch minus using a portable crushing system. Approximately 202,000 tonnes of development rock was crushed from June to October 2015. Crushing was suspended for approximately one month from mid-August to mid-September due to an equipment failure.

TDRSA – Development Rock Crushing, October 2015

4.2.1. Development Rock Storage Volume

In 2015, approximately 60,000 m^3 (126,000 t) of development rock was placed on the TDRSA from the underground. Assuming a development rock swell factor of 1.3, approximately 78,000 m^3 of development rock was placed in the TDRSA in 2015. Also in 2015, 123,818 m^3 (260,018 t) of development rock was removed from the TDRSA for use in cemented rock fill. No limestone was added to the TDRSA in 2015 as the volume of waste rock added was significantly less than the volume removed. In addition, the waste rock that was added to the TDRSA will only be stored for a short period of time before being crushed and used in CRF backfill. The addition of cement in the backfill also provides additional buffering capacity. Table 4.2.1 summarizes the project to date volumes of development rock and limestone stored in the TDRSA as well as the volume of waste rock that has been removed for use in backfill.

Table 4.2.1 2015 TDRSA Volume Totals – Project to Date

Month	Volume of Waste Rock Mined (m^3)	Swelled Volume of Waste Rock (m^3)	Limestone Delivered (m^3)	Waste Rock Used for Backfill (m^3)	Swelled Volume of Waste Rock Used for Backfill (m^3)	TDRSA Volume Project Total to Date (m^3)
Previous Total	211,404	274,825	10,005	10,307	13,399	271,431
2015 Total	60,000	78,000	0	123,818	160,963	188,468

*Note: an adjustment was made to year-end 2014 TDRSA volume to account for swell of waste rock that was removed for use in backfill (-791 m^3)
Source: Mine Engineering Department – Dec. 2015 End of Month Report

4.2.2. 2015 Mining Forecast

The 2016 mining forecast calls for the continuation of developing the extraction drifts, stope accesses, and internal raises for a total of 555 meters of lateral advance and 52 meters of vertical advance which would result in an additional 16,471 m^3 (44,472 t) of development rock being removed and stored on the TDRSA. Assuming an estimate of 30 percent swell, approximately 21,412m^3 of development rock will be placed on the TDRSA in 2016. Crushing of development rock will resume in the spring on the TDRSA and backfilling of stopes with CRF containing the crushed development rock will continue and will result in the reduction of material stored on the TDRSA. Secondary stopes will also be mined for the first time in 2016 and steady state production is expected to continue. All estimates are contingent upon the current production schedule and is subject to change.

4.2.3. TDRSA Sump Dewatering Volume and Quality

The TDRSA has two collection sumps; the contact water and leak detection. The contact water sump collects drainage from the primary TDRSA liner where the water is in contact with development rock. The leak detection sump collects water from beneath the primary liner within the secondary liner system. This water has not been in contact with the development rock because it is rain water that has been encapsulated in the secondary liner since construction. Both sumps are continuously monitored through the use of pressure transducers.

The contact water pumping system is equipped with an automatic pump start and high water alarm to indicate when the water level is approaching the one foot maximum head level. The leak detection sump is manually pumped and sampled as necessary. Operational controls, which include operator training and control panel lockout, have been implemented to ensure the systems operate as designed and required sampling and volume collection occurs.

Primary Contact Water Sump Monitoring

Daily inspections of the TDRSA primary sump level are conducted by water treatment plant (WTP) operators and an additional weekly inspection by the Environmental Department. The water level is recorded in a compliance logbook that is kept onsite and available upon request. Results of the daily and weekly inspections indicate that water levels in the sump were maintained within the ranges specified by the Part 632 permit or returned to those ranges within seven days following a significant wet weather event (rain and/or snowmelt).

In 2015, approximately 4.3 million gallons of water was pumped from the TDRSA contact water sump to the contact water basins (CWBs) for eventual treatment in the WTP. Quarterly water quality monitoring of the contact water sump was conducted in February, June, September, and December 2015. The majority of results were consistent with those previously reported including pH which ranged from 6.3 – 6.9 SU. A pH value in this range indicates that the waste rock is being managed effectively as it is not resulting in water that is characterized as acidic. Results for calcium, manganese, nickel, ammonia, and nitrite trended up slightly in 2015 while results for chloride trended down compared to historical values. A summary of the 2015 monitoring results can be found in Appendix D.

Leak Detection Sump Monitoring

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

In 2015, four samples were collected and the accumulation rates calculated. The average daily rate of accumulation was consistent throughout the year at 0.019 gal/acre/day and was well below the 25 gal/acre/day threshold indicated in the permit. Table 4.2.3 below summarizes the calculated flow rate from the TDRSA leak detection sump for 2015. A total of approximately 20 gallons of water was purged from the leak detection sump in 2015 which is down from the 30 gallons removed in 2014. This is an estimated value as the flow did not totalize on the flow meter. The flow meter was tested by maintenance and found to be functioning properly and therefore it was determined that the flow rate may be too low to register on the flow meter. The total volume of water purged to date is only a small fraction of the estimated 26,000 gallons of rainfall that entered the secondary collection system during construction.

Samples were collected from the leak detection sump in February, June, September, and December 2015. Upon sample collection, the pH and conductivity of the sample is immediately determined and the remaining sample aliquot is sent to an off-site laboratory for analysis. Although only pH and sulfate analysis is required by the permit, additional parameters (i.e. magnesium, sodium, chloride, nitrate, nitrite, and ammonia) are also collected in order to further understand the water quality of the leak detection sump. Once the sample is collected, the remaining water contained in the leak detection sump is purged to the contact water basins.

Table 4.2.3 below summarizes the TDRSA leak detection sump analytical results for 2015. The pH results were fairly consistent and ranged from a low of 7.3 to a high of 7.8 which is neutral to slightly basic in nature. Sulfate results ranged from a minimum of 780 mg/L in February to 930 mg/L in June and December. The sulfate concentrations for each of the samples collected in 2015 were above the 500 mg/L threshold identified in the permit.

As required, the MDEQ was notified of the elevated sulfate results. Review of the data from the TDRSA primary contact water and leak sumps identified clear differences in the concentrations of sulfate, magnesium, chloride, and nitrate between the two sumps. This indicates that the water in the leak detection sump was not from the primary contact sump and the integrity of the liner is intact. In addition, as stated above, the volume of water present in the sump in 2015 was less than the volume present in 2014 further demonstrating that the liner has not been compromised. The source of sulfate was likely introduced during construction of the lining system and is becoming more concentrated as the volume of water present in the sump decreases. Results will continue to be reviewed and any potential trends documented. Any upward trending will be reported to the Department.

Table 4.2.3 TDRSA Leak Detection Sump Results for 2015

Parameter	2/26/15	6/4/15	9/14/15	12/2/15
Magnesium (mg/L)	14	15	16	16
Sodium (mg/L)	590	610	620	670
Chloride (mg/L)	14	14	13	14
Sulfate (mg/L)	780	930	920	930
Nitrate (mg/L)	26	26	24	23
Nitrite (mg/L)	0.78	0.25	0.25	0.13
Ammonia (mg/L)	0.10	0.18	0.10	0.13
Average Daily Flow Rate (gal/acre/day)	0.019	0.019	0.019	0.019
Purged Volume (gal)*	5	5	5	5
pH	7.3	7.8	7.3	7.3
Specific Conductivity (uS/cm)	2,977	1,854	2,941	2,870

*estimated volume, flow rate was too low to register on the flow meter.

4.3. Site Water Usage, Treatment, and Discharge

Site wide water management includes three separate sources for supplying water to surface and underground mining activities and three primary sources that supply water to the CWBs for eventual treatment in the Water Treatment Plant. The WTP processes the water and provides a portion for recycle within the WTP itself, for recycle within the mining operations, and for discharge to the Treated Water Infiltration System (TWIS).

4.3.1. Supply Water Sources and Usage

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

The domestic well (QALPSW001) is used to supply potable water to the surface facilities, truck wash, and fire water tank if necessary. During 2015, the approximate water use was 9,787 gpd (6.8 gpm). This was down from the average of 12,367 gpd utilized in 2014.

The mine services well (QAL011D) is primarily used to supply water for exploration drilling, underground operations, dust suppression, and the fire water tank which supplies water to the network of fire hydrants onsite. Approximately 59,163 gpd (41 gpm) of water was utilized in 2015 which is up from an average of 41,013 gpd supplied in 2014. The increase was expected with the onset of production mining where additional underground equipment is working in multiple stopes. In addition, in 2015 a water cannon was utilized to knock down loose material that remained suspended after a stope blast. This is required as no one is allowed to work under an unsuspended load. A higher pressure, lower capacity pump will be utilized in 2016 and should result in a reduction in underground water use for that purpose.

The third source of water on the mine site is the treated utility water which is supplied by the WTP. This is water that is collected in the CWBs, treated through the first half of the treatment process and subsequently recycled within the WTP rather than being discharged to the TWIS. The utility water is required in various stages of the water treatment process including for cooling, dilution, backwash, and in various cleaning processes. In 2015, the total volume of utility water treated and recycled was approximately 4,987 gpd (3.5 gpm) which is down from last year.

4.3.2. Storm Water Control

The mine site storm water is either defined as non-contact storm water or contact storm water. The non-contact storm water is collected in non-contact water infiltration basins (NCWIBs) where it then infiltrates into the ground. This water does not require treatment because it is from areas of the site that have no contact with operations. The contact storm water is collected in two lined basins where it is held prior to treatment through the water treatment facility. Contact water is any water that may come into contact with material from the underground mine.

4.3.3. CWB Water Management and Water Quality

Three primary sources of site water are discharged to the CWBs prior to treatment in the WTP. These include dewatering from the underground mine, dewatering from the TDRSA, and precipitation and storm water that falls on the contact area. Additional intermittent sources include dewatering from the sumps located in the Coarse Ore Storage Area (COSA), truck wash, fuel area, and truck shop.

Immediately following the commencement of mining, CWB levels have been recorded daily by the WTP operators. This log is available on request. All rainfall and snow melt that occurred in 2015 was collected and managed within the capacity of the CWBs. A water management plan has been developed for the site and is available upon request.

The water quality of the CWBs is evaluated on a quarterly basis. This characterization provides the WTP operators with valuable data that may affect process control and also provides information to identify any parameter trending in water quality as mining progresses. Samples were collected from the influent sampling point at the WTP in February, June, September, and December with the annual parameter list collected in Q3. The majority of the CWB monitoring results were consistent with those previously reported. Sodium, chloride, nitrate, iron, and specific conductance results were lower in 2015 compared to historical results while copper and nickel trended up slightly. A summary of the results can be found in Appendix D.

4.3.4 Non-Contact Water Infiltration Basins (NCWIB)

There are three NCWIBs located in the main surface facility area and one NCWIB near the ventilation air raise. Inspections of the NCWIBs, following wet weather events, continue to indicate the basins are operating as expected with storm water readily infiltrating back into the ground. The only exception is following spring melt or excessive rain events in which water is present for a minimal period of time before infiltration occurs. The basins are monitored for excess silting that would prevent infiltration from occurring and not allow the basins to operate as designed.

In accordance with the mining permit, monitoring wells are required to be located down gradient of each NCWIB and must be sampled in the event of a surface discharge from the basin. Eagle Mine has chosen to sample these wells at least annually as surface discharge is not expected to occur. Monitoring wells, QAL070A and QAL073A, located down gradient of NCWIBs 2 & 3 are monitored on an annual basis. Monitoring wells QAL071A and QAL024A are located down gradient of NCWIB 1 and NCWIB 4 and are monitored on a quarterly basis as part of the overall mine monitoring well network.

The analytical results from these monitoring locations are compared to the established benchmarks calculated for each. In 2015, the results indicated a small number of cations and/or anions including sodium, chloride, nitrate, calcium, magnesium, and hardness were outside of calculated benchmarks at one or more locations. Results from QAL071A are further discussed in section 4.1 below and all results are summarized in Appendix F of this report. The benchmarks for these locations were updated in late 2015 and results will be compared to the new values beginning in Q1 2016.

4.3.5. Water Treatment Plant Operations and Discharge

The WTP successfully treated and discharged over 38 million gallons of water in 2015. A summary of the monthly discharge rates can be found in Table 4.3.5 below.

Effluent discharges to the TWIS are regulated under Groundwater Discharge Permit GW1810162 with discharge volume and analytical results reported to the MDEQ on a monthly basis through the online MiWaters reporting system. On March 25, 2015 Eagle received a new groundwater discharge permit which is valid through April 1, 2018. The new permit added an influent monitoring point in the WTP (Reverse Osmosis Influent), included requirements to install two new monitoring wells downgradient of the TWIS, and prepare a vanadium study and work plan to address elevated levels of vanadium detected in one TWIS downgradient monitoring well. All requirements were met on or before the required due dates cited in the new permit.

Table 4.3.5 Volume of Water Discharged in 2015

Month	Volume of Water Discharged (gallons)
January	1,782,237
February	709,493
March	5,375,082
April	6,406,565
May	3,548,826
June	4,345,885
July	3,299,800
August	2,451,262
September	2,520,024
October	764,231
November	3,086,366
December	4,008,782
Total	**38,298,553**

Source: WTP Operators log

The water treatment process generates two waste streams; filter press and crystallizer. The filter press waste stream is dewatered solids from the multi-flow treatment process and is primarily comprised of calcium and magnesium, while the crystallizer waste is essentially sodium chloride. Samples of the waste streams were sent to the laboratory as required by the disposal landfill. All results indicate that the wastes are non-hazardous. In 2015, 389 metric tonnes of crystallizer waste was disposed at a Wisconsin landfill and approximately 137 metric tonnes of filter press waste was disposed at the Marquette County Landfill.

4.4. Materials Handling

4.4.1. Chemical Handling, Storage, and Reporting

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, Eagle Mine 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 threshold quantities. Due to the volume of chemicals stored/used at the site, primarily in the WTP, a Tier II Report was submitted in January 2015 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 Powell Township Fire Department.

5. Additional Monitoring Activities

5.1 Water Quality Monitoring

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

5.1.1 Quarterly Groundwater Quality Monitoring

Groundwater quality is monitored through a network of monitoring wells located both inside and outside the mine site perimeter fence. A map of the well locations can be found in Appendix E.

Four rounds of quarterly sampling were completed in March, May, August/September, and November 2015. The Eagle Mine Permit prescribes both a long parameter list for annual monitoring events (conducted in Q2 2015) and a short list to be used quarterly (Q1, Q3, Q4 2015). In addition to the permit required sampling lists, locations QAL061A, QAL062A, and QAL067A are analyzed for volatile organic compounds (VOCs) on an annual basis in response to comments provided during the permit application process. VOC samples were collected in Q2 2015 and all results were found to be non-detect. 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 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, with the lower of the two being used for comparison. 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. Results were reviewed in late 2015 and those that were found to be not trending, based on statistical analysis, were used to update the benchmarks. Results will be compared to the updated benchmarks beginning in Q1 of 2016.

Groundwater Sampling, November 2015 (Photo Courtesy of NJC)

Monitoring Results

Twenty-three monitoring well samples were collected 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 majority of parameters analyzed reported values below the analytical reporting limit and calculated benchmark, and are listed as non-detect. The greatest number of detections were reported for anion and cation parameters. 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:

- Location QAL024A reported benchmark deviations for one or more of the following anions/cations during 2015; calcium, chloride, magnesium, nitrate, sodium, and alkalinity-bicarbonate. Although the results are greater than the established benchmarks the results for sodium, chloride, and nitrate are trending down from levels detected in 2014. Results for the remaining parameters remained fairly consistent throughout the year and did not indicate that any significant trending was occurring. No metals were regularly detected at location QAL024A.
- Location QAL067A, located on the southeast corner of the TDRSA, reported benchmark deviations for chloride, nitrate, sodium and sulfate during each of the 2015 sampling quarters and two of four quarters for mercury and alkalinity bicarbonate. Additional parameters were detected above established benchmarks for one sampling event and are summarized in Appendix F. The results for sodium and chloride have trended down since the highest historical detection was reported in Q4 2014. The results for nitrate and sulfate remained fairly consistent between 2015 sampling events. No apparent trend is present for those parameters. An extensive review was completed in 2014 to determine the source of the elevated results and are most likely associated with the extensive use of salt on the contact area in 2011 combined with the construction activities in 2013-2014 that required the removal of pavement in many areas adjacent to these monitoring locations. Results will continue to be closely monitored and any trends noted.
- QAL062A located on the eastern berm of the TDRSA reported alkalinity bicarbonate, sodium, and chloride above calculated benchmarks for each sampling event in 2015. Results for alkalinity bicarbonate and chloride trended upward throughout the year while sodium results remained fairly consistent between sampling events. Although the monitoring well is located next to the TDRSA it can be eliminated as a potential source as metals are present in the contact water of the TDRSA but are not detected in QAL062A. The elevated chloride levels are most likely the result of the chloride plume that appears to be slowly moving across the site that is the result of historical salt use on the contact area.
- In 2015, QAL071A, located near the northwest corner of the septic drain field, reported detections of anions/cations, including alkalinity bicarbonate, chloride, nitrate, sulfate, and sodium for each of the four 2015 sampling events and calcium, magnesium, and hardness during Q2 2015 that were greater than the established benchmarks. As noted in the 2014 annual report it was suspected that the elevated values were the result of the well's location near the septic drain field. In Q3 2014, the action level for nitrate was met at QAL071A. As such, in early 2015, the Department required Eagle to conduct supplementary sampling at location QAL074A located downgradient of the septic system and investigate the source of

the elevated results. The summary report was submitted to the Department on April 16, 2015 and results are summarized below:

- A review of upgradient wells and TDRSA and CWB results indicated that there is no correlation between the results and elevated levels of nitrates detected at QAL071A. In addition, activities that were identified as occurring near NCWIB No.1 (i.e. snow storage and seeding/mulching) that could have potentially influenced QAL071A both occurred after the elevated nitrate results were initially reported, thus eliminating them as the potential source.
- Groundwater elevations for QAL071A and QAL074A indicate that there is a localized trend evident following spring snowmelt which is likely due to the influence of NCWIB No. 1 and the septic system. As such, the groundwater flow in the area is altered and would allow groundwater to flow in the direction of QAL071A, thus potentially exposing the monitoring location to septic tank effluent.
- Chloride, sodium, and nitrates are all present in human wastes and are considered to be good indicators of septic system waters. All three constituents are present in the groundwater at QAL071A and QAL074A.
- The composition of the soil at monitoring location QAL071A allows for good drainage which could easily transport the septic effluent to the monitoring location. QAL074A is a slightly tighter formation with more clay present which could potentially slow the transmission of these waters into the well and may contribute to the difference in nitrate levels between QAL071A and QAL074A.
- Trace metals are generally filtered out by soils (i.e. adsorbed on soil particles). This is likely the reason why only low levels of metals are reported at QAL071A when higher levels are reported in the septic effluent. Unlike metals, nitrates and chloride are not adsorbed by soil due to their negative charges. This allows the nitrate and chloride ions to be easily transported in groundwater.
- A review of monitoring results from locations downgradient of QAL071A and QAL074A, near the treated water infiltration system (TWIS), do not show any signs of elevated nitrate or chloride levels. At this time there is no threat of elevated nitrate levels migrating offsite from monitoring location QAL071A.

After the submittal of the source investigation summary, in September 2015, it was discovered that the septic system and drain field were not functioning as designed. Due to an equipment malfunction, solids from the septic tank overflowed into the pumping chamber and eventually into the drain field resulting in plugged distribution lines. The lines were flushed and system was brought back online. While repairs were being made to the distribution lines, the septic tank was routinely pumped by a licensed septic effluent company. Although this situation was quickly resolved upon discovery it is uncertain how long the conditions persisted before being identified. It is possible that the septic drain field was not functioning as designed for an extended period of time and this situation may have also contributed to the elevated results detected in QAL071A and QAL074D.

Based on the information collected to date, the septic tank effluent cannot be excluded as a source of the elevated nitrate levels reported at QAL071A.

- Benchmark deviations were also reported at locations QAL044B, QAL060A, QAL063A, QAL064D, QAL065D, QAL070A, and QAL073A and are summarized in Appendix F. The majority of the deviations were for anions and cations and results were only slightly greater than established benchmarks. In the majority of the locations, the benchmarks are based on a small sample set of between four to six results. With such a limited sample set, it is highly probable that the deviations being seen are consistent with natural groundwater variations. Results were reviewed in late 2015 and those that were not trending, based on statistical analysis, were used to update the benchmarks. Results will be compared to the updated benchmarks beginning in Q1 of 2016.

As required by MP 01 2007 special condition N2, a statistical trend analysis has been conducted for all monitoring locations/parameters. Possible trends were identified for one or more parameters at fifteen compliance locations and eight background monitoring locations using data collected from baseline sampling events (2011) through December 2015. Sodium, nitrate, chloride, and alkalinity bicarbonate 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 in 2016 and results reviewed to determine if the trends are attributable to mining 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, including graphs, is available upon request.

As a component of the trend analysis review, Piper Diagrams were utilized to classify the water types and determine if any changes in water chemistry have occurred over time. The diagrams consist of three main components; two trilinear diagrams, one representing anion concentrations and the other cation concentrations; and one central diagram that illustrates the combination of the anion and cation concentrations. Once the water chemistry of a monitoring location is plotted on the Piper Diagram, groundwater can be classified into water types or chemical compositions based on the dominant ion chemistry. Piper Diagrams can also be used to illustrate the spatial and temporal chemical evolution of groundwater. If a significant change in groundwater chemistry is observed over a period of time it may be indicative of groundwater contamination.

In order to determine if significant changes in water chemistry have occurred, Piper Diagrams were created for select monitoring locations that have exhibited possible trends in one or more chemical parameters. Monitoring locations QAL025A, QAL026A, QAL044B, QAL060A, QAL062A, QAL064A, QAL066D, QAL068A, QAL069A, QAL70A, QAL071A, and QAL073A are all classified as having a calcium bicarbonate water chemistry and have shown no signs of a change in water chemistry over time. The following monitoring locations did exhibit a change in water chemistry and are further explained below:

- QAL024A – Water chemistry data from four samples collected during Q2, 2012 – 2015 were plotted. The water type was originally classified as calcium bicarbonate in 2012, then drifted into the sodium chloride classification in 2013, and in 2014 and 2015 was classified as mixed-cation chloride. This change in chemistry may have been associated with construction of the vent raise as well as salt use and snow storage practices near monitoring well QAL024A. Due to the small sample size and shift back towards a mixed-cation classification further sampling is necessary in order to better understand the water chemistry at this location. Results will continue to be closely monitored.

- QAL067A – Water chemistry data from eight samples collected during 2011 – 2015 were plotted. All samples prior to May 2014 were classified as having a water type of calcium bicarbonate. In May 2014, the water chemistry began to change and has been classified as sodium chloride since November 2014. This change in water chemistry is indicative of an external source of contamination and is likely due to contact area salt use as discussed above.
- QAL070A – Water chemistry from five samples collected during 2011 – 2015 were plotted. All samples collected prior to May 2015 were classified as having a water type of calcium bicarbonate which is indicative of shallow fresh groundwater. In May 2015, a shift in water chemistry occurred in which the water is now classified as calcium sulfate waters. This is the first event in which a major shift was identified and additional sampling is necessary to better understand the water chemistry at this location.

Piper Diagrams for each of the monitoring locations referenced above can be found in Appendix H.

5.1.2 Quarterly Surface Water Quality Monitoring

Surface water sampling was conducted on a quarterly basis in 2015 at eleven locations; nine on the Salmon-Trout River and one each on the Yellow Dog River and Cedar Creek. The samples collected represent winter base flow, spring snowmelt/runoff, summer base flow, and the fall rain season. Samples were collected in February, April/May, August, and October 2015. The spring runoff sample was collected in late April – early May in order to best represent the peak flow rates of the spring runoff. A map of the surface water sampling locations is found in Appendix I. 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)) in Appendix J.

Surface Water Sampling (Photo Courtesy of NJC)

Monitoring Results

Grab samples were collected from each location during the quarterly sampling events completed in February, April/May, August, and October 2015. The Eagle Mine Permit prescribes a long parameter list for annual monitoring events (conducted in Q2 2015) and a short list to be used quarterly (Q1, Q3, and Q4 2015). In addition to the grab samples, field measurements (DO, pH, specific conductivity, temperature) were collected and determined through the use of an YSI probe. The stream stage and flow measurements were obtained using a wading rod and current meter. All water quality samples were shipped overnight to TriMatrix Laboratories in Grand Rapids, Michigan, for analysis. Following is a summary of the 2015 events that occurred.

- The following parameters were detected above benchmarks for two consecutive Q2 sampling events; mercury at STRE002 and alkalinity bicarbonate, calcium, magnesium, and hardness at STRE009. These results are consistently above the calculated benchmarks in Q2 indicating that the results are likely due to seasonal variation attributable to snow melt.
- At compliance monitoring location STRM004, the results for mercury were marginally above the established benchmark for two consecutive Q3 sampling events. Mercury was detected at all surface water monitoring locations in Q3 at levels similar to or greater than was detected at STRM004.
- The following parameters were detected above benchmarks for two consecutive Q4 sampling events; iron at STRE001, total dissolved solids (TDS) at STRE002, and pH at STRE009.
    - The result for iron is consistent with the result reported in Q4 2014 and indicates that this is due to seasonal variation as the remainder of the results for iron in 2015 were below calculated benchmarks.
    - The TDS result is classified as an estimated value and may not be representative of actual conditions as a quality control limit was exceeded at the laboratory. The results for TDS were within calculated benchmarks for the remaining 2015 sampling quarters.
    - The pH result is slightly above benchmark, but is consistent with results historically reported at this location in other sampling quarters. Therefore the deviation is likely due to seasonal variation.

For the majority of the parameters, the benchmarks were calculated using only a small number of sample results and therefore are considered pending. In late 2015, all surface water benchmarks were reviewed and updated using results that were determined to not be trending based on statistical analysis. The updated benchmarks should provide for a more accurate assessment of results as a larger sample set was included in the calculation. Results will be compared to the updated benchmarks beginning in Q1 2016.

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

A trend analysis was also conducted for the surface water monitoring locations. The same statistical analysis as groundwater was utilized with the exception that each parameter was also analyzed for each quarter, rather than just parameter and location, in order to take into account seasonal variations.

Possible trends were identified for one or more parameters at all eleven monitoring locations using data collected from baseline sampling events (2011) through December 2015. Sulfate, pH and specific conductance were the most frequently noted as possibly trending. The largest number of the trends identified occurred in Q2 as a longer parameter list is analyzed during that sampling event. Results in Q2 also tend to deviate the most from baseline values as this event captures spring snowmelt/runoff. It should be noted that the elevated results and associated trends return to baseline levels in subsequent quarters showing that the results are likely due to seasonal variation.

A trend analysis will continue to be conducted in 2016 and results reviewed to determine if the trends are attributable to mining operations. A table summarizing the potential surface water trends can be found in Appendix K. For compliance monitoring locations in which results were outside of established benchmarks for at least two consecutive seasonal quarters and a potential trend was identified, the trend charts are also provided in Appendix K. This includes mercury at STRE002 for Q2 sampling events, mercury at STRM004 for Q3 events, and iron at STRE001 and pH at STRE009 for Q4 sampling events. A full report outlining groundwater trending results for all parameters and locations, including graphs, is available upon request.

5.2 Regional Hydrologic Monitoring

5.2.1 Continuous, Daily and Monthly Groundwater Elevations

Monitoring wells QAL023B, QAL024A, QAL044B, QAL064D, QAL065D, QAL066D and wetland locations WLD022, WLD023, WLD025, WLD026, WLD027, and WLD028 are instrumented with continuous water level meters and downloaded quarterly by North Jackson Company field technicians. A map of these locations can be found in Appendix L.

Calculated background water levels and monthly water level results are based on mean daily values and summarized in Appendix N. Monitoring well water level results for 2015 were found to be consistent with baseline data, with the exception of the following:

- QAL023B – The mean water level reading reported in September 2015 was a maximum of 0.3 feet below the minimum baseline level calculated for this location.
- QAL024A – The mean water level readings from February – April 2015 were reported at a maximum of 0.2 feet below the minimum baseline level calculated for this location. The lowest reading was recorded in March 2015 but returned to baseline levels by May.
- QAL044B - The mean water level readings from February – March and September 2015 were a maximum of 0.2 feet below the minimum baseline level calculated for this location. The lowest reading was recorded in September and in all cases the water level returned to baseline levels.
- QAL065D – The mean water level reading reported in September 2015 was a maximum of 0.1 feet below the minimum baseline level calculated for this location.
- QAL066D - The mean water level readings in March and September 2015 were a maximum of 0.3 feet below the minimum baseline level calculated for this location. The water levels returned to baseline levels in the months following the lower readings.

The lower water level readings reported at locations QAL024A, QAL044B, and QAL066D from February – April were likely due to frozen conditions when little to no recharge occurs from precipitation. Mean water level readings in September at locations QAL023B, QAL044B, QAL065D, and QAL066D were just outside of the baseline minimum in each case and may be due to the below average rainfall that was reported for the region in the fall of 2015. Water levels will continue to be closely monitored in 2016.

Water levels at the wetland locations did not fall more than six inches below pre-mining baseline levels in accordance with permit condition L4c. Location WLD026-9.5 reported water levels slightly above baseline levels in April and May which may be attributable to spring snowmelt conditions. Water levels returned to baseline levels by June 2015. Location WLD026 had previously been impacted by beaver activity which resulted in ponding. These conditions were no longer observed in 2015. Hydrographs of each groundwater and wetland monitoring location can be found in Appendix O.

In addition to continuous monitoring, Eagle Mine implemented a regional hydrologic monitoring program to assess potential groundwater elevation changes due to mine dewatering. The regional monitoring wells cover an area of approximately 14 square miles. Discrete water elevations are measured on a quarterly basis at 118 locations. During Q1 several wetland locations were unable to be monitored due to frozen or unsafe conditions.

A map of the hydrologic monitoring locations can be found in Appendix L and a map of the A and D zone contour maps for each sampling quarter can be found in Appendix M. A review of the results determined the following:

- No significant changes or shifts in calculated GW contours were reported for calendar year 2015.
- Mounding has been noted at down gradient TWIS locations and is likely associated with the effluent discharge from the water treatment plant.
- New minimum water levels were reported in Q3 and/or Q4 2015 for the following monitoring well locations: QAL003B, QAL023B, QAL043B, QAL064D, QAL065D, QAL066D. In each case the water levels decreased less than one foot from historical levels. A review of water level data from the area indicates that these declines are most likely attributed to water withdrawal from the mine services well and lower than average annual precipitation rates. There has been a consistent declining trend in the D zone aquifer, measured at QAL004D, which is located within the direct influence of the mine services well, since mid-2013 and a corresponding declining trend in peak-to-peak seasonal water levels in the B/D zones above the ore body of about 0.5 feet from 2013 – 2015. These wells are all located within the same confined aquifer and the operation of the mine services well results in the removal of water near the well and establishes hydraulic gradients that draws flow from more distant parts of the aquifer (i.e. vicinity of the ore body). Although the majority of these monitoring locations are located over the ore body it is unlikely that the declining water levels are related to groundwater infiltration into the mine as baseline modelling indicated that seepage would need to be approximately 100 gpm or greater in order to see a drawdown similar to what is currently being observed in the B/D zones above the ore body. To date, the highest monthly average infiltration rates recorded were approximately 13 gpm in 2013, well below the 100 gpm that would be indicative of water level changes due to infiltration.
- New minimum water levels were reported in Q3 and/or Q4 2015 for the following wetland monitoring locations: WLD001, WLD022, WLD023, WLD026, and WLD027. In each case the water levels decreased less than one foot from historical levels. These locations are completely unaffected by pumping of the mine services well or underground mine infiltration and are instead entirely influenced by seasonal and annual precipitation patterns and stream flow hydraulics. In 2015, precipitation rates were below average for the area which likely resulted in the decline in water levels observed in the wetland.
- New maximum water levels were reported in Q3 2015 for the following locations: QAL060A, QAL068A, QAL070A, QAL073A. Water levels increased less than one foot at each of the locations.

A summary of discrete water elevation results from Q1-Q4 2015 are summarized in Appendix P.

5.2.2 Continuous Surface Water Monitoring

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

As with the continuous groundwater monitoring locations, the results for surface water locations are also being reported by water year (October 1 – September 30). Continuous readings during the 2015 water year were averaged over each month of operation from October 1, 2014 thru September 30, 2015 and are based on mean daily values. Background levels are based on data collected from September 2004 through August 2011 for all locations. Monthly temperature, flow, and specific conductivity are summarized in Appendix Q. Following is a summary of the findings:

- Continuous flow readings were not collected from location STRE002 in 2015 due to beaver activity. In addition, flow readings were not collected at location STRM004, STRM005, or YDRM002 in the winter months due to ice build-up.
- Continuous temperature and specific conductance readings were not reported for the majority of the year at location STRM005 as the results did not meet quality control criteria. Specific conductance measurements were not reported from October 2014 – March 2015 at location STRM004 also due to results outside of quality control criteria.
- When collected, all temperature, flow, and specific conductance measurements were found to be within historical minimum and maximum value readings at all locations.

Hydrographs for each location are found in Appendix R and show a clear correlation between the flow rate and specific conductivity readings. As flow rates increases specific conductivity readings decrease.

5.3 Biological Monitoring

Biological monitoring events conducted in 2015 included flora and fauna surveys, wetland monitoring, fish and macro invertebrate surveys, and a narrow-leaved gentian survey. Results from each survey have been compiled into annual reports which are available upon request. A brief summary of each survey is provided below.

5.3.1 Flora and Fauna/Wetland Monitoring Report

The 2015 flora, fauna, and wetland vegetation surveys were conducted by King & MacGregor Environmental, Inc. (KME). Table 5.3.1 below outlines the type and duration of the surveys that were conducted in 2015.

Table 5.3.1 Type and Duration of 2015 Flora, Fauna, and Wetland Surveying Events

Survey Type	Survey Date
Bird	June 15-19, September 22-24 & 30
Small Mammals	September 22-24
Large Mammals	June 9-10 & 15-19, August 18-19, September 22-24 & 30,
Toads/Frogs	April 16, June 2 & 29
Wetland Vegetative Monitoring	June 9-10
Upland Vegetative Monitoring	June 9-10, August 18-19
Narrow-Leaved Gentian	August 19

The wildlife and plant species identified during the 2015 surveys within the Study Area are similar to those identified during previous KME surveys with the exception of Points 11W and 12W which could not be surveyed as they continue to be active roadways for logging and exploration drilling operations. Following is a summary of the survey results:

- Forty-two species of birds, none of which are threatened or endangered, were observed during the bird surveys. Consistent with previous studies, the Nashville warbler was the most abundant bird observed during the June survey, while the Canada goose 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.
- Twenty-two small mammals representing seven 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 generally consistent with previous survey results. Small mammals appear to be distributed throughout wooded and open areas, in both upland and wetland habitats.
- Whitetail deer was the only large mammal species directly observed during the 2015 surveys. Deer were seen infrequently throughout the Study Area during the course of the ecological surveys. Similar to previous years, fresh scat and tracks of moose and coyote were observed occasionally throughout the Study Area.
- Three frog species were heard during the survey; none of which are threatened or endangered. All three of the sampling points exhibited use by frogs for breeding. The most frequently heard species in 2015 was the northern spring peeper and green frog. The frog and toad species identified are typical of those expected in the habitats present in the Study Area. No frog calls were heard during the April 16th survey, likely due to weather conditions including low temperatures and persistent snow and ice cover. The 2015 survey results are similar to those of previous years.

Vegetative sampling plots in both wetland and upland communities identified plant species common to this region. The overall richness and distribution of wetland and upland vegetation in 2015 was found to be very similar to previous years. No threatened or endangered plant species were encountered within the vegetative survey plots. The population of narrow-leafed gentian observed within the study area was robust. All of the wildlife and plant species identified within the Study

Area are typically associated with vegetative communities that are relatively common within the region.

Wetland vegetation survey plot 13W, June 2015

Upland vegetation survey plot 22, August 2015

5.3.2 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 in or near the Study Area. MNFI lists the NLG as a threatened species in Michigan. 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.

In 2006, the federally endangered Kirtland's warbler was observed in Marquette County. Although one has never been detected in the study area since KME began monitoring, there is suitable habitat present for the species to exist. Spruce grouse is a state special concern species; this species was occasionally observed during the 2015 ecological surveys, south and east of the Salmon-Trout River. Scat and tracks of moose (State Special Concern) were observed occasionally in 2015 throughout the Study Area. No evidence of the gray wolf was discovered.

5.3.3 Narrow-Leaved Gentian (NLG)

The methods used to conduct the 2015 NLG field investigation were consistent with the previous NLG studies. Photographic and Global Positioning System documentation was collected on August 19, 2015. In addition, the local climate changes and overall health of the NLG colonies were assessed relative to previous years. The area of investigation was expanded in 2015 to include the area just north of the Yellow Dog River in addition to the main branch of the Salmon Trout River south of the Triple A Road. The area near the Yellow Dog was included as the information was required for an exploration survey.

According to National Oceanic and Atmospheric Administration data, precipitation totals were within 10% of normal for the area during the 2015 water year and temperatures were near average. Flow in the Salmon Trout River and Yellow Dog River appeared normal. Therefore, the necessary hydrology to support the NLG population was present in 2015.

The NLG colonies appeared healthy in 2015 relative to previous observances. Flowering NLG were found in abundance (hundreds of individual plants) both along the Salmon Trout River in approximately the same areas where they were previously observed and in the expanded search area.


Narrow-leaved Gentian North of the Yellow Dog River, August 2015

5.3.4 Fisheries and Macro Invertebrate Report

The 2015 Fisheries and Macro-Invertebrate annual surveys were conducted by Advanced Ecological Management (AEM). A total of ten stations were surveyed during summer 2015, including one station in the Yellow Dog River, one station in Cedar Creek, five stations in the Main Branch of the Salmon Trout River, and three stations in tributaries of the East Branch of the Salmon Trout River.

A total of 575 fish were collected in 2015 from all stations, down from 1,365 fish in 2014, with 86% of the total being captured at Station 6 located on the main branch of the Salmon Trout River. Among all stations, a total of seven species of fish were observed during the aquatic survey. Northern redbelly dace (*Phoxinus eos*), brook sticklebacks (Culaea inconstans), and brook trout (*Salvelinus fontinalis*), were the most frequently collected species. No Michigan Natural Features Inventory (MNFI) listed threatened or endangered fish species were identified in the stations investigated in 2015. The biggest difference in total fish from 2014 to 2015 was observed at Station 6 where in 2014, 1,266 fish were collected, 1,192 of which were northern redbelly dace. In 2015, 492 fish were collected from Station 6, with 213 of those being northern redbelly dace. Unlike 2014, four brook trout were collected from Station 6 in 2015. Although the number of fish captured at Station 6 in 2015 was lower than numbers collected in 2014 it is still consistent with historical values which have ranged from 184 in 2011 to 1,266 in 2014.

Using the P-51 protocol, a total of 2,287 macro-invertebrates, representing 53 taxa, were collected from all ten stations that were investigated in 2015. Due to beaver dams in the vicinity of Stations 6 and 7, the P-51 measurement protocols could not be applied to those areas. The total macro-invertebrates collected in 2015 is an increase of 313 specimens compared to the total number collected in 2014. The annual variation is consistent with previous surveys conducted during the baseline period. The macro-invertebrate communities within the Salmon Trout River have been scored by AEM as excellent or acceptable communities. In most stations, the macro-invertebrate community rating was consistent with previous sampling efforts.

The aquatic and stream habitat at stations sampled during 2015 were rated as “Good” or “Excellent” habitat quality. Station 9 habitat changed from an “Excellent” rating in previous years to a “Good” rating in 2014 and 2015. The change in the habitat rating of Station 9 was due to sand moving into the station from upstream and filling the pools. Station 9 is located more than two miles northeast of the Eagle Mine site, but is immediately southwest of the Northwestern Road. The substrate of this location is comprised primarily of silt and sand which may easily erode if vegetation is compromised. The 2015 P-51 habitat ratings for all other stations were consistent with previous surveys conducted by AEM.

A copy of the full report is available upon request.

Aquatics monitoring location Station 6, June 2015

5.3.5 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.

5.4 Miscellaneous Monitoring

5.4.1. Soil Erosion Control Measures (SESC)

In accordance with Part 91 (NREPA, 1994 PA 451, as amended), SESC measures installed around the perimeter of the mine ventilation area, with the exception of a section along the south fence, were removed as permanent vegetation had been established. The section along the south fence was re-seeded and therefore SESC measures will remain in place until a sufficient amount of permanent vegetative growth is established. Although SESC measures related to the construction of mining facilities now fall under the purview of Part 632, Eagle Mine will maintain compliance with the requirements of Part 91 for the SESC permit that is currently in place for the mine ventilation area. To ensure the integrity of the installed controls, inspections occur 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.

5.4.2 Berms, Embankments and Basins

All containment berms and embankments of the TDRSA, CWB, NCWIBs, and facility perimeter are inspected on a monthly basis, or after a 0.5” rain event, to ensure cracking, settlement, or erosion is not affecting the integrity of the berms. Inspections were completed as required in 2015 with observations and/or repair recommendations recorded in the surface inspection log stored in the compliance binder at the mine site. Issues identified are immediately reported and corrected by onsite staff. A follow-up inspection is completed to ensure that repairs have been made.

In 2015, one area was identified requiring repair; the drainage area east of the Ambulance Garage which eroded during spring snowmelt. Riprap was added to the drainage area east of the ambulance garage in June to eliminate any further erosion.

Grounds work was also completed at the Vent Raise. In early July, gravel was placed in front of the vent raise heater building and near the propane tanks in order to minimize vegetative growth as required by MSHA. A buffer strip remains around both areas to mitigate the movement of sand or soils from the site.


Heater house prior to gravel application, June 2015


Heater house after gravel was applied, July 2015

The silt fence was also replaced along the southern fence line behind the vent raise where previous efforts to vegetate the area were unsuccessful. The area was re-seeded and mulched in July 2015 and efforts were successful as permanent vegetation was established. The remaining silt fence will be removed in the spring of 2016.


Vent raise area prior to re-seeding, June 2015


Vent raise area after re-seeding, September 2015

5.4.3 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 the WTP, truck wash and truck shop floors, sumps, and trench drains and contact area and travel ways comprised of concrete or asphalt.

The WTP, truck wash and truck shop floors, sumps, and drains were inspected monthly from January through December 2015. Inspections of the contact area and travel ways were completed during the months of April through November. Per the monitoring plan, inspections of the contact area and travel ways are suspended during the months when snow covers much of the surface and winter weather prevents effective patching efforts.

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

In late 2014, indents in the asphalt in laydown area north of the TDRSA were identified as requiring repair. However, upon further inspection in the spring of 2015, the indents were found to be superficial and only impacted the surface of the asphalt and therefore did not require repair. These indents were the result of heavy pipe racks and wooden beams have been placed beneath the racks to prevent any further damage to the asphalt.

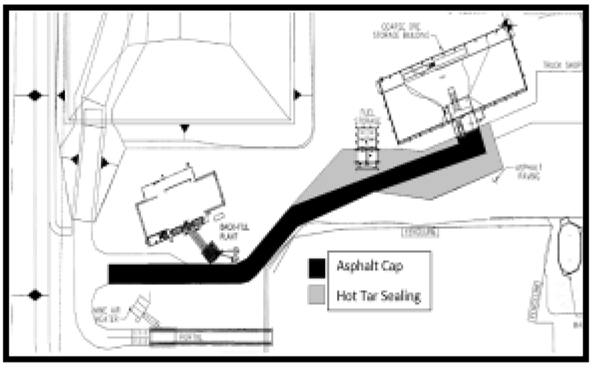
Inspections resumed for the contact area after snowmelt occurred in the spring of 2015. Cracking at joints along cement pads was identified on the haul route from the COSA to the portal heater building. Concrete repairs were scheduled and occurred from June 30th – July 9th. The joints that showed signs of cracking were cut and replaced with a repair mortar.

Almost immediately following the completion of the concrete repairs, inspections of the haul route identified the repair mortar that was used was wearing prematurely. In an effort to mitigate concerns regarding the integrity of the contact area, in mid-October a layer of asphalt was applied to the roadway from the COSA dump bays to the portal heater building to "cap" the distressed concrete. Outlying concrete joints that were not covered by the asphalt cap were sealed using hot tar.

Inspections of the contact area will resume in the spring of 2016 and will focus on the integrity of the asphalt cap and whether any additional repairs are necessary.

No other areas were identified as requiring repairs in 2015.

Asphalt Cap, October 2015



Map of contact area repairs, October 2015

5.4.4 Geochemistry Program

In 2015, the focus of the geochemistry program continued to be on the water quality of the underground as it is representative of ore.

Four underground water quality samples were collected in February, June, September, and December 2015 from Jump Tank No. 1 located in the main decline underground. Water from the lower levels of the mine are pumped to Jump Tank No. 1 which then pumps the water to the CWBs. Samples were analyzed for the annual parameter list in Q3 and quarterly list in Q1, Q2, and Q4.

Review of the data, available to date, is within predicted levels and can be readily treated and removed by the WTP. A summary table and graph of the results and are available in Appendix D.

5.4.5 NCWIB & CWB Sediment Accumulation Measurements

Sediment accumulation is monitored and measured at both the contact and non-contact water basins. This requirement is in place as sediment accumulation in the NCWIBs could result in diminished infiltration capacities and decreased water storage capacity in the CWBs.

Non-Contact Water Infiltration Basins

As required by the mining permit, sediment accumulation measurements are conducted on an annual basis for the NCWIBs. Each of the four NCWIBs were inspected in 2015. With the exception of NCWIB No.2, located near the cold storage warehouse, no reportable accumulation was observed at any of the locations. Approximately one foot of sand has started to accumulate in the northwest corner of NCWIB No. 2 due to snow that is stored there in the winter. When the snow melts the sand is left behind. The sand that is currently present in the basin has not impacted infiltration, but will continue to be monitored and removed if necessary. Minimal vegetation was observed at NCWIBs 1, 2, 3, and 4 and will continue to be monitored in 2016. If the vegetation persists it may require removal if it begins to impact infiltration rates.

Contact Water Basins

Two sediment thickness measurements were completed in CWB No. 1 and 2 utilizing a boat and sludge judge to measure the accumulation. The first inspection was conducted on June 23, 2015 for both basins and the second sediment thickness measurements were completed in August for CWB No. 1 and October for CWB No. 2.

CWB No. 2 was found to have a maximum accumulation of eight inches near the northwest corner where the WTP outfall is located. This outfall is the point in which recycled or off-spec water from the WTP is deposited back into the basins prior to re-treatment. The remainder of the basin averaged approximately two inches of sediment accumulation. CWB No. 2 measurements were slightly higher in 2015 with average thickness measuring less than one inch in 2014 compared to two inches in 2015.

CWB No. 1 was found to have an estimated maximum accumulation of approximately 50 inches at the south end of the basin with the north end averaging five inches or less. CWB No. 1 sediment accumulation did not increase significantly from levels reported in 2014. This is likely due to the construction of an underground sump system which allows materials time to settle prior to being pumped to the surface. The accumulation of sediment does slightly reduce the basin capacity however, the basins were oversized from the estimated volumes cited as required in the permit application. The permitted operating level of the CWBs is approximately 11 MG which is significantly higher than the 8.1 MG estimated to be the result of a 100-yr combined 24-hr rainfall and 50-yr snowmelt based on the current drainage area data. The estimated 1,834 yd^3 of accumulated sediment in CWB No.1 displaces roughly 370,420 gallons. Although this does reduce the basin capacity it does not reduce it to a level below the required design capacity cited in the permit application.

A proactive approach was taken to remove the sediment buildup from CWB No. 1. In August 2015, the water level of CWB No. 1 was lowered and sediment was removed using a vacuum truck and placed on the TDRSA. The operation removed a portion of sediment directly in front of the underground outflow, but not all accumulated sediment. A larger scale sediment removal operation is being considered for 2016.

6. 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.

7. 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 accordance with MSHA, Eagle Mine is required to have a Mine Rescue team that is routinely and adequately trained to respond to underground emergency situations. The Mine Rescue team is comprised of three, six member teams that train approximately 8-10 hours per month which includes at least two hours "under air" using the Draeger BG-4 closed-circuit breathing apparatus. In 2015, training included familiarization with the mine map and underground navigation, understanding ventilation and air flow in the mine, mine gases, rescue and recovery, basic extrication, fires and firefighting, first aid, and operation and maintenance of the BG-4 breathing apparatus. Training scenarios included underground rescues under varying conditions such as smoky environments resulting in reduced visibility.

In addition to the Mine Rescue team, security personnel are EMTs and paramedics who are trained in accordance with state and federal regulations. Eagle Mine also maintains a state licensed ALS ambulance onsite for immediate response to 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 was 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 S. This plan will also be submitted to the Local Emergency Management Coordinator.

8. 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.

9. Organizational Information

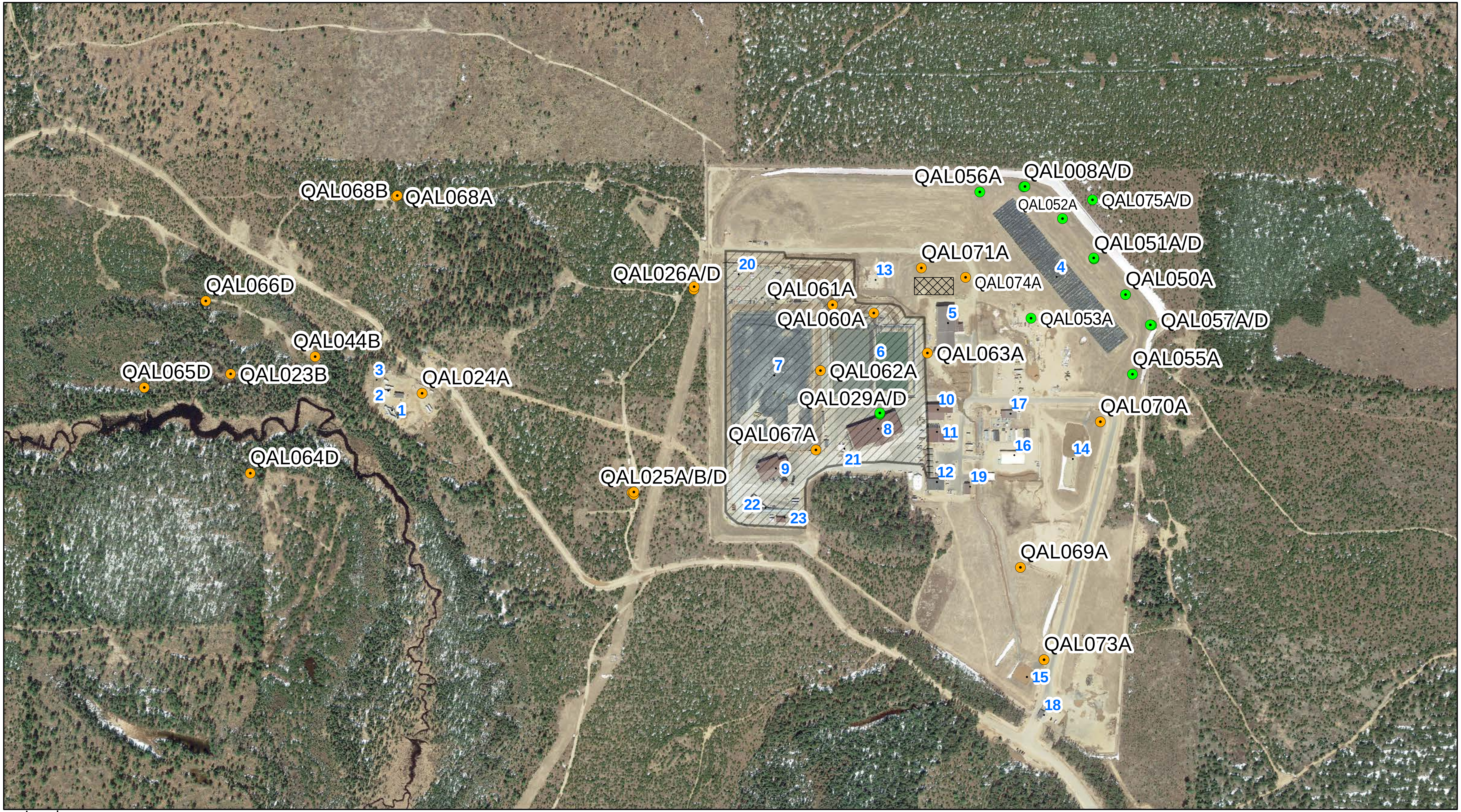
An updated organization report can be found in Appendix T.

Appendix A

Eagle Mine

Site Map

Eagle Mine LLC Mine Monitoring Map



Legend

- 1 - Main Ventilation Air Raise
- 2 - Air Intake / Alimak Emergency Egress
- 3 - Non-Contact Water Basin #4
- 4 - Treated Water Infiltration System
- 5 - Water Treatment Plant
- 6 - Contact Water Basins
- 7 - Temporary Development Rock Storage Area
- 8 - Coarse Ore Storage Area
- 9 - Aggregate Storage and Batch Plant
- 10 - Truck Wash
- 11 - Truck Shop
- 12 - Administration Building and Mine Drys
- 13 - Non-Contact Water Basin #1
- 14 - Non-Contact Water Basin #2
- 15 - Non-Contact Water Basin #3
- 16 - Warehouse
- 17 - Powerhouse
- 18 - Guardhouse
- 19 - Ambulance Garage
- 20 - Explosives Magazine
- 21 - Fuel Storage Area
- 22 - Portal
- 23 - Compressor Building

Ground Water Discharge Permit Wells

Part 632 Mining Permit Wells

Mine Septic Field

Contact Area

Date: 2/4/2016

0 0.0425 0.085 0.17 0.255 0.34 0.425 Miles

N E S W

Appendix B

Eagle Mine

Rock Stability Certification

Eagle Mine
lundin mining

Eagle Mine
4547 County Road 601
Champion, MI 49814, USA
Phone: (906) 339-7000
Fax: (906) 339-7005
www.eaglemine.com

Thursday, March 10, 2016

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

Subject: Rock Stability Certification – Eagle Mine, Marquette County Michigan Mining Permit (MP 01 2007)

In accordance with condition E-8 of mining permit MP 01 2007, I certify that the rock stability modelling provided in the mine permit application is still valid. This was verified through a review of a coupled geologic/hydrologic stress and mining sequence model which did not indicate any changes in rock mass conditions through 2015. In addition, daily visual inspections are also conducted by Eagle Mine representatives and/or contractor mining personnel to verify ground stability.

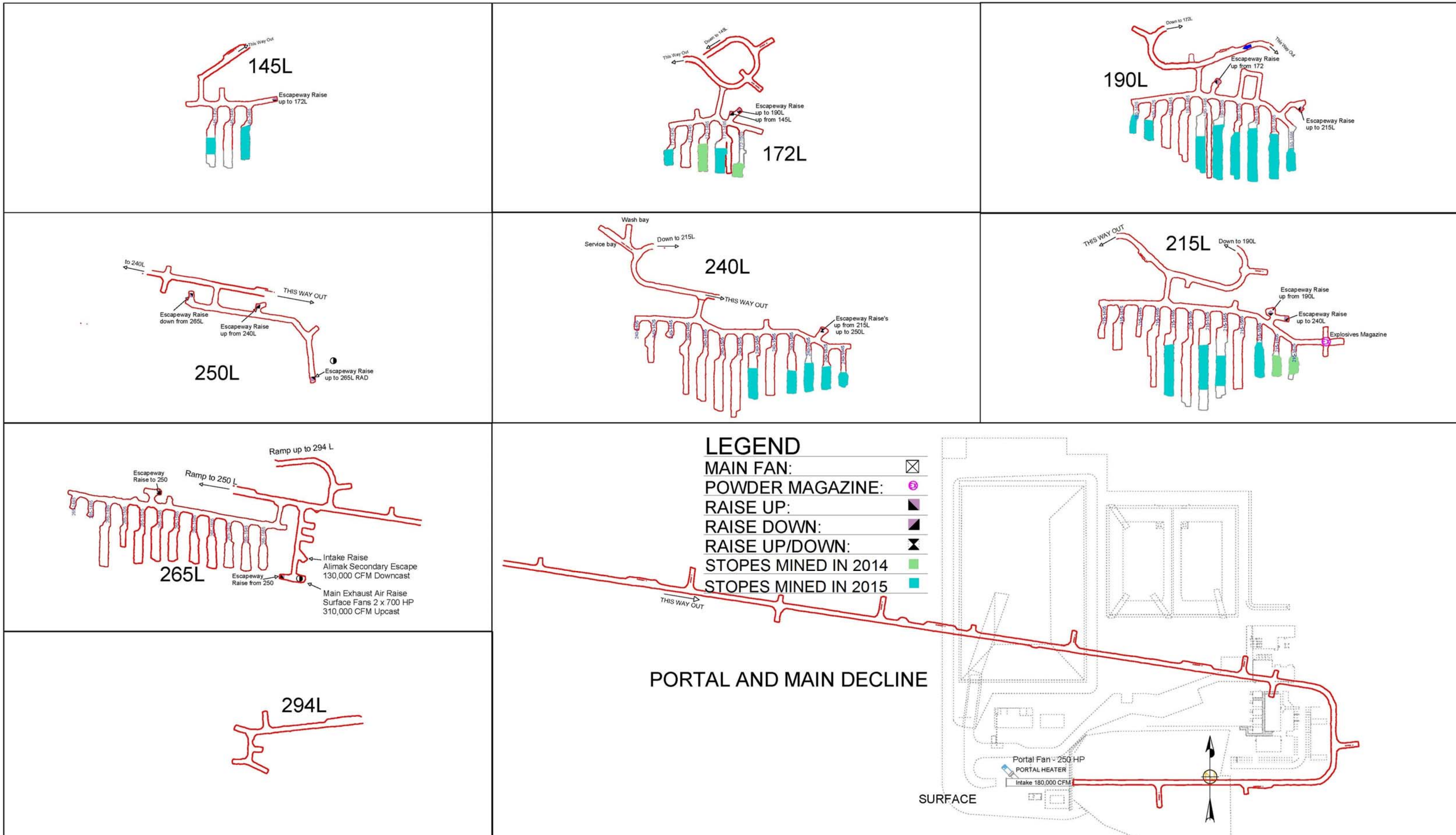
Sincerely,

Jeff Murray
Mine Manager
Eagle Mine, LLC.

Appendix C

Eagle Mine

Map of Production Mining Progress



	Sign-off	Date
Mine Manager		
Safety Manager		
Operations Superintendent		
Engineer		

Design By:
Drawn By: TRJ
Check By:
Comp. File:
Scale: 1:300
Draw Date: 11-Feb-2016
Sheet:
Dwg. No.:

Eagle Mine

Development and Stope Ext.
Feb 11, 2016

Appendix D

Eagle Mine

Facilities Water Quality Monitoring Results

2015
Mine Permit Water Quality Monitoring Data
Contact Water Basins
Eagle Mine

Parameter	Unit	Q1 2015 3/5/2015	Q2 2015 6/4/2015	Q3 2015 9/14/2015	Q4 2015 12/2/2015
Field					
pH	SU	**9.7**	**8.4**	**8.6**	**8.7**
Specific Conductivity	µS/cm	**2589**	**2420**	**2706**	**2444**
Metals					
Aluminum, Total	mg/L	—	—	**190**	—
Antimony, Total	µg/L	—	—	**3.5**	—
Arsenic, Total	µg/L	**1.2**	<1.0	**1.2**	<1.0
Barium, Total	µg/L	—	—	**54**	—
Beryllium, Total	µg/L	—	—	<1.0	—
Boron, Total	µg/L	**520**	**480**	**610**	**620**
Cadmium, Total	µg/L	—	—	<0.20	—
Chromium, Total	µg/L	—	—	**3.9**	—
Cobalt, Total	µg/L	—	—	**1.7**	—
Copper, Total	µg/L	**45**	**45**	**33**	**43**
Iron, Total	µg/L	**1300**	**1400**	**570**	**450**
Lead, Total	µg/L	—	—	<1.0	—
Lithium, Total	µg/L	—	—	**16**	—
Manganese, Total	µg/L	**19**	**28**	**32**	**64**
Mercury, Total	µg/L	**0.0023**	**0.0028**	**0.0007**	**0.0026**
Molybdenum, Total	µg/L	—	—	**36**	—
Nickel, Total	µg/L	**130**	**64**	**64**	**89**
Selenium, Total	µg/L	**3.6**	**1.2**	**4.6**	**12.0**
Silver, Total	µg/L	—	—	<0.20	—
Strontium, Total	µg/L	—	—	**1700**	—
Thallium, Total	µg/L	—	—	<1.0	—
Vanadium, Total	µg/L	—	—	<4.0	—
Zinc, Total	µg/L	<10	<10	<10	**15**
Major Anions					
Alkalinity, Bicarbonate	mg/L	**51**	**47**	**44**	**59**
Alkalinity, Carbonate	mg/L	<2.0	<2.0	<2.0	**2.1**
Chloride	mg/L	**350**	**250**	**140**	**180**
Fluoride	µg/L	—	—	**140**	—
Nitrogen, Nitrite	mg/L	—	—	**6.7**	—
Nitrogen, Nitrate	mg/L	**71**	**66**	**110**	**79**
Sulfate	mg/L	**370**	**510**	**650**	**590**
Major Cations					
Calcium, Total	mg/L	—	—	**140**	—
Magnesium, Total	mg/L	—	—	**29**	—
Potassium, Total	µg/L	—	—	**54000**	—
Sodium, Total	mg/L	**410**	**370**	**350**	**330**

— Analyte not included in the quarterly parameter list.

2015
Mine Permit Water Quality Monitoring Data
TDRSA Contact Water Sump
Eagle Mine

Parameter	Unit	Q1 2015 2/26/2015	Q2 2015 6/4/2015	Q3 2015 9/14/2015	Q4 2015 12/2/2015
Field					
pH	SU	**6.9**	**6.5**	**6.3**	**6.7**
Specific Conductivity	µS/cm	**5544**	**4030**	**6395**	**5260**
Metals					
Aluminum, Total	mg/L	—	—	**0.11**	—
Antimony, Total	µg/L	—	—	<1.0	—
Arsenic, Total	µg/L	<1.0	<1.0	<1.0	<1.0
Barium, Total	µg/L	—	—	**45**	—
Beryllium, Total	µg/L	—	—	<1.0	—
Boron, Total	µg/L	**54**	**1100**	**1400**	**1300**
Cadmium, Total	µg/L	—	—	**0.24**	—
Chromium, Total	µg/L	—	—	**3.2**	—
Cobalt, Total	µg/L	—	—	**2.3**	—
Copper, Total	µg/L	<1.0	**1.5**	**2.3**	**9.2**
Iron, Total	µg/L	<10	**67**	**91**	**39**
Lead, Total	µg/L	—	—	<1.0	—
Lithium, Total	µg/L	—	—	<8.0	—
Manganese, Total	µg/L	**170**	**290**	**610**	**820**
Mercury, Total	µg/L	**0.0018**	**0.003**	**0.0025**	**0.0086**
Molybdenum, Total	µg/L	—	—	**16**	—
Nickel, Total	µg/L	**10**	**32**	**32**	**410**
Selenium, Total	µg/L	**12**	**7.1**	**11**	**14**
Silver, Total	µg/L	—	—	<0.20	—
Strontium, Total	µg/L	—	—	**4600**	—
Thallium, Total	µg/L	—	—	<1.0	—
Vanadium, Total	µg/L	—	—	<4.0	—
Zinc, Total	µg/L	<10	<10	<10	**14**
Major Anions					
Alkalinity, Bicarbonate	mg/L	**31**	**21**	**32**	**19**
Alkalinity, Carbonate	mg/L	<2.0	<2.0	<2.0	<2.0
Chloride	mg/L	**73**	**75**	**82**	**91**
Fluoride	µg/L	—	—	<100	—
Nitrogen, Ammonia	mg/L	**0.085**	**4.6**	**11**	**11**
Nitrogen, Nitrate	mg/L	**390**	**250**	**510**	**360**
Nitrogen, Nitrite	mg/L	<0.05	**0.5**	**3.0**	**3.6**
Sulfate	mg/L	**1800**	**1300**	**1600**	**1500**
Major Cations					
Calcium, Total	mg/L	—	—	**560**	—
Magnesium, Total	mg/L	**260**	**160**	**230**	**180**
Potassium, Total	µg/L	—	—	**77000**	—
Sodium, Total	mg/L	**370**	**290**	**500**	**430**

— Analyte not included in the quarterly parameter list.

2015
Mine Permit Water Quality Monitoring Data
TDRSA Leak Detection Sump
Eagle Mine

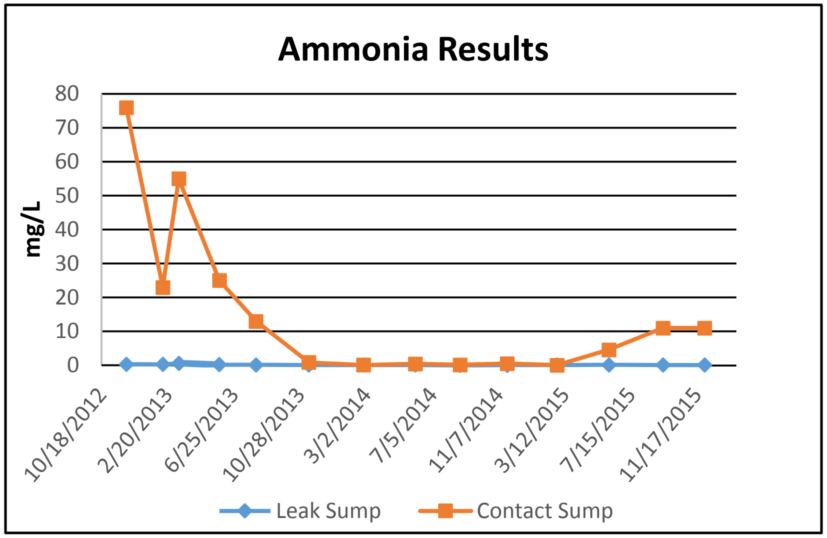
Parameter	Unit	Q1 2015 2/26/2015	Q2 2015 6/4/2015	Q3 2015 9/14/2015	Q4 2015 12/2/2015
Field					
pH	SU	**7.3**	**7.8**	**7.3**	**7.3**
Specific Conductivity	µS/cm	**2977**	**1854**	**2941**	**2870**
Major Anions					
Chloride	mg/L	**14**	**14**	**13**	**14**
Nitrogen, Ammonia	mg/L	**0.10**	**0.18**	**0.10**	**0.13**
Nitrogen, Nitrate	mg/L	**26**	**26**	**24**	**23**
Nitrogen, Nitrite	mg/L	**0.78**	**0.25**	**0.24**	**0.13**
Sulfate	mg/L	**780**	**930**	**920**	**930**
Major Cations					
Magnesium, Total	mg/L	**14**	**15**	**16**	**16**
Sodium, Total	mg/L	**590**	**610**	**620**	**670**

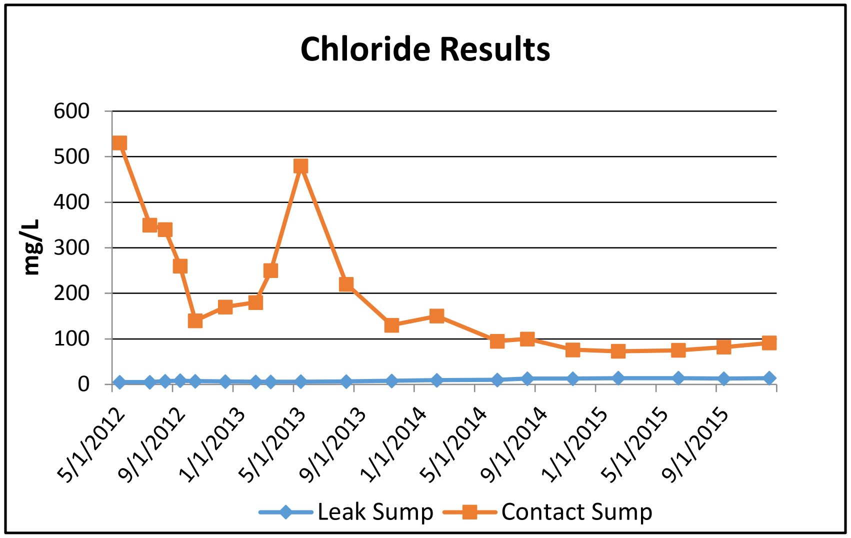
2015
Mine Permit Water Quality Monitoring Data
Underground Influent
Eagle Mine

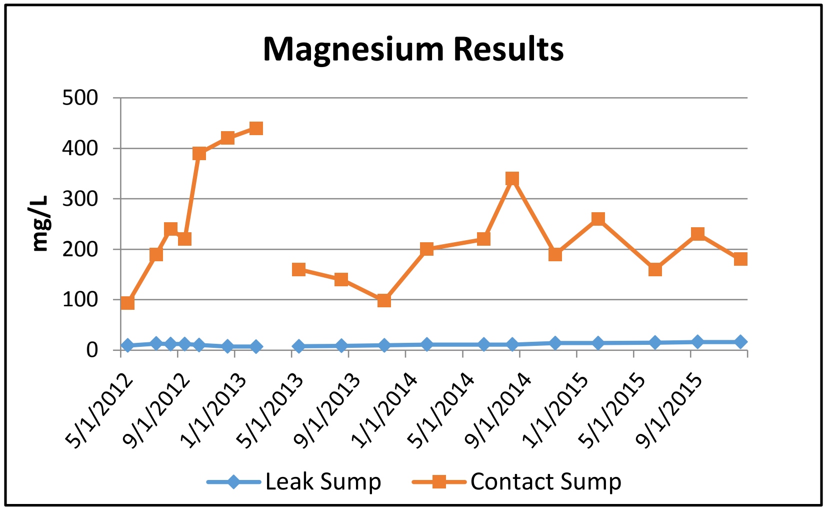
Parameter	Unit	Q1 2015 3/5/2015	Q1 2015 3/5/2015	Q3 2015 9/14/2015	Q4 2015 12/2/2015
Field					
pH	SU	**7.3**	**8.1**	**9.3**	**10.2**
Specific Conductivity	µS/cm	**1470**	**2445**	**3042**	**888**
Metals					
Aluminum, Total	mg/L	—	—	**2400**	—
Antimony, Total	µg/L	—	—	**13**	—
Arsenic, Total	µg/L	**12**	**8.8**	**13**	**17**
Barium, Total	µg/L	—	—	**160**	—
Beryllium, Total	µg/L	—	—	<1.0	—
Boron, Total	µg/L	**670**	**450**	**730**	**600**
Cadmium, Total	µg/L	—	—	**2.7**	—
Chromium, Total	µg/L	—	—	**210**	—
Cobalt, Total	µg/L	—	—	**300**	—
Copper, Total	µg/L	**5500**	**1600**	**12000**	**13000**
Iron, Total	µg/L	**86000**	**49000**	**55000**	**120000**
Lead, Total	µg/L	—	—	**54**	—
Lithium, Total	µg/L	—	—	**47**	—
Manganese, Total	µg/L	**840**	**620**	**1100**	**1500**
Mercury, Total	µg/L	**0.081**	**0.039**	**0.042**	**0.130**
Molybdenum, Total	µg/L	—	—	**58**	—
Nickel, Total	µg/L	**6300**	**1600**	**9800**	**12000**
Selenium, Total	µg/L	**8.1**	**6.2**	**17**	**10**
Silver, Total	µg/L	—	—	**5.0**	—
Strontium, Total	µg/L	—	—	**1600**	—
Thallium, Total	µg/L	—	—	<1.0	—
Vanadium, Total	µg/L	—	—	**81**	—
Zinc, Total	µg/L	**360**	**150**	**670**	**410**
Major Anions					
Alkalinity, Bicarbonate	mg/L	**51**	**47**	**140**	**550**
Alkalinity, Carbonate	mg/L	<2.0	<2.0	<2.0	<2.0
Chloride	mg/L	**350**	**88**	**340**	**110**
Fluoride	µg/L	—	—	**290**	—
Nitrogen, Nitrate	mg/L	**71**	**52**	**210**	**22**
Nitrogen, Nitrite	mg/L	—	—	**5.6**	—
Sulfate	mg/L	**370**	**180**	**230**	**120**
Major Cations					
Calcium, Total	mg/L	—	—	**190**	—
Magnesium, Total	mg/L	—	—	**29**	—
Potassium, Total	µg/L	—	—	**75000**	—
Sodium, Total	mg/L	—	—	**280**	—

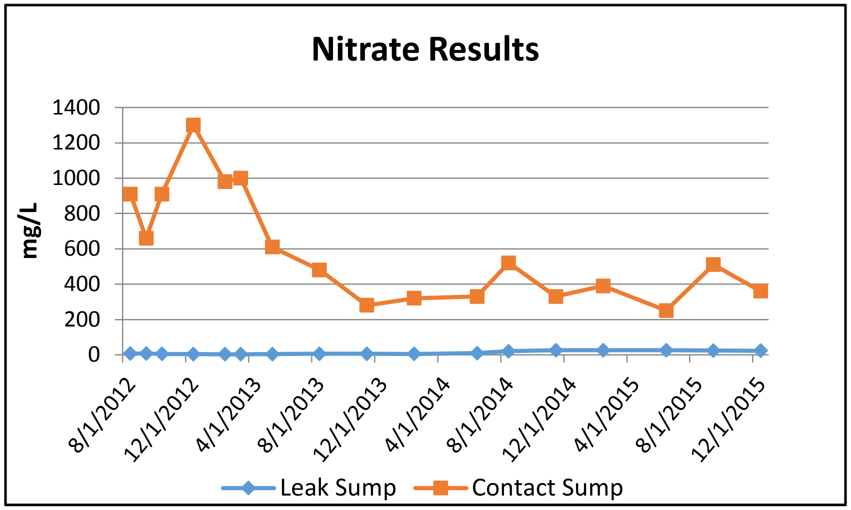
— Analyte not included in the quarterly parameter list.

2015
Mine Permit Water Quality Monitoring Data
TDRSA Contact Water & Leak Sump
Eagle Mine

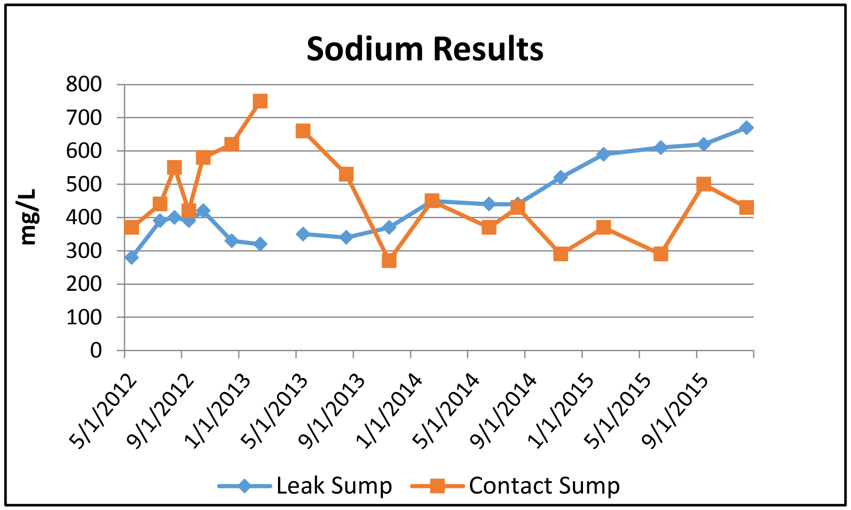


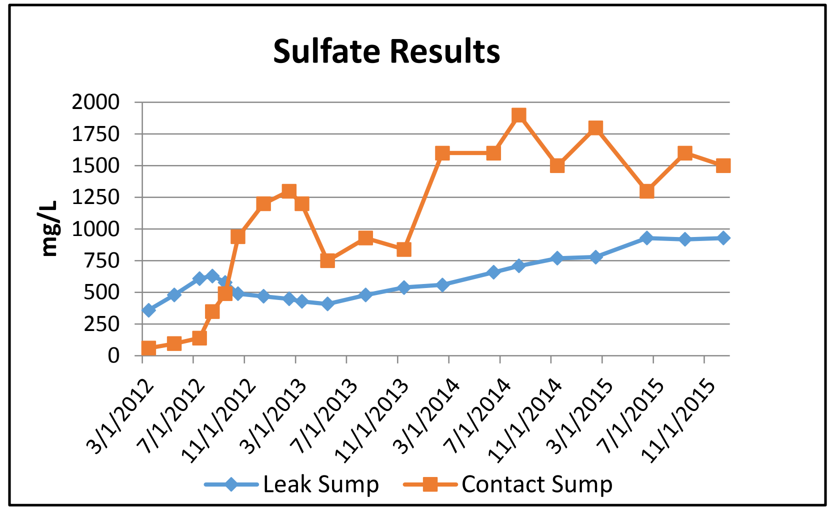




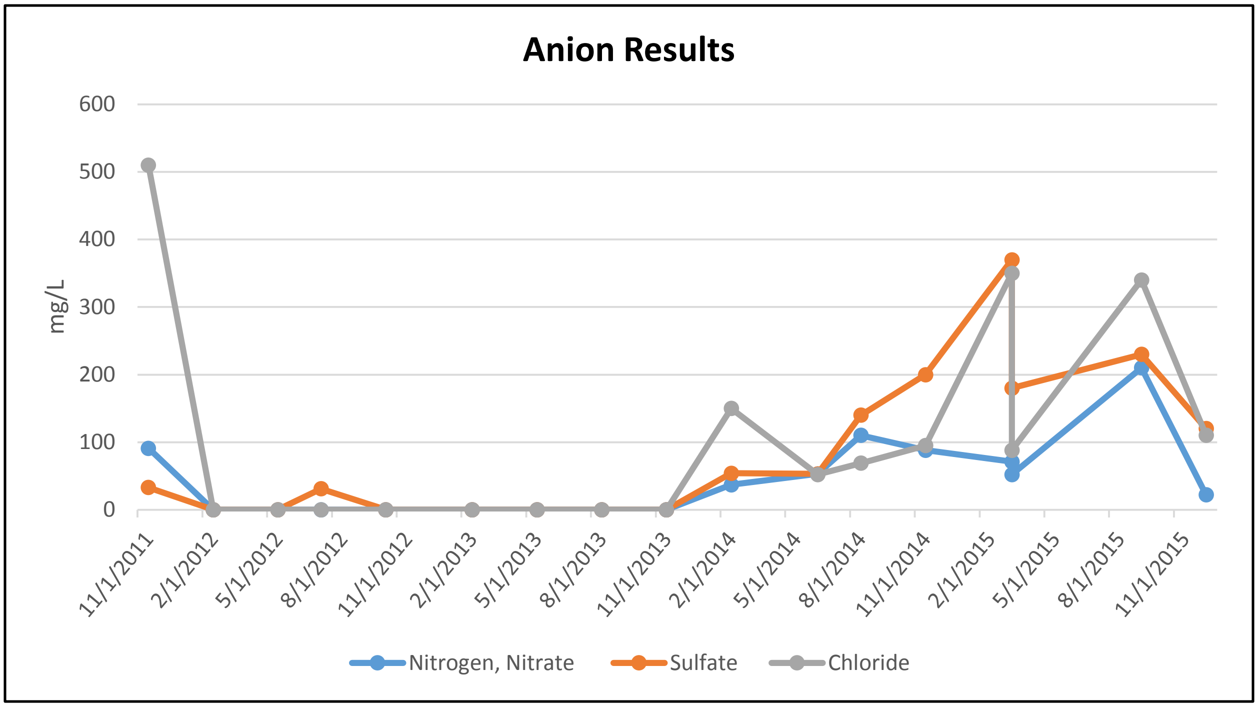


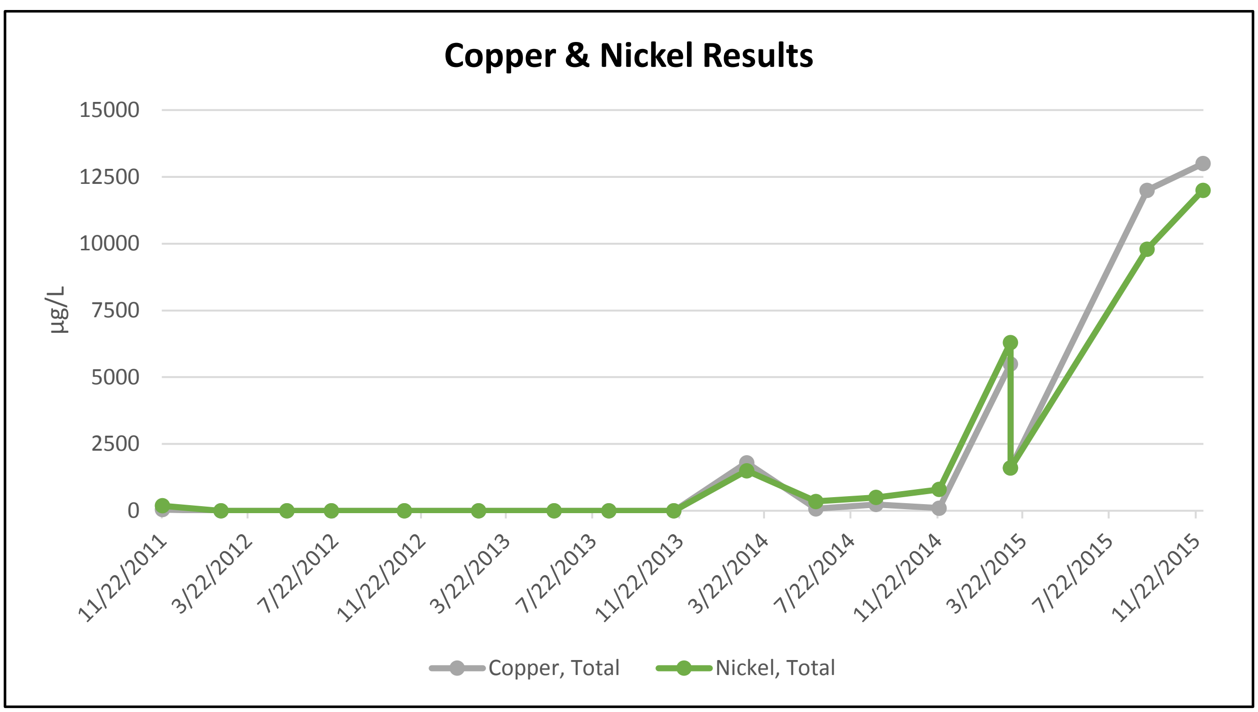
2015
Mine Permit Water Quality Monitoring Data
TDRSA Contact Water & Leak Sump
Eagle Mine



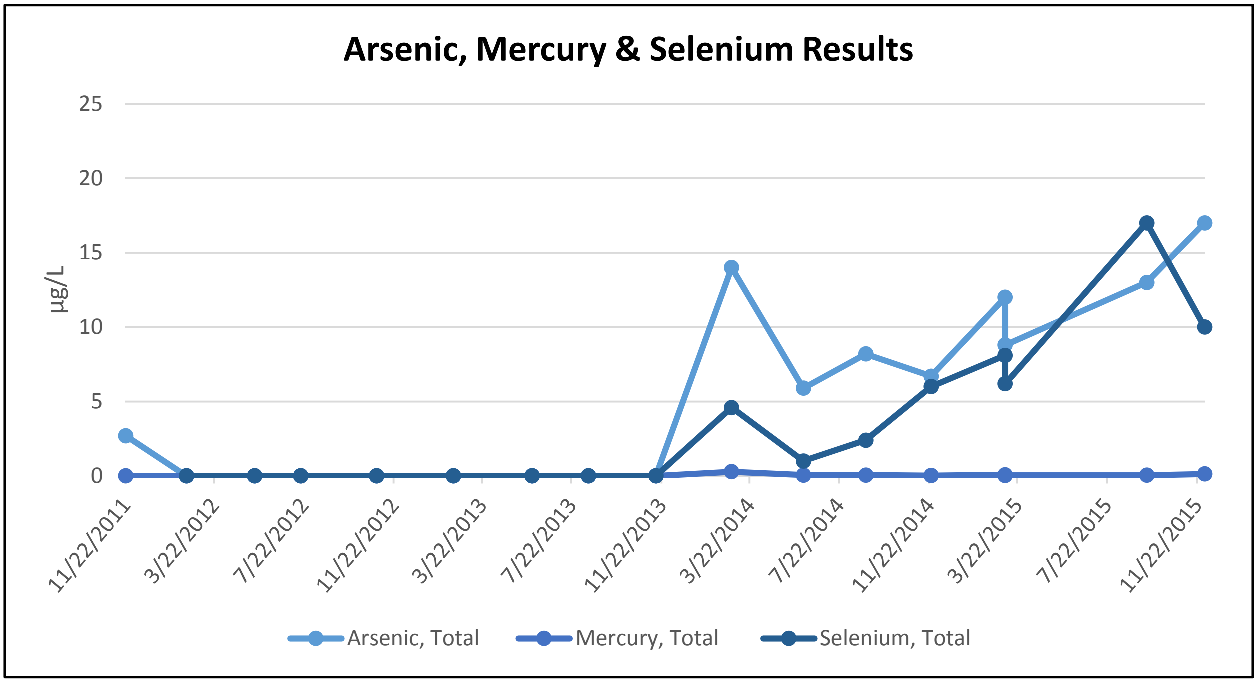


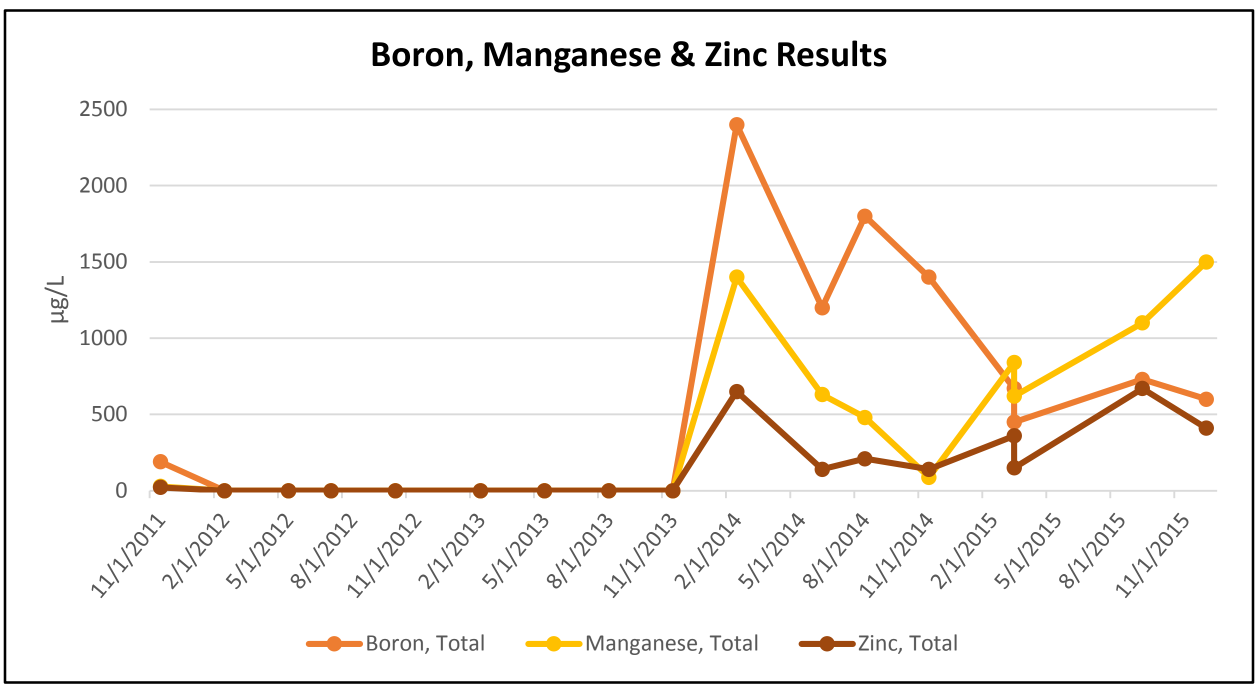
2015
Mine Permit Water Quality Monitoring Data
Underground Influent
Eagle Mine





2015
Mine Permit Water Quality Monitoring Data
Underground Influent
Eagle Mine

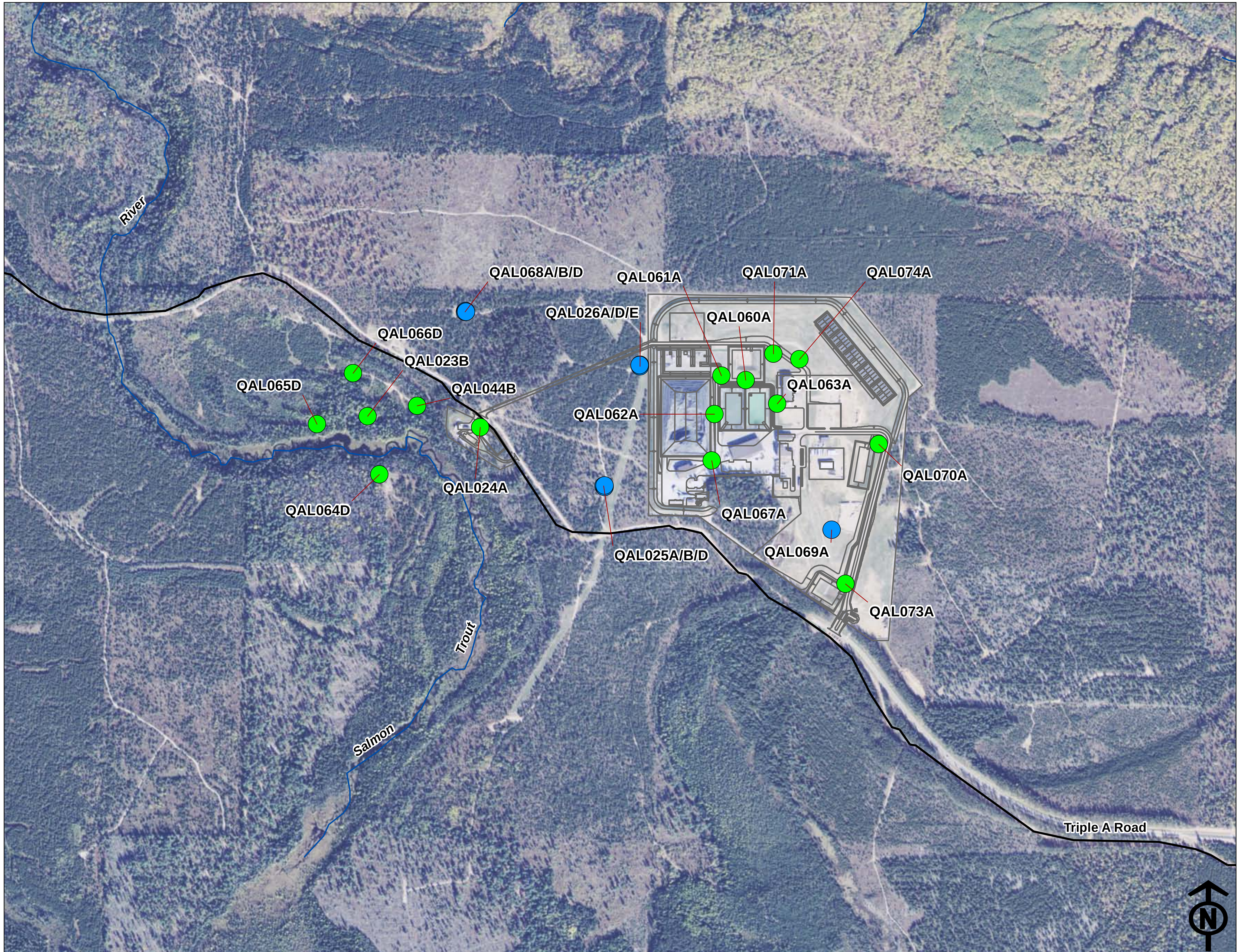




Appendix E

Eagle Mine

Groundwater Monitoring Well Location Map



MINE PERMIT GROUNDWATER QUALITY MONITORING LOCATIONS
Project View

COMPLIANCE WATER QUALITY
BACKGROUND WATER QUALITY
ROAD
HYDROGRAPHY
MINE FACILITY

Reference
Data provided by: Eagle Mine and North Jackson Company

Projection & Datum: UTM NAD 83 Zone 16N

0 2,000 Feet

Scale: 1:12,000

Eagle Mine
a subsidiary of lundin mining

North Jackson Company
ENVIRONMENTAL SCIENCE & ENGINEERING

Appendix F

Eagle Mine

Groundwater Monitoring Well Results

and

Benchmark Summary Table

Eagle Mine
2015 Mine Permit Groundwater Monitoring
Benchmark Comparison Summary

Location	Location Classification	Q1	Q2	Q3	Q4
QAL023B	Compliance		pH		alkalinity-bicarbonate, pH
QAL024A	Compliance	**alkalinity-bicarbonate, chloride,** iron, **nitrate, sodium**	**alkalinity-bicarbonate, calcium, chloride, magnesium, nitrate, sodium**	**alkalinity-bicarbonate, chloride, nitrate,** pH, **sodium**	**alkalinity-bicarbonate, chloride, nitrate, sodium**
QAL025A	Background	**alkalinity-bicarbonate, pH, sodium**	**alkalinity-bicarbonate, pH, sodium**	**alkalinity-bicarbonate, sodium**	**alkalinity-bicarbonate, sodium**
QAL025B	Background				alkalinity-carbonate
QAL025D	Background		magnesium		
QAL026A	Background	**nitrate, sodium**	**nitrate, sodium**	**nitrate, sodium**	**nitrate, sodium**
QAL026D	Background			alkalinity-carbonate, nitrate	**nitrate**
QAL026E	Background				nitrate
QAL044B	Compliance	**sodium, sulfate**	**sulfate**		pH, sodium
QAL060A	Compliance	arsenic, **nitrate**	**arsenic, nitrate**	**nitrate,** pH	arsenic, **nitrate, pH**
QAL061A	Compliance		nitrate	pH	nitrate
QAL062A	Compliance	**alkalinity-bicarbonate, chloride, sodium**	**alkalinity-bicarbonate, calcium, chloride, magnesium, sodium**	**alkalinity-bicarbonate, chloride, sodium**	**alkalinity-bicarbonate, chloride,** pH, **sodium**
QAL063A	Compliance	**alkalinity-bicarbonate**	**alkalinity-bicarbonate,** calcium, magnesium, sodium	**alkalinity-bicarbonate,** chloride**, sodium**	**alkalinity-bicarbonate, chloride,** nitrate, **sodium**
QAL064D	Compliance	**alkalinity-bicarbonate**	**alkalinity-bicarbonate, magnesium**	**alkalinity-bicarbonate**	**alkalinity-bicarbonate**
QAL065D	Compliance	alkalinity-bicarbonate, iron, nitrate	**strontium**		
QAL066D	Compliance	alkalinity-bicarbonate, **pH**	**alkalinity-bicarbonate, magnesium, pH**	iron, **pH**	alkalinity-bicarbonate, **iron,** mercury, **pH,** sodium, sulfate
QAL067A	Compliance	**chloride, mercury, nitrate, sodium, sulfate**	alkalinity-bicarbonate, barium, **calcium, chloride,** copper, **magnesium, mercury, nitrate, potassium, sodium,** strontium**, sulfate**	**alkalinity-bicarbonate, chloride, nitrate, sodium, sulfate**	**alkalinity-bicarbonate, chloride,** mercury, **nitrate, sodium, sulfate**
QAL068A	Background		pH		pH
QAL068B	Background				alkalinity-carbonate
QAL068D	Background				
QAL069A	Background	**alkalinity-bicarbonate, chloride, mercury, nitrate, pH, sodium, sulfate**	**alkalinity-bicarbonate, calcium, chloride, magnesium, mercury, nitrate, pH, sodium, sulfate**	**alkalinity-bicarbonate, chloride, mercury, nitrate, pH, sodium, sulfate**	**alkalinity-bicarbonate, chloride, mercury, nitrate, pH, sodium, sulfate**
QAL070A	Compliance		**calcium, chloride, magnesium, nitrate,** sodium		
QAL071A	Compliance	**alkalinity-bicarbonate, chloride,** iron, **nitrate, pH, sodium, sulfate**	**alkalinity-bicarbonate, calcium, chloride, magnesium, nitrate, pH, sodium, sulfate**	**alkalinity-bicarbonate, chloride, nitrate, pH, sodium, sulfate**	**alkalinity-bicarbonate, chloride, nitrate, pH, sodium, sulfate**
QAL073A	Compliance		**alkalinity-bicarbonate, calcium, chloride,** iron, **magnesium, nitrate, sodium**		
QAL074A	Compliance	alkalinlity-bicarbonate, chloride, nitrate	calcium, **chloride,** magnesium, **nitrate**, sulfate	alkalinity-bicarbonate, **chloride, nitrate**, sodium, **sulfate**	**alkalinity-bicarbonate, chloride, nitrate, sodium, 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 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.

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL023B (UMB)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/03/15[D]		Q2 2015 05/13/15[T]		Q3 2015 09/09/15[T]		Q4 2015 11/04/15[T]	
Field										
D.O.[1]	ppm	--	<0.1		**0.2**		**0.5**		**0.4**	
ORP	mV	--	**-140**		**-109**		**-52**		**-130**	
pH	SU	8.1-9.1 t	**8.8**		**7.0**		**8.2**		**7.5**	
Specific Conductance	µS/cm @ 25°C	--	**125**		**107**		**114**		**113**	
Temperature	°C	--	**5.1**		**7.3**		**8.9**		**7.2**	
Turbidity	NTU	--	**7**		<1		**1**		<1	
Water Elevation	ft MSL	--	**1415.72**		**1415.85**		**1415.17**		**1415.28**	
Metals										
Aluminum	ug/L	200	--		<50		--		--	
Antimony	ug/L	5.5	--		<5.0		--		--	
Arsenic	ug/L	6.0	<2.0		<2.0		<2.0		<2.0	
Barium	ug/L	80	--		<20		--		--	
Beryllium	ug/L	2.5	--		<1.0		--		--	
Boron	ug/L	400	<100		<100		<100	e	<100	
Cadmium	ug/L	2.0	--		<0.50		--		--	
Chromium	ug/L	20	--		<5.0		--		--	
Cobalt	ug/L	40	--		<10		--		--	
Copper	ug/L	20	<5.0		<5.0		<5.0		<5.0	
Iron	ug/L	192 p	**51**	a	**85**		**110**		**58**	
Lead	ug/L	4.0	--		<1.0		--		--	
Lithium	ug/L	32	--		<8.0		--		--	
Manganese	ug/L	80	<20		<20		<20		<20	
Mercury	ng/L	2.00	<0.500		**1.16**	e	**0.644**	e	<0.500	
Molybdenum	ug/L	40	--		<10		--		--	
Nickel	ug/L	100	<25		<25		<25		<25	
Selenium	ug/L	4.0	<1.0		<1.0		<1.0	e	<1.0	
Silver	ug/L	0.80	--		<0.20		--		--	
Strontium	ug/L	200	--		<50		--		--	
Thallium	ug/L	2.0	--		<2.0		--		--	
Vanadium	ug/L	40	--		<2.0		<1.0		<1.0	
Zinc	ug/L	40	<10		<10		<10	e	<10	
Major Anions										
Alkalinity, Bicarbonate	mg/L	67 p	**62**		**65**		**61**	e	**67**	
Alkalinity, Carbonate	mg/L	8.0	<2.0		<2.0	e	<2.0		<2.0	
Chloride	mg/L	4.0	<1.0		<1.0		<1.0		**1.1**	
Fluoride	mg/L	0.40	--		<0.10		--		--	
Nitrogen, Nitrate	mg/L	0.20	<0.050	e	<0.050	e	<0.050		**0.051**	a,e,s
Sulfate	mg/L	6.0 p	**4.1**		**4.4**		**3.1**		**5.8**	
Major Cations										
Calcium	mg/L	18	--		**13**		**--**		**--**	
Magnesium	mg/L	4.1	--		**3.2**		**--**		**--**	
Potassium	mg/L	2.0	--		<0.50		--		--	
Sodium	mg/L	12	**7.6**		**9.1**		**8.9**		**8.4**	
General										
Hardness	mg/L	62	--		**46**		**--**		**--**	

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL024A (UMB)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/03/15[T]	Q2 2015 05/13/15[T]	Q3 2015 09/08/15[T]	Q4 2015 11/04/15[T]
Field						
D.O.[1]	ppm	--	**10**	**11**	**11**	**11**
ORP	mV	--	**47**	**205**	**37**	**17**
pH	SU	6.2-7.2 t	**7.0**	**6.4**	**6.1**	**6.4**
Specific Conductance	µS/cm @ 25°C	--	**378**	**235**	**331**	**293**
Temperature	°C	--	**7.5**	**7.9**	**7.6**	**8.0**
Turbidity	NTU	--	<1	<1	<1	<1
Water Elevation	ft MSL	--	**1417.29**	**1418.19**	**1417.90**	**1417.53**
Metals						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	6.0	<2.0	<2.0	<2.0	<2.0
Barium	ug/L	80	**--**	**29**	**--**	**--**
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100 e	<100
Cadmium	ug/L	2.0	--	<0.50	--	--
Chromium	ug/L	20	--	<5.0	--	--
Cobalt	ug/L	40	--	<10	--	--
Copper	ug/L	20	<5.0	<5.0	<5.0	<5.0
Iron	ug/L	97	**110** a	<20	<20	<20
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20	<20	<20	<20
Mercury	ng/L	2.00	**0.720**	<0.500 e	**0.521** e	<0.500
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25	<25	<25	<25
Selenium	ug/L	4.0	<1.0	<1.0	<1.0 e	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	**--**	**58**	**--**	**--**
Thallium	ug/L	2.0	--	<2.0	--	--
Vanadium	ug/L	40	--	<2.0	<1.0	<1.0
Zinc	ug/L	40	<10	<10	<10 e	<10
Major Anions						
Alkalinity, Bicarbonate	mg/L	24	**32**	**34**	**31** e	**35**
Alkalinity, Carbonate	mg/L	8.0	<2.0	<2.0 e	<2.0	<2.0
Chloride	mg/L	1.4	**95**	**81**	**92**	**72**
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.20	**1.1** e	**0.94** e	**1.1**	**0.68** a,e
Sulfate	mg/L	8.0	**4.8**	**3.9**	**3.8**	**4.4**
Major Cations						
Calcium	mg/L	5.4	**--**	**18**	**--**	**--**
Magnesium	mg/L	2.0	**--**	**3.2**	**--**	**--**
Potassium	mg/L	2.0	**--**	**1.9**	**--**	**--**
Sodium	mg/L	1.2 t	**40**	**41**	**27**	**22**
General						
Hardness	mg/L	17	**--**	**58**	**--**	**--**

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

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL025A (Background)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/02/15[T]	Q2 2015 05/12/15[T]	Q3 2015 09/08/15[T]	Q4 2015 11/04/15[T]
Field						
D.O.[1]	ppm	--	**12**	**12**	**12**	**12**
ORP	mV	--	**117**	**147**	**114**	**6**
pH	SU	6.4-7.4	**7.4**	**7.5**	**7.2**	**6.9**
Specific Conductance	µS/cm @ 25°C	--	**68**	**46**	**51**	**57**
Temperature	°C	--	**7.2**	**7.0**	**7.8**	**7.6**
Turbidity	NTU	--	<1	<1	**1**	<1
Water Elevation	ft MSL	--	**1412.82**	**1414.17**	**1417.22**	**1416.69**
Metals						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	6.0	<2.0	<2.0	<2.0	<2.0
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100 e	<100
Cadmium	ug/L	2.0	--	<0.50	--	--
Chromium	ug/L	20	--	<5.0	--	--
Cobalt	ug/L	40	--	<10	--	--
Copper	ug/L	20	<5.0	<5.0	<5.0	<5.0
Iron	ug/L	73	<20	<20	<20	**68**
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20	<20	<20	<20
Mercury	ng/L	2.00	**0.597**	<0.500 e	<0.500 e	<0.500
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25	<25	<25	<25
Selenium	ug/L	4.0	<1.0	<1.0	<1.0 e	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<2.0	--	--
Vanadium	ug/L	40	--	<2.0	<1.0	<1.0
Zinc	ug/L	40	<10	<10	<10 e	<10
Major Anions						
Alkalinity, Bicarbonate	mg/L	25	**28**	**25**	**26** e	**29**
Alkalinity, Carbonate	mg/L	8.0	<2.0	<2.0 e	<2.0	<2.0
Chloride	mg/L	1.8	**1.1**	**1.4**	**1.7**	**1.4**
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	1.1	**0.82** e	**0.74** e	**0.45**	**0.45** a,e
Sulfate	mg/L	8.0	**2.3**	<2.0	**2.4**	**2.6**
Major Cations						
Calcium	mg/L	7.6 p	**--**	**6.2**	**--**	**--**
Magnesium	mg/L	1.6 p	**--**	**1.2**	**--**	**--**
Potassium	mg/L	2.0	**--**	**0.75**	**--**	**--**
Sodium	mg/L	0.78	**0.99**	**1.0**	**0.91**	**0.91**
General						
Hardness	mg/L	26 p	**--**	**20**	**--**	**--**

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL025B (Background)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/02/15[T]		Q2 2015 05/12/15[T]		Q3 2015 09/08/15[T]		Q4 2015 11/04/15[T]	
Field										
D.O.[1]	ppm	--	**11**		**11**		**11**		**11**	
ORP	mV	--	**74**		**97**		**67**		**-37**	
pH	SU	8.5-9.5	**9.0**		**9.0**		**9.0**		**9.0**	
Specific Conductance	µS/cm @ 25°C	--	**69**		**61**		**63**		**62**	
Temperature	°C	--	**6.8**		**6.5**		**7.8**		**7.5**	
Turbidity	NTU	--	<1		<1		<1		<1	
Water Elevation	ft MSL	--	**1415.87**		**1416.72**		**1417.09**		**1416.57**	
Metals										
Aluminum	ug/L	200	--		<50		--		--	
Antimony	ug/L	5.5	--		<5.0		--		--	
Arsenic	ug/L	6.0	<2.0		<2.0		<2.0		<2.0	
Barium	ug/L	80	--		<20		--		--	
Beryllium	ug/L	2.5	--		<1.0		--		--	
Boron	ug/L	400	<100		<100		<100	e	<100	
Cadmium	ug/L	2.0	--		<0.50		--		--	
Chromium	ug/L	20	--		<5.0		--		--	
Cobalt	ug/L	40	--		<10		--		--	
Copper	ug/L	20	<5.0		<5.0		<5.0		<5.0	
Iron	ug/L	61	<20		<20		<20		**29**	
Lead	ug/L	4.0	--		<1.0		--		--	
Lithium	ug/L	32	--		<8.0		--		--	
Manganese	ug/L	80	<20		<20		<20		<20	
Mercury	ng/L	2.00	**0.534**		<0.500	e	<0.500	e	<0.500	
Molybdenum	ug/L	40	--		<10		--		--	
Nickel	ug/L	100	<25		<25		<25		<25	
Selenium	ug/L	4.0	<1.0		<1.0		<1.0	e	<1.0	
Silver	ug/L	0.80	--		<0.20		--		--	
Strontium	ug/L	200	--		<50		--		--	
Thallium	ug/L	2.0	--		<2.0		--		--	
Vanadium	ug/L	40	--		<2.0		**1.0**		**1.1**	
Zinc	ug/L	40	<10		<10		<10	e	<10	
Major Anions										
Alkalinity, Bicarbonate	mg/L	38 t	**30**		**30**		**28**	e	**25**	
Alkalinity, Carbonate	mg/L	12	**4.9**		**4.8**	e	**8.3**		**14**	
Chloride	mg/L	1.7	<1.0		<1.0		<1.0		<1.0	
Fluoride	mg/L	0.40	--		<0.10		--		--	
Nitrogen, Nitrate	mg/L	0.20	**0.13**	e	**0.12**	e	**0.14**		**0.14**	a,e
Sulfate	mg/L	3.5	**2.3**		**2.1**		**2.3**		**2.3**	
Major Cations										
Calcium	mg/L	11 p	**--**		**8.7**		**--**		**--**	
Magnesium	mg/L	1.7 p	**--**		**1.6**		**--**		**--**	
Potassium	mg/L	2.0	--		<0.50		--		--	
Sodium	mg/L	5.6 p	**2.1**		**2.0**		**2.1**		**2.1**	
General										
Hardness	mg/L	34 p	**--**		**28**		**--**		**--**	

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL025D (Background)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/02/15[T]	Q2 2015 05/12/15[T]	Q3 2015 08/12/15[T]	Q4 2015 11/04/15[T]
Field						
D.O.[1]	ppm	--	**5.1**	**4.9**	**5.0**	**5.0**
ORP	mV	--	**44**	**104**	**227**	**-70**
pH	SU	8.4-9.4	**8.7**	**8.7**	**8.8**	**8.6**
Specific Conductance	µS/cm @ 25°C	--	**96**	**85**	**96**	**88**
Temperature	°C	--	**7.2**	**6.7**	**7.8**	**7.2**
Turbidity	NTU	--	<1	<1	<1	<1
Water Elevation	ft MSL	--	**1412.09**	**1412.49**	**1413.26**	**1412.60**
Metals						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	4.7 t	**2.7**	**2.7**	**2.9**	**2.8**
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100 e	<100
Cadmium	ug/L	2.0	--	<0.50	--	--
Chromium	ug/L	20	--	<5.0	--	--
Cobalt	ug/L	40	--	<10	--	--
Copper	ug/L	20	<5.0	<5.0	<5.0	<5.0
Iron	ug/L	137 t	**52** a	**36**	**42**	**77**
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20	<20	<20	<20
Mercury	ng/L	1.32	**0.648**	**0.503** e,s	<0.500 e	<0.500
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25	<25	<25	<25
Selenium	ug/L	4.0	<1.0	<1.0	<1.0 e	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<2.0	--	--
Vanadium	ug/L	40	--	**3.8**	**3.7**	**3.9**
Zinc	ug/L	40	<10	<10	<10 e	<10
Major Anions						
Alkalinity, Bicarbonate	mg/L	54	**43**	**47**	**47** e	**41**
Alkalinity, Carbonate	mg/L	19 t	**2.9**	<2.0 e	<2.0	**6.0**
Chloride	mg/L	2.2	<1.0	<1.0	<1.0	<1.0
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.17	**0.14** e	**0.12** e	**0.13**	**0.15** a,e
Sulfate	mg/L	10 t	**5.3**	**5.0**	**5.0**	**5.6**
Major Cations						
Calcium	mg/L	12 p	**--**	**11**	**--**	**--**
Magnesium	mg/L	2.6 p	**--**	**2.6**	**--**	**--**
Potassium	mg/L	2.0	**--**	**0.58**	**--**	**--**
Sodium	mg/L	17 t	**4.9**	**3.9**	**4.1**	**4.1**
General						
Hardness	mg/L	40 p	**--**	**38**	**--**	**--**

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL026A (Background)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 02/10/15[T]	Q2 2015 05/11/15[T]	Q3 2015 08/12/15[T]	Q4 2015 11/04/15[T]
Field						
D.O.[1]	ppm	--	**13**	**11**	**10**	**11**
ORP	mV	--	**41**	**261**	**55**	**-8**
pH	SU	6.4-7.4 p	**6.5**	**6.7**	**6.9**	**6.5**
Specific Conductance	µS/cm @ 25°C	--	**143**	**108**	**168**	**132**
Temperature	°C	--	**--**	**7.2**	**11.5**	**9.4**
Turbidity	NTU	--	<1	<1	<1	<1
Water Elevation	ft MSL	--	**1415.63**	**1416.12**	**1417.07**	**1416.62**
Metals						
Aluminum	ug/L	200	--	**170**	**--**	**--**
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	6.0	<2.0	<2.0	<2.0	<2.0
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100 e	<100
Cadmium	ug/L	2.0	--	<0.50	--	--
Chromium	ug/L	20	--	<5.0	--	--
Cobalt	ug/L	40	--	<10	--	--
Copper	ug/L	20	<5.0	<5.0	<5.0	<5.0
Iron	ug/L	350	**36** a	**320**	**110**	**95**
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20	<20	<20	<20
Mercury	ng/L	2.0	<0.500	<0.500 e	<0.500 e	**0.792**
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25	<25	<25	<25
Selenium	ug/L	4.0	<1.0	<1.0	<1.0 e	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	**51**	**--**	**--**
Thallium	ug/L	2.0	--	<2.0	--	--
Vanadium	ug/L	40	--	<2.0	<1.0	<1.0
Zinc	ug/L	40	<10	<10	<10 e	<10
Major Anions						
Alkalinity, Bicarbonate	mg/L	117	**97**	**79**	**68** e	**71**
Alkalinity, Carbonate	mg/L	8.0	<2.0	<2.0 e	<2.0	<2.0
Chloride	mg/L	4.0	**1.7**	**1.8**	**1.5**	**1.2**
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.73 t	**1.5** e	**1.7** e	**1.8**	**1.3** a,e
Sulfate	mg/L	4.7 t	**2.4**	<2.0	<2.0	**2.1**
Major Cations						
Calcium	mg/L	p	--	**25**	**--**	**--**
Magnesium	mg/L	p	--	**3.8**	**--**	**--**
Potassium	mg/L	2.0	--	**1.3**	**--**	**--**
Sodium	mg/L	1.3	**1.6**	**1.6**	**1.4**	**1.5**
General						
Hardness	mg/L	p	--	**78**	**--**	**--**

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

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL026D (Background)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 02/10/15[T]	Q2 2015 05/11/15[T]	Q3 2015 08/12/15[T]	Q4 2015 11/04/15[T]
Field						
D.O.[1]	ppm	--	**12**	**11**	**11**	**11**
ORP	mV	--	**122**	**220**	**21**	**-60**
pH	SU	8.3-9.3 t	**8.9**	**8.8**	**9.2**	**8.8**
Specific Conductance	µS/cm @ 25°C	--	**65**	**43**	**74**	**59**
Temperature	°C	--	**6.6**	**7.2**	**7.4**	**7.3**
Turbidity	NTU	--	<1	<1	<1	<1
Water Elevation	ft MSL	--	**1408.96**	**1410.21**	**1409.94**	**1409.40**
Metals						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	6.0	<2.0	<2.0	<2.0	<2.0
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100 e	<100
Cadmium	ug/L	2.0	--	<0.50	--	--
Chromium	ug/L	20	--	<5.0	--	--
Cobalt	ug/L	40	--	<10	--	--
Copper	ug/L	20	<5.0	<5.0	<5.0	<5.0
Iron	ug/L	80	<20	<20	<20	<20
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20	<20	<20	<20
Mercury	ng/L	2.00	<0.500	<0.500 e	<0.500 e	<0.500
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25	<25	<25	<25
Selenium	ug/L	4.0	<1.0	<1.0	<1.0 e	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<2.0	--	--
Vanadium	ug/L	40	--	<2.0	<1.0	<1.0
Zinc	ug/L	40	<10	<10	<10 e	<10
Major Anions						
Alkalinity, Bicarbonate	mg/L	33	**28**	**30**	**25** e	**27**
Alkalinity, Carbonate	mg/L	6.4	**4.5**	**3.8** e	**8.0**	**6.0**
Chloride	mg/L	4.0	<1.0	<1.0	<1.0	<1.0
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.10 t	**0.087** e	**0.097** e	**0.11**	**0.10** a,e
Sulfate	mg/L	8.0	<2.0	<2.0	<2.0	**2.1**
Major Cations						
Calcium	mg/L	15	--	**9.5**	**--**	**--**
Magnesium	mg/L	3.1	--	**1.5**	**--**	**--**
Potassium	mg/L	2.0	--	<0.50	--	--
Sodium	mg/L	0.73	**0.60**	**0.70**	**0.66**	**0.70**
General						
Hardness	mg/L	51	--	**30**	**--**	**--**

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL026E (Background)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/02/15^T	Q2 2015 05/12/15^T	Q3 2015 09/08/15^T	Q4 2015 11/04/15^T
Field						
D.O.[1]	ppm	--	**0.1**	**0.2**	**0.4**	**--**
ORP	mV	--	**-202**	**-150**	**-96**	**-132**
pH	SU	7.9-8.9 p	**8.6**	**8.6**	**8.3**	**8.7**
Specific Conductance	µS/cm @ 25°C	--	**122**	**108**	**111**	**111**
Temperature	°C	--	**6.8**	**6.8**	**7.7**	**7.2**
Turbidity	NTU	--	<1	<1	<1	<1
Water Elevation	ft MSL	--	**1408.82**	**1409.04**	**1409.85**	**1409.22**
Metals						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	7.8	**6.5**	**7.2**	**7.1**	**7.4**
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100 e	<100
Cadmium	ug/L	2.0	--	<0.50	--	--
Chromium	ug/L	20	--	<5.0	--	--
Cobalt	ug/L	40	--	<10	--	--
Copper	ug/L	20	<5.0	<5.0	<5.0	<5.0
Iron	ug/L	80	<20	<20	**20**	<20
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20	<20	<20	<20
Mercury	ng/L	2.00	<0.500	<0.500 e	<0.500 e	<0.500
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25	<25	<25	<25
Selenium	ug/L	4.0	<1.0	<1.0	<1.0 e	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	**--**	**60**	**--**	**--**
Thallium	ug/L	2.0	--	<2.0	--	--
Vanadium	ug/L	40	--	<2.0	<1.0	<1.0
Zinc	ug/L	40	<10	<10	<10 e	<10
Major Anions						
Alkalinity, Bicarbonate	mg/L	136 p	**58**	**60**	**56** e	**59**
Alkalinity, Carbonate	mg/L	8.0	<2.0	<2.0 e	**2.1**	**3.0**
Chloride	mg/L	4.0	<1.0	<1.0	**1.0**	**1.1**
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.20	<0.050 e	<0.050 e	<0.050	**0.23** a,e
Sulfate	mg/L	8.6	**7.6**	**7.4**	**7.5**	**7.6**
Major Cations						
Calcium	mg/L	17	**--**	**14**	**--**	**--**
Magnesium	mg/L	4.3	**--**	**3.8**	**--**	**--**
Potassium	mg/L	2.0	**--**	**1.8**	**--**	**--**
Sodium	mg/L	2.0 p	**1.7**	**1.6**	**1.6**	**1.7**
General						
Hardness	mg/L	60	**--**	**51**	**--**	**--**

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL044B (UMB)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/03/15[T]		Q2 2015 05/12/15[T]		Q3 2015 09/08/15[T]		Q4 2015 11/04/15[T]	
Field										
D.O.[1]	ppm	--	**0.1**		**0.3**		**3.2**		**3.0**	
ORP	mV	--	**-285**		**-226**		**-111**		**-163**	
pH	SU	8.0-9.0 p	**8.8**		**8.8**		**8.9**		**9.0**	
Specific Conductance	µS/cm @ 25°C	--	**109**		**78**		**96**		**93**	
Temperature	°C	--	**6.2**		**7.3**		**8.0**		**8.1**	
Turbidity	NTU	--	<1		<1		**2**		<1	
Water Elevation	ft MSL	--	**1414.83**		**1415.18**		**1415.07**		**1414.60**	
Metals										
Aluminum	ug/L	200	--		<50		--		--	
Antimony	ug/L	5.5	--		<5.0		--		--	
Arsenic	ug/L	6.0	<2.0		<2.0		<2.0		<2.0	
Barium	ug/L	80	--		<20		--		--	
Beryllium	ug/L	2.5	--		<1.0		--		--	
Boron	ug/L	400	<100		<100		<100	e	<100	
Cadmium	ug/L	2.0	--		<0.50		--		--	
Chromium	ug/L	20	--		<5.0		--		--	
Cobalt	ug/L	40	--		<10		--		--	
Copper	ug/L	20	<5.0		<5.0		<5.0		<5.0	
Iron	ug/L	114 p	**22**	a	**25**		**22**		<20	
Lead	ug/L	4.0	--		<1.0		--		--	
Lithium	ug/L	32	--		<8.0		--		--	
Manganese	ug/L	80	<20		<20		<20		<20	
Mercury	ng/L	2.00	**0.745**		**0.706**	e,s	<0.500	e	<0.500	
Molybdenum	ug/L	40	--		<10		--		--	
Nickel	ug/L	100	<25		<25		<25		<25	
Selenium	ug/L	4.0	<1.0		<1.0		<1.0	e	<1.0	
Silver	ug/L	0.80	--		<0.20		--		--	
Strontium	ug/L	200	--		<50		--		--	
Thallium	ug/L	2.0	--		<2.0		--		--	
Vanadium	ug/L	40	--		<2.0		<1.0		<1.0	
Zinc	ug/L	40	<10		<10		<10	e	<10	
Major Anions										
Alkalinity, Bicarbonate	mg/L	58	**51**		**37**		**46**	e	**42**	
Alkalinity, Carbonate	mg/L	8.0	<2.0		<2.0	e	**2.1**		**4.0**	
Chloride	mg/L	4.0	**1.1**		<1.0		**1.4**		**1.5**	
Fluoride	mg/L	0.40	--		<0.10		--		--	
Nitrogen, Nitrate	mg/L	0.20	<0.050	e	<0.050	e	<0.050		<0.050	e
Sulfate	mg/L	8.0	**8.4**		**8.0**		**7.8**		**7.7**	
Major Cations										
Calcium	mg/L	18	**--**		**10**		**--**		**--**	
Magnesium	mg/L	4.8	**--**		**2.3**		**--**		**--**	
Potassium	mg/L	2.0	--		<0.50		--		--	
Sodium	mg/L	2.6	**2.6**		**2.1**		**2.4**		**2.6**	
General										
Hardness	mg/L	64	**--**		**34**		**--**		**--**	

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL060A (TDRSA-CWB)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/02/15[T]		Q2 2015 05/12/15[T]		Q3 2015 09/08/15[T]		Q4 2015 11/04/15[T]	
Field										
D.O.[1]	ppm	--	**11**		**11**		**11**		**11**	
ORP	mV	--	**41**		**122**		**120**		**110**	
pH	SU	7.9-8.9	**8.8**		**8.7**		**9.0**		**8.9**	
Specific Conductance	µS/cm @ 25°C	--	**74**		**70**		**77**		**69**	
Temperature	°C	--	**7.1**		**7.3**		**8.2**		**8.2**	
Turbidity	NTU	--	<1		<1		<1		<1	
Water Elevation	ft MSL	--	**1404.41**		**1404.63**		**1405.33**		**1404.99**	
Metals										
Aluminum	ug/L	200	--		<50		--		--	
Antimony	ug/L	5.5	--		<5.0		--		--	
Arsenic	ug/L	4.7	**5.0**		**4.8**		**4.6**		**4.7**	
Barium	ug/L	80	--		<20		--		--	
Beryllium	ug/L	2.5	--		<1.0		--		--	
Boron	ug/L	400	<100		<100		<100	e	<100	
Cadmium	ug/L	2.0	--		<0.50		--		--	
Chromium	ug/L	20	--		<5.0		--		--	
Cobalt	ug/L	40	--		<10		--		--	
Copper	ug/L	20	<5.0		<5.0		<5.0		<5.0	
Iron	ug/L	80	<20		<20		<20		<20	
Lead	ug/L	4.0	--		<1.0		--		--	
Lithium	ug/L	32	--		<8.0		--		--	
Manganese	ug/L	80	<20		<20		<20		<20	
Mercury	ng/L	0.788	<0.500		<0.500	e	<0.500	e	<0.500	
Molybdenum	ug/L	40	--		<10		--		--	
Nickel	ug/L	100	<25		<25		<25		<25	
Selenium	ug/L	4.0	<1.0		<1.0		<1.0	e	<1.0	
Silver	ug/L	0.80	--		<0.20		--		--	
Strontium	ug/L	56	--		<50		--		--	
Thallium	ug/L	2.0	--		<2.0		--		--	
Vanadium	ug/L	40	--		<2.0		**1.2**		**1.2**	
Zinc	ug/L	40	<10		<10		<10	e	<10	
Major Anions										
Alkalinity, Bicarbonate	mg/L	58	**40**		**40**		**34**	e	**36**	
Alkalinity, Carbonate	mg/L	8.0	<2.0		<2.0	e	**4.2**		<2.0	
Chloride	mg/L	1.6	<1.0		<1.0		<1.0		**1.1**	
Fluoride	mg/L	0.40	--		<0.10		--		--	
Nitrogen, Nitrate	mg/L	0.12	**0.17**	e	**0.48**	e	**0.14**		**0.20**	a,e
Sulfate	mg/L	4.2	**2.3**		**2.2**		**2.3**		**2.3**	
Major Cations										
Calcium	mg/L	16	**--**		**10**		**--**		**--**	
Magnesium	mg/L	3.9	**--**		**2.4**		**--**		**--**	
Potassium	mg/L	1.2	**--**		**0.82**		**--**		**--**	
Sodium	mg/L	2.1	**0.96**		**0.89**		**0.80**		**0.88**	
General										
Hardness	mg/L	55	**--**		**35**		**--**		**--**	

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

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL061A (TDRSA-CWB)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/02/15[T]	Q2 2015 05/12/15[T]	Q3 2015 09/08/15[T]	Q4 2015 11/04/15[T]
Field						
D.O.[1]	ppm	--	**11**	**11**	**11**	**11**
ORP	mV	--	**55**	**132**	**132**	**104**
pH	SU	8.1-9.1	**8.8**	**8.8**	**9.1**	**8.9**
Specific Conductance	µS/cm @ 25°C	--	**71**	**69**	**75**	**68**
Temperature	°C	--	**7.4**	**7.4**	**8.1**	**7.9**
Turbidity	NTU	--	<1	<1	<1	<1
Water Elevation	ft MSL	--	**1405.75**	**1405.94**	**1406.79**	**1406.36**
Metals						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	6.0	<2.0	<2.0	<2.0	<2.0
Barium	89	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100 e	<100
Cadmium	ug/L	2.0	--	<0.50	--	--
Chromium	ug/L	20	--	<5.0	--	--
Cobalt	ug/L	40	--	<10	--	--
Copper	ug/L	20	<5.0	<5.0	<5.0	<5.0
Iron	ug/L	80	<20	<20	**34**	<20
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20	<20	<20	<20
Mercury	ng/L	2.00	<0.500	<0.500 e	<0.500 e	<0.500
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25	<25	<25	<25
Selenium	ug/L	4.0	<1.0	<1.0	<1.0 e	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<2.0	--	--
Vanadium	ug/L	40	--	<2.0	<1.0	<1.0
Zinc	ug/L	40	<10	<10	<10 e	<10
Major Anions						
Alkalinity, Bicarbonate	mg/L	41 t	**35**	**40**	**33** e	**36**
Alkalinity, Carbonate	mg/L	4.6	<2.0	<2.0 e	**2.1**	<2.0
Chloride	mg/L	1.6	<1.0	<1.0	**1.1**	**1.1**
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.27	**0.26** e	**0.30** e	**0.24**	**0.31** a,e
Sulfate	mg/L	2.8	**2.1**	**2.0**	**2.3**	**2.3**
Major Cations						
Calcium	mg/L	15	**--**	**11**	**--**	**--**
Magnesium	mg/L	2.2 p	**--**	**2.0**	**--**	**--**
Potassium	mg/L	2.0	**--**	**0.51**	**--**	**--**
Sodium	mg/L	0.72	**0.62**	**0.58**	**0.59**	**0.70**
General						
Hardness	mg/L	37 p	**--**	**36**	**--**	**--**

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL062A (TDRSA-CWB)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/02/15[T]	Q2 2015 05/12/15[T]	Q3 2015 09/08/15[T]	Q4 2015 11/04/15[T]
Field						
D.O.[1]	ppm	--	**10**	**10**	**10**	**10**
ORP	mV	--	**47**	**112**	**101**	**117**
pH	SU	8.3-9.3	**8.4**	**8.5**	**8.5**	**8.3**
Specific Conductance	µS/cm @ 25°C	--	**151**	**183**	**233**	**261**
Temperature	°C	--	**7.1**	**7.4**	**8.1**	**8.0**
Turbidity	NTU	--	<1	<1	<1	<1
Water Elevation	ft MSL	--	**1407.08**	**1407.24**	**1408.16**	**1407.70**
Metals						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	6.0	<2.0	<2.0	<2.0	<2.0
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100 e	<100
Cadmium	ug/L	2.0	--	<0.50	--	--
Chromium	ug/L	20	--	<5.0	--	--
Cobalt	ug/L	40	--	<10	--	--
Copper	ug/L	20	<5.0	<5.0	<5.0	<5.0
Iron	ug/L	34	<20	<20	<20	<20
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20	<20	<20	<20
Mercury	ng/L	2.00	<0.500	<0.500 e	<0.500 e	<0.500
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25	<25	<25	<25
Selenium	ug/L	4.0	<1.0	<1.0	<1.0 e	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<2.0	--	--
Vanadium	ug/L	40	--	<2.0	<1.0	<1.0
Zinc	ug/L	40	<10	<10	<10 e	**31**
Major Anions						
Alkalinity, Bicarbonate	mg/L	48 t	**71**	**81**	**90** e	**100**
Alkalinity, Carbonate	mg/L	4.5 t	**2.9**	<2.0 e	<2.0	<2.0
Chloride	mg/L	1.6	**5.3**	**13**	**20**	**34**
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.43	**0.27** e	**0.24** e	**0.31**	**0.37** a,e
Sulfate	mg/L	2.8	**2.1**	<2.0	<2.0	**2.0**
Major Cations						
Calcium	mg/L	12 p	**--**	**28**	**--**	**--**
Magnesium	mg/L	2.2 p	**--**	**5.4**	**--**	**--**
Potassium	mg/L	2.0	**--**	**1.2**	**--**	**--**
Sodium	mg/L	0.76 t	**1.3**	**1.1**	**1.3**	**1.9**
General						
Hardness	mg/L	40 p	**--**	**92**	**--**	**--**

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL063A (TDRSA-CWB)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/03/15[T]	Q2 2015 05/12/15[T]	Q3 2015 09/08/15[T]	Q4 2015 11/04/15[T]
Field						
D.O.[1]	ppm	--	**10**	**10**	**10**	**10**
ORP	mV	--	**12**	**120**	**129**	**104**
pH	SU	8.1-9.1 p	**8.8**	**8.7**	**8.8**	**8.7**
Specific Conductance	µS/cm @ 25°C	--	**97**	**107**	**135**	**131**
Temperature	°C	--	**7.2**	**7.6**	**8.5**	**8.3**
Turbidity	NTU	--	<1	<1	<1	<1
Water Elevation	ft MSL	--	**1401.65**	**1400.98**	**1401.94**	**1401.52**
Metals						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	6.0	<2.0	<2.0	<2.0	<2.0
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100 e	<100
Cadmium	ug/L	2.0	--	<0.50	--	--
Chromium	ug/L	20	--	<5.0	--	--
Cobalt	ug/L	40	--	<10	--	--
Copper	ug/L	20	<5.0	<5.0	<5.0	<5.0
Iron	ug/L	52	<20	**37**	<20	<20
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20	<20	<20	<20
Mercury	ng/L	2.00	<0.500	**0.511** e,s	<0.500 e	<0.500
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25	<25	<25	<25
Selenium	ug/L	4.0	<1.0	<1.0	<1.0 e	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<2.0	--	--
Vanadium	ug/L	40	--	<2.0	<1.0	<1.0
Zinc	ug/L	40	<10	<10	<10 e	<10
Major Anions						
Alkalinity, Bicarbonate	mg/L	42 t	**51**	**65**	**66** e	**71**
Alkalinity, Carbonate	mg/L	3.2 t	<2.0	<2.0 e	**2.1**	**2.0**
Chloride	mg/L	1.7	<1.0	<1.0	**1.9**	**3.1**
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.26	**0.22** e	**0.19** e	**0.22**	**0.27** a,e
Sulfate	mg/L	2.8	**2.3**	<2.0	**2.1**	**2.4**
Major Cations						
Calcium	mg/L	12 p	--	**17**	--	--
Magnesium	mg/L	2.0 p	--	**3.0**	--	--
Potassium	mg/L	2.0	--	**0.73**	--	--
Sodium	mg/L	0.78	**0.72**	**0.78**	**0.81**	**0.95**
General						
Hardness	mg/L	40 p	--	**55**	--	--

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

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL064D (UMB)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/03/15[T]	Q2 2015 05/12/15[T]	Q3 2015 09/08/15[T]	Q4 2015 11/04/15[T]
Field						
D.O.[1]	ppm	--	**0.2**	**1.5**	**0.6**	**0.2**
ORP	mV	--	**-241**	**-204**	**-184**	**-218**
pH	SU	8.0-9.0	**8.7**	**8.5**	**8.6**	**8.7**
Specific Conductance	µS/cm @ 25°C	--	**147**	**130**	**135**	**134**
Temperature	°C	--	**5.7**	**6.5**	**7.2**	**7.1**
Turbidity	NTU	--	<1	<1	<1	<1
Water Elevation	ft MSL	--	**1416.58**	**1417.12**	**1416.65**	**1416.00**
Metals						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	6.0	<2.0	<2.0	<2.0	<2.0
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100 e	<100
Cadmium	ug/L	2.0	--	<0.50	--	--
Chromium	ug/L	20	--	<5.0	--	--
Cobalt	ug/L	40	--	<10	--	--
Copper	ug/L	20	<5.0	<5.0	<5.0	<5.0
Iron	ug/L	30 t	**25** a	**26**	**22**	**26**
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20	<20	<20	<20
Mercury	ng/L	2.00	**0.577**	<0.500 e	<0.500 e	<0.500
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25	<25	<25	<25
Selenium	ug/L	4.0	<1.0	<1.0	<1.0 e	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	**--**	**97**	**--**	**--**
Thallium	ug/L	2.0	--	<2.0	--	--
Vanadium	ug/L	40	--	<2.0	<1.0	<1.0
Zinc	ug/L	40	<10	<10	<10 e	<10
Major Anions						
Alkalinity, Bicarbonate	mg/L	69	**89**	**75**	**76** e	**73**
Alkalinity, Carbonate	mg/L	8.0	<2.0	<2.0 e	**4.2**	**4.0**
Chloride	mg/L	4.7	**2.7**	**2.2**	**2.8**	**2.4**
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.20	<0.050 e	<0.050 e	<0.050	<0.050 e
Sulfate	mg/L	8.0	<2.0	<2.0	<2.0	<2.0
Major Cations						
Calcium	mg/L	22	**--**	**18**	**--**	**--**
Magnesium	mg/L	3.3 p	**--**	**4.0**	**--**	**--**
Potassium	mg/L	2.0	**--**	**1.1**	**--**	**--**
Sodium	mg/L	7.1 t	**4.2**	**4.2**	**4.3**	**4.4**
General						
Hardness	mg/L	51 p	**--**	**61**	**--**	**--**

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL065D (UMB)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/09/15[T]		Q2 2015 05/13/15[T]		Q3 2015 09/09/15[T]		Q4 2015 11/04/15[T]	
Field										
D.O.[1]	ppm	--	**0.1**		**0.1**		**0.4**		**0.3**	
ORP	mV	--	**-109**		**-181**		**-130**		**-189**	
pH	SU	8.0-9.0	**8.2**		**8.5**		**8.8**		**8.1**	
Specific Conductance	µS/cm @ 25°C	--	**153**		**128**		**140**		**138**	
Temperature	°C	--	**6.4**		**7.1**		**8.0**		**7.2**	
Turbidity	NTU	--	<1		<1		<1		<1	
Water Elevation	ft MSL	--	**1417.28**		**1416.74**		**1416.21**		**1415.96**	
Metals										
Aluminum	ug/L	200	--		<50		--		--	
Antimony	ug/L	5.5	--		<5.0		--		--	
Arsenic	ug/L	5.2	**2.8**		**2.7**		**2.4**		**2.4**	
Barium	ug/L	80	--		<20		--		--	
Beryllium	ug/L	2.5	--		<1.0		--		--	
Boron	ug/L	400	<100		<100		<100	e	<100	
Cadmium	ug/L	2.0	--		<0.50		--		--	
Chromium	ug/L	20	--		<5.0		--		--	
Cobalt	ug/L	40	--		<10		--		--	
Copper	ug/L	20	<5.0		<5.0		<5.0		<5.0	
Iron	ug/L	60 t	**68**	a	**36**		**47**		**44**	
Lead	ug/L	4.0	--		<1.0		--		--	
Lithium	ug/L	32	--		<8.0		--		--	
Manganese	ug/L	80	<20		<20		<20		<20	
Mercury	ng/L	2.00	<0.500		<0.500	e	**0.543**	e	<0.500	
Molybdenum	ug/L	40	--		<10		--		--	
Nickel	ug/L	100	<25		<25		<25		<25	
Selenium	ug/L	4.0	<1.0		<1.0		<1.0	e	<1.0	
Silver	ug/L	0.80	--		<0.20		--		--	
Strontium	ug/L	188 p	**--**		**220**		--		--	
Thallium	ug/L	2.0	--		<2.0		--		--	
Vanadium	ug/L	40	--		<2.0		<1.0		<1.0	
Zinc	ug/L	40	<10		<10		<10	e	<10	
Major Anions										
Alkalinity, Bicarbonate	mg/L	86	**86**		**84**		**85**	e	**81**	
Alkalinity, Carbonate	mg/L	8.0	<2.0		**3.9**	e	<2.0		<2.0	
Chloride	mg/L	1.6	<1.0		<1.0		<1.0		**1.2**	
Fluoride	mg/L	0.40	**--**		<0.10		--		--	
Nitrogen, Nitrate	mg/L	0.20	**0.23**	e	<0.050	e	<0.050		**0.051**	a,e,s
Sulfate	mg/L	4.7	<2.0		<2.0		<2.0		<2.0	
Major Cations										
Calcium	mg/L	14 p	**--**		**12**		**--**		**--**	
Magnesium	mg/L	4.6 p	**--**		**4.4**		**--**		**--**	
Potassium	mg/L	2.9 p	**--**		**2.6**		**--**		**--**	
Sodium	mg/L	12	**8.6**		**9.8**		**10**		**11**	
General										
Hardness	mg/L	54 p	**--**		**48**		**--**		**--**	

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL066D (UMB)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/03/15[T]		Q2 2015 05/12/15[T]		Q3 2015 09/09/15[T]		Q4 2015 11/04/15[T]	
Field										
D.O.[1]	ppm	--	**2.1**		**7.6**		**7.9**		**1.4**	
ORP	mV	--	**-91**		**-15**		**-87**		**-40**	
pH	SU	10.4-11.4 p	**8.9**		**8.8**		**9.0**		**8.6**	
Specific Conductance	µS/cm @ 25°C	--	**104**		**74**		**92**		**107**	
Temperature	°C	--	**4.9**		**6.3**		**9.8**		**8.3**	
Turbidity	NTU	--	<1		<1		<1		<1	
Water Elevation	ft MSL	--	**1415.94**		**1416.32**		**1415.85**		**1415.47**	
Metals										
Aluminum	ug/L	675 p	--		<50		--		--	
Antimony	ug/L	5.5 p	--		<5.0		--		--	
Arsenic	ug/L	9.7 p	**5.6**		**5.7**		**6.3**		**6.7**	
Barium	ug/L	80 p	--		<20		--		--	
Beryllium	ug/L	2.5 p	--		<1.0		--		--	
Boron	ug/L	400 p	<100		<100		<100	e	<100	
Cadmium	ug/L	2.0 p	--		<0.50		--		--	
Chromium	ug/L	20 p	--		<5.0		--		--	
Cobalt	ug/L	40 p	--		<10		--		--	
Copper	ug/L	20	<5.0		<5.0		<5.0		<5.0	
Iron	ug/L	49 p	**28**	a	**31**		**210**		**370**	
Lead	ug/L	4.0 p	--		<1.0		--		--	
Lithium	ug/L	32 p	--		<8.0		--		--	
Manganese	ug/L	80 p	<20		<20		<20		<20	
Mercury	ng/L	1.37 p*	**0.582**		**0.612**	e,s	**0.663**	e	**1.43**	
Molybdenum	ug/L	40 p	--		<10		--		--	
Nickel	ug/L	100 p	<25		<25		<25		<25	
Selenium	ug/L	4.0 p	<1.0		<1.0		**1.4**	e	<1.0	
Silver	ug/L	0.80 p	--		<0.20		--		--	
Strontium	ug/L	570 p	**--**		**66**		**--**		**--**	
Thallium	ug/L	2.0 p	--		<2.0		--		--	
Vanadium	ug/L	40 p	--		<2.0		<1.0		<1.0	
Zinc	ug/L	40 p	<10		<10		**19**	e	<10	
Major Anions										
Alkalinity, Bicarbonate	mg/L	45 p	**53**		**58**		**41**	e	**51**	
Alkalinity, Carbonate	mg/L	65 p	**2.4**		<2.0	e	**2.1**		**4.0**	
Chloride	mg/L	2.0 p	<1.0		<1.0		<1.0		<1.0	
Fluoride	mg/L	0.14 p	--		<0.10		--		--	
Nitrogen, Nitrate	mg/L	0.20 p	<0.050	e	<0.050	e	<0.050		**0.076**	a,e
Sulfate	mg/L	11 p	**7.1**		**7.6**		**8.7**		**11**	
Major Cations										
Calcium	mg/L	87 p	**--**		**13**		**--**		**--**	
Magnesium	mg/L	2.0 p	**--**		**2.3**		**--**		**--**	
Potassium	mg/L	3.6 p	**--**		**1.2**		**--**		**--**	
Sodium	mg/L	7.6 p	**5.1**		**5.3**		**6.2**		**8.5**	
General										
Hardness	mg/L	213 p	**--**		**42**		**--**		**--**	

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL067A (TDRSA-CWB)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/02/15[T]		Q2 2015 05/12/15[T]		Q3 2015 09/09/15[T]		Q4 2015 11/04/15[T]	
Field										
D.O.[1]	ppm	--	**9.1**		**9.4**		**9.1**		**9.1**	
ORP	mV	--	**120**		**173**		**289**		**218**	
pH	SU	5.9-6.9	**6.2**		**6.1**		**6.0**		**6.1**	
Specific Conductance	µS/cm @ 25°C	--	**3915**		**3701**		**2836**		**2260**	
Temperature	°C	--	**8.1**		**8.0**		**8.2**		**8.3**	
Turbidity	NTU	--	<1		<1		<1		<1	
Water Elevation	ft MSL	--	**1414.31**		**1414.37**		**1415.15**		**1414.76**	
Metals										
Aluminum	ug/L	200	--		<50		--		--	
Antimony	ug/L	5.5	--		<5.0		--		--	
Arsenic	ug/L	6.0	<2.0		<2.0		<2.0		<2.0	
Barium	ug/L	80	**--**		**460**		**--**		**--**	
Beryllium	ug/L	2.5	--		<1.0		--		--	
Boron	ug/L	400	<100		<100		<100	e	<100	
Cadmium	ug/L	2.0	--		<0.50		--		--	
Chromium	ug/L	20	--		<5.0		--		--	
Cobalt	ug/L	40	--		<10		--		--	
Copper	ug/L	20	**13**		**24**		<5.0		<5.0	
Iron	ug/L	80	**25**	a	**30**		<20		**31**	
Lead	ug/L	4.0	--		<1.0		--		--	
Lithium	ug/L	32	--		<8.0		--		--	
Manganese	ug/L	80	<20		<20		<20		<20	
Mercury	ng/L	2.00	**3.53**		**3.29**	e	**1.83**	e	**2.48**	
Molybdenum	ug/L	40	--		<10		--		--	
Nickel	ug/L	100	<25		<25		<25		<25	
Selenium	ug/L	4.0	**1.3**		<1.0		<1.0	e	<1.0	
Silver	ug/L	0.80	--		**0.34**		**--**		**--**	
Strontium	ug/L	200	--		**300**		**--**		**--**	
Thallium	ug/L	2.0	--		<2.0		--		--	
Vanadium	ug/L	40	--		<2.0		<1.0		<1.0	
Zinc	ug/L	40	<10		<10		<10	e	<10	
Major Anions										
Alkalinity, Bicarbonate	mg/L	27	**25**		**33**		**46**	e	**50**	
Alkalinity, Carbonate	mg/L	8.0	<2.0		<2.0	e	<2.0		<2.0	
Chloride	mg/L	1.9	**1300**		**1300**		**890**		**770**	
Fluoride	mg/L	0.40	--		<0.10		--		--	
Nitrogen, Nitrate	mg/L	0.25 t	**1.4**	e	**0.96**	e	**2.1**		**1.8**	a,e
Sulfate	mg/L	8.4 t	**11**		**12**		**15**		**14**	
Major Cations										
Calcium	mg/L	8.2 p	**--**		**55**		**--**		**--**	
Magnesium	mg/L	1.3 p	**--**		**34**		**--**		**--**	
Potassium	mg/L	1.3 p	**--**		**7.0**		**--**		**--**	
Sodium	mg/L	1.6 t	**720**		**660**		**490**		**450**	
General										
Hardness	mg/L	26 p	**--**		**277**		**--**		**--**	

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL068A (Background)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/02/15[T]	Q2 2015 05/12/15[T]	Q3 2015 09/08/15[T]	Q4 2015 11/04/15[T]
Field						
D.O.[1]	ppm	--	**11**	**12**	**12**	**12**
ORP	mV	--	**195**	**247**	**85**	**167**
pH	SU	6.6-7.6 t	**6.7**	**6.4**	**6.8**	**6.6**
Specific Conductance	µS/cm @ 25°C	--	**41**	**29**	**28**	**32**
Temperature	°C	--	**7.0**	**7.1**	**7.2**	**7.1**
Turbidity	NTU	--	<1	<1	<1	<1
Water Elevation	ft MSL	--	**1421.22**	**1421.20**	**1422.21**	**1422.57**
Metals						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	6.0	<2.0	<2.0	<2.0	<2.0
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100 e	<100
Cadmium	ug/L	2.0	--	<0.50	--	--
Chromium	ug/L	20	--	<5.0	--	--
Cobalt	ug/L	40	--	<10	--	--
Copper	ug/L	20	<5.0	<5.0	<5.0	<5.0
Iron	ug/L	80	<20	<20	<20	<20
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20	<20	<20	<20
Mercury	ng/L	2.00	<0.500	<0.500 e	<0.500 e	<0.500
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25	<25	<25	<25
Selenium	ug/L	4.0	<1.0	<1.0	<1.0 e	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<2.0	--	--
Vanadium	ug/L	40	--	<2.0	<1.0	<1.0
Zinc	ug/L	40	<10	<10	<10 e	<10
Major Anions						
Alkalinity, Bicarbonate	mg/L	45 p	**19**	**22**	**33** e	**17**
Alkalinity, Carbonate	mg/L	8.0	<2.0	<2.0 e	<2.0	<2.0
Chloride	mg/L	2.3	<1.0	<1.0	<1.0	<1.0
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.20	<0.050 e	**0.052** e	<0.050	<0.050 e
Sulfate	mg/L	2.5	**2.1**	<2.0	<2.0	<2.0
Major Cations						
Calcium	mg/L	6.9	**--**	**5.4**	**--**	**--**
Magnesium	mg/L	2.0	**--**	**1.0**	**--**	**--**
Potassium	mg/L	2.0	**--**	**0.84**	**--**	**--**
Sodium	mg/L	1.0	**0.80**	**0.69**	**0.69**	**0.66**
General						
Hardness	mg/L	22	**--**	**18**	**--**	**--**

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

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL068B (Background)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/02/15[T]	Q2 2015 05/12/15[T]	Q3 2015 09/08/15[T]	Q4 2015 11/04/15[T]
Field						
D.O.[1]	ppm	--	**11**	**11**	**11**	**11**
ORP	mV	--	**177**	**149**	**0**	**38**
pH	SU	8.4-9.4 t	**8.8**	**9.0**	**9.2**	**8.7**
Specific Conductance	µS/cm @ 25°C	--	**61**	**41**	**52**	**58**
Temperature	°C	--	**7.0**	**7.0**	**7.7**	**7.4**
Turbidity	NTU	--	<1	<1	<1	<1
Water Elevation	ft MSL	--	**1413.21**	**1413.39**	**1414.05**	**1413.69**
Metals						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	6.0	<2.0	<2.0	<2.0	<2.0
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100 e	<100
Cadmium	ug/L	2.0	--	<0.50	--	--
Chromium	ug/L	20	--	<5.0	--	--
Cobalt	ug/L	40	--	<10	--	--
Copper	ug/L	20	<5.0	<5.0	<5.0	<5.0
Iron	ug/L	237 p	**36** a	<20	<20	<20
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20	<20	<20	<20
Mercury	ng/L	2.00	<0.500	<0.500 e	<0.500 e	<0.500
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25	<25	<25	<25
Selenium	ug/L	4.0	<1.0	<1.0	<1.0 e	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<2.0	--	--
Vanadium	ug/L	40	--	<2.0	**1.1**	**1.0**
Zinc	ug/L	40	<10	<10	<10 e	<10
Major Anions						
Alkalinity, Bicarbonate	mg/L	31	**23**	**27**	**27** e	**18**
Alkalinity, Carbonate	mg/L	8.3	**6.8**	**2.9** e	**5.2**	**12**
Chloride	mg/L	1.5	<1.0	<1.0	**1.2**	<1.0
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.12	**0.097** e	**0.072** e	**0.067**	**0.079** a,e
Sulfate	mg/L	5.6 p	**2.4**	**2.3**	**2.5**	**2.6**
Major Cations						
Calcium	mg/L	10 p	**--**	**7.9**	**--**	--
Magnesium	mg/L	2.0 p	**--**	**1.6**	**--**	--
Potassium	mg/L	2.0	**--**	**0.54**	**--**	--
Sodium	mg/L	1.8 t	**1.2**	**0.95**	**0.94**	**0.97**
General						
Hardness	mg/L	33 p	**--**	**26**	**--**	--

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL068D (Background)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/02/15[T]	Q2 2015 05/12/15[T]	Q3 2015 09/08/15[T]	Q4 2015 11/04/15[T]
Field						
D.O.[1]	ppm	--	**2.1**	**3.8**	**2.1**	**1.9**
ORP	mV	--	**95**	**120**	**-20**	**-27**
pH	SU	7.9-8.9 t	**8.5**	**8.4**	**8.6**	**8.5**
Specific Conductance	µS/cm @ 25°C	--	**119**	**81**	**101**	**112**
Temperature	°C	--	**5.1**	**6.3**	**11.1**	**9.2**
Turbidity	NTU	--	<1	<1	<1	<1
Water Elevation	ft MSL	--	**1413.28**	**1413.44**	**1414.41**	**1413.72**
Metals						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	5.7	**4.4**	**4.4**	**4.6**	**4.8**
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100 e	<100
Cadmium	ug/L	2.0	--	<0.50	--	--
Chromium	ug/L	20	--	<5.0	--	--
Cobalt	ug/L	40	--	<10	--	--
Copper	ug/L	20	<5.0	<5.0	**5.7**	<5.0
Iron	ug/L	167	<20	**30**	<20	<20
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20	<20	<20	<20
Mercury	ng/L	2.17 t	<0.500	**0.631** e,s	<0.500 e	<0.500
Molybdenum	ug/L	40 p	--	<10	--	--
Nickel	ug/L	100	<25	<25	<25	<25
Selenium	ug/L	4.0	**1.2**	<1.0	<1.0 e	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<2.0	--	--
Vanadium	ug/L	40	--	**3.0**	**3.2**	**2.8**
Zinc	ug/L	40	<10	<10	<10 e	<10
Major Anions						
Alkalinity, Bicarbonate	mg/L	61 p	**58**	**59**	**59** e	**58**
Alkalinity, Carbonate	mg/L	8.4	<2.0	<2.0 e	**2.1**	<2.0
Chloride	mg/L	1.6	<1.0	<1.0	**1.2**	**1.1**
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.20	**0.057** e	<0.050 e	<0.050	**0.063** a,e,s
Sulfate	mg/L	12	**5.9**	**5.5**	**5.7**	**5.7**
Major Cations						
Calcium	mg/L	15 p	--	**14**	--	--
Magnesium	mg/L	3.9 p	--	**3.8**	--	--
Potassium	mg/L	2.2 p	--	**1.3**	--	--
Sodium	mg/L	6.7	**3.3**	**4.0**	**3.4**	**4.2**
General						
Hardness	mg/L	53 p	--	**51**	--	--

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL069A (Background)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/02/15[T]		Q2 2015 05/12/15[T]		Q3 2015 09/08/15[T]		Q4 2015 11/04/15[T]	
Field										
D.O.[1]	ppm	--	**6.6**		**6.5**		**5.0**		**6.3**	
ORP	mV	--	**130**		**156**		**23**		**53**	
pH	SU	7.8-8.8 t	**7.5**		**6.9**		**7.5**		**7.4**	
Specific Conductance	µS/cm @ 25°C	--	**498**		**316**		**476**		**483**	
Temperature	°C	--	**7.4**		**7.6**		**8.3**		**8.2**	
Turbidity	NTU	--	<1		<1		<1		<1	
Water Elevation	ft MSL	--	**1381.77**		**1382.31**		**1382.85**		**1382.34**	
Metals										
Aluminum	ug/L	200	--		<50		--		--	
Antimony	ug/L	5.5	--		<5.0		--		--	
Arsenic	ug/L	6.0	<2.0		<2.0		<2.0		<2.0	
Barium	ug/L	80	--		<20		--		--	
Beryllium	ug/L	2.5	--		<1.0		--		--	
Boron	ug/L	400	<100		<100		<100	e	<100	
Cadmium	ug/L	2.0	--		<0.50		--		--	
Chromium	ug/L	20	--		<5.0		--		--	
Cobalt	ug/L	40	--		<10		--		--	
Copper	ug/L	20	<5.0		<5.0		<5.0		<5.0	
Iron	ug/L	80	<20		<20		<20		<20	
Lead	ug/L	4.0	--		<1.0		--		--	
Lithium	ug/L	32	--		<8.0		--		--	
Manganese	ug/L	80	<20		<20		<20		<20	
Mercury	ng/L	2.00	**6.69**		**6.24**	**e**	**16.5**	**e**	**8.61**	
Molybdenum	ug/L	40	--		<10		--		--	
Nickel	ug/L	100	<25		<25		<25		<25	
Selenium	ug/L	4.0	**2.1**		<1.0		<1.0	e	<1.0	
Silver	ug/L	0.80	--		<0.20		--		--	
Strontium	ug/L	200	**--**		**63**		**--**		**--**	
Thallium	ug/L	2.0	--		<2.0		--		--	
Vanadium	ug/L	40	--		<2.0		<1.0		<1.0	
Zinc	ug/L	40	<10		<10		<10	e	<10	
Major Anions										
Alkalinity, Bicarbonate	mg/L	138 t	**210**		**200**		**210**	e	**200**	
Alkalinity, Carbonate	mg/L	8.0	<2.0		<2.0	e	<2.0		<2.0	
Chloride	mg/L	2.6	**35**		**30**		**58**		**51**	
Fluoride	mg/L	0.40	--		<0.10		--		--	
Nitrogen, Nitrate	mg/L	0.57	**1.3**	e	**1.7**	e	**0.99**		**1.1**	a,e
Sulfate	mg/L	4.3	**6.1**		**6.3**		**6.7**		**7.3**	
Major Cations										
Calcium	mg/L	35 p	**--**		**49**		**--**		**--**	
Magnesium	mg/L	18 p	**--**		**19**		**--**		**--**	
Potassium	mg/L	2.0	**--**		**1.5**		**--**		**--**	
Sodium	mg/L	1.2 t	**9.5**		**9.3**		**19**		**20**	
General										
Hardness	mg/L	162 p	**--**		**200**		**--**		**--**	

Table 1
Mine Permit Groundwater Quality Monitoring Data
2012-2015 QAL070A (NCWIB)
Eagle Mine

Parameter	Unit	Benchmark	Q4 2012 10/23/12[T]	Q2 2013 05/22/13[T]	Q2 2014 05/13/14[T]	Q2 2015 05/13/15[T]
Field						
D.O.[1]	ppm	--	**11**	**11**	**11**	**11**
ORP	mV	--	**56**	**147**	**121**	**167**
pH	SU	8.1-9.1 p	**8.7**	**9.1**	**9.0**	**8.6**
Specific Conductance	µS/cm @ 25°C	--	**76**	**82**	**106**	**188**
Temperature	°C	--	**9.2**	**7.2**	**8.4**	**9.0**
Turbidity	NTU	--	<1	<1	<1	<1
Water Elevation	ft MSL	--	**1368.98**	**1369.45**	**1369.91**	**1370.25**
Metals						
Aluminum	ug/L	200	<50	<50	<50	<50
Antimony	ug/L	5.5	<5.0	<5.0	<5.0	<5.0
Arsenic	ug/L	6.0	<2.0	<2.0	<2.0	<2.0
Barium	ug/L	80	<20	<20	<20	<20
Beryllium	ug/L	2.5	<1.0	<1.0	<1.0	<1.0
Boron	ug/L	400	<100	<100	<100	<100
Cadmium	ug/L	2.0	<0.50	<0.50	<0.50	<0.50
Chromium	ug/L	20	<5.0	<5.0	<5.0	<5.0
Cobalt	ug/L	40	<10	<10	<10	<10
Copper	ug/L	20	<5.0	<5.0	<5.0	<5.0
Iron	ug/L	80	<20	<20 e	<20	<20
Lead	ug/L	4.0	<1.0	<1.0 e	<1.0	<1.0
Lithium	ug/L	32	<8.0	<8.0	<8.0	<8.0
Manganese	ug/L	80	<20	<20	<20	<20
Mercury	ng/L	2.00	<0.500	<0.500	<0.500	**0.680** e,s
Molybdenum	ug/L	40	<10	<10	<10	<10
Nickel	ug/L	100	<25	<25	<25	<25
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	<0.20	<0.20	<0.20	<0.20
Strontium	ug/L	200	<50	<50 e	<50	**59**
Thallium	ug/L	2.0	<2.0	<2.0	<2.0	<2.0
Vanadium	ug/L	40	<10	<10	<10	<2.0
Zinc	ug/L	40	<10	<10	<10	<10
Major Anions						
Alkalinity, Bicarbonate	mg/L	42 p	**33**	**33**	**34**	**40**
Alkalinity, Carbonate	mg/L	8.0	**3.0**	**4.3** e	**4.3**	<2.0 e
Chloride	mg/L	4.0	**1.4**	**1.9**	**6.5**	**58**
Fluoride	mg/L	0.40	<0.10	<0.10	<0.10	<0.10
Nitrogen, Nitrate	mg/L	0.22 p	**0.17**	**0.24**	**0.38**	**0.98** e
Sulfate	mg/L	8.0	**2.1**	**2.2**	**2.5**	**3.5**
Major Cations						
Calcium	mg/L	11 p	**8.5**	**12**	**13**	**31**
Magnesium	mg/L	3.0 p	**2.1**	**3.1**	**3.1**	**6.4**
Potassium	mg/L	2.0	**0.57**	**0.66** e	**0.68**	**1.2**
Sodium	mg/L	2.0	**0.89**	**1.1**	**1.1**	**5.5**
General						
Hardness	mg/L	40 p	**30**	**43**	**45**	**104**

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL071A (TDRSA-CWB)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/02/15[T]	Q2 2015 05/13/15[T]	Q3 2015 09/08/15[T]	Q4 2015 11/04/15[T]
Field						
D.O.[1]	ppm	--	**11**	**11**	**11**	**11**
ORP	mV	--	**105**	**145**	**115**	**89**
pH	SU	8.1-9.1	**8.0**	**7.7**	**8.0**	**8.0**
Specific Conductance	µS/cm @ 25°C	--	**435**	**280**	**416**	**328**
Temperature	°C	--	**7.7**	**7.9**	**8.4**	**7.8**
Turbidity	NTU	--	<1	<1	<1	<1
Water Elevation	ft MSL	--	**1404.64**	**1405.56**	**1405.52**	**1404.66**
Metals						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	6.0	<2.0	<2.0	<2.0	<2.0
Barium	ug/L	80	--	**22**	**--**	**--**
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100 e	<100
Cadmium	ug/L	2.0	--	<0.50	--	--
Chromium	ug/L	20	--	<5.0	--	--
Cobalt	ug/L	40	--	<10	--	--
Copper	ug/L	20	**9.2**	**9.8**	**5.4**	<5.0
Iron	ug/L	44	**180** a	<20	<20	<20
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20	<20	<20	<20
Mercury	ng/L	2.00	**0.806**	**0.614** e,s	<0.500 e	<0.500
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25	<25	<25	<25
Selenium	ug/L	4.0	<1.0	<1.0	<1.0 e	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	**68**	**--**	**--**
Thallium	ug/L	2.0	--	<2.0	--	--
Vanadium	ug/L	40	--	<2.0	<1.0	<1.0
Zinc	ug/L	40	<10	<10	<10 e	<10
Major Anions						
Alkalinity, Bicarbonate	mg/L	44 t	**150**	**140**	**130** e	**120**
Alkalinity, Carbonate	mg/L	6.0	<2.0	<2.0 e	<2.0	<2.0
Chloride	mg/L	1.5	**27**	**30**	**44**	**24**
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.31	**9.8** e	**8.2** e	**7.4**	**5.6** a,e
Sulfate	mg/L	3.3	**8.6**	**7.3**	**7.6**	**8.0**
Major Cations						
Calcium	mg/L	12 p	**--**	**61**	**--**	**--**
Magnesium	mg/L	1.7 p	**--**	**8.7**	**--**	**--**
Potassium	mg/L	2.0	**--**	**1.2**	**--**	**--**
Sodium	mg/L	1.8	**8.1**	**5.7**	**11**	**8.7**
General						
Hardness	mg/L	38 p	**--**	**188**	**--**	**--**

Table 1
Mine Permit Groundwater Quality Monitoring Data
2012-2015 QAL073A (NCWIB)
Eagle Mine

Parameter	Unit	Benchmark	Q4 2012 10/23/12[T]	Q2 2013 05/22/13[T]	Q2 2014 05/13/14[T]	Q2 2015 05/13/15[T]
Field						
D.O.[1]	ppm	--	**10**	**11**	**11**	**11**
ORP	mV	--	**123**	**219**	**168**	**167**
pH	SU	6.1-7.1 p	**6.6**	**6.9**	**6.7**	**6.8**
Specific Conductance	µS/cm @ 25°C	--	**73**	**219**	**190**	**160**
Temperature	°C	--	**9.3**	**8.0**	**8.8**	**10**
Turbidity	NTU	--	<1	<1	<1	<1
Water Elevation	ft MSL	--	**1380.92**	**1381.59**	**1381.11**	**1382.45**
Metals						
Aluminum	ug/L	200	<50	<50	<50	**110**
Antimony	ug/L	5.5	<5.0	<5.0	<5.0	<5.0
Arsenic	ug/L	6.0	<2.0	<2.0	<2.0	<2.0
Barium	ug/L	80	<20	<20	<20	<20
Beryllium	ug/L	2.5	<1.0	<1.0	<1.0	<1.0
Boron	ug/L	400	<100	<100	<100	<100
Cadmium	ug/L	2.0	<0.50	<0.50	<0.50	<0.50
Chromium	ug/L	20	<5.0	<5.0	<5.0	<5.0
Cobalt	ug/L	40	<10	<10	<10	<10
Copper	ug/L	20	<5.0	<5.0	<5.0	<5.0
Iron	ug/L	70 p	**56**	**22** a,e	**43**	**130**
Lead	ug/L	4.0	<1.0	<1.0 e	<1.0	<1.0
Lithium	ug/L	32	<8.0	<8.0	<8.0	<8.0
Manganese	ug/L	80	<20	<20	<20	<20
Mercury	ng/L	2.00	<0.500	<0.500	<0.500	**0.942** e
Molybdenum	ug/L	40	<10	<10	<10	<10
Nickel	ug/L	100	<25	<25	<25	<25
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	<0.20	<0.20	<0.20	<0.20
Strontium	ug/L	200	<50	**86** e	**67**	**94**
Thallium	ug/L	2.0	<2.0	<2.0	<2.0	<2.0
Vanadium	ug/L	40	<10	<10	<10	<2.0
Zinc	ug/L	40	<10	<10	<10	<10
Major Anions						
Alkalinity, Bicarbonate	mg/L	44 p	**33**	**71**	**69**	**97**
Alkalinity, Carbonate	mg/L	8.0	<2.0	<2.0 e	<2.0	<2.0 e
Chloride	mg/L	4.0	<1.0	**16**	**5.0**	**8.4**
Fluoride	mg/L	0.40	<0.10	<0.10	<0.10	<0.10
Nitrogen, Nitrate	mg/L	0.60 p	**0.43**	**1.9**	**4.8**	**2.0** e
Sulfate	mg/L	8.0	**2.3**	**4.9**	**6.1**	**7.9**
Major Cations						
Calcium	mg/L	9.2 p	**9.0**	**31**	**26**	**32**
Magnesium	mg/L	2.5 p	**1.9**	**6.8**	**5.4**	**7.0**
Potassium	mg/L	2.0	**0.64**	**1.3** e	**1.1**	**1.3**
Sodium	mg/L	1.2 p	**0.93**	**1.9**	**1.3**	**1.8**
General						
Hardness	mg/L	33 p	**30**	**105**	**87**	**109**

Table 1
Mine Permit Groundwater Quality Monitoring Data
Q1-Q4 2015 QAL074A (Septic & WWTP)
Eagle Mine

Parameter	Unit	Benchmark	Q1 2015 03/03/15[D]	Q2 2015 05/13/15[T]	Q3 2015 09/09/15[T]	Q4 2015 11/04/15[T]
Field						
D.O.[1]	ppm	--	**11**	**10**	**11**	**10**
ORP	mV	--	**-8**	**157**	**191**	**68**
pH	SU	p	**9.3**	**8.9**	**8.8**	**8.7**
Specific Conductance	µS/cm @ 25°C	--	**156**	**124**	**232**	**217**
Temperature	°C	--	**7.9**	**10**	**16**	**9.0**
Turbidity	NTU	--	**347**	<1	<1	<1
Water Elevation	ft MSL	--	**1403.38**	**1403.69**	**1403.41**	**1402.07**
Metals						
Aluminum	ug/L	200	--	**150**	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	6.0	<2.0	<2.0	<2.0	<2.0
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100 e	<100
Cadmium	ug/L	2.0	--	<0.50	--	--
Chromium	ug/L	20	--	<5.0	--	--
Cobalt	ug/L	40	--	<10	--	--
Copper	ug/L	20	<5.0	<5.0	<5.0	<5.0
Iron	ug/L	p	<20	**180**	**52**	**73**
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20	<20	<20	<20
Mercury	ng/L	2.00	<0.500	**0.875** e	**0.669** e	**1.11**
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25	<25	<25	<25
Selenium	ug/L	4.0	<1.0	<1.0	<1.0 e	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<2.0	--	--
Vanadium	ug/L	40	--	<2.0	<1.0	<1.0
Zinc	ug/L	40	<10	<10	<10 e	<10
Major Anions						
Alkalinity, Bicarbonate	mg/L	32 p	**35**	**31**	**37** e	**35**
Alkalinity, Carbonate	mg/L	p	<2.0	<2.0 e	<2.0	**2.0**
Chloride	mg/L	4.0	**29**	**37**	**41**	**42**
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.43 p	**0.75** e	**1.8** e	**1.8** e	**2.2** a,e
Nitrogen, Nitrite	mg/L	p	--	--	**2.4**	--
Sulfate	mg/L	5.1 p	**5.0**	**5.2**	**6.9**	**6.9**
Phosphorus, Total	mg/L	p	--	--	--	--
Major Cations						
Calcium	mg/L	10 p	--	**24**	--	--
Magnesium	mg/L	1.9 p	--	**4.6**	--	--
Potassium	mg/L	2.0	--	**0.93**	--	--
Sodium	mg/L	3.5 p	**1.5**	**2.3**	**4.6**	**4.9**
General						
Hardness	mg/L	32 p	--	**79**	--	--

Mine Permit Groundwater Quality Monitoring Data
Supplemental Volatile Organic Compounds Monitoring Results
QAL061A (TDRSA-CWB)
Eagle Mine

Parameter	Unit	Q2 2015 05/12/15[T]
Volatile Organic Compounds		
1,1,1-Trichloroethane	ug/L	<1.0
1,1,2,2-Tetrachloroethane	ug/L	<1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	ug/L	<1.0
1,1,2-Trichloroethane	ug/L	<1.0
1,1-Dichloroethane	ug/L	<1.0
1,1-Dichloroethene	ug/L	<1.0
1,2,4-Trichlorobenzene	ug/L	<1.0
1,2-Dibromo-3-chloropropane	ug/L	<1.0
1,2-Dibromoethane	ug/L	<1.0
1,2-Dichlorobenzene	ug/L	<1.0
1,2-Dichloroethane	ug/L	<1.0
1,2-Dichloropropane	ug/L	<1.0
1,3-Dichlorobenzene	ug/L	<1.0
1,4-Dichlorobenzene	ug/L	<1.0
2-Butanone (MEK)	ug/L	<5.0
2-Hexanone	ug/L	<5.0
4-Methyl-2-pentanone (MIBK)	ug/L	<5.0
Acetone	ug/L	<10
Benzene	ug/L	<1.0
Bromodichloromethane	ug/L	<1.0
Bromoform	ug/L	<1.0
Bromomethane	ug/L	<1.0
Carbon Disulfide	ug/L	<5.0
Carbon Tetrachloride	ug/L	<1.0
Chlorobenzene	ug/L	<1.0
Chloroethane	ug/L	<1.0
Chloroform	ug/L	<1.0
Chloromethane	ug/L	<1.0
cis-1,2-Dichloroethene	ug/L	<1.0
cis-1,3-Dichloropropene	ug/L	<1.0
Cyclohexane	ug/L	<5.0
Dibromochloromethane	ug/L	<1.0
Dichlorodifluoromethane	ug/L	<1.0
Ethylbenzene	ug/L	<1.0
Isopropylbenzene	ug/L	<1.0
Methyl Acetate	ug/L	<5.0
Methyl tert-Butyl Ether	ug/L	<1.0
Methylcyclohexane	ug/L	<5.0
Methylene Chloride	ug/L	<1.0
Styrene	ug/L	<1.0
Tetrachloroethene	ug/L	<1.0
Toluene	ug/L	<1.0
trans-1,2-Dichloroethene	ug/L	<1.0
trans-1,3-Dichloropropene	ug/L	<1.0
Trichloroethene	ug/L	<1.0
Trichlorofluoromethane	ug/L	<1.0
Vinyl Chloride	ug/L	<1.0
Xylene (Total)	ug/L	<3.0

Mine Permit Groundwater Quality Monitoring Data
Supplemental Volatile Organic Compounds Monitoring Results
QAL062A (TDRSA-CWB)
Eagle Mine

Parameter	Unit	Q2 2015 05/12/15[T]
Volatile Organic Compounds		
1,1,1-Trichloroethane	ug/L	<1.0
1,1,2,2-Tetrachloroethane	ug/L	<1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	ug/L	<1.0
1,1,2-Trichloroethane	ug/L	<1.0
1,1-Dichloroethane	ug/L	<1.0
1,1-Dichloroethene	ug/L	<1.0
1,2,4-Trichlorobenzene	ug/L	<1.0
1,2-Dibromo-3-chloropropane	ug/L	<1.0
1,2-Dibromoethane	ug/L	<1.0
1,2-Dichlorobenzene	ug/L	<1.0
1,2-Dichloroethane	ug/L	<1.0
1,2-Dichloropropane	ug/L	<1.0
1,3-Dichlorobenzene	ug/L	<1.0
1,4-Dichlorobenzene	ug/L	<1.0
2-Butanone (MEK)	ug/L	<5.0
2-Hexanone	ug/L	<5.0
4-Methyl-2-pentanone (MIBK)	ug/L	<5.0
Acetone	ug/L	<10
Benzene	ug/L	<1.0
Bromodichloromethane	ug/L	<1.0
Bromoform	ug/L	<1.0
Bromomethane	ug/L	<1.0
Carbon Disulfide	ug/L	<5.0
Carbon Tetrachloride	ug/L	<1.0
Chlorobenzene	ug/L	<1.0
Chloroethane	ug/L	<1.0
Chloroform	ug/L	<1.0
Chloromethane	ug/L	<1.0
cis-1,2-Dichloroethene	ug/L	<1.0
cis-1,3-Dichloropropene	ug/L	<1.0
Cyclohexane	ug/L	<5.0
Dibromochloromethane	ug/L	<1.0
Dichlorodifluoromethane	ug/L	<1.0
Ethylbenzene	ug/L	<1.0
Isopropylbenzene	ug/L	<1.0
Methyl Acetate	ug/L	<5.0
Methyl tert-Butyl Ether	ug/L	<1.0
Methylcyclohexane	ug/L	<5.0
Methylene Chloride	ug/L	<1.0
Styrene	ug/L	<1.0
Tetrachloroethene	ug/L	<1.0
Toluene	ug/L	<1.0
trans-1,2-Dichloroethene	ug/L	<1.0
trans-1,3-Dichloropropene	ug/L	<1.0
Trichloroethene	ug/L	<1.0
Trichlorofluoromethane	ug/L	<1.0
Vinyl Chloride	ug/L	<1.0
Xylene (Total)	ug/L	<3.0

Mine Permit Groundwater Quality Monitoring Data
Supplemental Volatile Organic Compounds Monitoring Results
QAL067A (TDRSA-CWB)
Eagle Mine

Parameter	Unit	Q2 2015 05/12/15[T]
Volatile Organic Compounds		
1,1,1-Trichloroethane	ug/L	<1.0
1,1,2,2-Tetrachloroethane	ug/L	<1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	ug/L	<1.0
1,1,2-Trichloroethane	ug/L	<1.0
1,1-Dichloroethane	ug/L	<1.0
1,1-Dichloroethene	ug/L	<1.0
1,2,4-Trichlorobenzene	ug/L	<1.0
1,2-Dibromo-3-chloropropane	ug/L	<1.0
1,2-Dibromoethane	ug/L	<1.0
1,2-Dichlorobenzene	ug/L	<1.0
1,2-Dichloroethane	ug/L	<1.0
1,2-Dichloropropane	ug/L	<1.0
1,3-Dichlorobenzene	ug/L	<1.0
1,4-Dichlorobenzene	ug/L	<1.0
2-Butanone (MEK)	ug/L	<5.0
2-Hexanone	ug/L	<5.0
4-Methyl-2-pentanone (MIBK)	ug/L	<5.0
Acetone	ug/L	<10
Benzene	ug/L	<1.0
Bromodichloromethane	ug/L	<1.0
Bromoform	ug/L	<1.0
Bromomethane	ug/L	<1.0
Carbon Disulfide	ug/L	<5.0
Carbon Tetrachloride	ug/L	<1.0
Chlorobenzene	ug/L	<1.0
Chloroethane	ug/L	<1.0
Chloroform	ug/L	<1.0
Chloromethane	ug/L	<1.0
cis-1,2-Dichloroethene	ug/L	<1.0
cis-1,3-Dichloropropene	ug/L	<1.0
Cyclohexane	ug/L	<5.0
Dibromochloromethane	ug/L	<1.0
Dichlorodifluoromethane	ug/L	<1.0
Ethylbenzene	ug/L	<1.0
Isopropylbenzene	ug/L	<1.0
Methyl Acetate	ug/L	<5.0
Methyl tert-Butyl Ether	ug/L	<1.0
Methylcyclohexane	ug/L	<5.0
Methylene Chloride	ug/L	<1.0
Styrene	ug/L	<1.0
Tetrachloroethene	ug/L	<1.0
Toluene	ug/L	<1.0
trans-1,2-Dichloroethene	ug/L	<1.0
trans-1,3-Dichloropropene	ug/L	<1.0
Trichloroethene	ug/L	<1.0
Trichlorofluoromethane	ug/L	<1.0
Vinyl Chloride	ug/L	<1.0
Xylene (Total)	ug/L	<3.0

Table 1
Groundwater Quality Data
Mine Permit Monitoring
Explanation of Abbreviations and Data Qualifiers
Eagle Project

Abbreviation or Data Qualifier	Explanation
1	Many D.O. values are elevated due to well screen configuration and aquifer characteristics and the low-flow sampling method. Super-saturated DO values are rejected (see R data qualifier) as not being representative of true conditions.
2	Benchmarks for QAL066D are all pending due to the unreliability of data generated for this monitoring location.
3	QAL070A and QAL073A are only sampled annually (usually in Q2).
a	Estimated value. Duplicate precision for this parameter exceeded quality control limit.
b	Estimated value. Sample received after EPA established hold time expired.
BP	Below pump. Maximum water elevation is shown.
CWB	Contact Water Basin
D	Sample for metal and major cation parameters was filtered and values are dissolved concentrations.
e	Estimated value. The laboratory statement of data qualifications indicates that a quality control limit for this parameter was exceeded.
f	Value should be considered an estimate because field stabilization was not achieved of at least one parameter.
i	Insufficient water for collection of field parameters and/or sample.
NM	Not measured.
p	Pending. Some parameters/locations require additional baseline data to calculate a benchmark.
Q	Quarter.
R	Measured value was rejected based on quality control procedures.
RL	Laboratory reporting limit.
s	Potential false positive value. Compound present in blank sample.
t	Trending. Benchmarks are not proposed for baseline datasets that appear to be trending (using samples collected through Q4 2012) because the data do not represent a random distribution about the baseline mean. Trend analysis is recommended in place of benchmark screening for parameters that appear to be trending.
T	Sample was not filtered and all values are total concentrations.
TDRSA	Temporary Development Rock Storage Area
UMB	Underground Mine Boundary
	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.

Appendix G

Eagle Mine

Groundwater Monitoring

Trend Analysis Summary & Trending Charts

2015 Mine Permit Groundwater Monitoring
Trend Analysis Summary
Eagle Mine

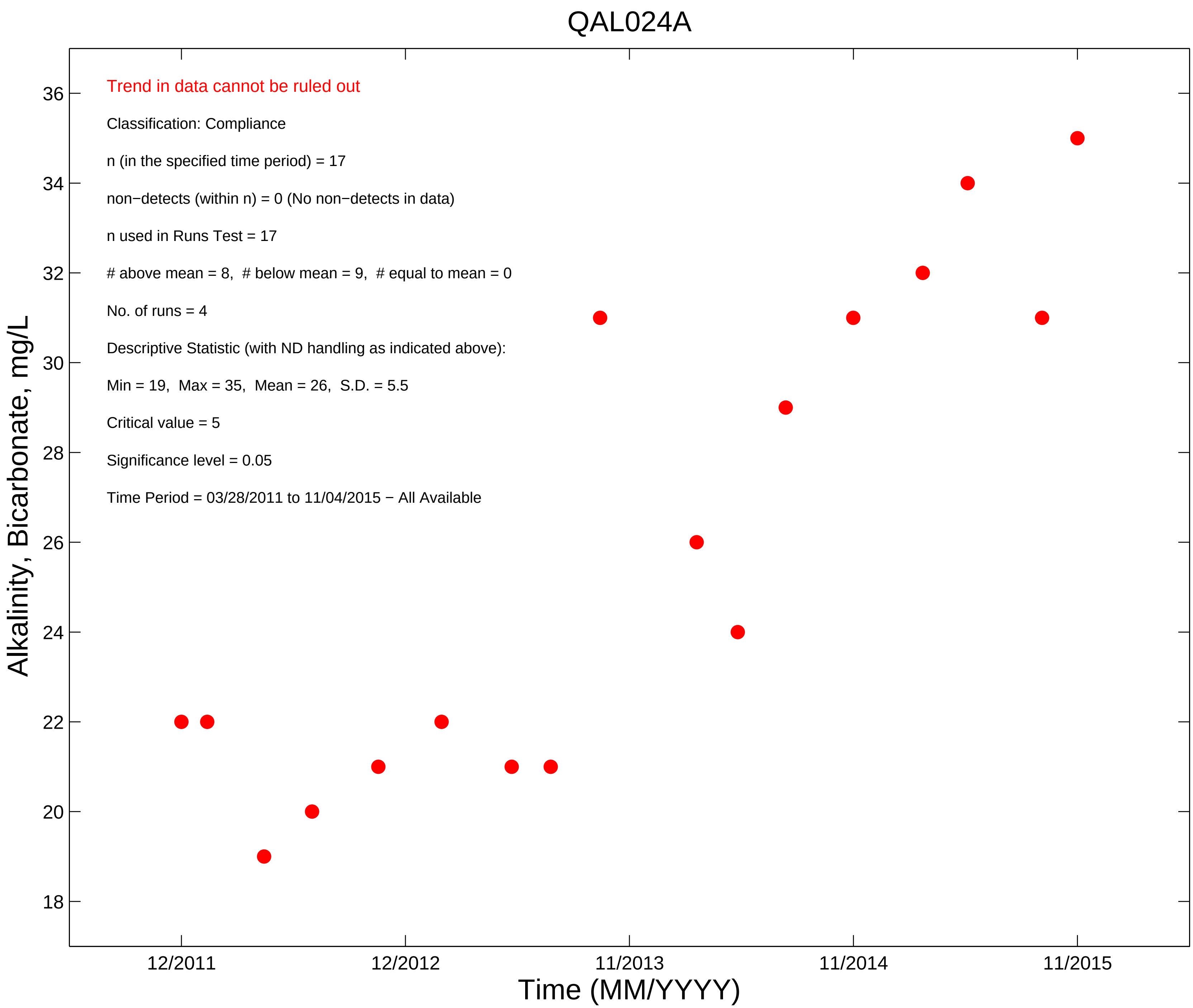
Location	Classi- fication	Parameter	Unit	# Samples	# NDs	Non-detects handling	# Used in Runs Test	Min	Max	Mean	St. Dev.	# Above Mean	# Below Mean	# Equal Mean	# Runs	Critical value	Statistical Significance Level	Trend Present	Remarks
QAL023B	Compliance	Sodium	mg/L	17	0	No NDs	17	6.7	11	8.6	1.37	8	9	0	4	5	0.05	Y	
QAL024A	Compliance	Alkalinity, Bicarbonate	mg/L	17	0	No NDs	17	19	35	26	5.50	8	9	0	4	5	0.05	Y	
QAL024A	Compliance	Chloride	mg/L	17	2	Included as RL	17	1.0	340	81	86.71	9	8	0	5	5	0.05	Y	Non-unique RL in data
QAL024A	Compliance	Nitrogen, Nitrate	mg/L	17	3	Included as RL	17	0.050	1.3	0.45	0.42	7	10	0	2	5	0.05	Y	Non-unique RL in data
QAL024A	Compliance	Sodium	mg/L	17	0	No NDs	17	0.55	180	33	42.91	7	10	0	5	5	0.05	Y	
QAL025A	Background	Alkalinity, Bicarbonate	mg/L	19	0	No NDs	19	16	31	25	4.10	11	8	0	6	6	0.05	Y	
QAL025A	Background	Potassium	mg/L	5	0	No NDs	5	0.69	0.83	0.75	0.05	2	3	0	2	2	0.25	Y	
QAL025A	Background	Sodium	mg/L	19	0	No NDs	19	0.62	1.1	0.84	0.16	10	9	0	4	6	0.05	Y	
QAL025B	Background	Iron	ug/L	19	12	Included as RL	19	20	53	24	9.00	5	14	0	4	5	0.05	Y	
QAL025B	Background	pH	SU	19	0	No NDs	19	8.5	9.4	9.0	0.20	7	12	0	6	6	0.05	Y	
QAL025B	Background	Sodium	mg/L	19	0	No NDs	19	1.8	5.6	2.7	0.86	7	12	0	6	6	0.05	Y	
QAL025B	Background	Specific Conductance	µS/cm @ 25°C	19	0	No NDs	19	51	136	75	18.50	8	11	0	6	6	0.05	Y	
QAL025B	Background	Sulfate	mg/L	19	1	Included as RL	19	2.0	3.4	2.5	0.33	10	9	0	6	6	0.05	Y	Non-unique RL in data
QAL025D	Background	Alkalinity, Bicarbonate	mg/L	19	0	No NDs	19	40	53	45	3.30	10	9	0	6	6	0.05	Y	
QAL025D	Background	Alkalinity, Carbonate	mg/L	19	4	Included as RL	19	2.0	16	5.0	3.82	6	13	0	3	5	0.05	Y	
QAL025D	Background	Arsenic	ug/L	19	0	No NDs	19	2.4	4.3	2.9	0.47	4	13	2	4	4	0.05	Y	
QAL025D	Background	Iron	ug/L	19	4	Included as RL	19	20	100	50	20.90	12	7	0	6	6	0.05	Y	
QAL025D	Background	Potassium	mg/L	5	0	No NDs	5	0.56	0.64	0.60	0.03	3	2	0	2	2	0.25	Y	
QAL025D	Background	Sodium	mg/L	19	0	No NDs	19	3.9	15	6.1	2.97	5	14	0	2	5	0.05	Y	
QAL026A	Background	Chloride	mg/L	14	1	Included as RL	14	1.0	4.2	2.0	0.96	5	9	0	3	4	0.05	Y	
QAL026A	Background	Nitrogen, Nitrate	mg/L	14	0	No NDs	14	0.49	3.2	1.3	0.70	8	6	0	2	4	0.05	Y	Non-unique RL in data
QAL044B	Compliance	Chloride	mg/L	17	2	Included as RL	17	1.0	3.2	1.6	0.70	5	12	0	3	4	0.05	Y	
QAL044B	Compliance	Sodium	mg/L	17	0	No NDs	17	2.1	5.9	3.2	1.00	6	11	0	3	5	0.05	Y	
QAL060A	Compliance	Alkalinity, Bicarbonate	mg/L	19	0	No NDs	19	34	56	45	8.20	9	10	0	2	6	0.05	Y	
QAL060A	Compliance	Calcium	mg/L	6	0	No NDs	6	10	15	13	2.10	4	2	0	2	2	0.25	Y	
QAL060A	Compliance	Magnesium	mg/L	6	0	No NDs	6	2.4	3.7	3.1	0.53	4	2	0	2	2	0.25	Y	
QAL060A	Compliance	Nitrogen, Nitrate	mg/L	19	0	No NDs	19	0.063	0.48	0.16	0.09	8	11	0	4	6	0.05	Y	
QAL060A	Compliance	Potassium	mg/L	6	0	No NDs	6	0.82	1.1	1.0	0.13	4	2	0	2	2	0.25	Y	
QAL060A	Compliance	Sodium	mg/L	19	0	No NDs	19	0.80	2.2	1.5	0.47	10	9	0	4	6	0.05	Y	
QAL060A	Compliance	Specific Conductance	µS/cm @ 25°C	19	0	No NDs	19	69	176	99	26.00	10	9	0	2	6	0.05	Y	
QAL060A	Compliance	Strontium	ug/L	6	4	Included as RL	6	50	54	51	1.70	2	4	0	2	2	0.25	Y	
QAL060A	Compliance	Sulfate	mg/L	19	1	Included as RL	19	2.0	4.1	3.0	0.78	9	10	0	2	6	0.05	Y	Non-unique RL in data
QAL061A	Compliance	Nitrogen, Nitrate	mg/L	19	0	No NDs	19	0.10	0.31	0.18	0.07	8	11	0	4	6	0.05	Y	
QAL061A	Compliance	pH	SU	19	0	No NDs	19	8.2	9.1	8.6	0.27	10	9	0	6	6	0.05	Y	
QAL062A	Compliance	Alkalinity, Bicarbonate	mg/L	19	0	No NDs	19	29	100	50	21.00	6	13	0	2	5	0.05	Y	
QAL062A	Compliance	Calcium	mg/L	6	0	No NDs	6	11	28	15	6.60	2	4	0	2	2	0.25	Y	
QAL062A	Compliance	Chloride	mg/L	19	4	Included as RL	19	1.0	34	4.8	8.64	4	15	0	2	4	0.05	Y	
QAL062A	Compliance	Nitrogen, Nitrate	mg/L	19	0	No NDs	19	0.21	0.40	0.302	0.05	9	10	0	6	6	0.05	Y	
QAL062A	Compliance	pH	SU	19	0	No NDs	19	8.1	9.4	8.6	0.28	8	11	0	6	6	0.05	Y	
QAL062A	Compliance	Sodium	mg/L	19	0	No NDs	19	0.53	1.9	0.84	0.34	5	14	0	4	5	0.05	Y	
QAL062A	Compliance	Specific Conductance	µS/cm @ 25°C	19	0	No NDs	19	54	261	109	57.90	5	14	0	2	5	0.05	Y	
QAL063A	Compliance	Alkalinity, Bicarbonate	mg/L	19	0	No NDs	19	33	71	42	12.00	4	15	0	2	4	0.05	Y	
QAL063A	Compliance	Specific Conductance	µS/cm @ 25°C	19	0	No NDs	19	55	151	89	25.50	6	13	0	4	5	0.05	Y	
QAL064D	Compliance	Calcium	mg/L	5	0	No NDs	5	15	20	17	2.30	3	2	0	2	2	0.25	Y	
QAL064D	Compliance	Fluoride	mg/L	5	3	Included as RL	5	0.10	0.19	0.124	0.04	2	3	0	2	2	0.25	Y	
QAL064D	Compliance	Magnesium	mg/L	5	0	No NDs	5	3.1	4.2	3.7	0.50	3	2	0	2	2	0.25	Y	
QAL064D	Compliance	Potassium	mg/L	5	0	No NDs	5	0.96	1.2	1.1	0.12	3	2	0	2	2	0.25	Y	
QAL064D	Compliance	Sodium	mg/L	19	0	No NDs	19	4.2	6.9	5.2	0.84	9	10	0	6	6	0.05	Y	
QAL064D	Compliance	Strontium	ug/L	5	0	No NDs	5	76	97	88	10.00	3	2	0	2	2	0.25	Y	
QAL065D	Compliance	Alkalinity, Bicarbonate	mg/L	19	0	No NDs	19	72	86	79	4.10	7	12	0	6	6	0.05	Y	
QAL065D	Compliance	Strontium	ug/L	5	0	No NDs	5	150	220	190	29.20	3	2	0	2	2	0.25	Y	Non-unique RL in data
QAL066D	Compliance	Alkalinity, Carbonate	mg/L	19	1	Included as RL	19	2.0	57	19	15.90	8	11	0	6	6	0.05	Y	
QAL066D	Compliance	Arsenic	ug/L	19	0	No NDs	19	5.6	12	7.9	1.90	9	10	0	5	6	0.05	Y	
QAL066D	Compliance	Chloride	mg/L	19	7	Included as RL	19	1.0	1.8	1.2	0.23	8	9	2	5	5	0.05	Y	
QAL066D	Compliance	Fluoride	mg/L	5	3	Included as RL	5	0.10	0.13	0.11	0.01	2	3	0	2	2	0.25	Y	
QAL066D	Compliance	Mercury	ng/L	19	5	Included as RL	19	0.500	12	2.3	3.45	4	15	0	3	4	0.05	Y	Non-unique RL in data
QAL066D	Compliance	pH	SU	19	0	No NDs	19	8.5	12	9.7	1.17	7	12	0	5	6	0.05	Y	
QAL066D	Compliance	Specific Conductance	µS/cm @ 25°C	19	0	No NDs	19	74	697	208	189.00	5	14	0	5	5	0.05	Y	

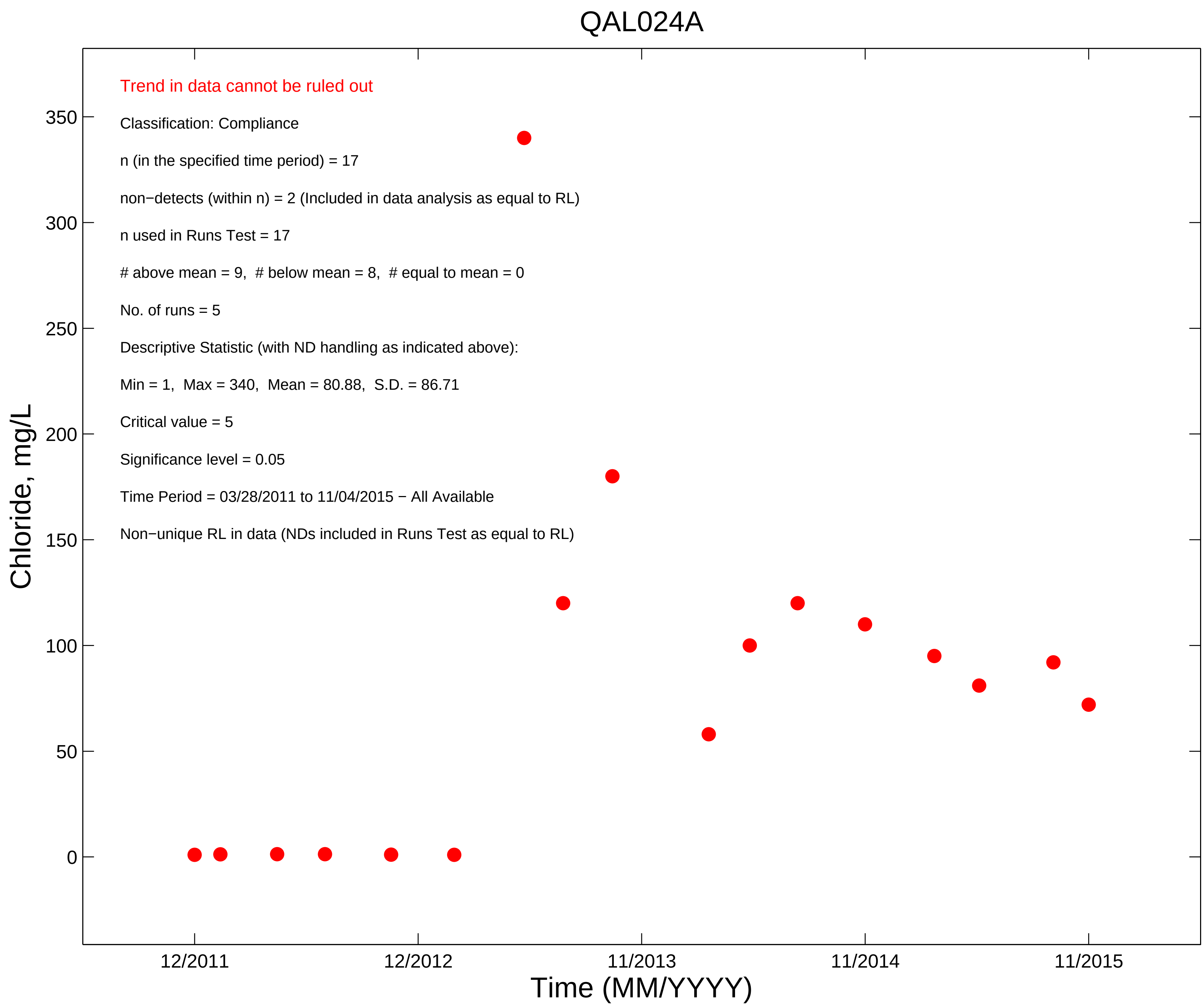
Explanations of abbrevations provided as the last page of this table.

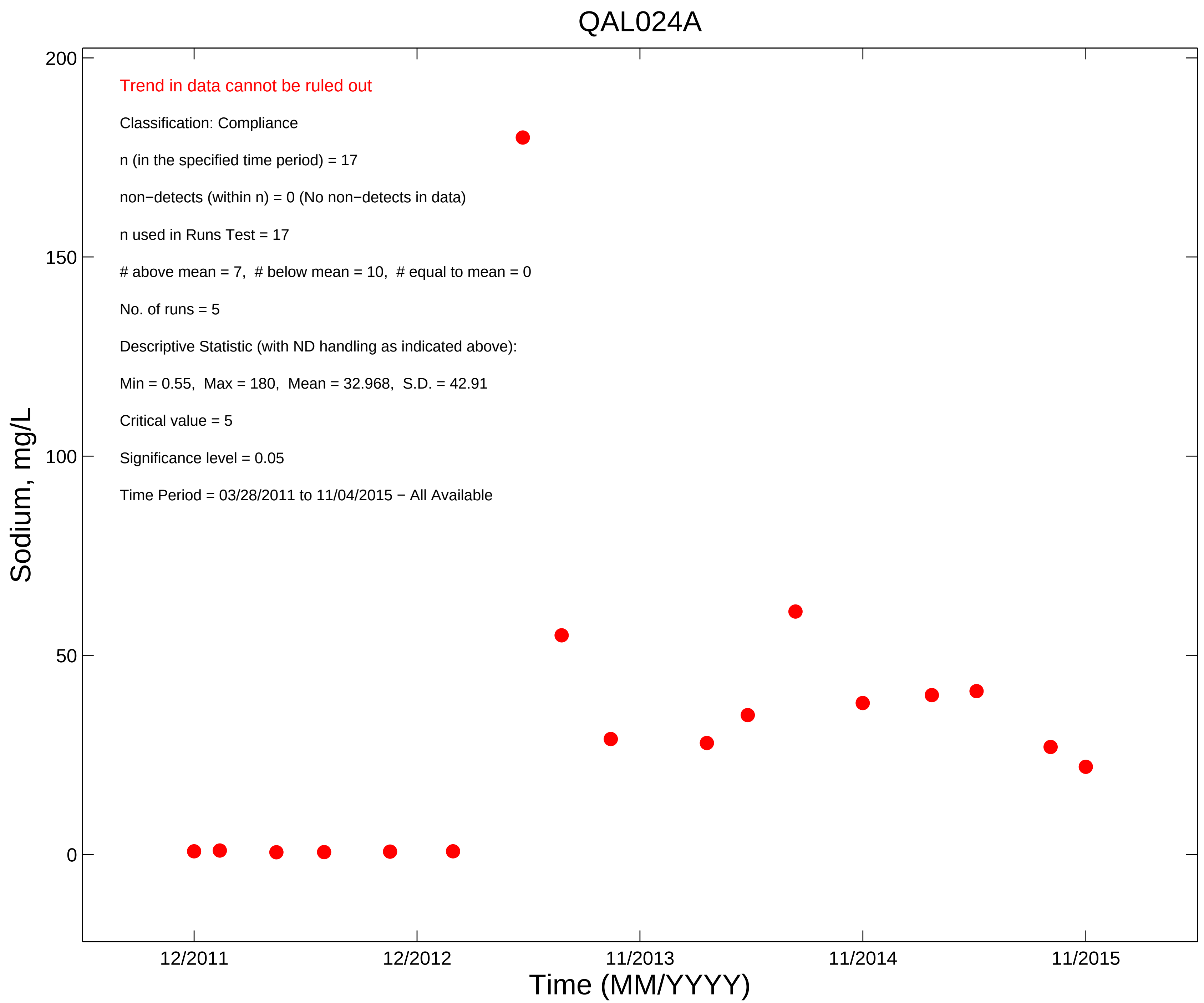
2015 Mine Permit Groundwater Monitoring
Trend Analysis Summary
Eagle Mine

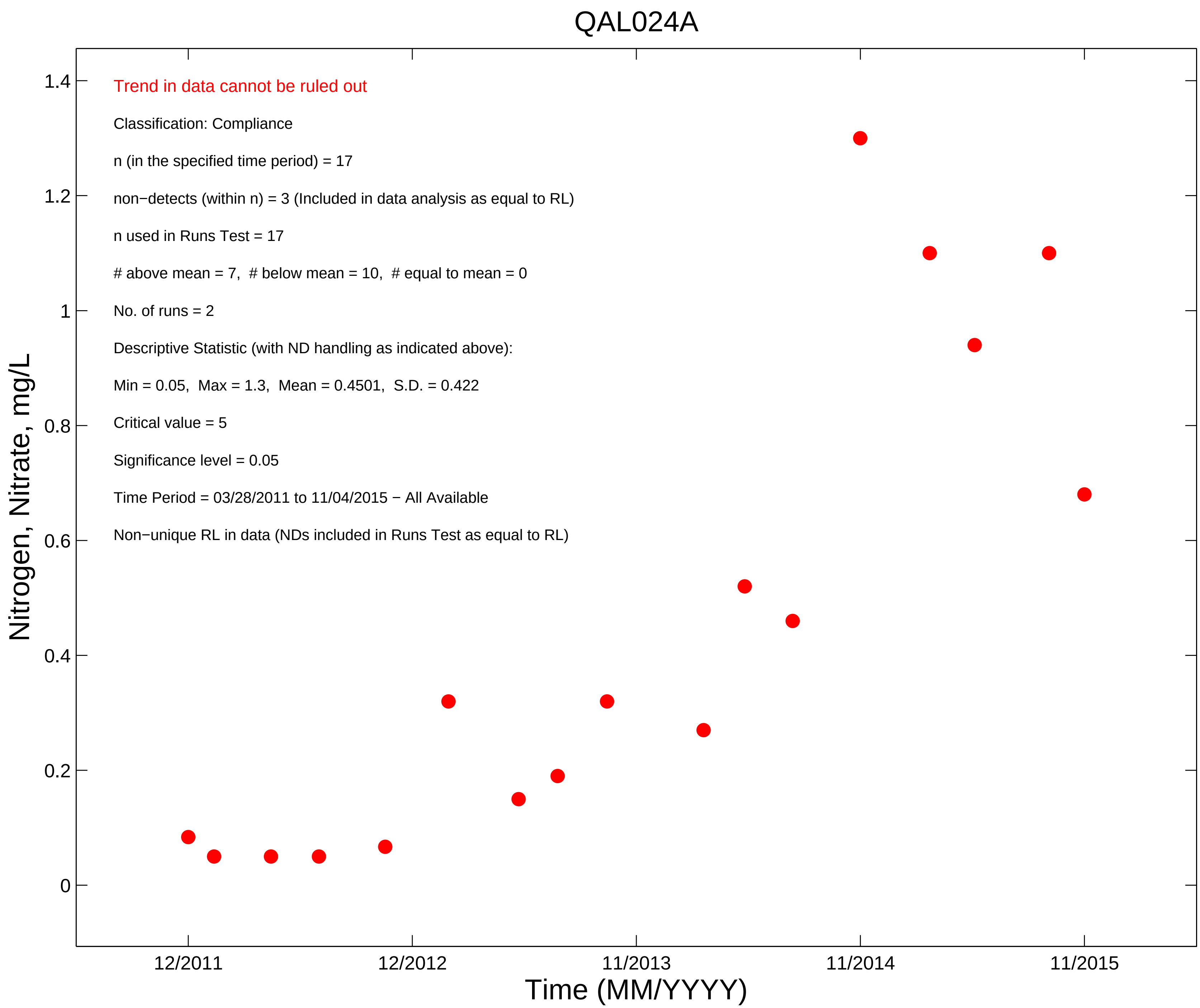
Location	Classi-fication	Parameter	Unit	# Samples	# NDs	Non-detects handling	# Used in Runs Test	Min	Max	Mean	St. Dev.	# Above Mean	# Below Mean	# Equal Mean	# Runs	Critical value	Statistical Significance Level	Trend Present	Remarks
QAL066D	Compliance	Sulfate	mg/L	19	0	No NDs	19	6.5	12	8.8	1.49	7	12	0	6	6	0.05	Y	Non-unique RL in data
QAL067A	Compliance	Calcium	mg/L	7	0	No NDs	7	4.1	110	28	40.38	2	5	0	2	2	0.10	Y	
QAL067A	Compliance	Chloride	mg/L	22	2	Included as RL	22	1.0	1600	405	566.57	8	14	0	4	7	0.05	Y	Non-unique RL in data
QAL067A	Compliance	Copper	ug/L	20	17	Included as RL	20	5.0	63	9.3	13.00	3	17	0	3	3	0.05	Y	
QAL067A	Compliance	Magnesium	mg/L	7	0	No NDs	7	0.60	53	13	21.39	2	5	0	2	2	0.10	Y	
QAL067A	Compliance	Mercury	ng/L	20	12	Included as RL	20	0.500	4.03	1.4	1.28	6	14	0	2	5	0.05	Y	
QAL067A	Compliance	Nitrogen, Nitrate	mg/L	22	0	No NDs	22	0.067	2.1	0.66	0.64	7	15	0	4	6	0.05	Y	Non-unique RL in data
QAL067A	Compliance	Potassium	mg/L	7	0	No NDs	7	0.75	9.2	3.1	3.50	2	5	0	2	2	0.10	Y	
QAL067A	Compliance	Sodium	mg/L	22	0	No NDs	22	0.57	740	190	286.96	6	16	0	2	6	0.05	Y	Non-unique RL in data
QAL067A	Compliance	Specific Conductance	µS/cm @ 25°C	22	0	No NDs	22	27	4888	1263	1675.00	8	14	0	4	7	0.05	Y	
QAL067A	Compliance	Sulfate	mg/L	22	5	Included as RL	22	2.0	15	5.7	4.94	7	15	0	4	6	0.05	Y	Non-unique RL in data
QAL068A	Background	Potassium	mg/L	5	0	No NDs	5	0.63	0.94	0.79	0.11	2	3	0	2	2	0.25	Y	
QAL068B	Background	Specific Conductance	µS/cm @ 25°C	19	0	No NDs	19	41	131	65	18.50	5	14	0	4	5	0.05	Y	
QAL068D	Background	Arsenic	ug/L	19	0	No NDs	19	3.5	5.6	4.5	0.43	7	12	0	5	6	0.05	Y	
QAL068D	Background	Mercury	ng/L	19	14	Included as RL	19	0.500	1.72	0.65	0.36	3	16	0	2	3	0.05	Y	
QAL068D	Background	Sulfate	mg/L	19	0	No NDs	19	5.0	12	6.4	1.69	6	13	0	2	5	0.05	Y	Non-unique RL in data
QAL069A	Background	Alkalinity, Bicarbonate	mg/L	19	0	No NDs	19	49	260	172	73.10	12	7	0	2	6	0.05	Y	
QAL069A	Background	Calcium	mg/L	5	0	No NDs	5	9.5	55	38	20.30	3	2	0	2	2	0.25	Y	Non-unique RL in data
QAL069A	Background	Chloride	mg/L	19	2	Included as RL	19	1.0	58	16	18.90	7	12	0	4	6	0.05	Y	
QAL069A	Background	Magnesium	mg/L	5	0	No NDs	5	5.4	24	17	7.87	3	2	0	2	2	0.25	Y	
QAL069A	Background	Nitrogen, Nitrate	mg/L	19	0	No NDs	19	0.083	2.3	1.0	0.73	9	10	0	4	6	0.05	Y	Non-unique RL in data
QAL069A	Background	pH	SU	19	0	No NDs	19	6.8	8.7	7.5	0.61	5	14	0	2	5	0.05	Y	
QAL069A	Background	Potassium	mg/L	5	0	No NDs	5	0.55	1.5	1.1	0.40	3	2	0	2	2	0.25	Y	
QAL069A	Background	Sodium	mg/L	19	0	No NDs	19	0.71	20	5.3	6.20	6	13	0	2	5	0.05	Y	
QAL069A	Background	Specific Conductance	µS/cm @ 25°C	19	0	No NDs	19	99	576	351	149.00	10	9	0	4	6	0.05	Y	
QAL069A	Background	Strontium	ug/L	5	2	Included as RL	5	50	64	57	6.80	3	2	0	2	2	0.25	Y	
QAL069A	Background	Sulfate	mg/L	19	1	Included as RL	19	2.0	7.3	4.5	1.50	8	11	0	2	6	0.05	Y	Non-unique RL in data
QAL070A	Compliance	Iron	ug/L	6	4	Included as RL	6	20	35	25	7.50	2	4	0	2	2	0.25	Y	
QAL070A	Compliance	Nitrogen, Nitrate	mg/L	6	0	No NDs	6	0.055	0.98	0.31	0.35	2	4	0	2	2	0.25	Y	Non-unique RL in data
QAL070A	Compliance	Specific Conductance	µS/cm @ 25°C	6	0	No NDs	6	61	188	96	47.80	2	4	0	2	2	0.25	Y	
QAL070A	Compliance	Sulfate	mg/L	6	0	No NDs	6	1.9	3.5	2.4	0.57	2	4	0	2	2	0.25	Y	Non-unique RL in data
QAL071A	Compliance	Alkalinity, Bicarbonate	mg/L	20	0	No NDs	20	30	150	78	43.30	8	12	0	4	6	0.05	Y	
QAL071A	Compliance	Calcium	mg/L	7	0	No NDs	7	11	62	30	23.00	3	4	0	2	2	0.10	Y	
QAL071A	Compliance	Chloride	mg/L	22	1	Included as RL	22	1.0	44	12	12.40	10	12	0	4	7	0.05	Y	
QAL071A	Compliance	Copper	ug/L	20	14	Included as RL	20	5.0	9.8	5.8	1.62	4	16	0	3	4	0.05	Y	
QAL071A	Compliance	Magnesium	mg/L	7	0	No NDs	7	1.4	8.7	4.2	3.30	3	4	0	2	2	0.10	Y	
QAL071A	Compliance	Mercury	ng/L	20	15	Included as RL	20	0.500	1.37	0.572	0.20	4	16	0	3	4	0.05	Y	
QAL071A	Compliance	Nitrogen, Nitrate	mg/L	22	0	No NDs	22	0.15	14	4.3	5.06	9	13	0	2	7	0.05	Y	Non-unique RL in data
QAL071A	Compliance	pH	SU	22	0	No NDs	22	7.3	8.8	8.2	0.45	11	11	0	6	7	0.05	Y	
QAL071A	Compliance	Potassium	mg/L	7	0	No NDs	7	0.70	1.4	0.91	0.28	2	5	0	2	2	0.10	Y	
QAL071A	Compliance	Sodium	mg/L	22	0	No NDs	22	0.87	11	3.3	3.55	6	16	0	2	6	0.05	Y	
QAL071A	Compliance	Specific Conductance	µS/cm @ 25°C	22	0	No NDs	22	53	469	228	143.00	11	11	0	4	7	0.05	Y	
QAL071A	Compliance	Sulfate	mg/L	22	0	No NDs	22	2.0	9.3	4.6	2.61	8	14	0	2	7	0.05	Y	Non-unique RL in data
QAL073A	Compliance	Alkalinity, Bicarbonate	mg/L	6	0	No NDs	6	20	97	52	32.00	3	3	0	2	2	0.10	Y	
QAL073A	Compliance	Calcium	mg/L	5	0	No NDs	5	5.6	32	21	12.50	3	2	0	2	2	0.25	Y	
QAL073A	Compliance	Magnesium	mg/L	5	0	No NDs	5	1.1	7	4.4	2.80	3	2	0	2	2	0.25	Y	
QAL073A	Compliance	Nitrogen, Nitrate	mg/L	6	0	No NDs	6	0.097	4.8	1.6	1.81	3	3	0	2	2	0.10	Y	Non-unique RL in data
QAL073A	Compliance	pH	SU	6	0	No NDs	6	6.6	6.9	6.7	0.13	2	3	1	2	2	0.25	Y	
QAL073A	Compliance	Potassium	mg/L	5	0	No NDs	5	0.63	1.3	0.99	0.34	3	2	0	2	2	0.25	Y	
QAL073A	Compliance	Specific Conductance	µS/cm @ 25°C	6	0	No NDs	6	50	219	124	74.80	3	3	0	2	2	0.10	Y	
QAL073A	Compliance	Sulfate	mg/L	6	0	No NDs	6	1.9	7.9	4.2	2.50	3	3	0	2	2	0.10	Y	Non-unique RL in data
QAL074A	Compliance	Chloride	mg/L	7	1	Included as RL	7	1.0	42	25	17.50	4	3	0	2	2	0.10	Y	
QAL074A	Compliance	Nitrogen, Nitrate	mg/L	7	0	No NDs	7	0.39	2.4	1.3	0.84	3	4	0	2	2	0.10	Y	Non-unique RL in data
QAL074A	Compliance	Sodium	mg/L	7	0	No NDs	7	1.5	4.9	2.8	1.40	2	5	0	2	2	0.10	Y	
QAL074A	Compliance	Sulfate	mg/L	7	0	No NDs	7	3.5	6.9	5.2	1.30	3	4	0	2	2	0.10	Y	Non-unique RL in data

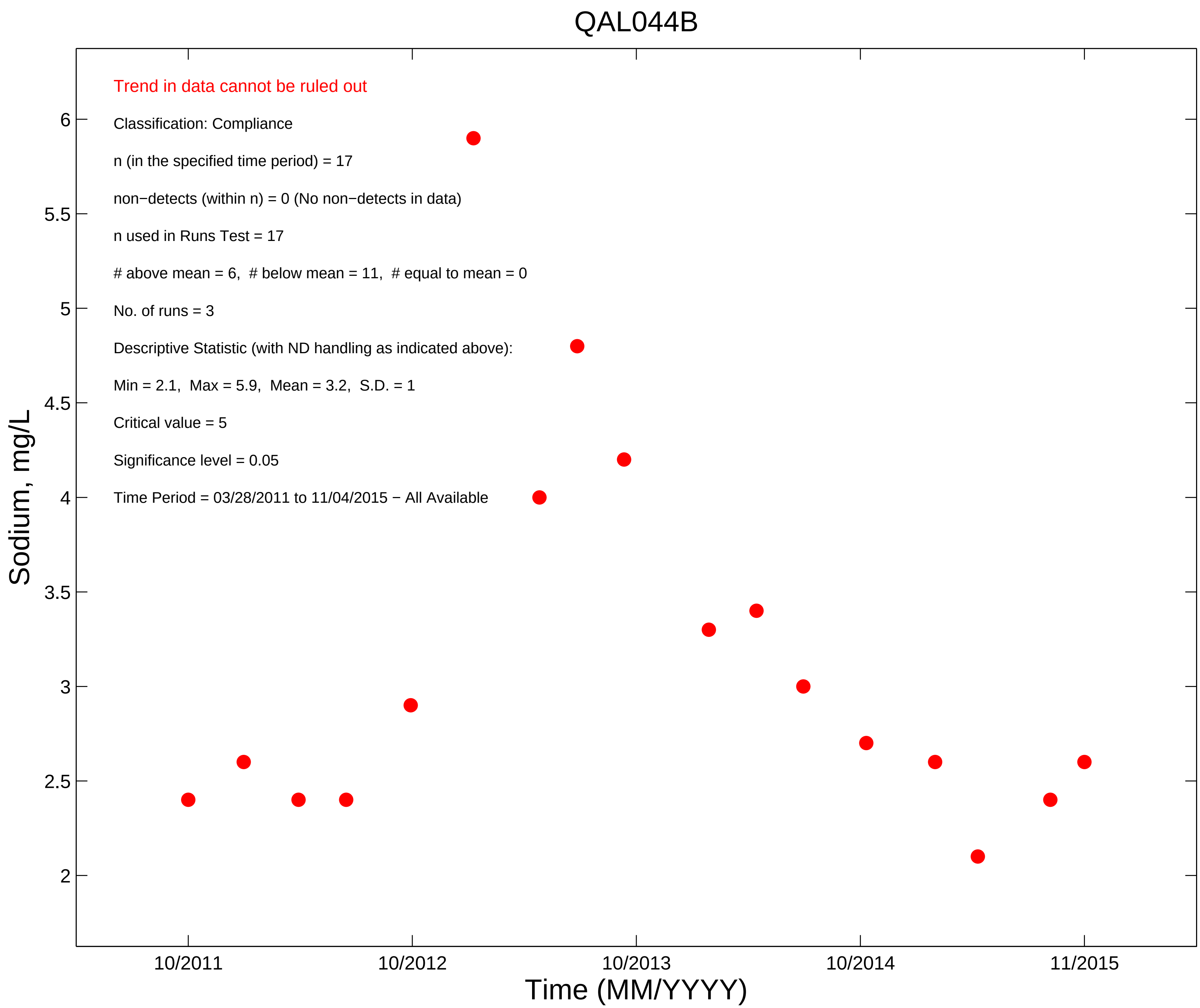
Explanations of abbrevations provided as the last page of this table.

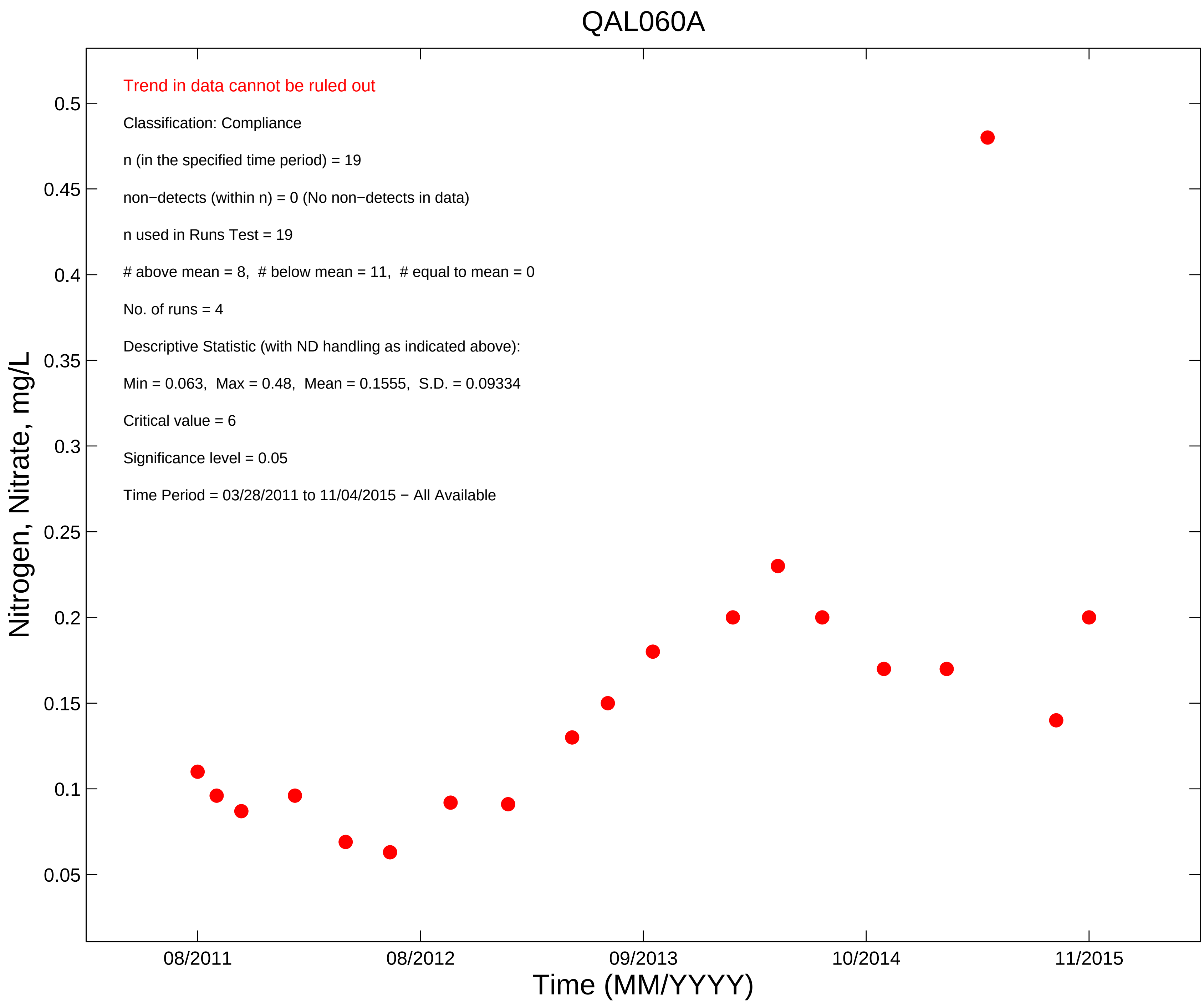

QAL024A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 17
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 17
above mean = 8, # below mean = 9, # equal to mean = 0
No. of runs = 4
Descriptive Statistic (with ND handling as indicated above):
Min = 19, Max = 35, Mean = 26, S.D. = 5.5
Critical value = 5
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Alkalinity, Bicarbonate, mg/L
36
34
32
30
28
26
24
22
20
18
12/2011
12/2012
11/2013
11/2014
11/2015
Time (MM/YYYY)

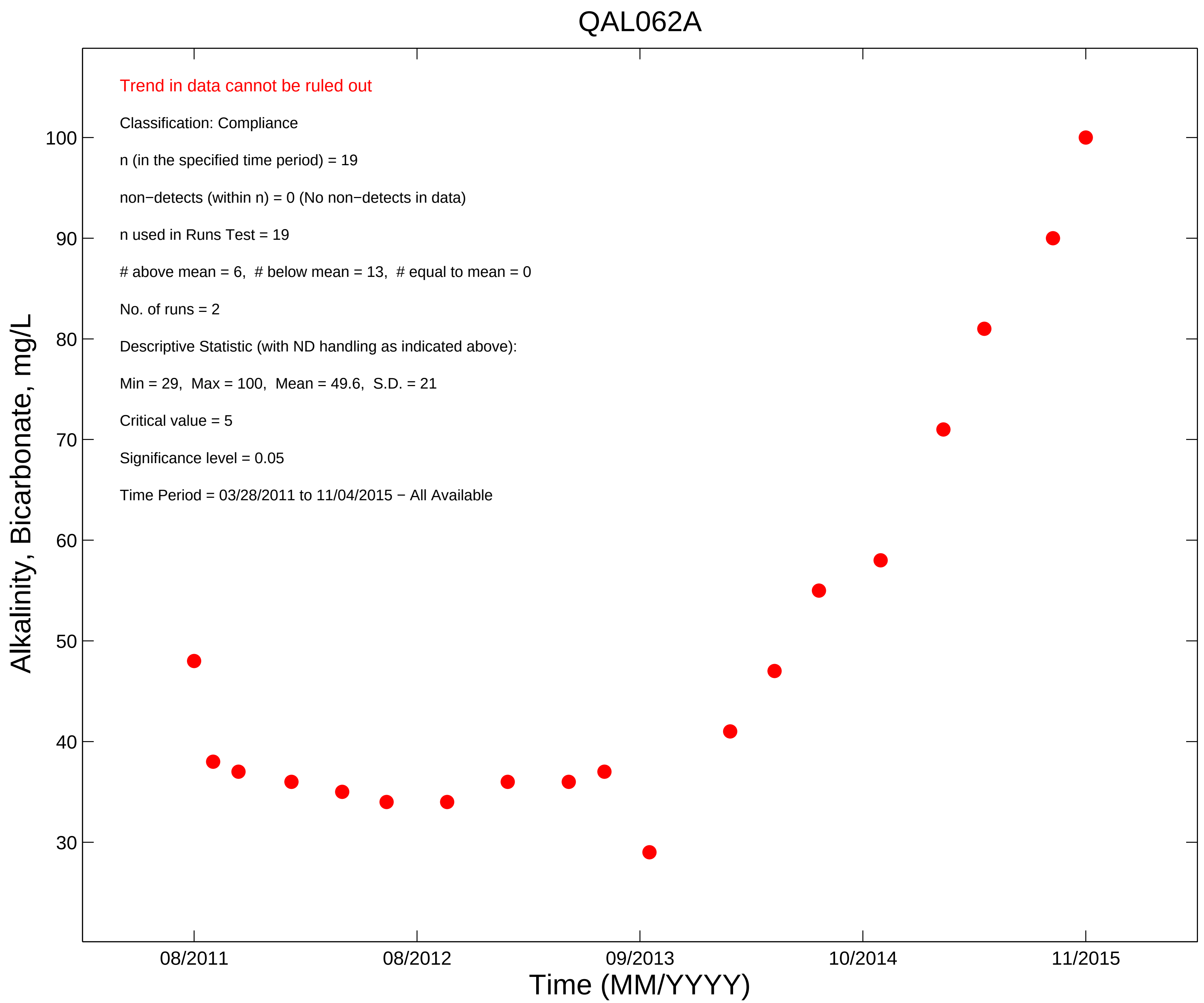

QAL024A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 17
non−detects (within n) = 2 (Included in data analysis as equal to RL)
n used in Runs Test = 17
above mean = 9, # below mean = 8, # equal to mean = 0
No. of runs = 5
Descriptive Statistic (with ND handling as indicated above):
Min = 1, Max = 340, Mean = 80.88, S.D. = 86.71
Critical value = 5
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Non−unique RL in data (NDs included in Runs Test as equal to RL)
Chloride, mg/L
350
300
250
200
150
100
50
0
12/2011
12/2012
11/2013
11/2014
11/2015
Time (MM/YYYY)

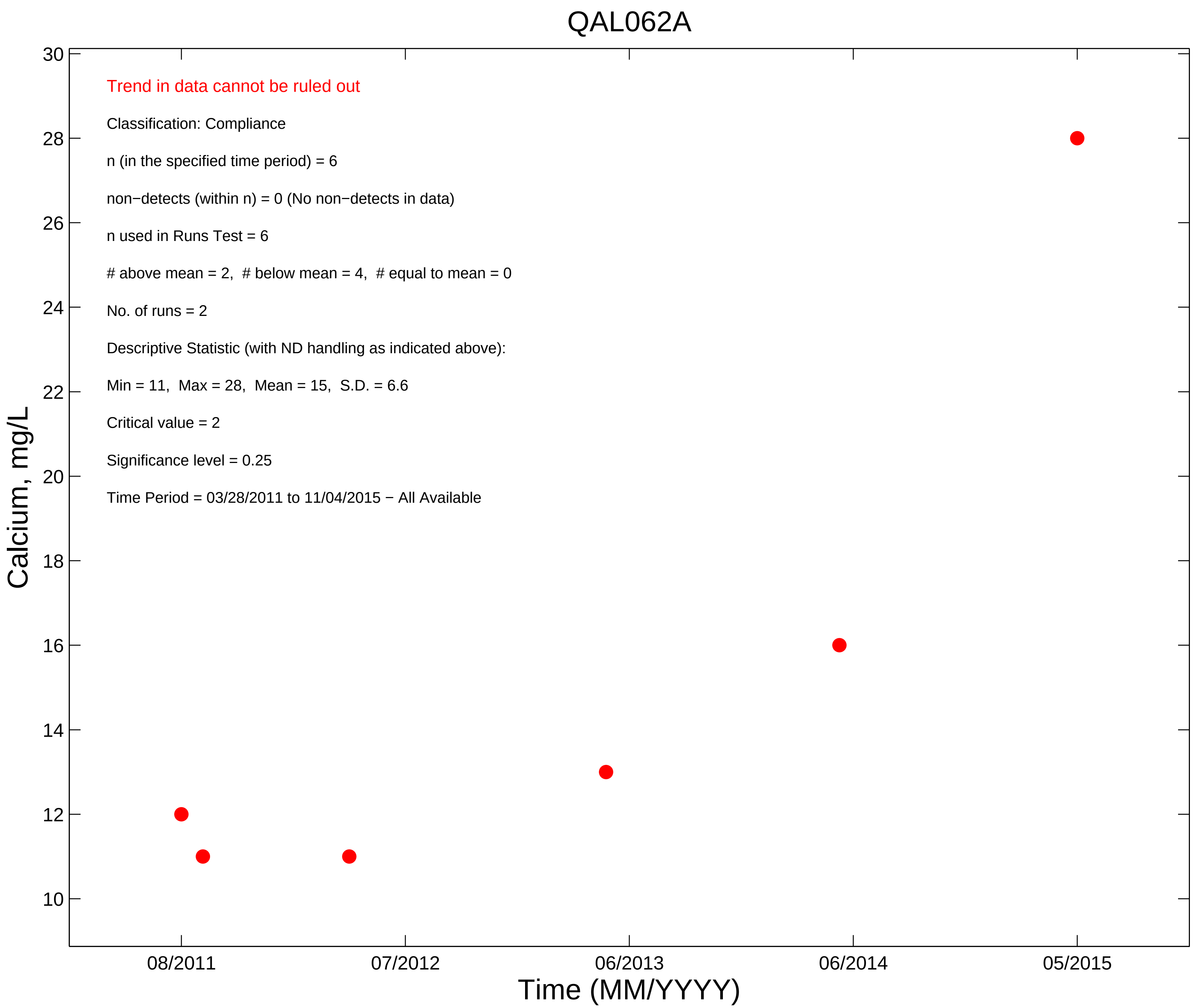

QAL024A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 17
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 17
above mean = 7, # below mean = 10, # equal to mean = 0
No. of runs = 5
Descriptive Statistic (with ND handling as indicated above):
Min = 0.55, Max = 180, Mean = 32.968, S.D. = 42.91
Critical value = 5
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Sodium, mg/L
200
150
100
50
0
12/2011
12/2012
11/2013
11/2014
11/2015
Time (MM/YYYY)

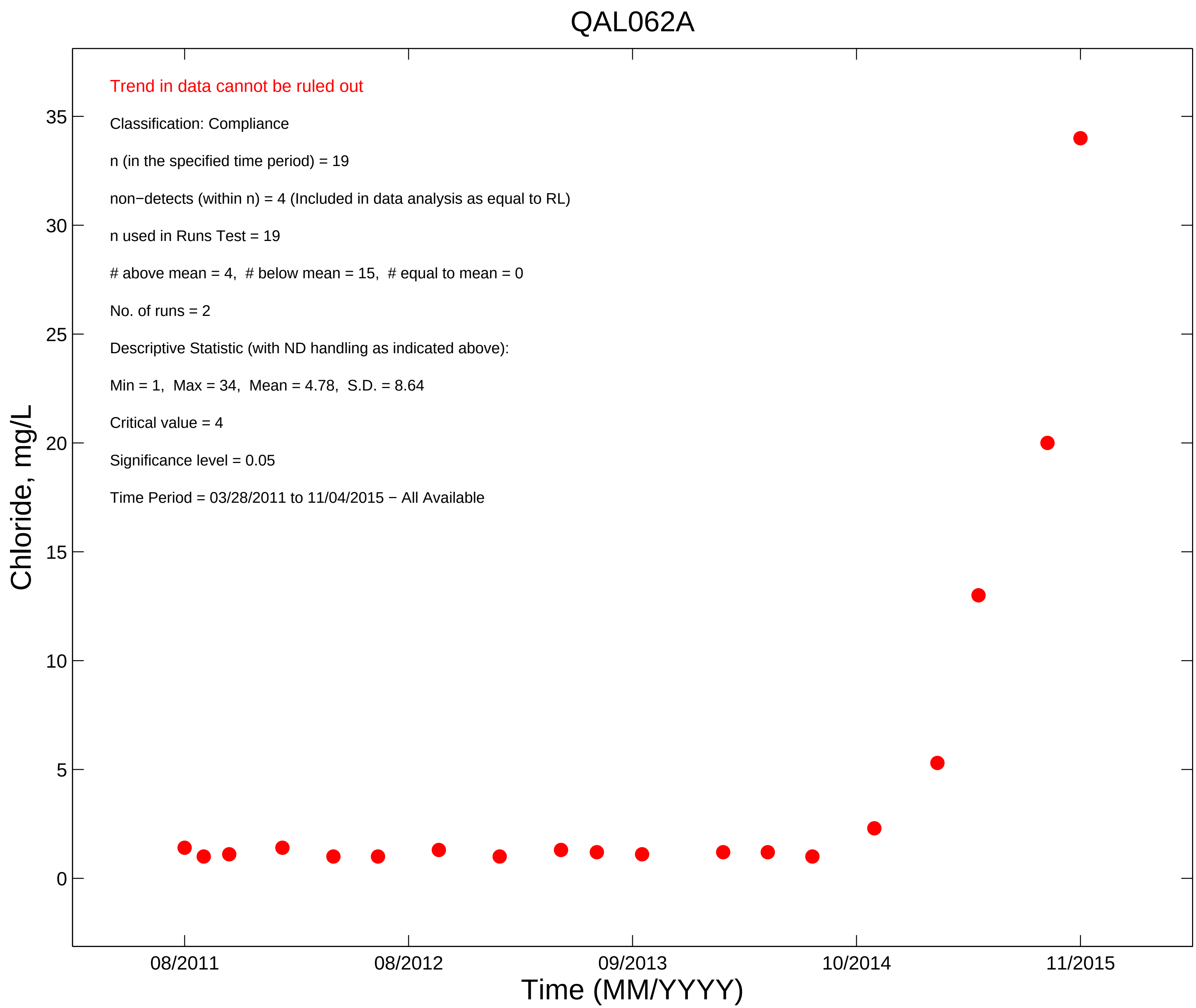

QAL024A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 17
non−detects (within n) = 3 (Included in data analysis as equal to RL)
n used in Runs Test = 17
above mean = 7, # below mean = 10, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 0.05, Max = 1.3, Mean = 0.4501, S.D. = 0.422
Critical value = 5
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Non−unique RL in data (NDs included in Runs Test as equal to RL)
Nitrogen, Nitrate, mg/L
1.4
1.2
1
0.8
0.6
0.4
0.2
0
12/2011
12/2012
11/2013
11/2014
11/2015
Time (MM/YYYY)


QAL044B
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 17
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 17
above mean = 6, # below mean = 11, # equal to mean = 0
No. of runs = 3
Descriptive Statistic (with ND handling as indicated above):
Min = 2.1, Max = 5.9, Mean = 3.2, S.D. = 1
Critical value = 5
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Sodium, mg/L
6
5.5
5
4.5
4
3.5
3
2.5
2
10/2011
10/2012
10/2013
10/2014
11/2015
Time (MM/YYYY)

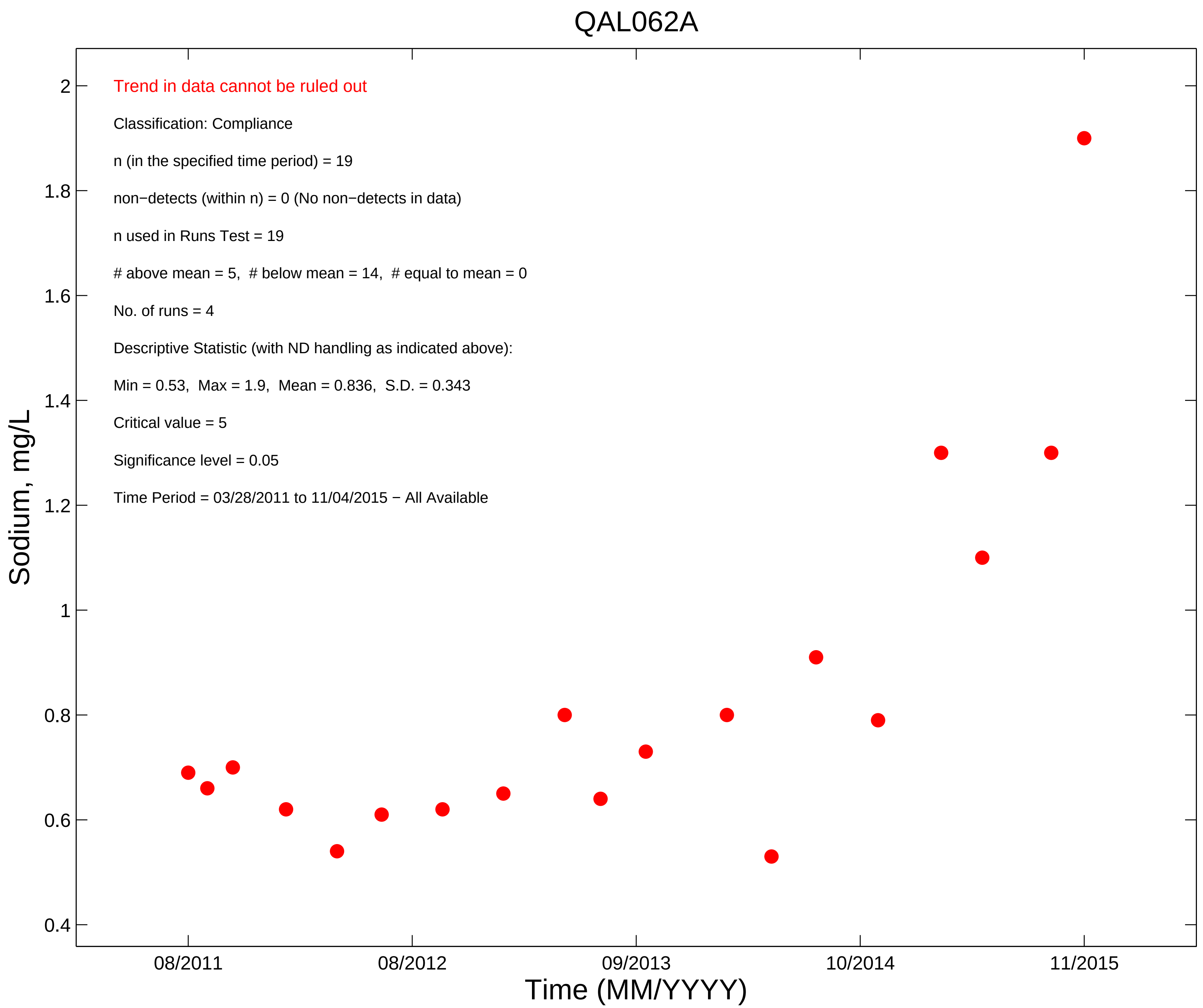

QAL060A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 19
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 19
above mean = 8, # below mean = 11, # equal to mean = 0
No. of runs = 4
Descriptive Statistic (with ND handling as indicated above):
Min = 0.063, Max = 0.48, Mean = 0.1555, S.D. = 0.09334
Critical value = 6
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Nitrogen, Nitrate, mg/L
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)

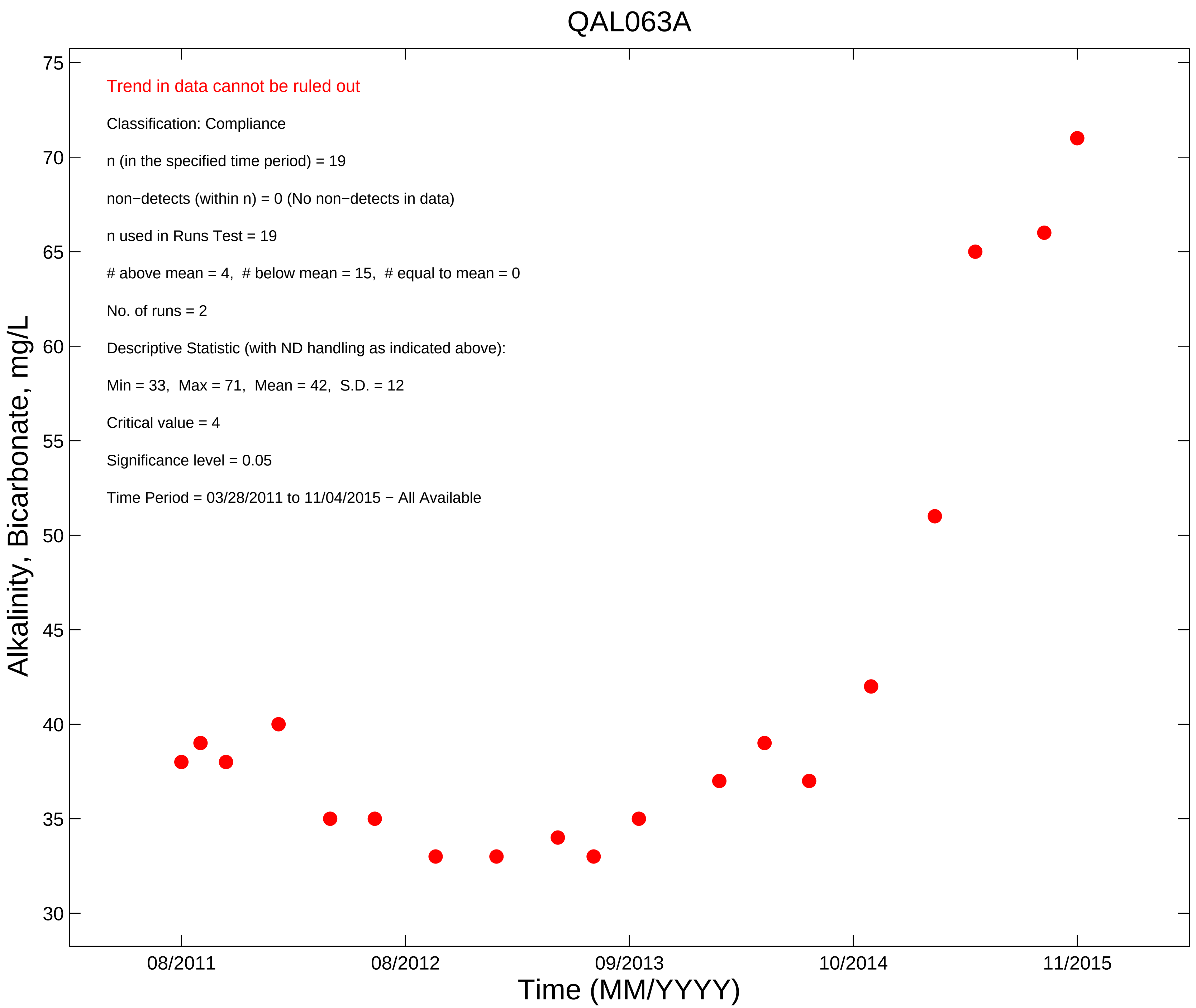

QAL062A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 19
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 19
above mean = 6, # below mean = 13, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 29, Max = 100, Mean = 49.6, S.D. = 21
Critical value = 5
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Alkalinity, Bicarbonate, mg/L
100
90
80
70
60
50
40
30
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)

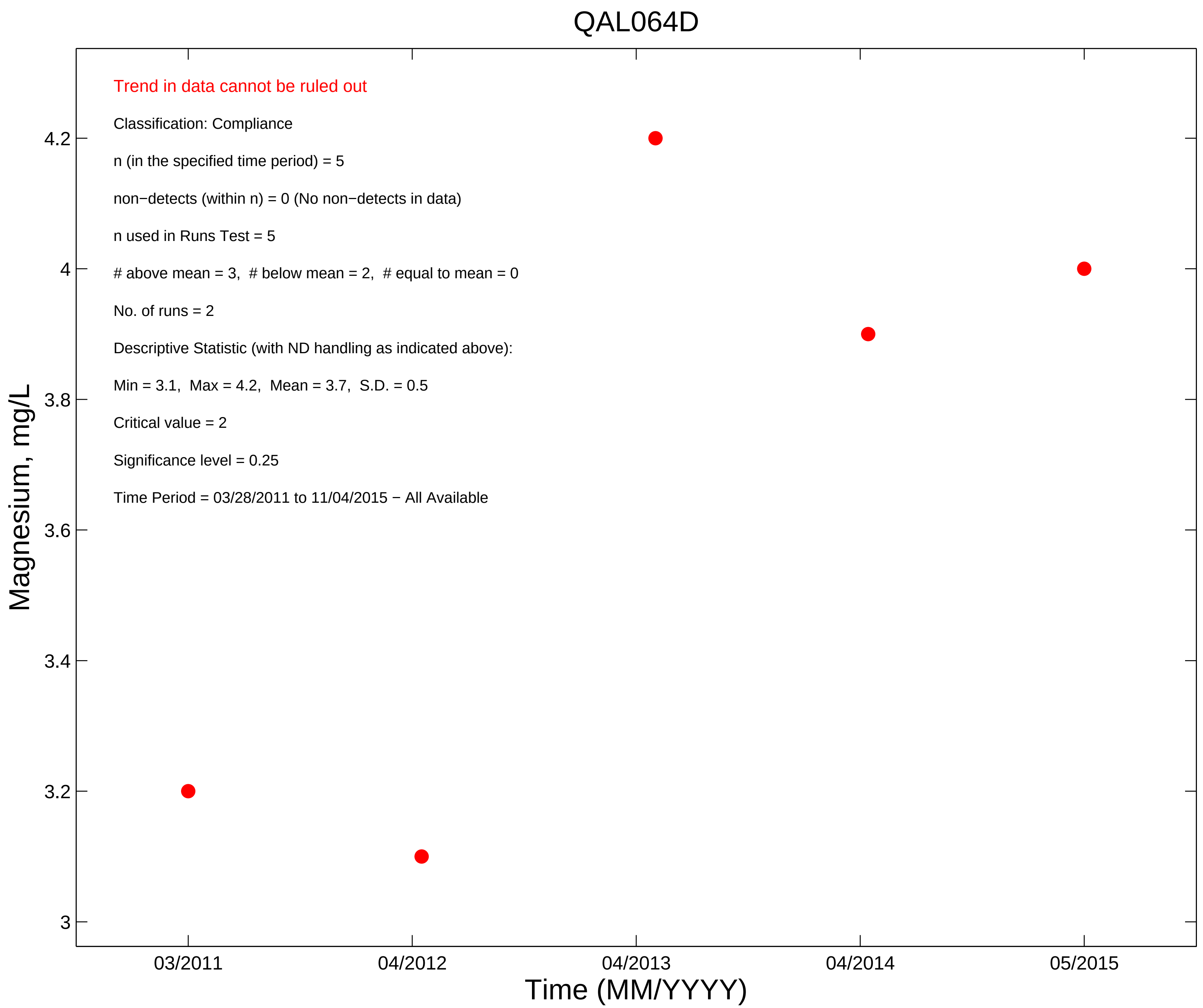

QAL062A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 6
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 6
above mean = 2, # below mean = 4, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 11, Max = 28, Mean = 15, S.D. = 6.6
Critical value = 2
Significance level = 0.25
Time Period = 03/28/2011 to 11/04/2015 − All Available
Calcium, mg/L
30
28
26
24
22
20
18
16
14
12
10
08/2011
07/2012
06/2013
06/2014
05/2015
Time (MM/YYYY)

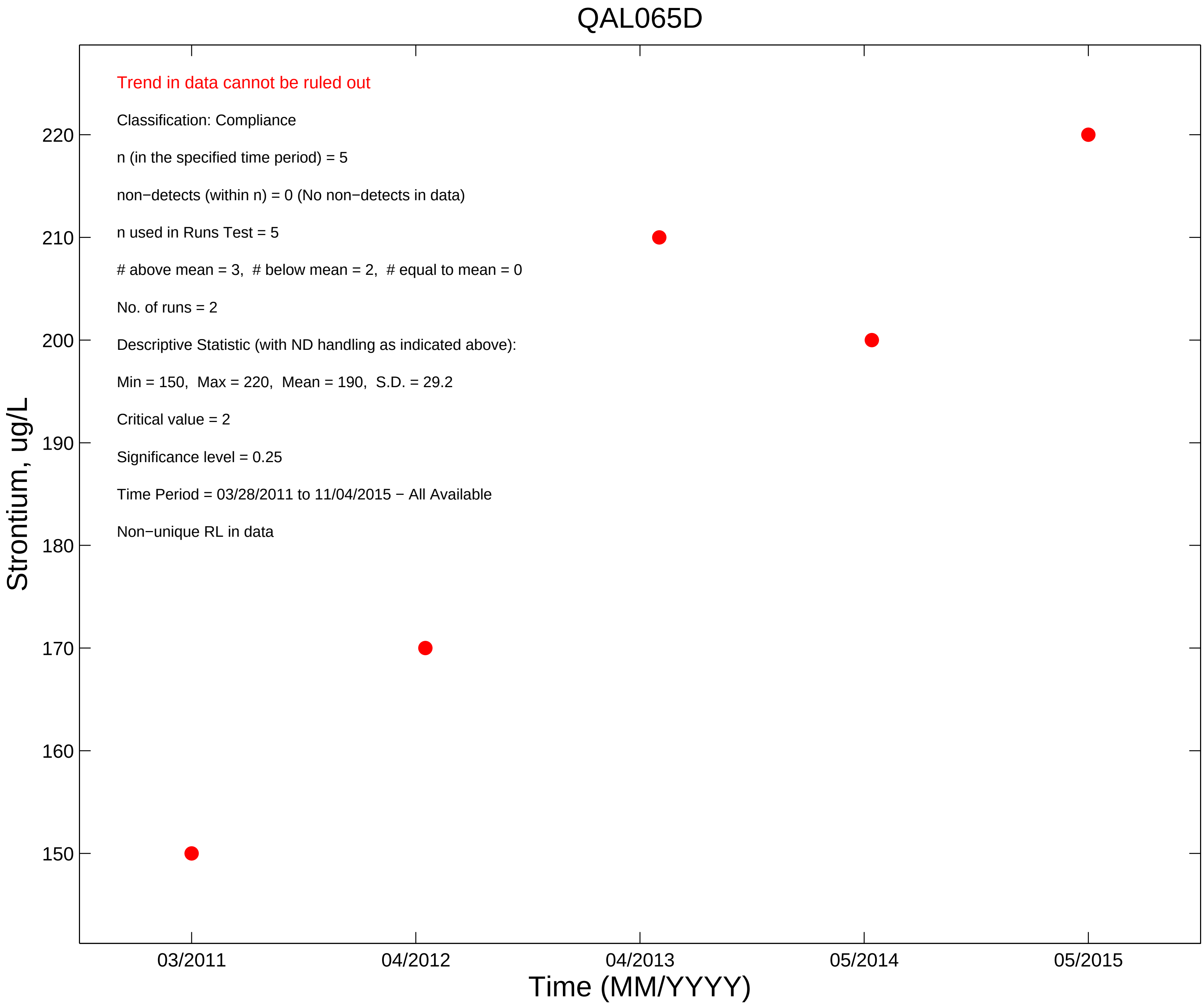


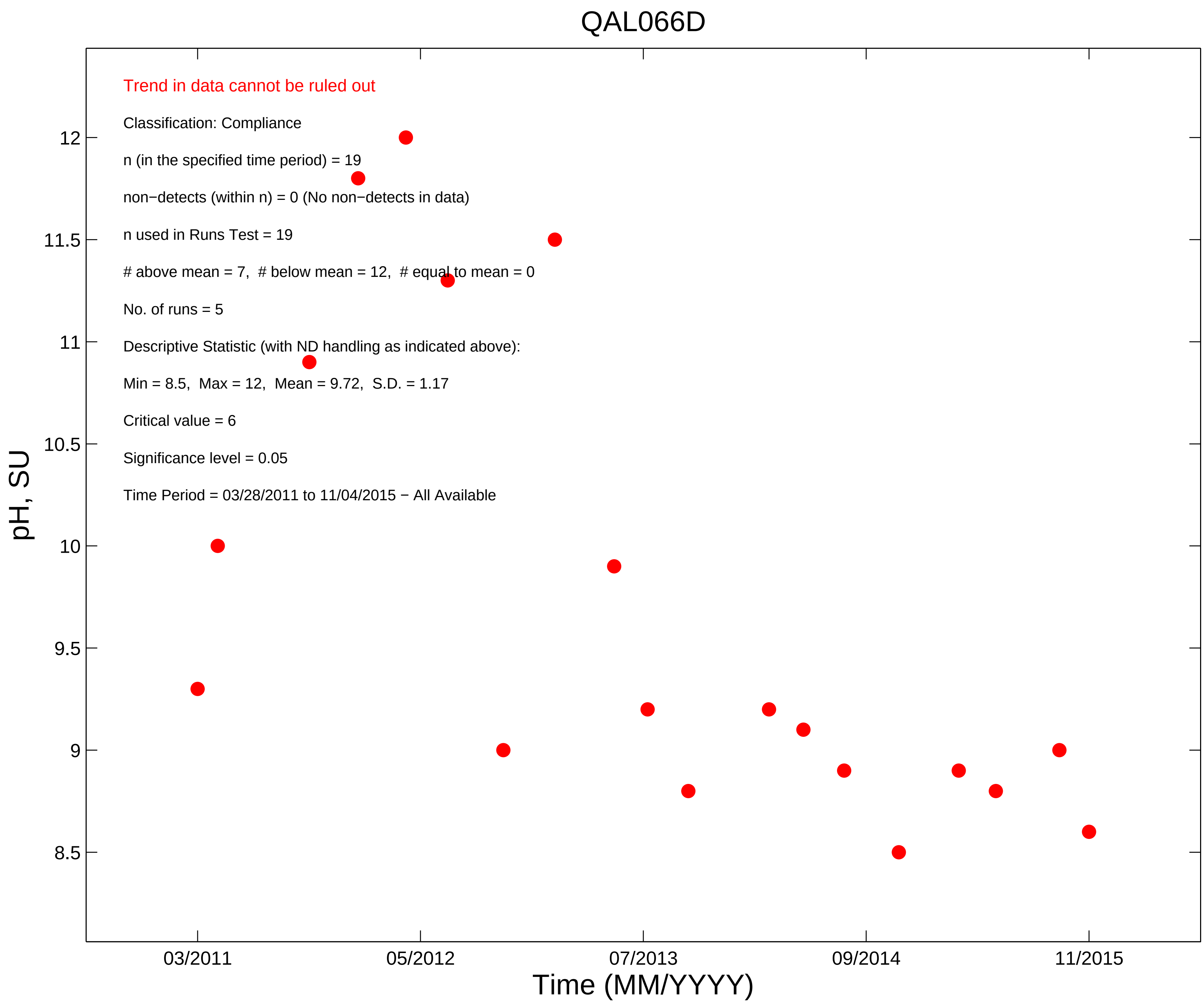
QAL062A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 19
non−detects (within n) = 4 (Included in data analysis as equal to RL)
n used in Runs Test = 19
above mean = 4, # below mean = 15, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 1, Max = 34, Mean = 4.78, S.D. = 8.64
Critical value = 4
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Chloride, mg/L
35
30
25
20
15
10
5
0
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)

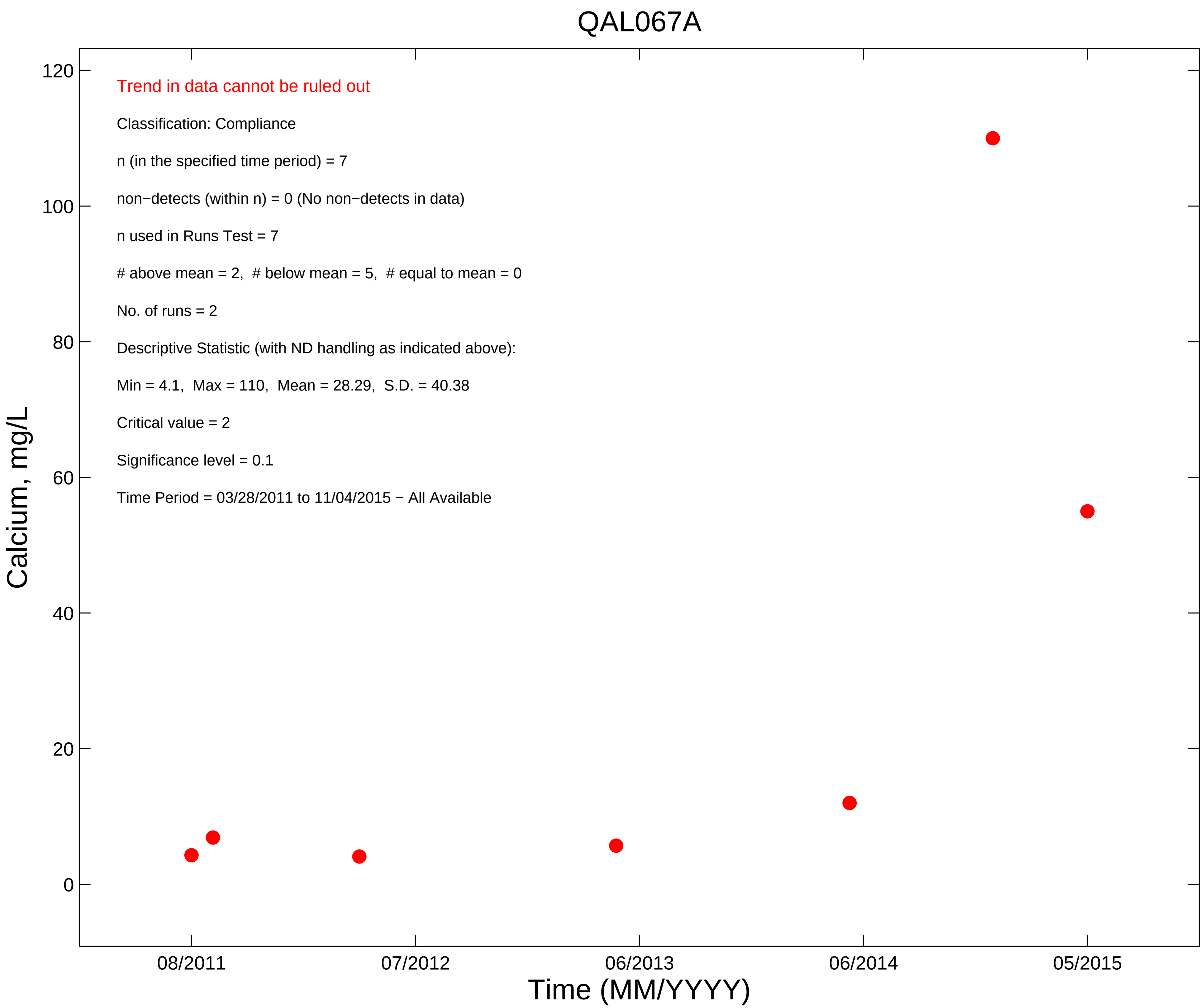

QAL062A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 19
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 19
above mean = 5, # below mean = 14, # equal to mean = 0
No. of runs = 4
Descriptive Statistic (with ND handling as indicated above):
Min = 0.53, Max = 1.9, Mean = 0.836, S.D. = 0.343
Critical value = 5
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Sodium, mg/L
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)

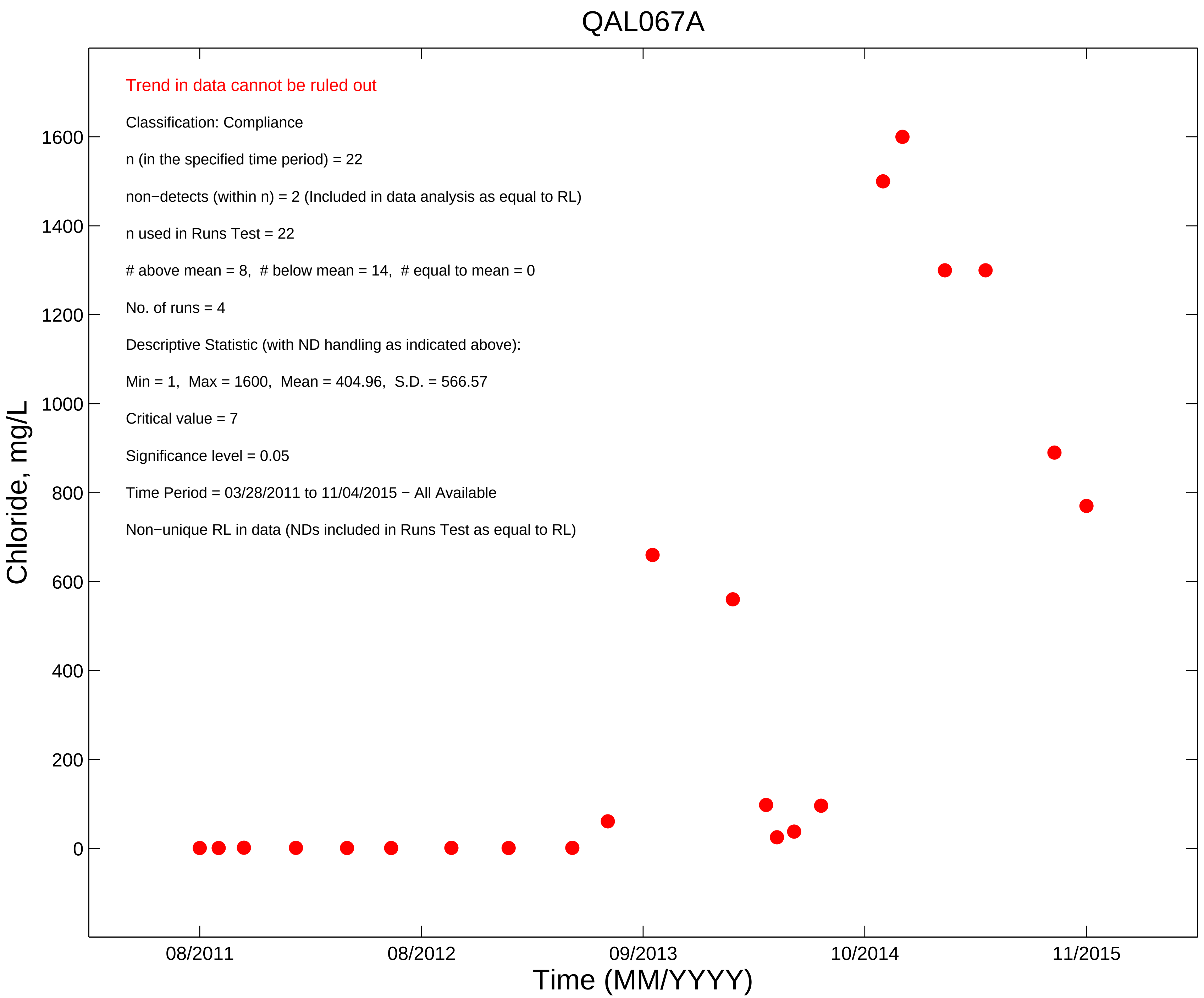

QAL063A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 19
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 19
above mean = 4, # below mean = 15, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 33, Max = 71, Mean = 42, S.D. = 12
Critical value = 4
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Alkalinity, Bicarbonate, mg/L
75
70
65
60
55
50
45
40
35
30
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)

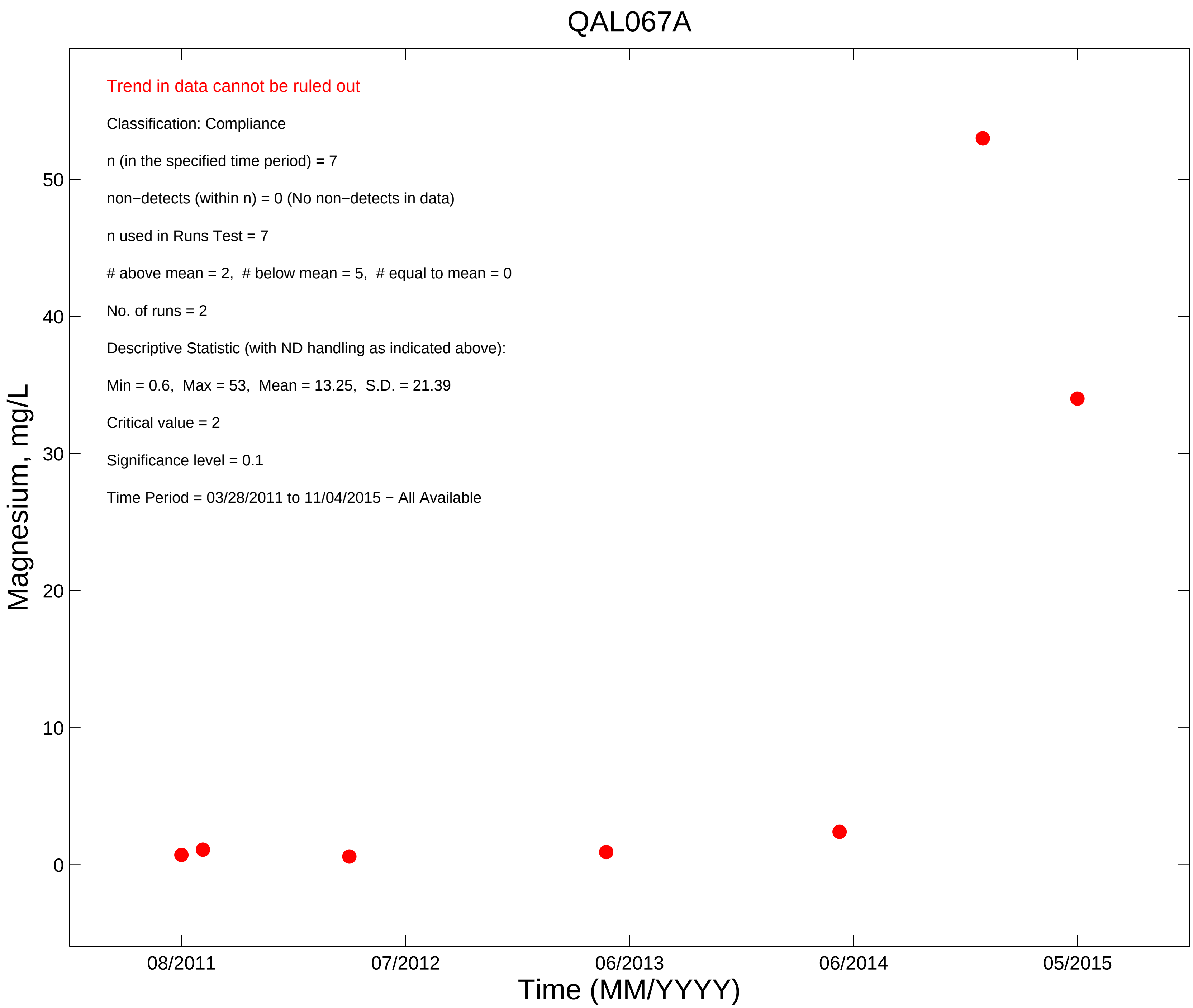

QAL064D
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 5
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 5
above mean = 3, # below mean = 2, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 3.1, Max = 4.2, Mean = 3.7, S.D. = 0.5
Critical value = 2
Significance level = 0.25
Time Period = 03/28/2011 to 11/04/2015 − All Available
Magnesium, mg/L
4.2
4
3.8
3.6
3.4
3.2
3
03/2011
04/2012
04/2013
04/2014
05/2015
Time (MM/YYYY)

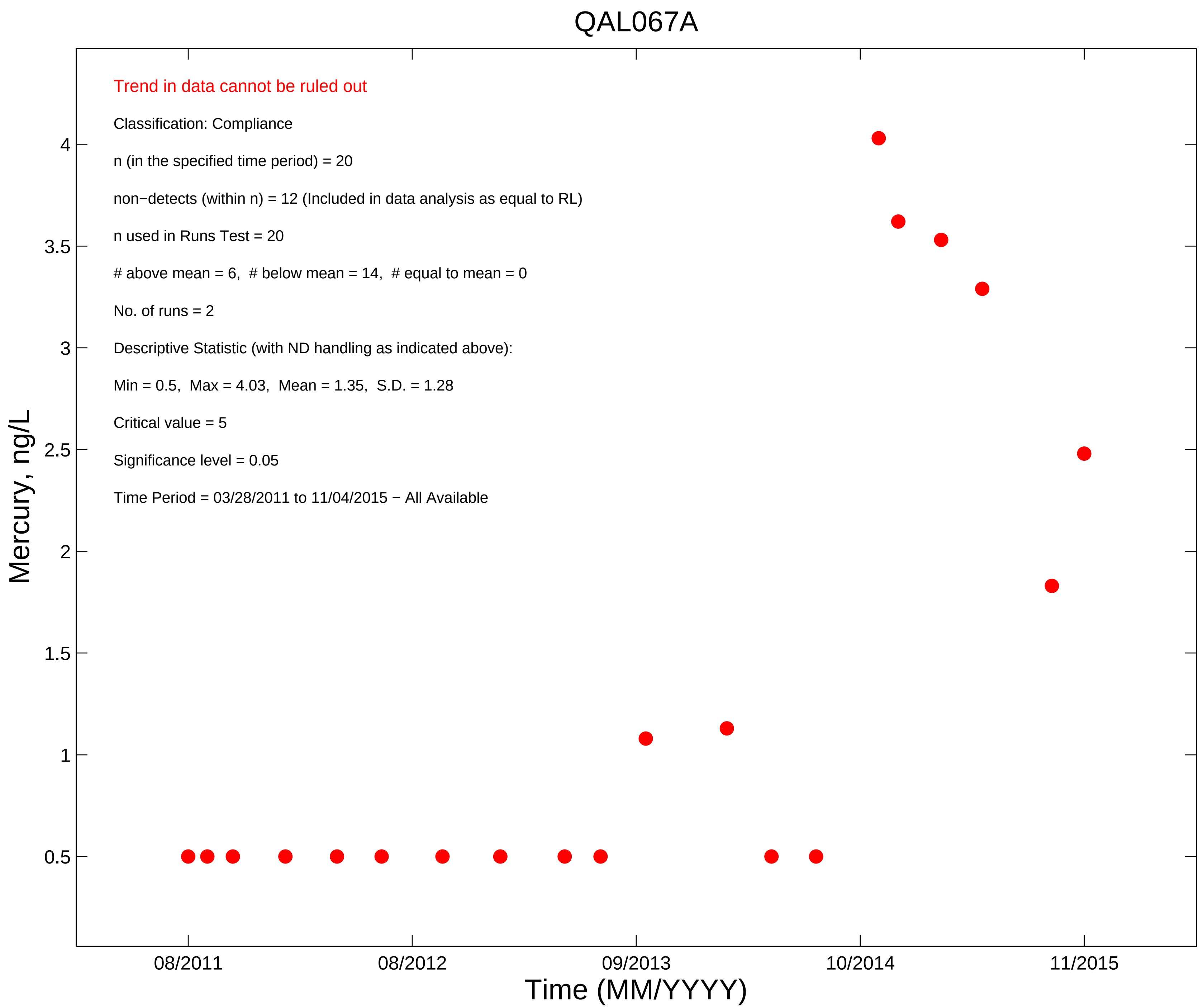

QAL065D
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 5
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 5
above mean = 3, # below mean = 2, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 150, Max = 220, Mean = 190, S.D. = 29.2
Critical value = 2
Significance level = 0.25
Time Period = 03/28/2011 to 11/04/2015 − All Available
Non−unique RL in data
Strontium, ug/L
220
210
200
190
180
170
160
150
03/2011
04/2012
04/2013
05/2014
05/2015
Time (MM/YYYY)

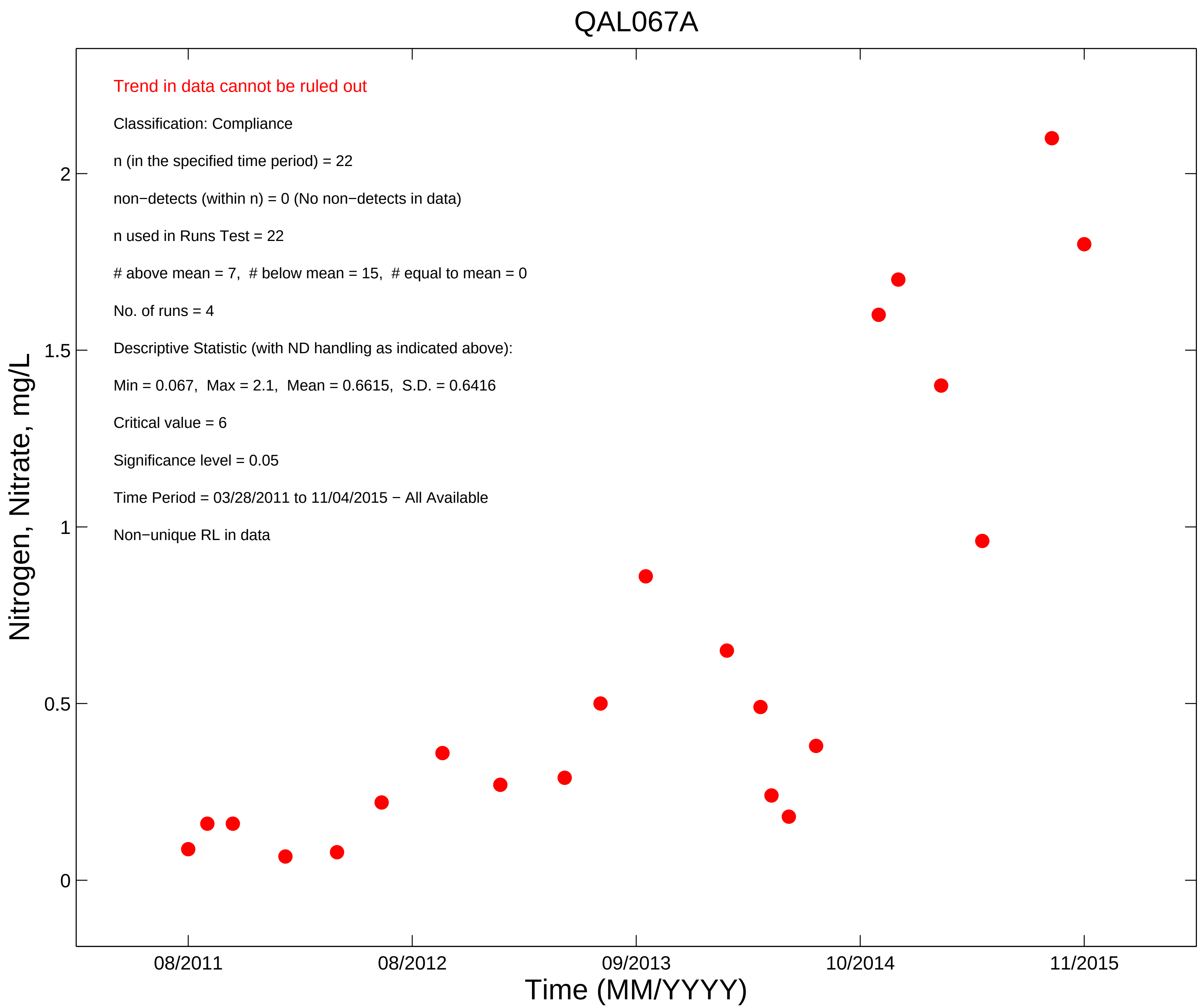

QAL066D
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 19
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 19
above mean = 7, # below mean = 12, # equal to mean = 0
No. of runs = 5
Descriptive Statistic (with ND handling as indicated above):
Min = 8.5, Max = 12, Mean = 9.72, S.D. = 1.17
Critical value = 6
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
pH, SU
12
11.5
11
10.5
10
9.5
9
8.5
03/2011
05/2012
07/2013
09/2014
11/2015
Time (MM/YYYY)

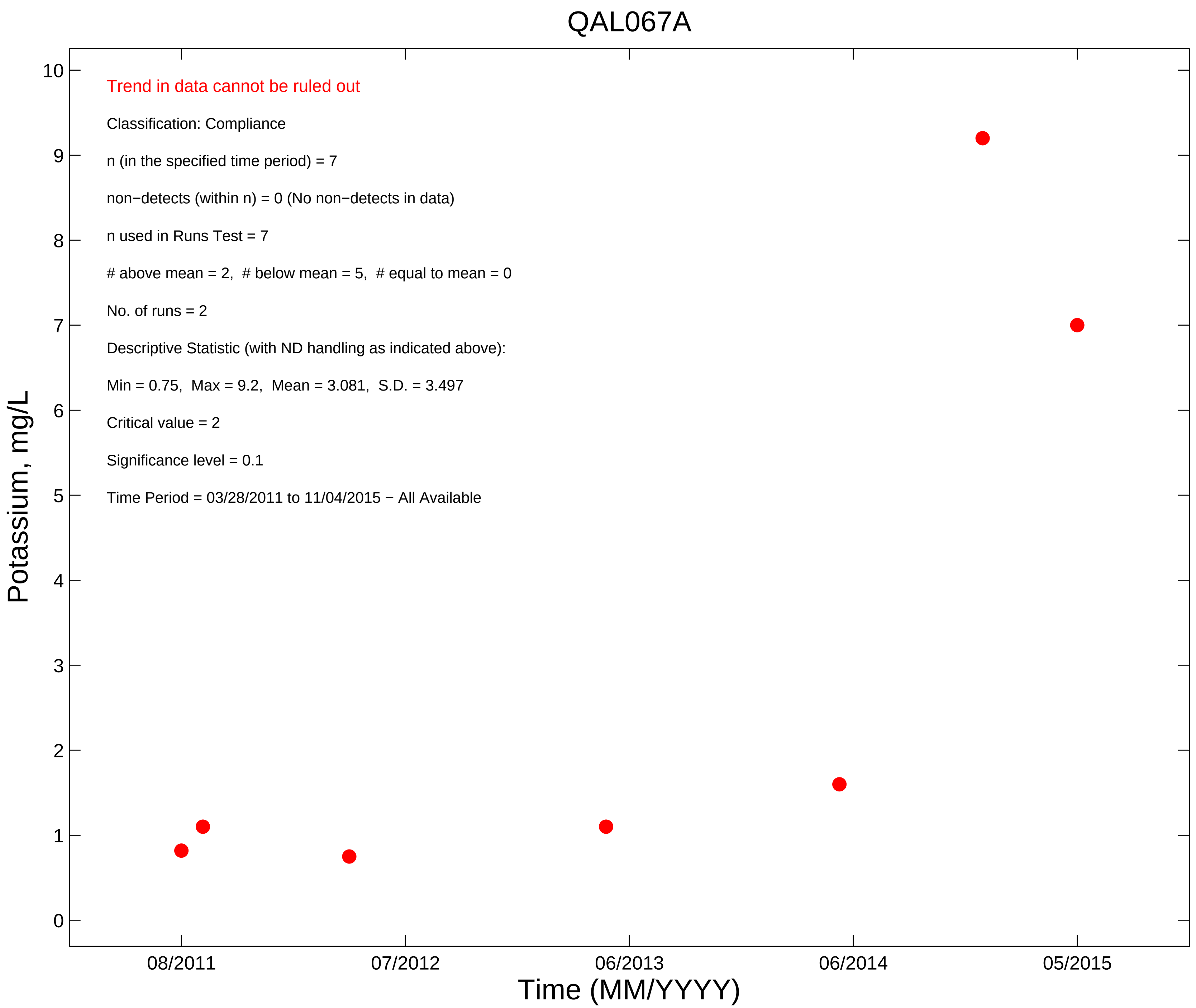

QAL067A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 7
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 7
above mean = 2, # below mean = 5, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 4.1, Max = 110, Mean = 28.29, S.D. = 40.38
Critical value = 2
Significance level = 0.1
Time Period = 03/28/2011 to 11/04/2015 − All Available
Calcium, mg/L
120
100
80
60
40
20
0
08/2011
07/2012
06/2013
06/2014
05/2015
Time (MM/YYYY)

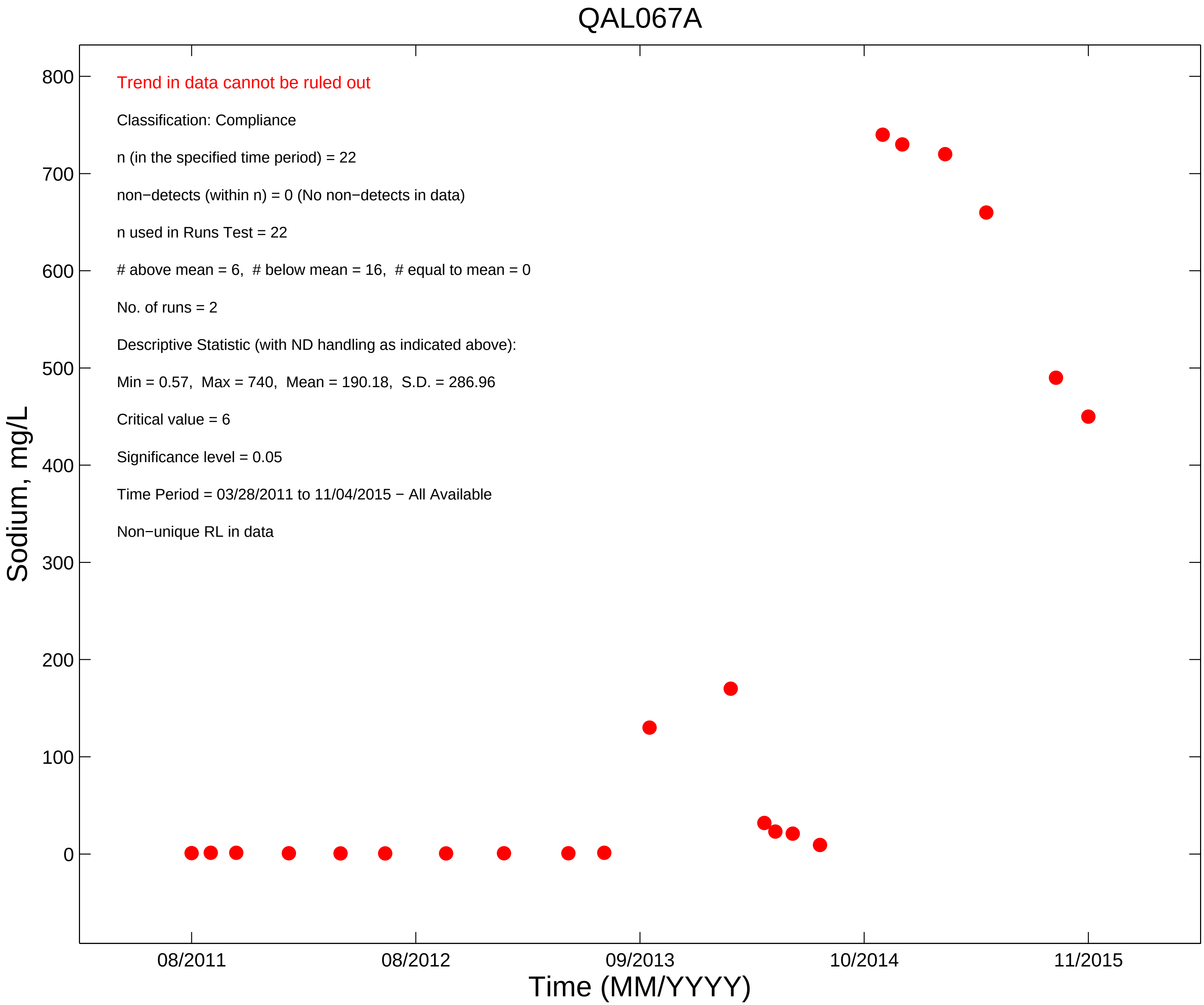

QAL067A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 22
non−detects (within n) = 2 (Included in data analysis as equal to RL)
n used in Runs Test = 22
above mean = 8, # below mean = 14, # equal to mean = 0
No. of runs = 4
Descriptive Statistic (with ND handling as indicated above):
Min = 1, Max = 1600, Mean = 404.96, S.D. = 566.57
Critical value = 7
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Non−unique RL in data (NDs included in Runs Test as equal to RL)
Chloride, mg/L
1600
1400
1200
1000
800
600
400
200
0
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)


QAL067A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 7
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 7
above mean = 2, # below mean = 5, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 0.6, Max = 53, Mean = 13.25, S.D. = 21.39
Critical value = 2
Significance level = 0.1
Time Period = 03/28/2011 to 11/04/2015 − All Available
Magnesium, mg/L
50
40
30
20
10
0
08/2011
07/2012
06/2013
06/2014
05/2015
Time (MM/YYYY)

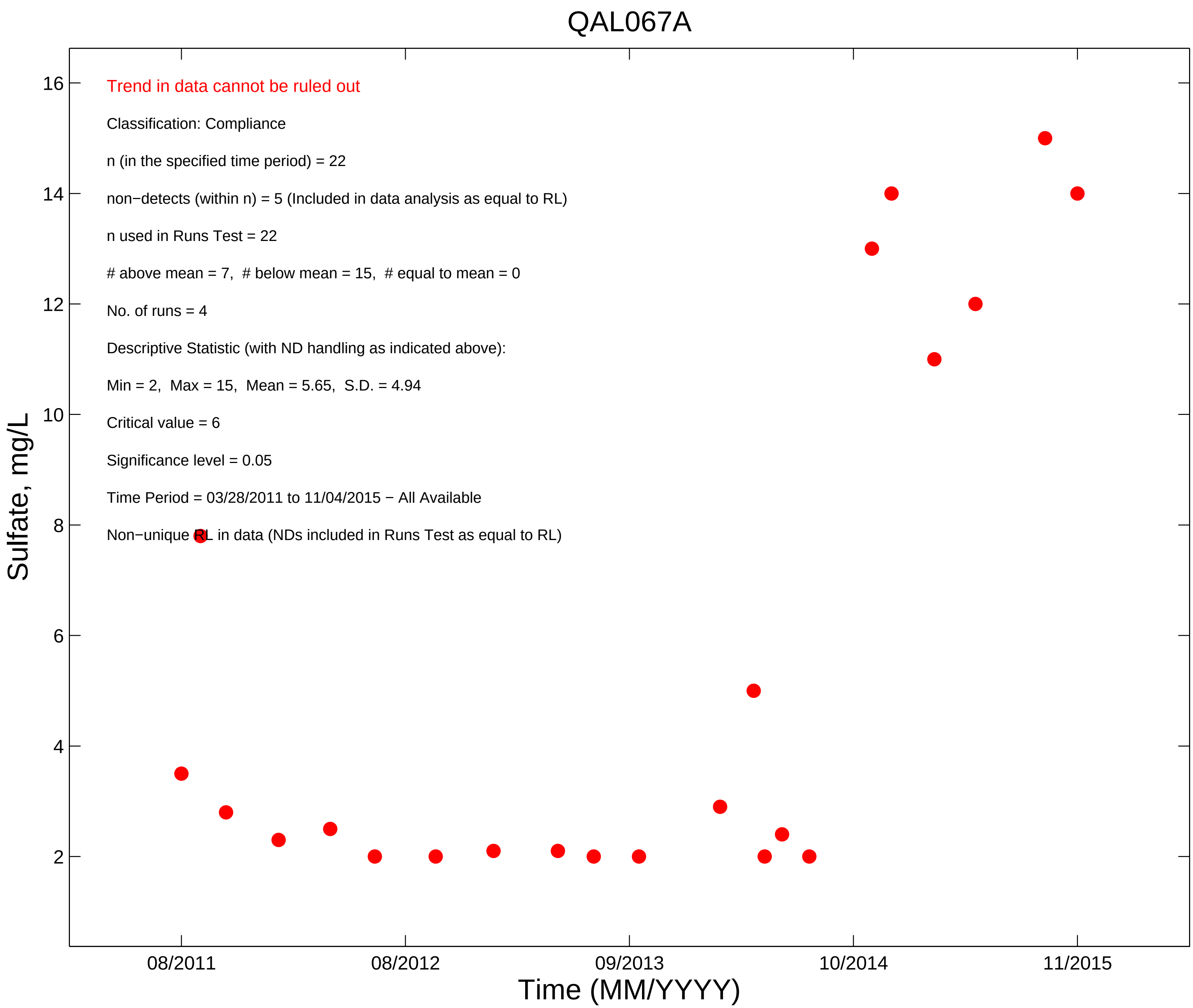

QAL067A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 20
non−detects (within n) = 12 (Included in data analysis as equal to RL)
n used in Runs Test = 20
above mean = 6, # below mean = 14, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 0.5, Max = 4.03, Mean = 1.35, S.D. = 1.28
Critical value = 5
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Mercury, ng/L
4
3.5
3
2.5
2
1.5
1
0.5
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)

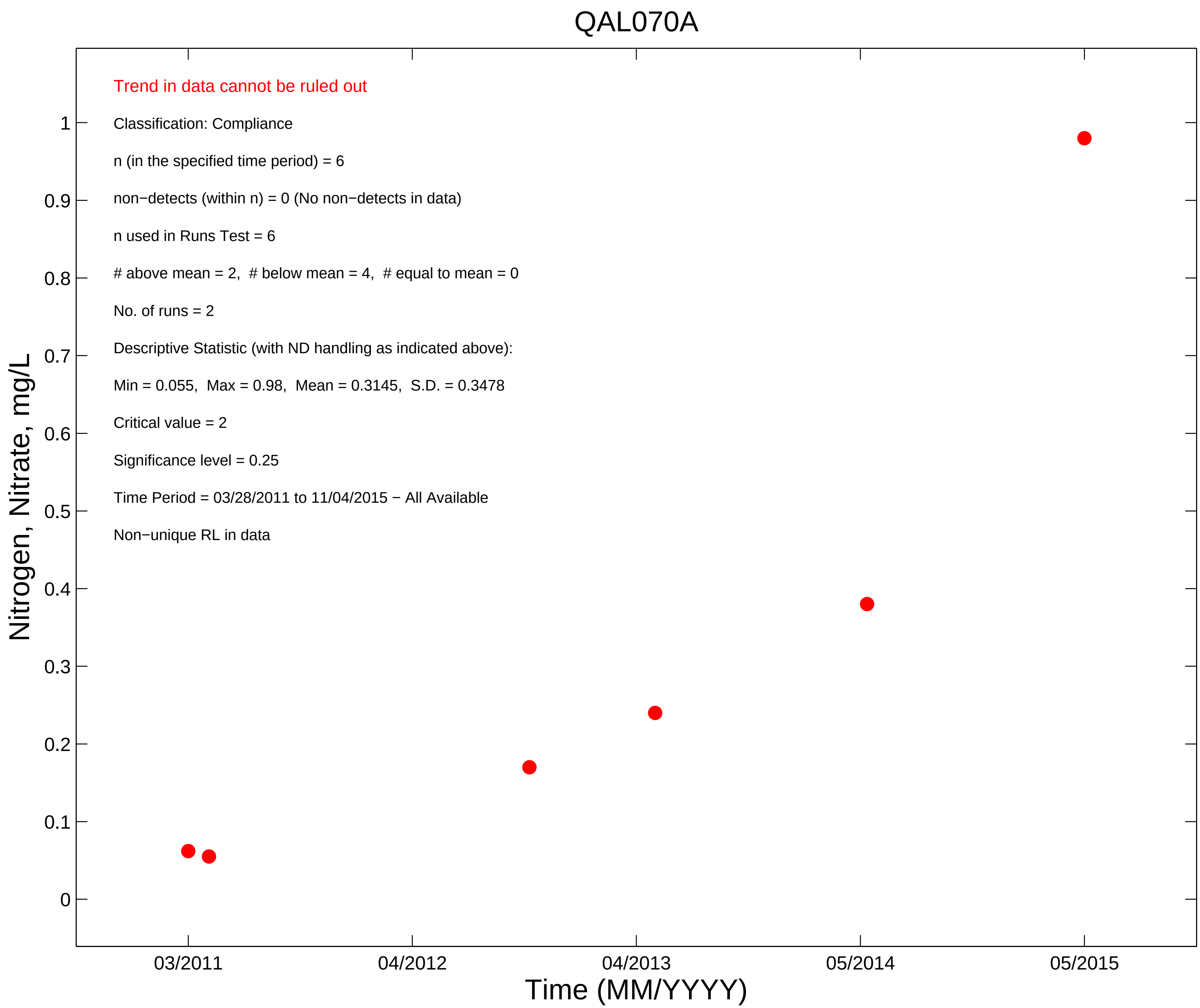

QAL067A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 22
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 22
above mean = 7, # below mean = 15, # equal to mean = 0
No. of runs = 4
Descriptive Statistic (with ND handling as indicated above):
Min = 0.067, Max = 2.1, Mean = 0.6615, S.D. = 0.6416
Critical value = 6
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Non−unique RL in data
Nitrogen, Nitrate, mg/L
0
0.5
1
1.5
2
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)

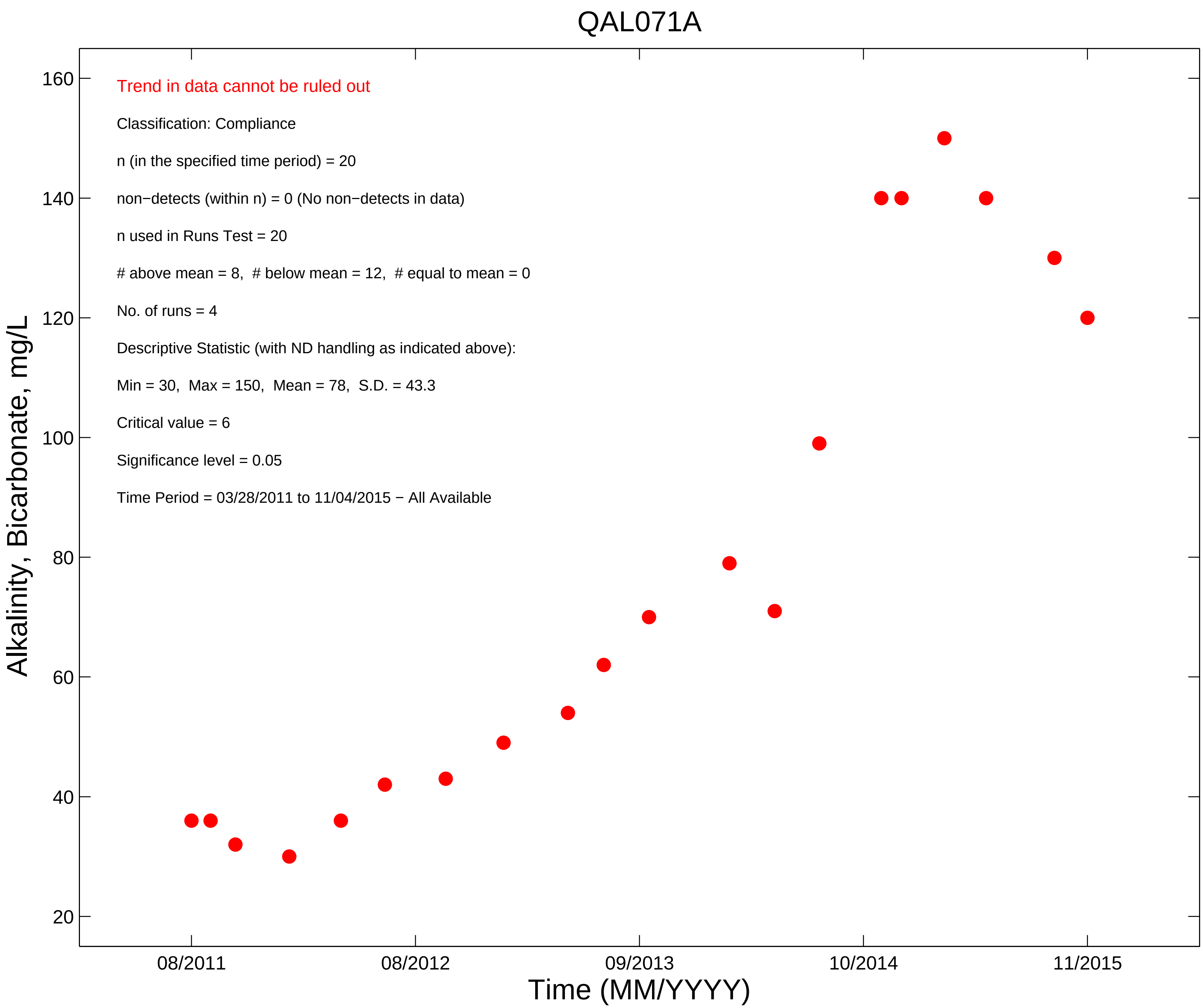

QAL067A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 7
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 7
above mean = 2, # below mean = 5, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 0.75, Max = 9.2, Mean = 3.081, S.D. = 3.497
Critical value = 2
Significance level = 0.1
Time Period = 03/28/2011 to 11/04/2015 − All Available
Potassium, mg/L
0
1
2
3
4
5
6
7
8
9
10
08/2011
07/2012
06/2013
06/2014
05/2015
Time (MM/YYYY)

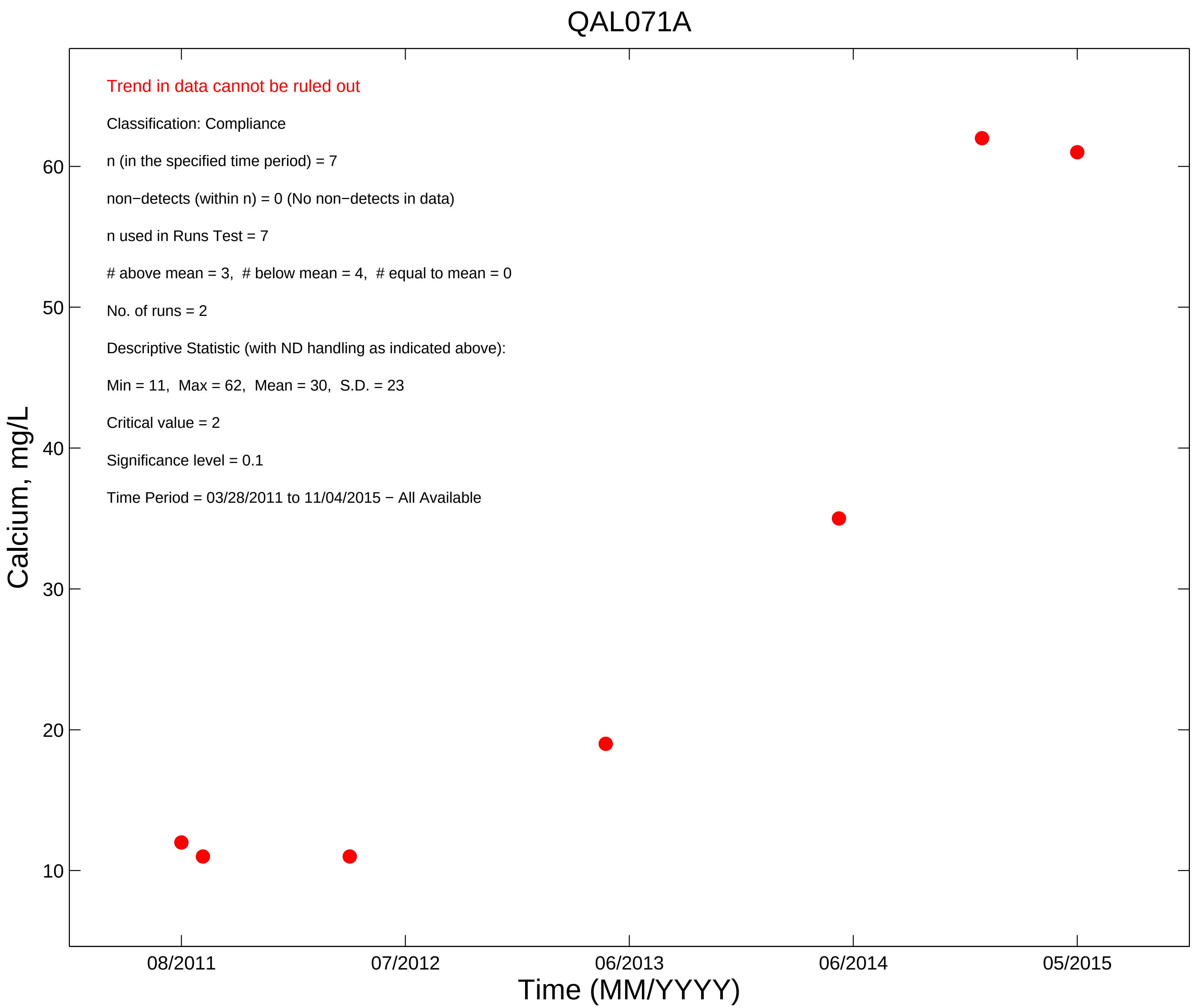


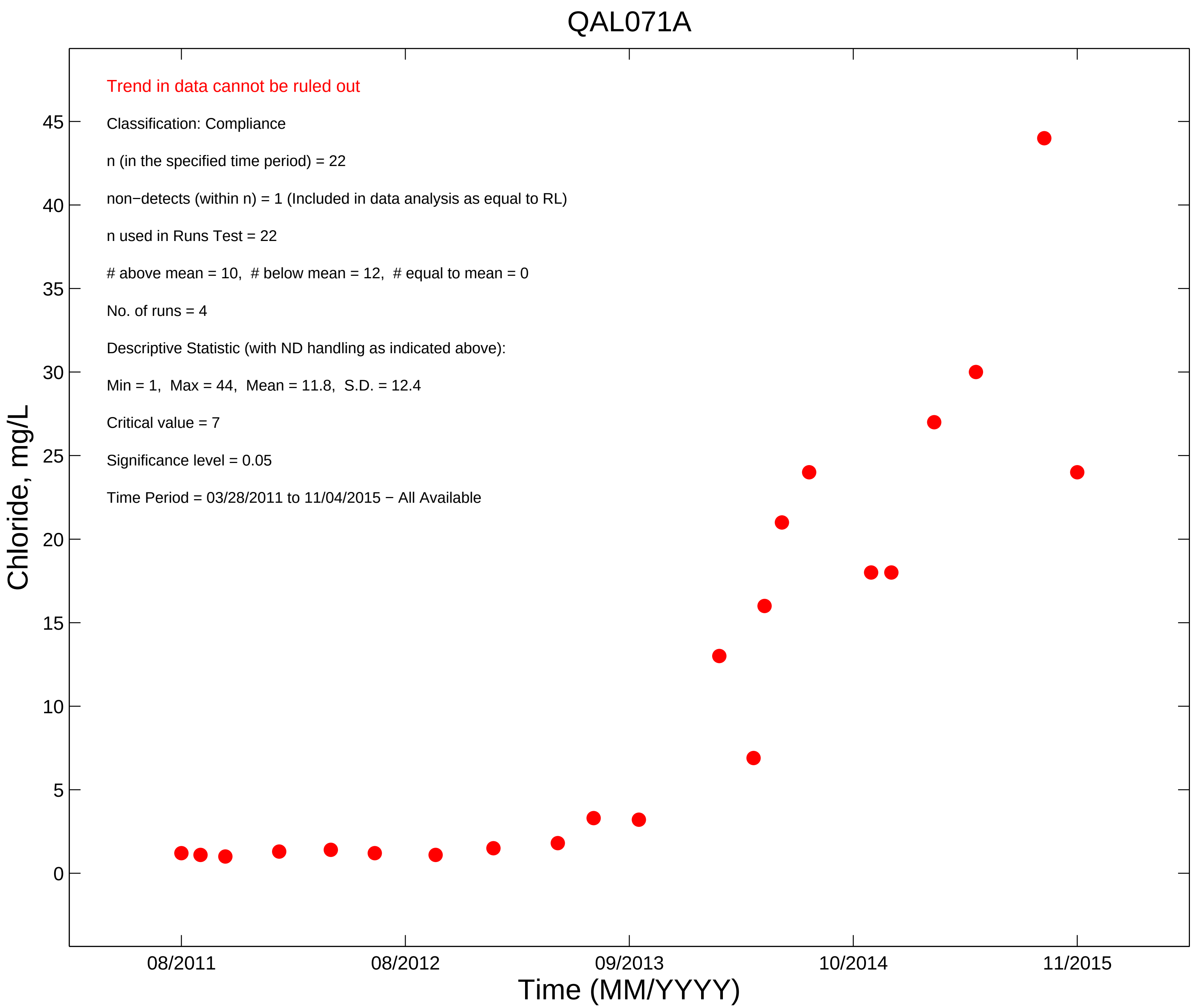
QAL067A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 22
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 22
above mean = 6, # below mean = 16, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 0.57, Max = 740, Mean = 190.18, S.D. = 286.96
Critical value = 6
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Non−unique RL in data
Sodium, mg/L
800
700
600
500
400
300
200
100
0
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)

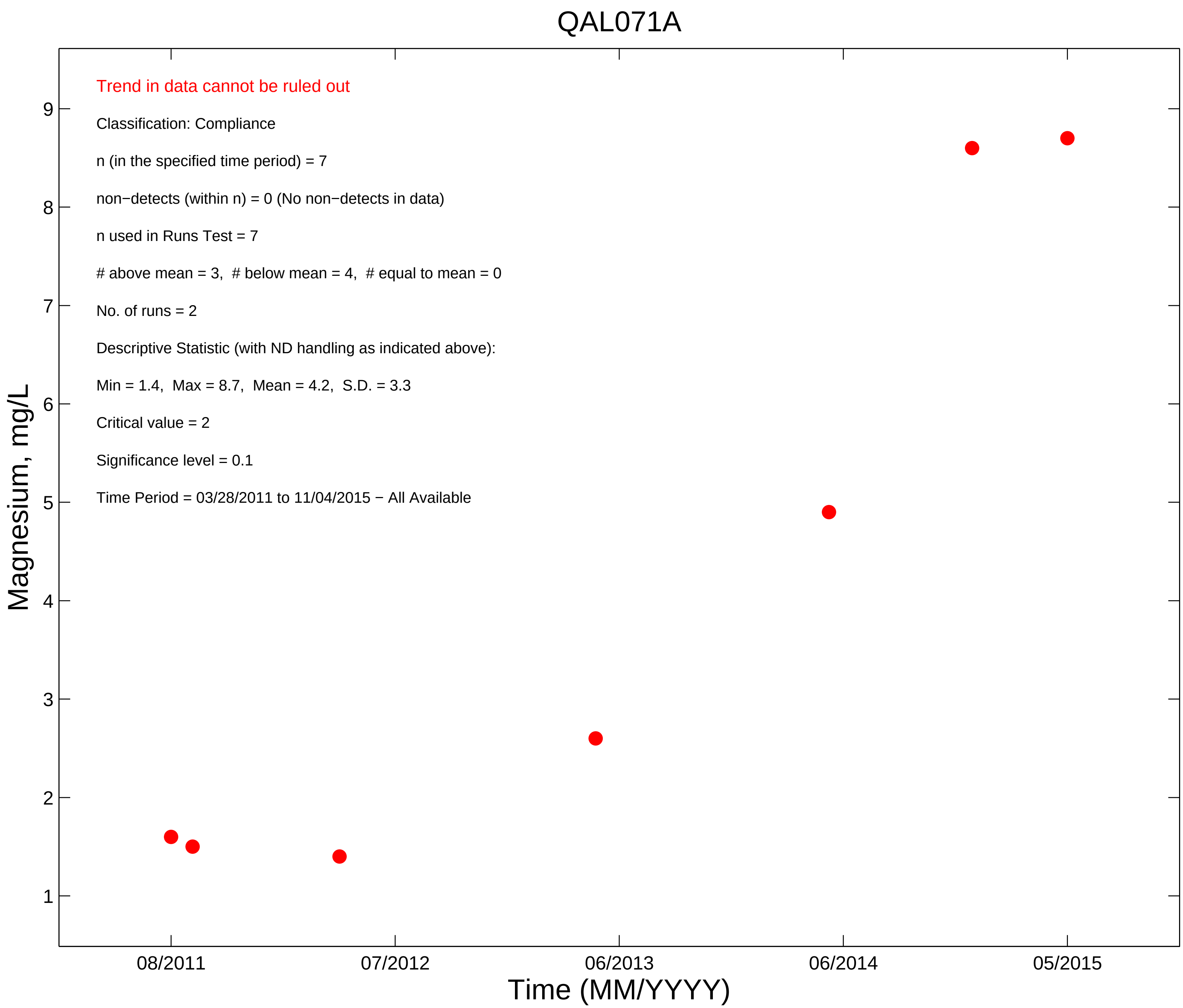

QAL067A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 22
non−detects (within n) = 5 (Included in data analysis as equal to RL)
n used in Runs Test = 22
above mean = 7, # below mean = 15, # equal to mean = 0
No. of runs = 4
Descriptive Statistic (with ND handling as indicated above):
Min = 2, Max = 15, Mean = 5.65, S.D. = 4.94
Critical value = 6
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Non−unique RL in data (NDs included in Runs Test as equal to RL)
Sulfate, mg/L
16
14
12
10
8
6
4
2
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)

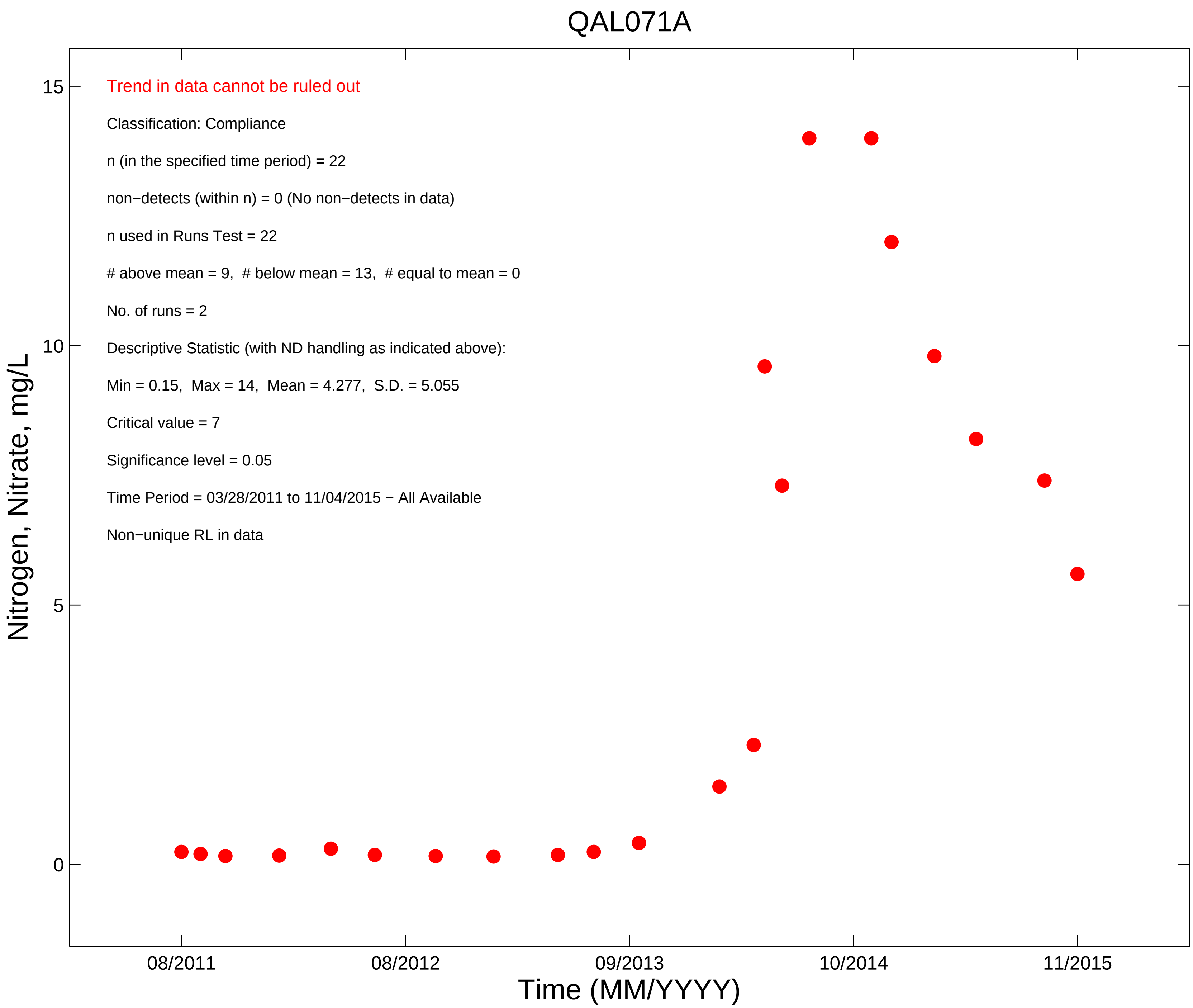

QAL070A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 6
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 6
above mean = 2, # below mean = 4, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 0.055, Max = 0.98, Mean = 0.3145, S.D. = 0.3478
Critical value = 2
Significance level = 0.25
Time Period = 03/28/2011 to 11/04/2015 − All Available
Non−unique RL in data
Nitrogen, Nitrate, mg/L
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
03/2011
04/2012
04/2013
05/2014
05/2015
Time (MM/YYYY)

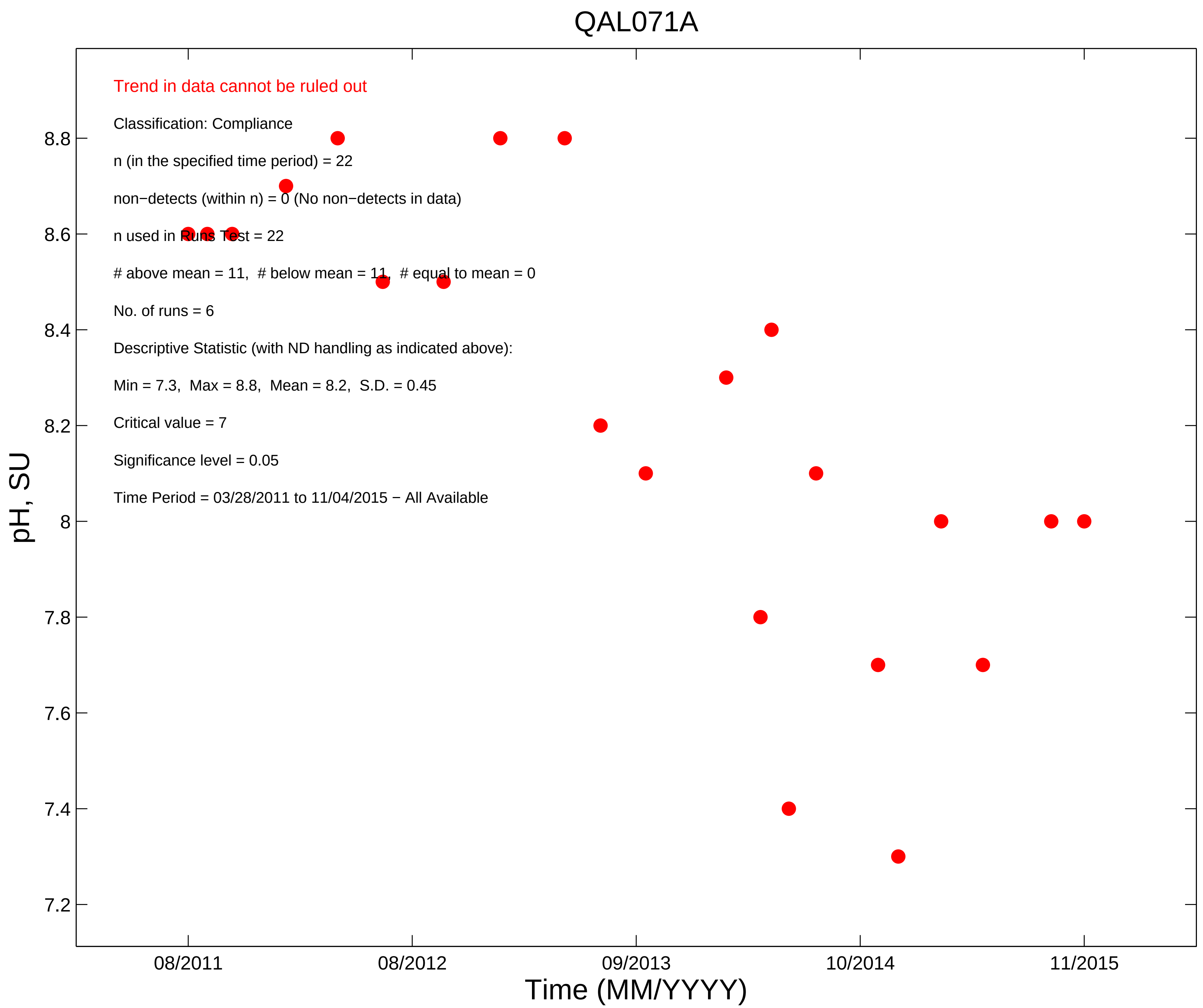

QAL071A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 20
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 20
above mean = 8, # below mean = 12, # equal to mean = 0
No. of runs = 4
Descriptive Statistic (with ND handling as indicated above):
Min = 30, Max = 150, Mean = 78, S.D. = 43.3
Critical value = 6
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Alkalinity, Bicarbonate, mg/L
160
140
120
100
80
60
40
20
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)

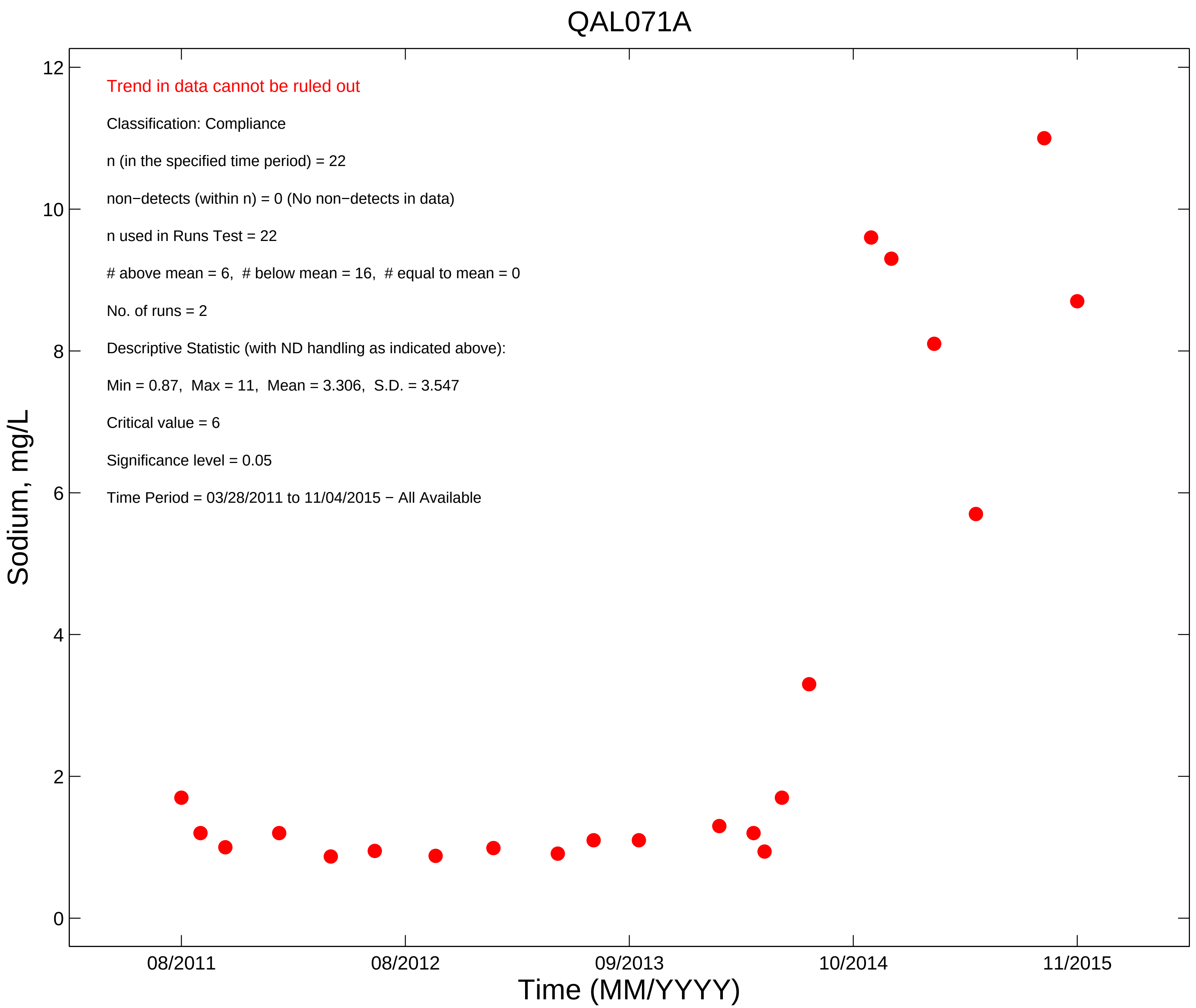

QAL071A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 7
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 7
above mean = 3, # below mean = 4, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 11, Max = 62, Mean = 30, S.D. = 23
Critical value = 2
Significance level = 0.1
Time Period = 03/28/2011 to 11/04/2015 − All Available
Calcium, mg/L
60
50
40
30
20
10
08/2011
07/2012
06/2013
06/2014
05/2015
Time (MM/YYYY)

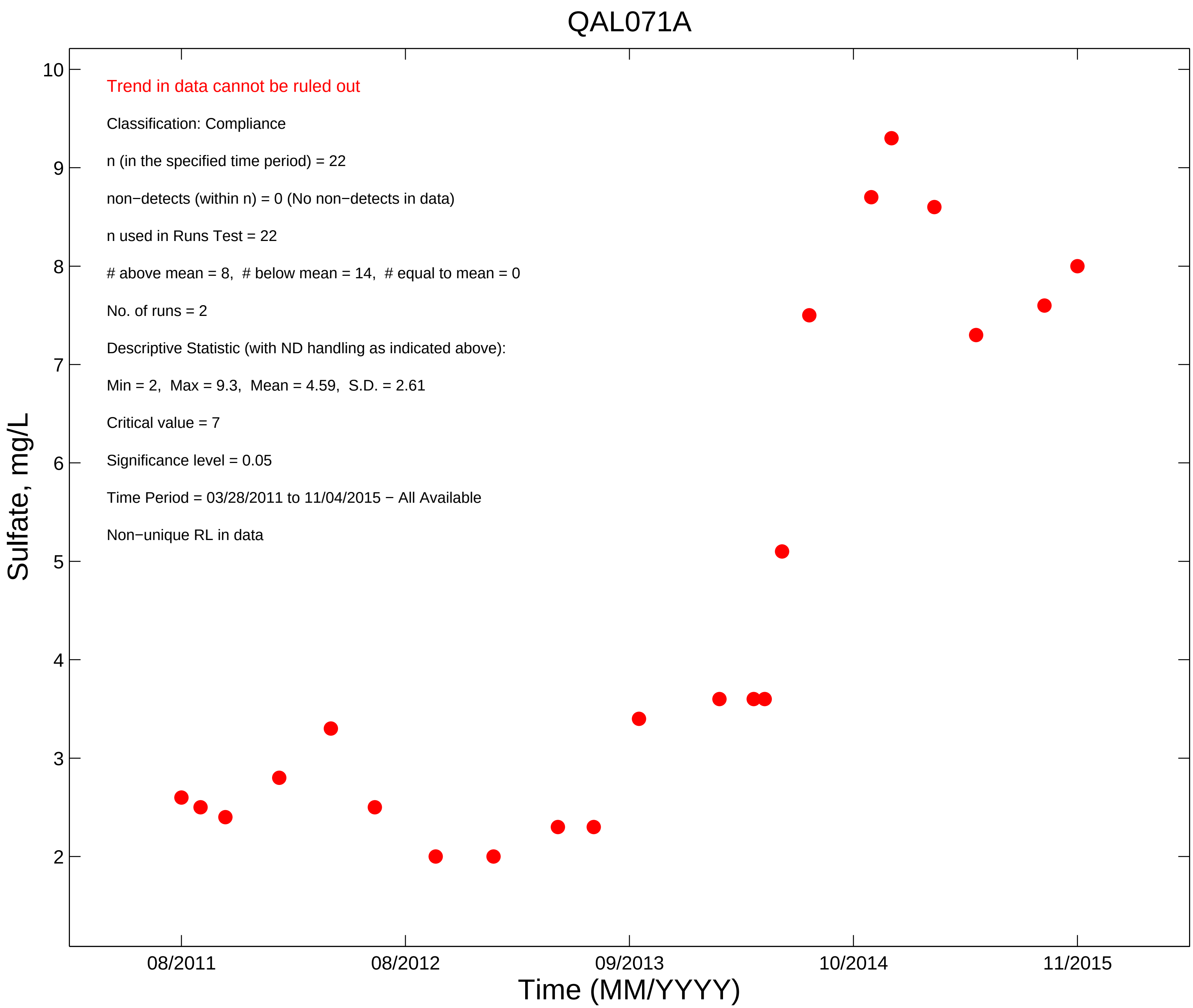

QAL071A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 22
non−detects (within n) = 1 (Included in data analysis as equal to RL)
n used in Runs Test = 22
above mean = 10, # below mean = 12, # equal to mean = 0
No. of runs = 4
Descriptive Statistic (with ND handling as indicated above):
Min = 1, Max = 44, Mean = 11.8, S.D. = 12.4
Critical value = 7
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Chloride, mg/L
45
40
35
30
25
20
15
10
5
0
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)

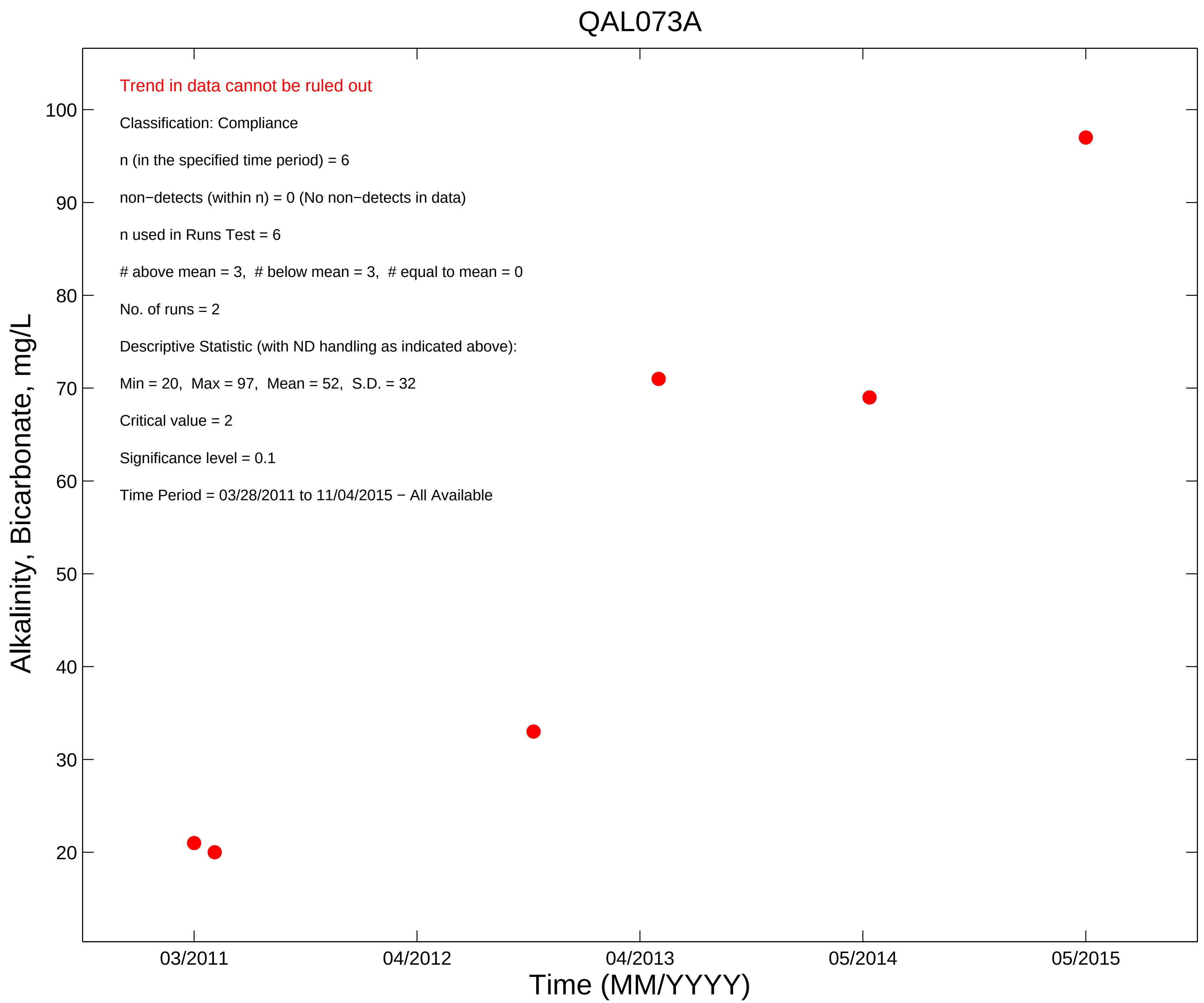

QAL071A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 7
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 7
above mean = 3, # below mean = 4, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 1.4, Max = 8.7, Mean = 4.2, S.D. = 3.3
Critical value = 2
Significance level = 0.1
Time Period = 03/28/2011 to 11/04/2015 − All Available
Magnesium, mg/L
1
2
3
4
5
6
7
8
9
08/2011
07/2012
06/2013
06/2014
05/2015
Time (MM/YYYY)

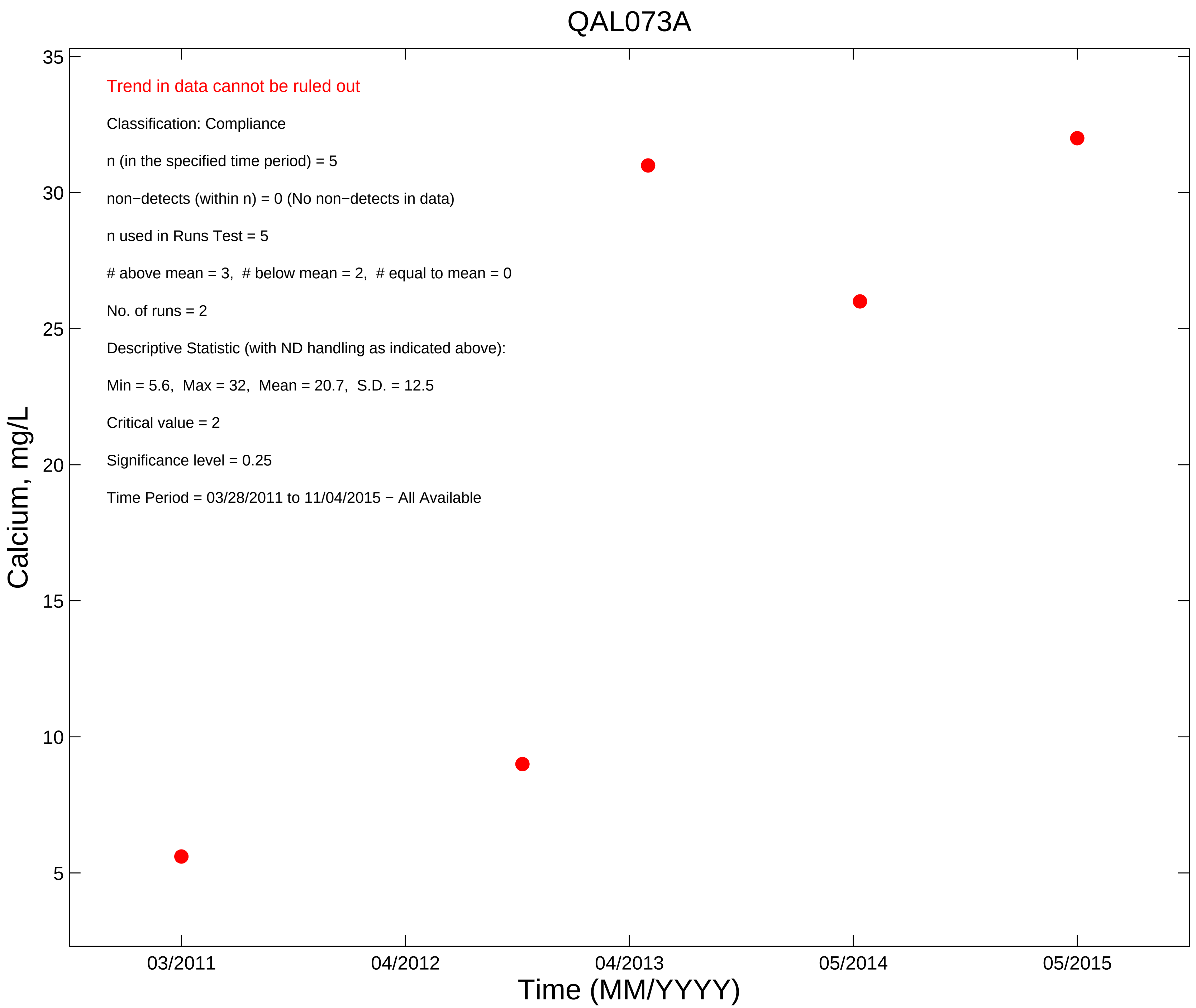

QAL071A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 22
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 22
above mean = 9, # below mean = 13, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 0.15, Max = 14, Mean = 4.277, S.D. = 5.055
Critical value = 7
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Non−unique RL in data
Nitrogen, Nitrate, mg/L
15
10
5
0
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)

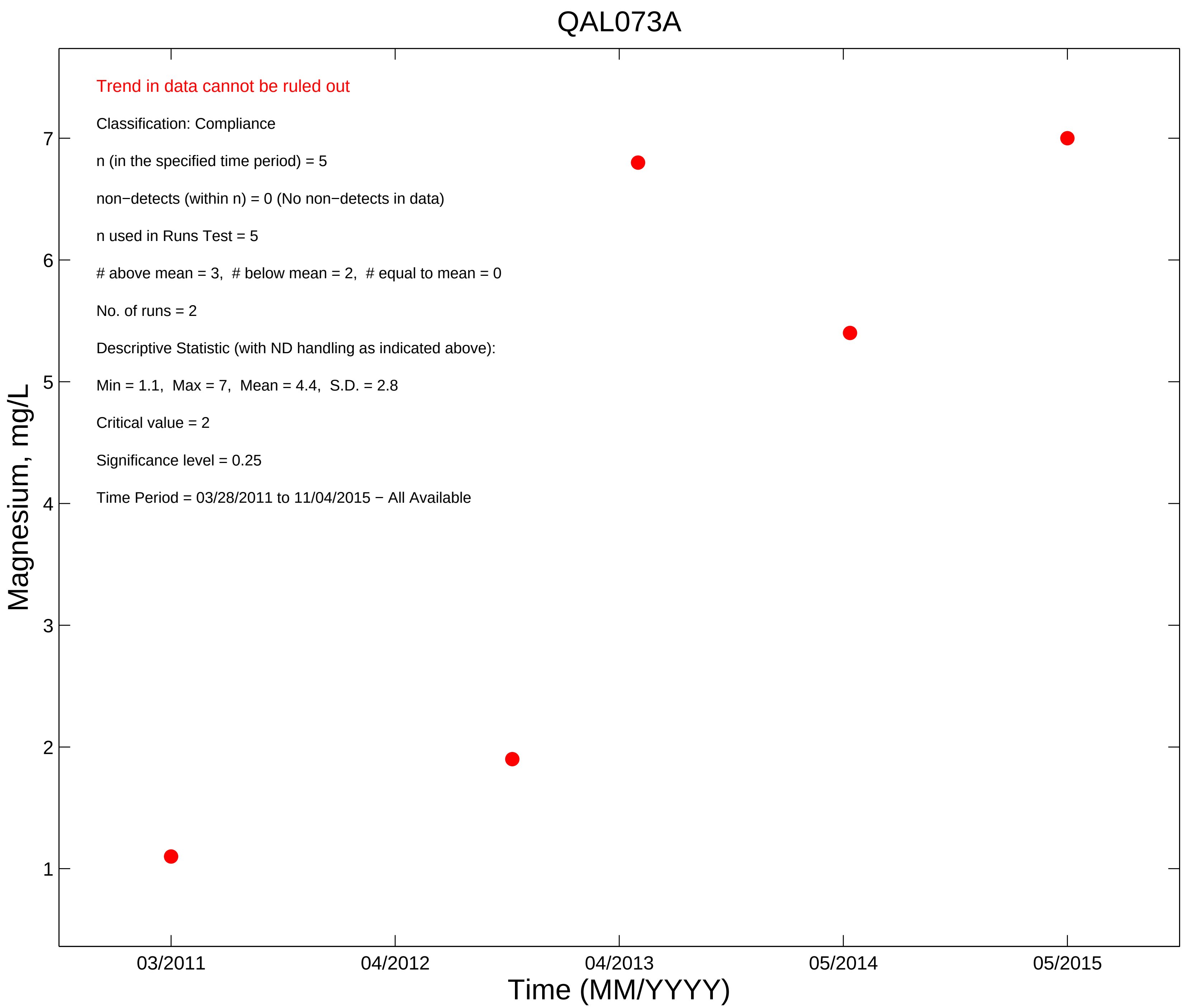

QAL071A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 22
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 22
above mean = 11, # below mean = 11, # equal to mean = 0
No. of runs = 6
Descriptive Statistic (with ND handling as indicated above):
Min = 7.3, Max = 8.8, Mean = 8.2, S.D. = 0.45
Critical value = 7
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
pH, SU
8.8
8.6
8.4
8.2
8
7.8
7.6
7.4
7.2
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)


QAL071A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 22
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 22
above mean = 6, # below mean = 16, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 0.87, Max = 11, Mean = 3.306, S.D. = 3.547
Critical value = 6
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Sodium, mg/L
0
2
4
6
8
10
12
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)

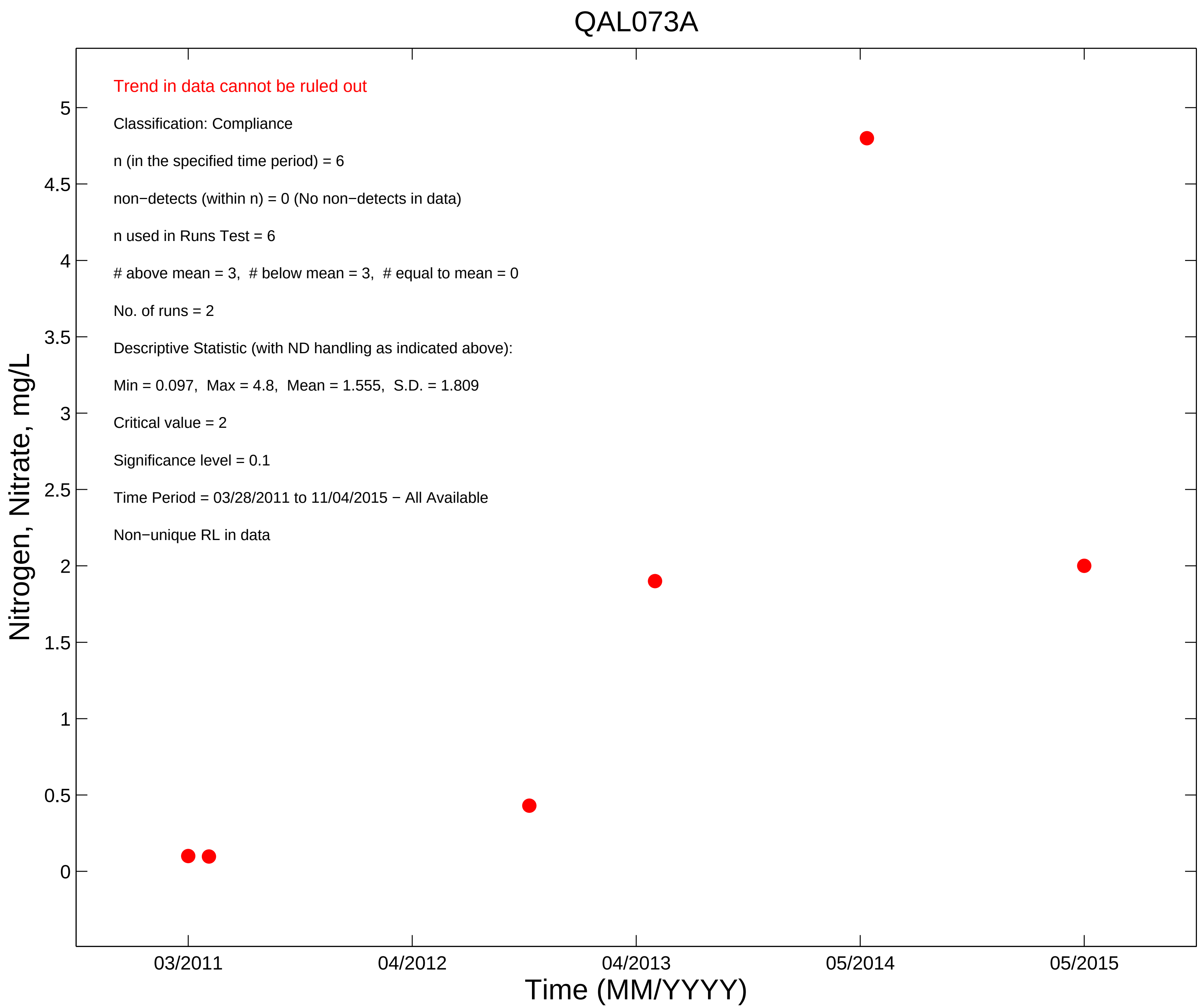

QAL071A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 22
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 22
above mean = 8, # below mean = 14, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 2, Max = 9.3, Mean = 4.59, S.D. = 2.61
Critical value = 7
Significance level = 0.05
Time Period = 03/28/2011 to 11/04/2015 − All Available
Non−unique RL in data
Sulfate, mg/L
10
9
8
7
6
5
4
3
2
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)


QAL073A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 6
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 6
above mean = 3, # below mean = 3, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 20, Max = 97, Mean = 52, S.D. = 32
Critical value = 2
Significance level = 0.1
Time Period = 03/28/2011 to 11/04/2015 − All Available
Alkalinity, Bicarbonate, mg/L
100
90
80
70
60
50
40
30
20
03/2011
04/2012
04/2013
05/2014
05/2015
Time (MM/YYYY)

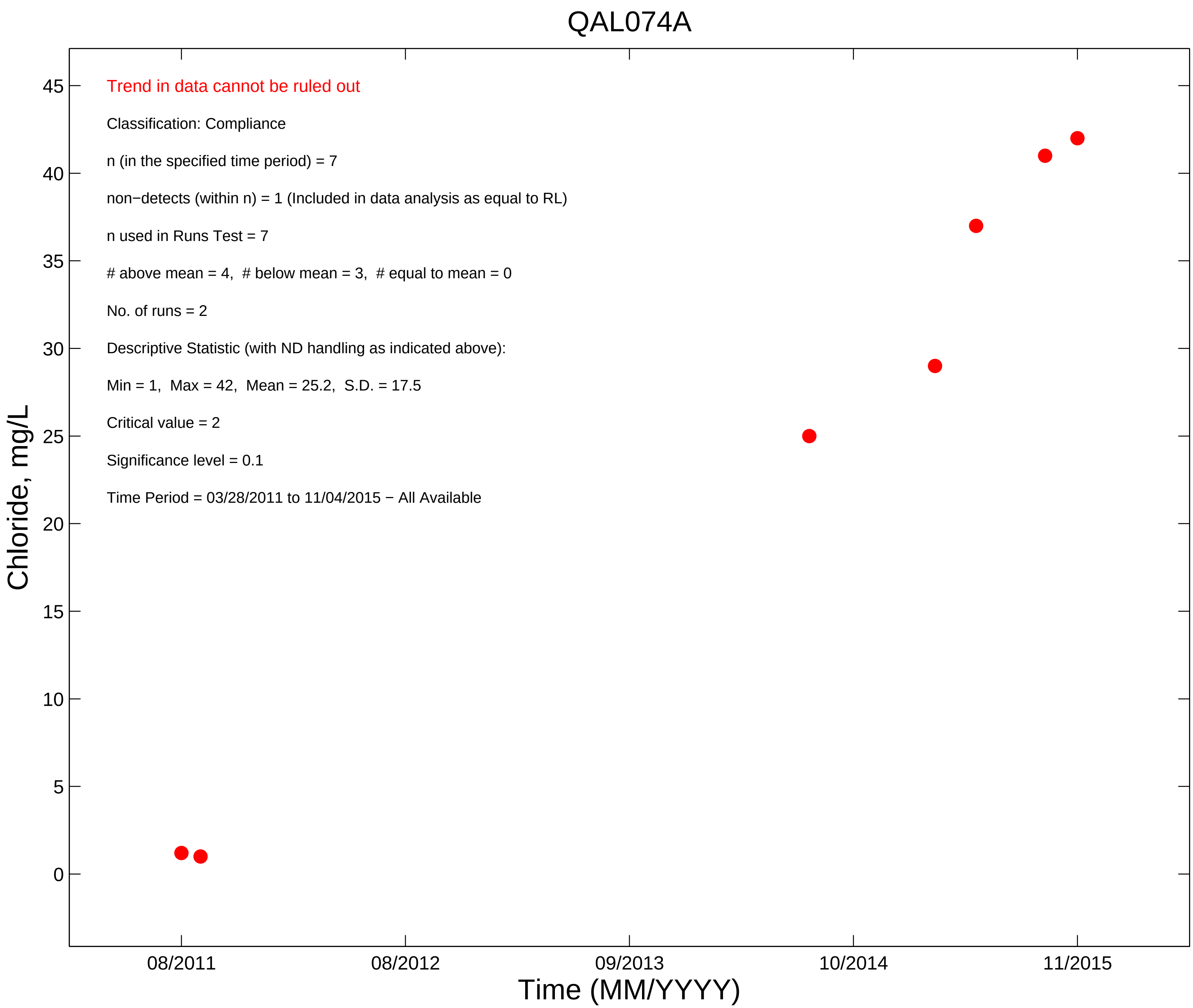

QAL073A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 5
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 5
above mean = 3, # below mean = 2, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 5.6, Max = 32, Mean = 20.7, S.D. = 12.5
Critical value = 2
Significance level = 0.25
Time Period = 03/28/2011 to 11/04/2015 − All Available
Calcium, mg/L
35
30
25
20
15
10
5
03/2011
04/2012
04/2013
05/2014
05/2015
Time (MM/YYYY)

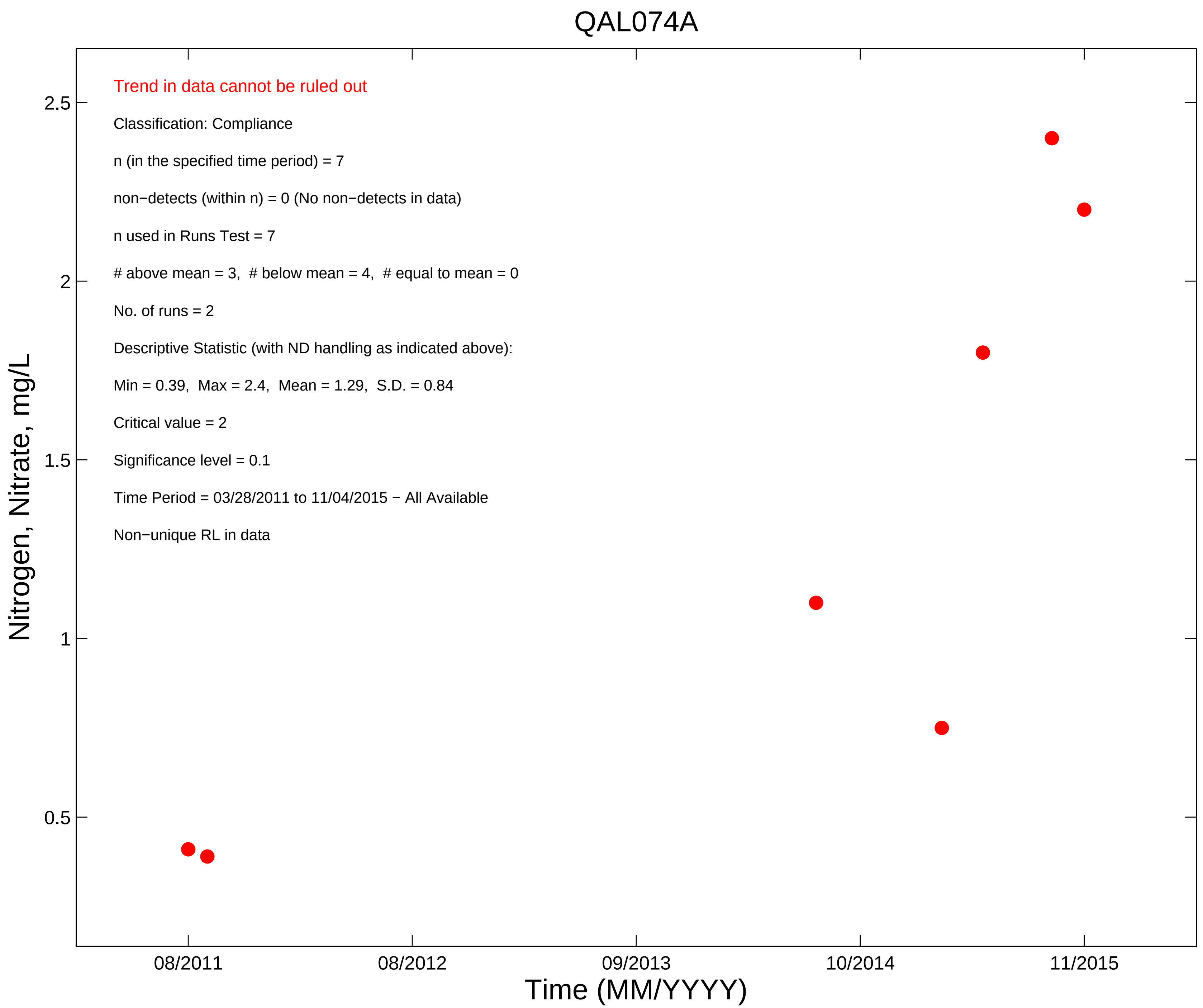


QAL073A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 5
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 5
above mean = 3, # below mean = 2, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 1.1, Max = 7, Mean = 4.4, S.D. = 2.8
Critical value = 2
Significance level = 0.25
Time Period = 03/28/2011 to 11/04/2015 − All Available
Magnesium, mg/L
1
2
3
4
5
6
7
03/2011
04/2012
04/2013
05/2014
05/2015
Time (MM/YYYY)

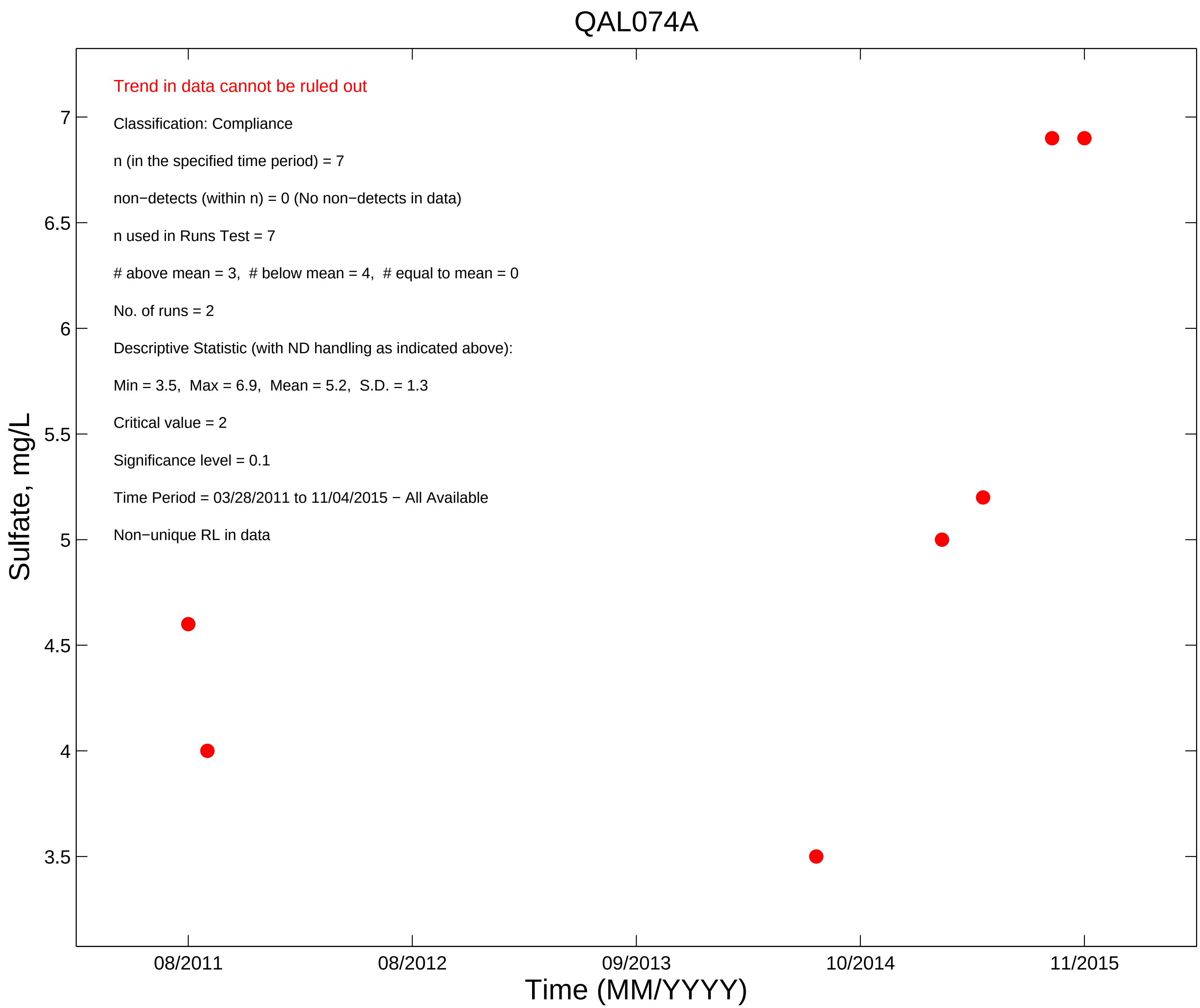


QAL073A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 6
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 6
above mean = 3, # below mean = 3, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 0.097, Max = 4.8, Mean = 1.555, S.D. = 1.809
Critical value = 2
Significance level = 0.1
Time Period = 03/28/2011 to 11/04/2015 − All Available
Non−unique RL in data
Nitrogen, Nitrate, mg/L
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
03/2011
04/2012
04/2013
05/2014
05/2015
Time (MM/YYYY)

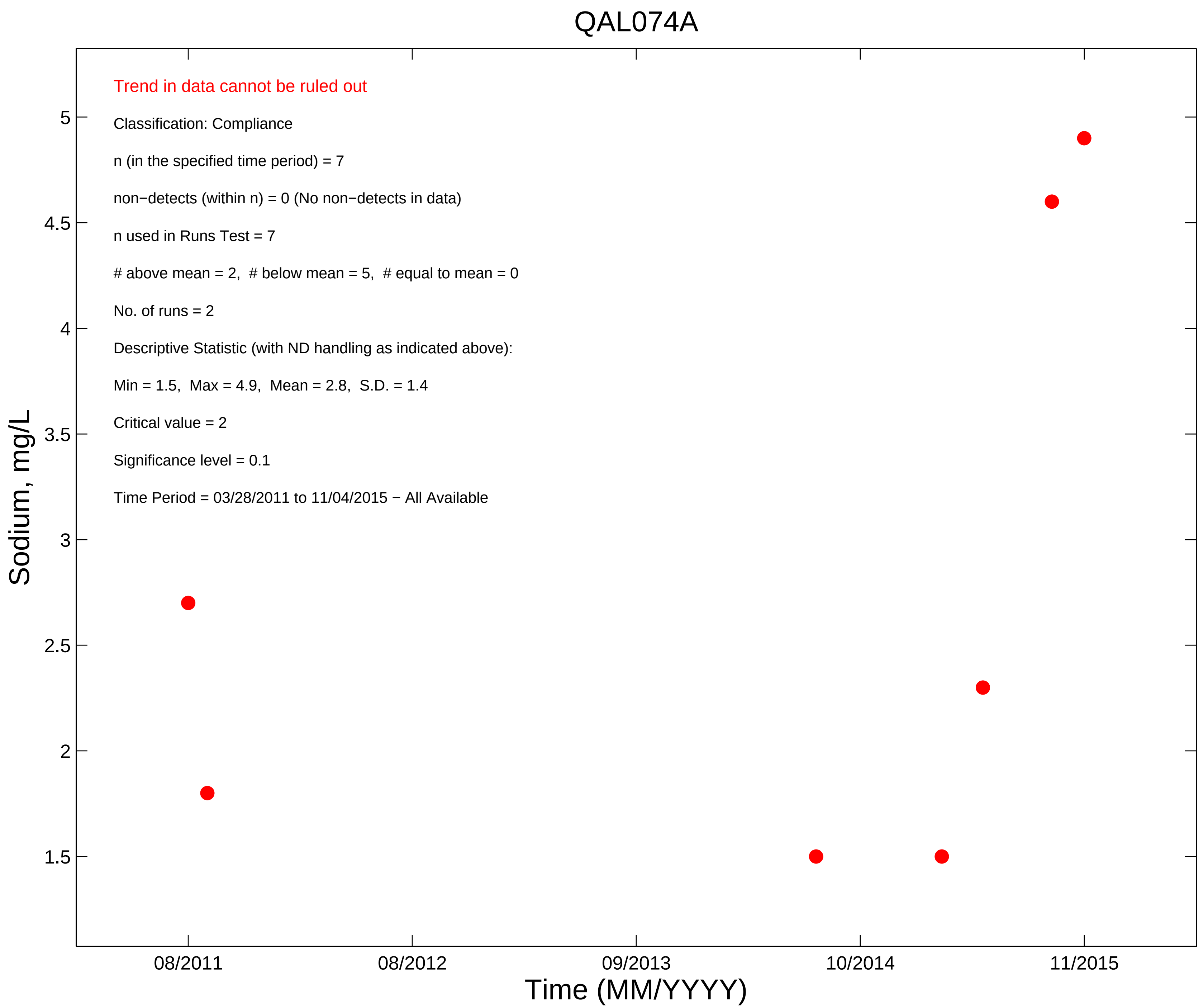

QAL074A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 7
non−detects (within n) = 1 (Included in data analysis as equal to RL)
n used in Runs Test = 7
above mean = 4, # below mean = 3, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 1, Max = 42, Mean = 25.2, S.D. = 17.5
Critical value = 2
Significance level = 0.1
Time Period = 03/28/2011 to 11/04/2015 − All Available
Chloride, mg/L
0
5
10
15
20
25
30
35
40
45
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)



QAL074A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 7
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 7
above mean = 3, # below mean = 4, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 0.39, Max = 2.4, Mean = 1.29, S.D. = 0.84
Critical value = 2
Significance level = 0.1
Time Period = 03/28/2011 to 11/04/2015 − All Available
Non−unique RL in data
Nitrogen, Nitrate, mg/L
2.5
2
1.5
1
0.5
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)



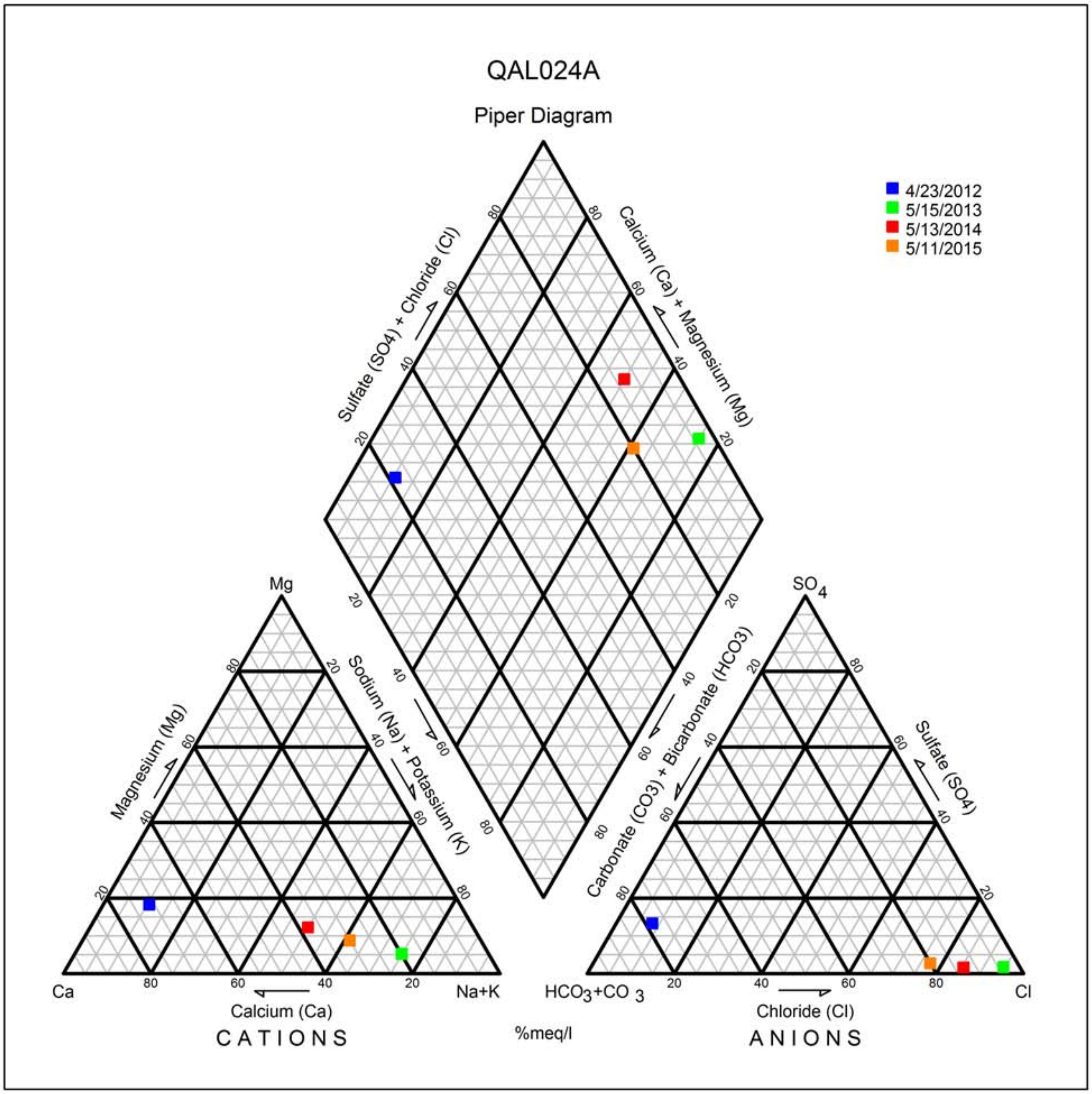
QAL074A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 7
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 7
above mean = 3, # below mean = 4, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 3.5, Max = 6.9, Mean = 5.2, S.D. = 1.3
Critical value = 2
Significance level = 0.1
Time Period = 03/28/2011 to 11/04/2015 − All Available
Non−unique RL in data
Sulfate, mg/L
7
6.5
6
5.5
5
4.5
4
3.5
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)

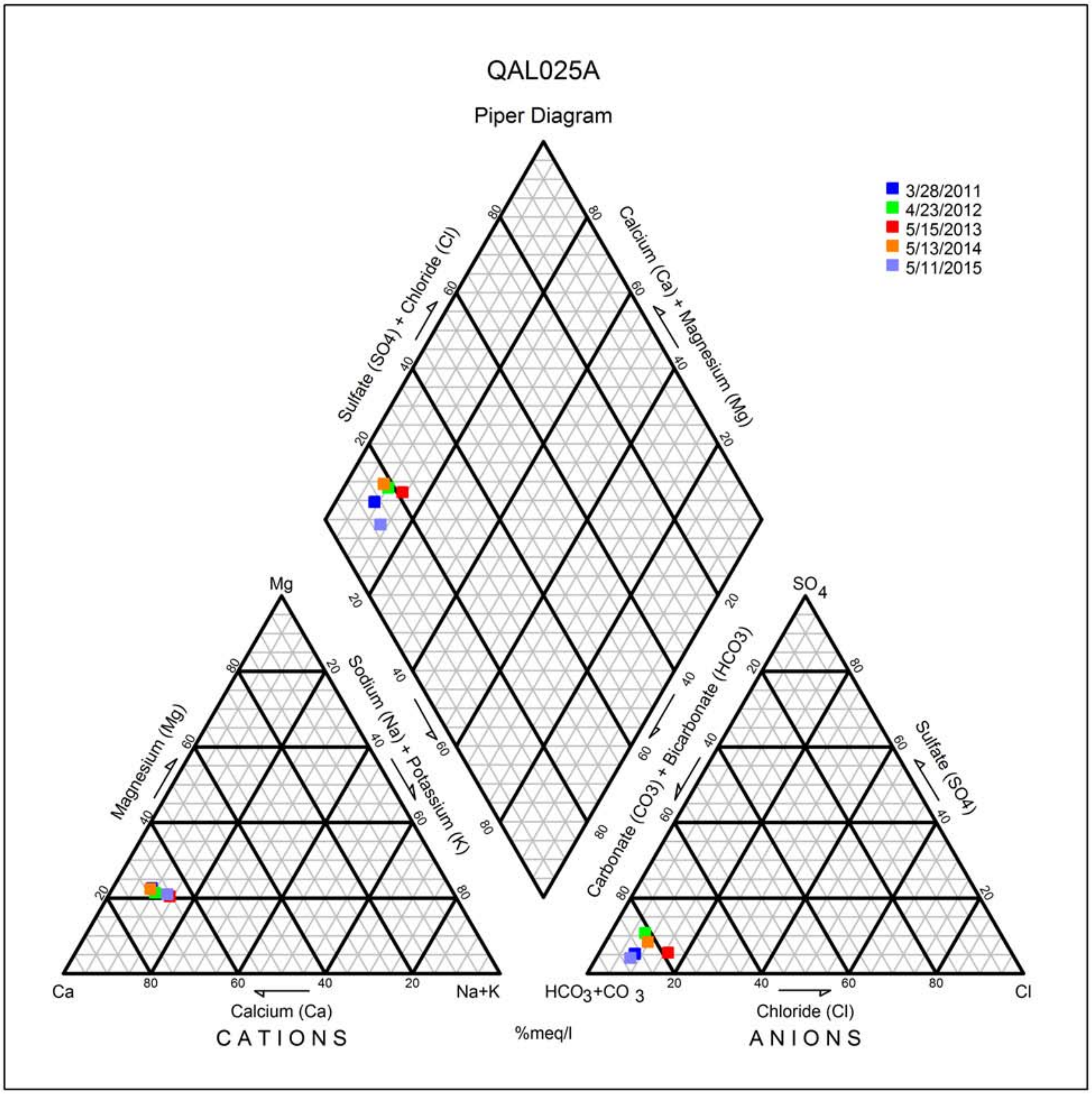

QAL074A
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 7
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 7
above mean = 2, # below mean = 5, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 1.5, Max = 4.9, Mean = 2.8, S.D. = 1.4
Critical value = 2
Significance level = 0.1
Time Period = 03/28/2011 to 11/04/2015 − All Available
Sodium, mg/L
5
4.5
4
3.5
3
2.5
2
1.5
08/2011
08/2012
09/2013
10/2014
11/2015
Time (MM/YYYY)

Appendix H

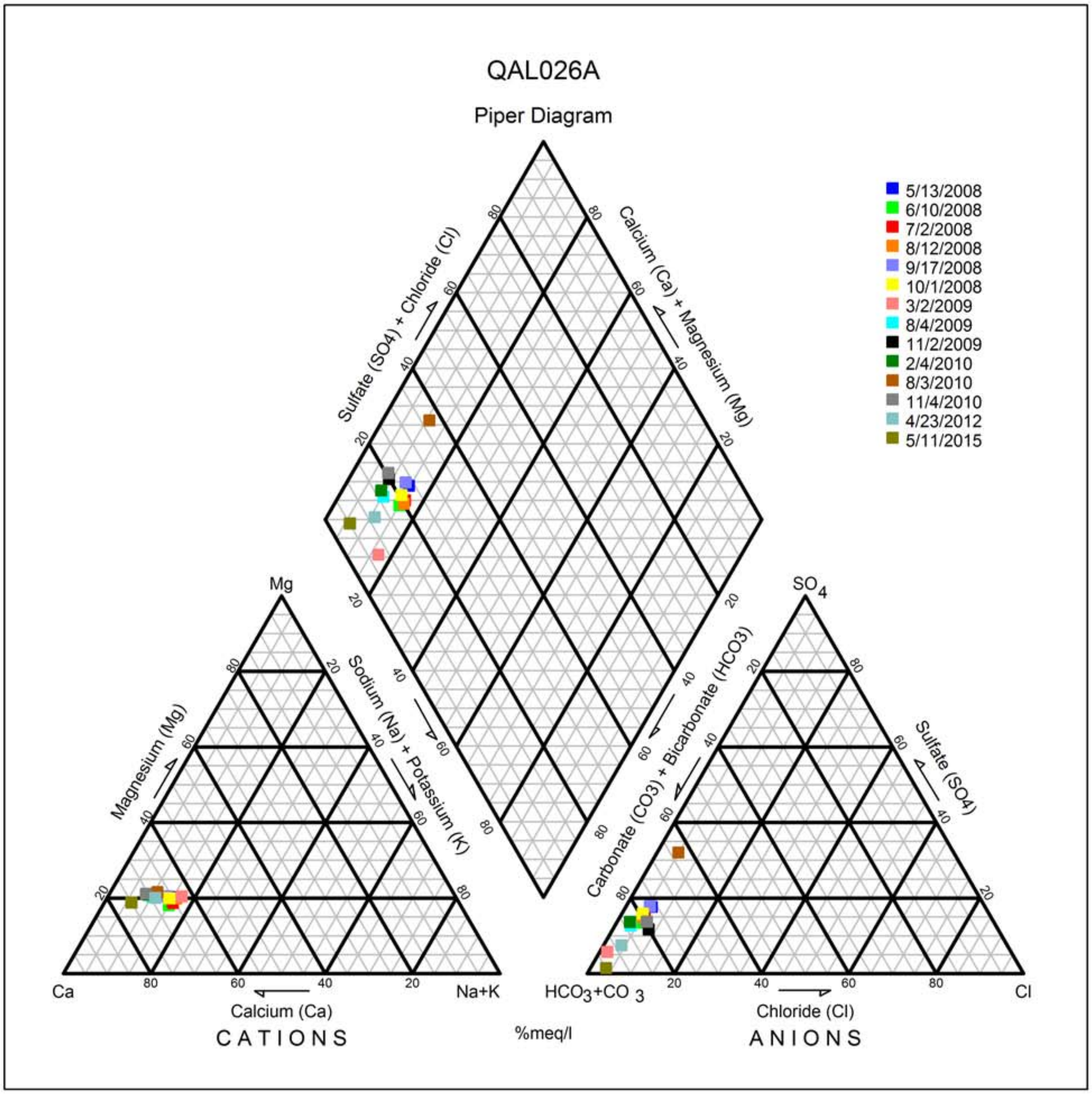
Eagle Mine

Groundwater Piper Diagrams

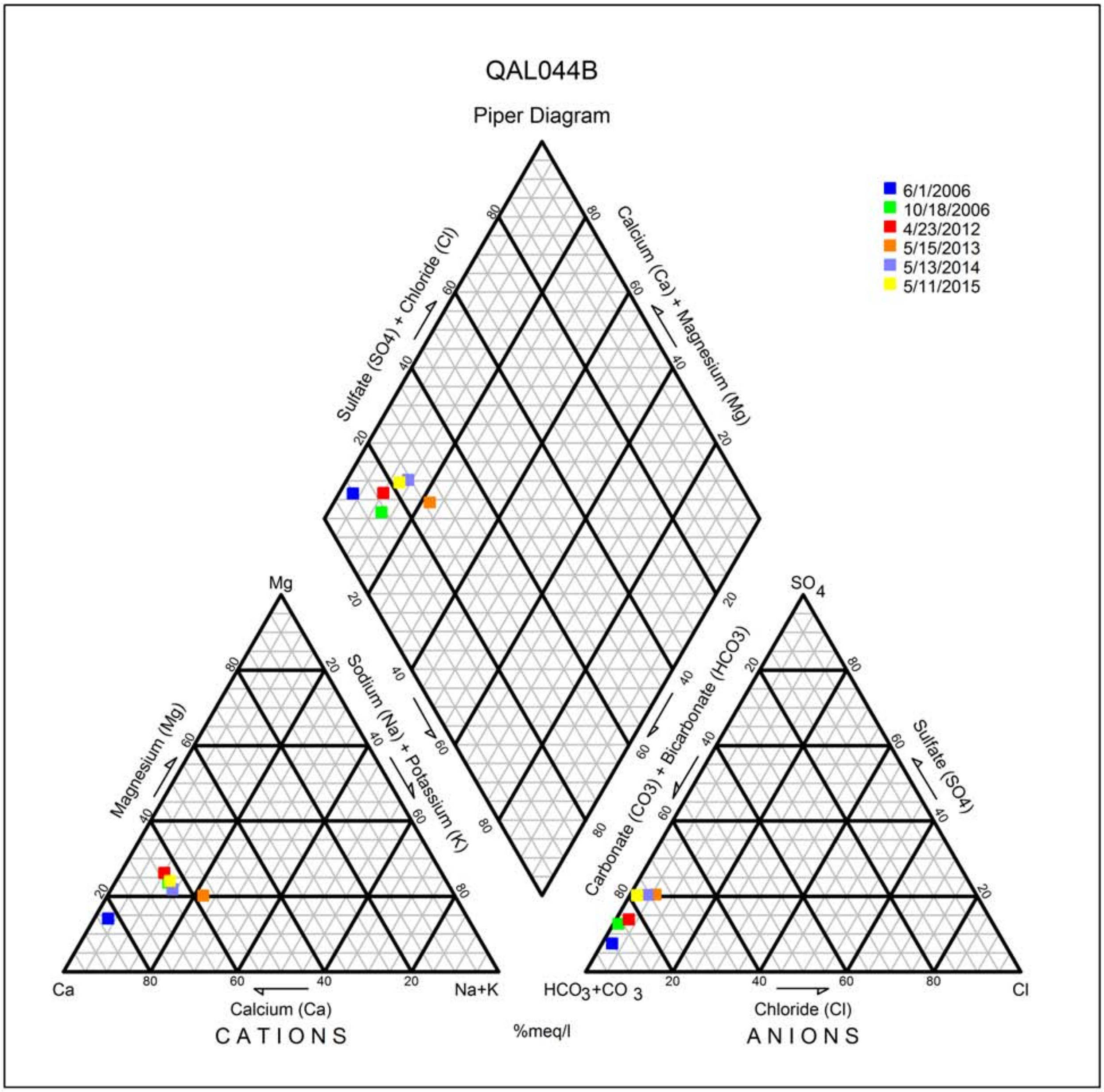

QAL024A
Piper Diagram
4/23/2012
5/15/2013
5/13/2014
5/11/2015
Sulfate (SO4) + Chloride (Cl)
Calcium (Ca) + Magnesium (Mg)
Sodium (Na) + Potassium (K)
Carbonate (CO3) + Bicarbonate (HCO3)
Magnesium (Mg)
Sulfate (SO4)
Mg
SO4
Ca
Na+K
HCO3+CO3
Cl
Calcium (Ca)
Chloride (Cl)
CATIONS
%meq/l
ANIONS



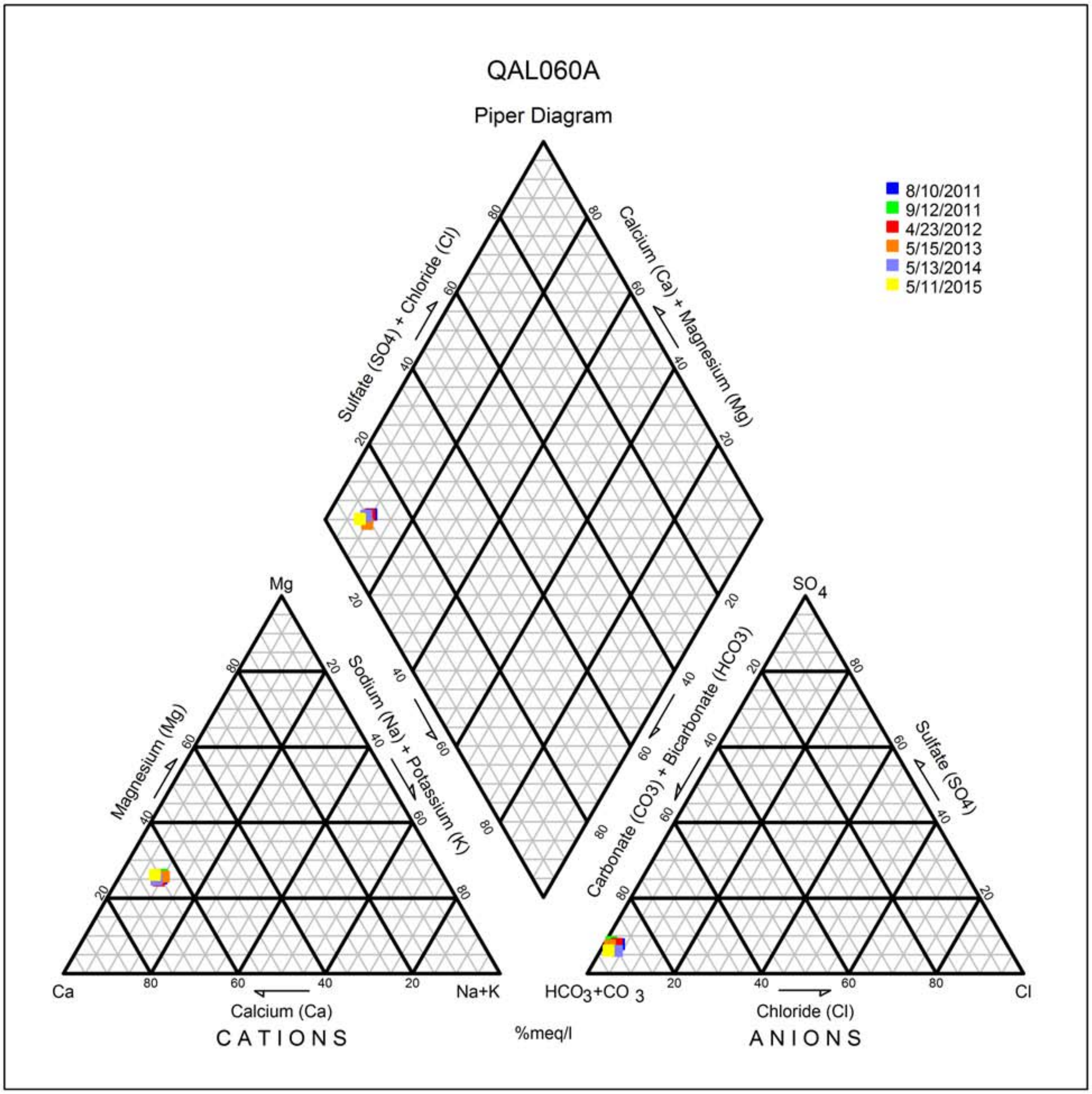
QAL025A
Piper Diagram
3/28/2011
4/23/2012
5/15/2013
5/13/2014
5/11/2015
Sulfate (SO4) + Chloride (Cl)
Calcium (Ca) + Magnesium (Mg)
Sodium (Na) + Potassium (K)
Carbonate (CO3) + Bicarbonate (HCO3)
Mg
Magnesium (Mg)
Ca
Calcium (Ca)
Na+K
CATIONS
%meq/l
SO4
Sulfate (SO4)
HCO3+CO3
Chloride (Cl)
Cl
ANIONS

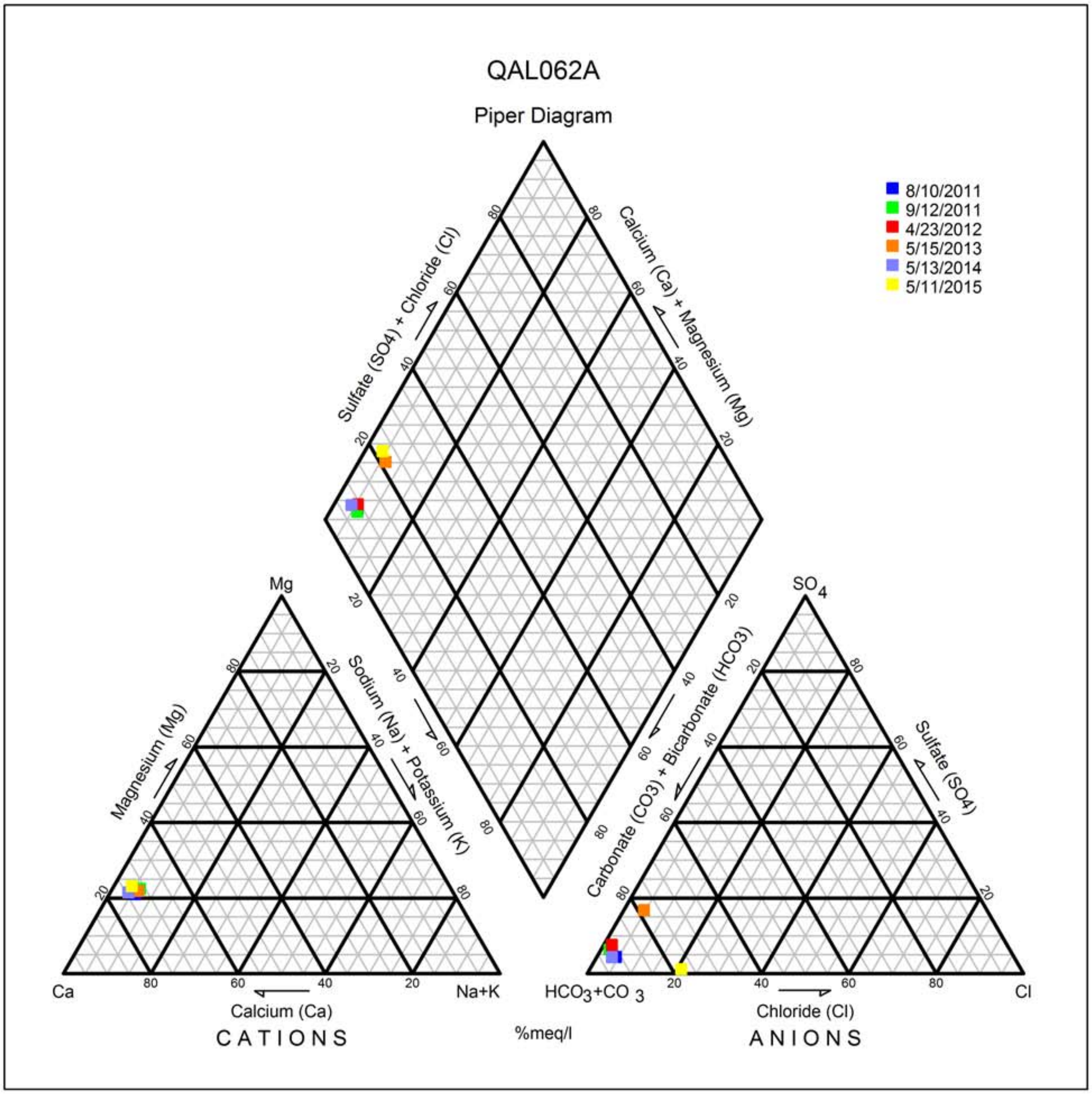


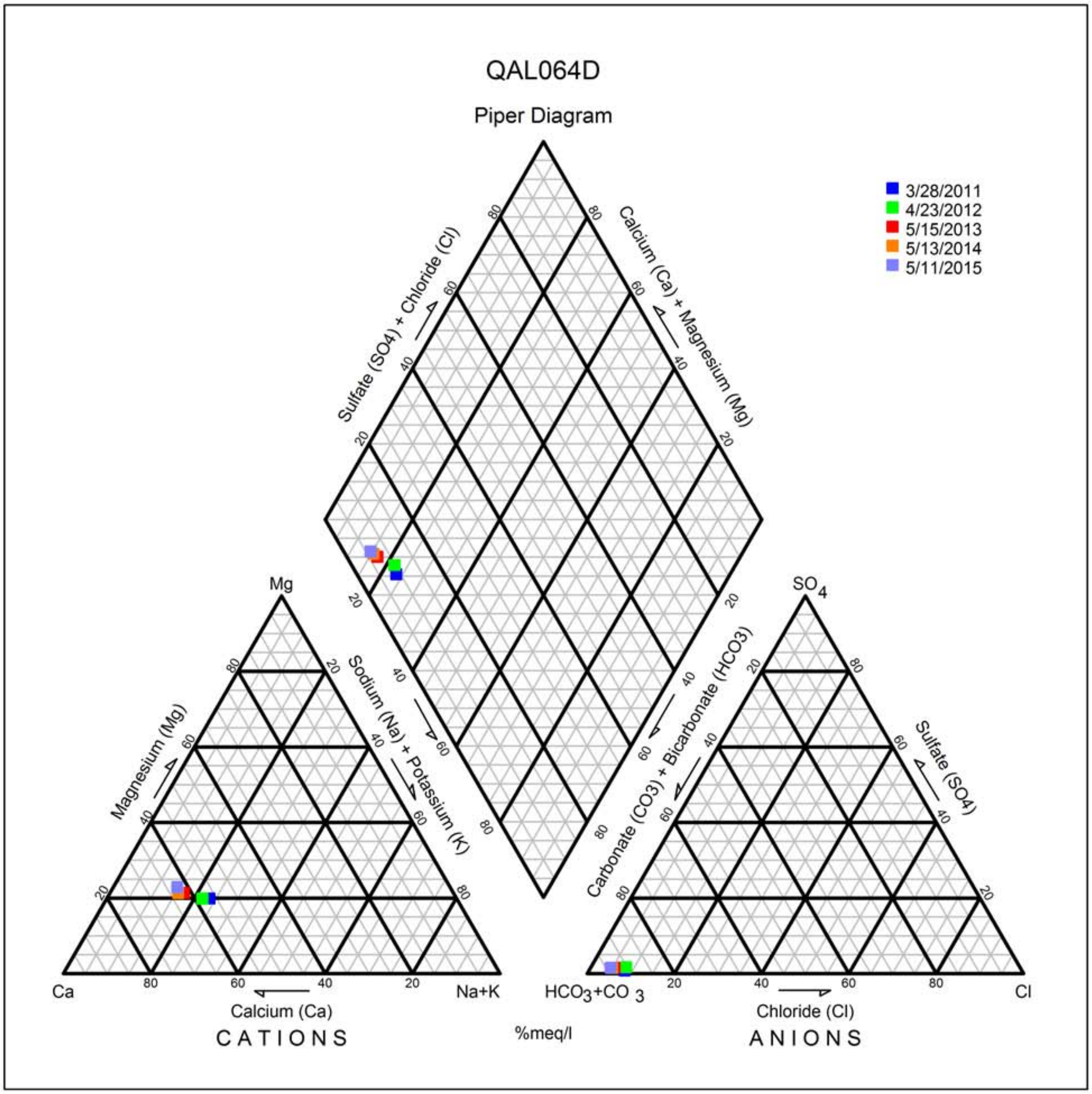
QAL026A
Piper Diagram
5/13/2008
6/10/2008
7/2/2008
8/12/2008
9/17/2008
10/1/2008
3/2/2009
8/4/2009
11/2/2009
2/4/2010
8/3/2010
11/4/2010
4/23/2012
5/11/2015
Sulfate (SO4) + Chloride (Cl)
Calcium (Ca) + Magnesium (Mg)
Sodium (Na) + Potassium (K)
Carbonate (CO3) + Bicarbonate (HCO3)
Magnesium (Mg)
Sulfate (SO4)
Mg
SO4
Ca
Na+K
HCO3+CO3
Cl
Calcium (Ca)
Chloride (Cl)
CATIONS
%meq/l
ANIONS



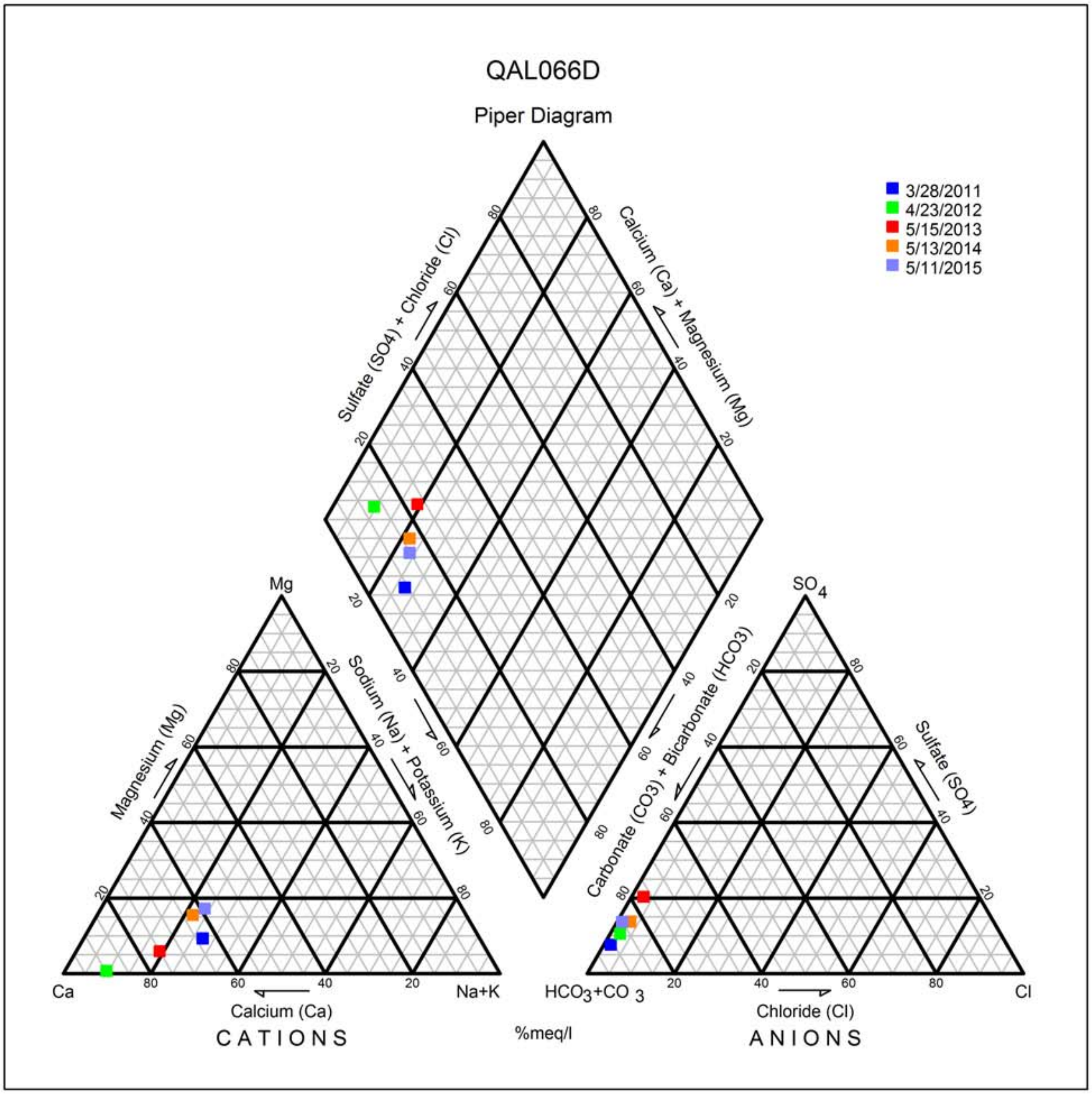
QAL044B
Piper Diagram
6/1/2006
10/18/2006
4/23/2012
5/15/2013
5/13/2014
5/11/2015
Sulfate (SO4) + Chloride (Cl)
Calcium (Ca) + Magnesium (Mg)
Sodium (Na) + Potassium (K)
Carbonate (CO3) + Bicarbonate (HCO3)
Magnesium (Mg)
Sulfate (SO4)
Mg
SO 4
Ca
Na+K
HCO3+CO 3
Cl
Calcium (Ca)
Chloride (Cl)
CATIONS
%meq/l
ANIONS


QAL060A
Piper Diagram
8/10/2011
9/12/2011
4/23/2012
5/15/2013
5/13/2014
5/11/2015
Sulfate (SO4) + Chloride (Cl)
Calcium (Ca) + Magnesium (Mg)
Carbonate (CO3) + Bicarbonate (HCO3)
Sodium (Na) + Potassium (K)
Mg
Magnesium (Mg)
Ca
Na+K
Calcium (Ca)
CATIONS
%meq/l
SO4
Sulfate (SO4)
HCO3+CO3
Cl
Chloride (Cl)
ANIONS

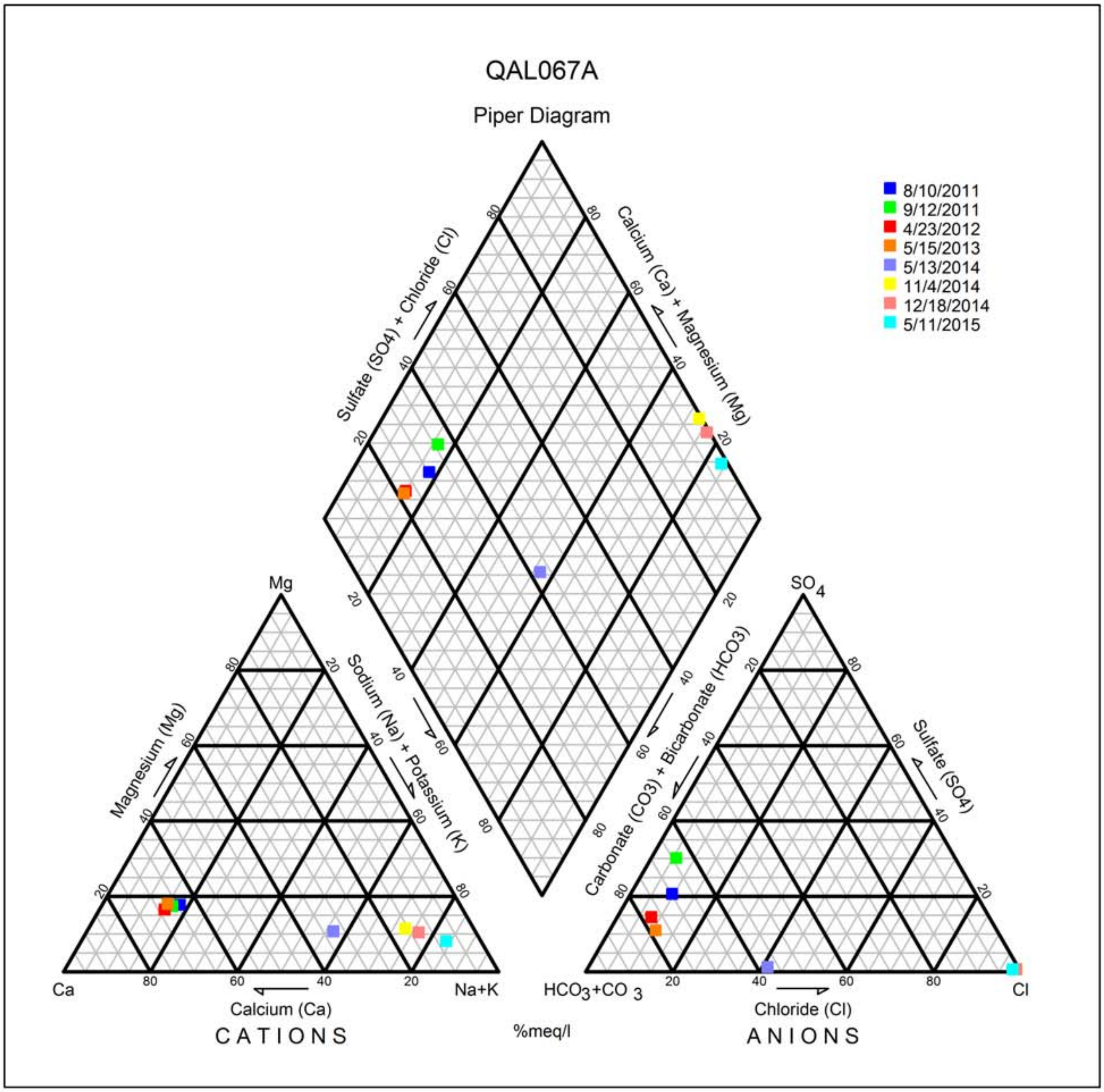

QAL062A
Piper Diagram
8/10/2011
9/12/2011
4/23/2012
5/15/2013
5/13/2014
5/11/2015
Sulfate (SO4) + Chloride (Cl)
Calcium (Ca) + Magnesium (Mg)
Carbonate (CO3) + Bicarbonate (HCO3)
Sodium (Na) + Potassium (K)
Mg
Magnesium (Mg)
Ca
Na+K
Calcium (Ca)
CATIONS
%meq/l
SO_4
Sulfate (SO4)
HCO_3+CO_3
Cl
Chloride (Cl)
ANIONS

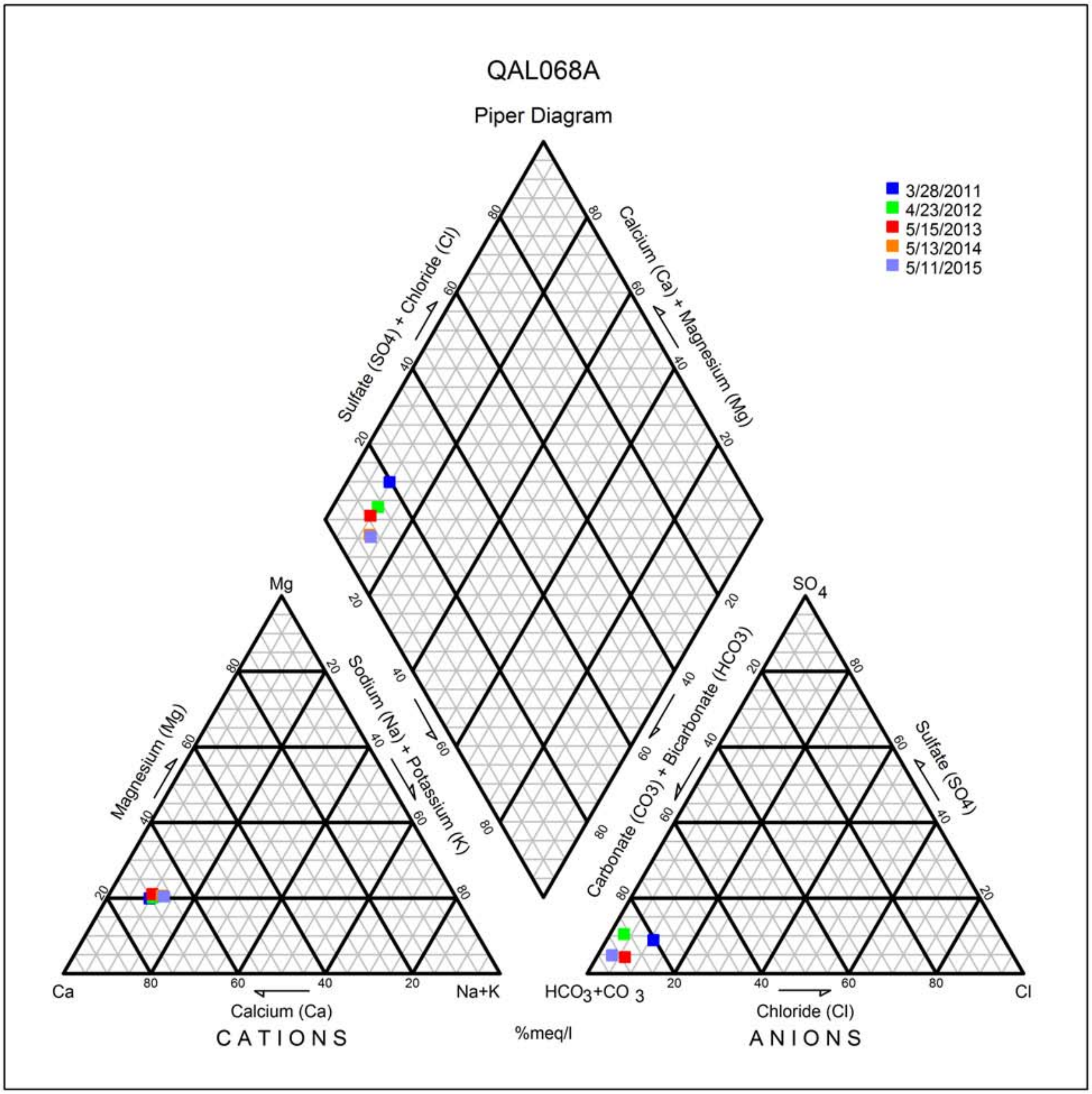


QAL064D
Piper Diagram
3/28/2011
4/23/2012
5/15/2013
5/13/2014
5/11/2015
Sulfate (SO4) + Chloride (Cl)
Calcium (Ca) + Magnesium (Mg)
Sodium (Na) + Potassium (K)
Carbonate (CO3) + Bicarbonate (HCO3)
Magnesium (Mg)
Sulfate (SO4)
Mg
SO4
Ca
Na+K
HCO3+CO3
Cl
Calcium (Ca)
Chloride (Cl)
CATIONS
%meq/l
ANIONS



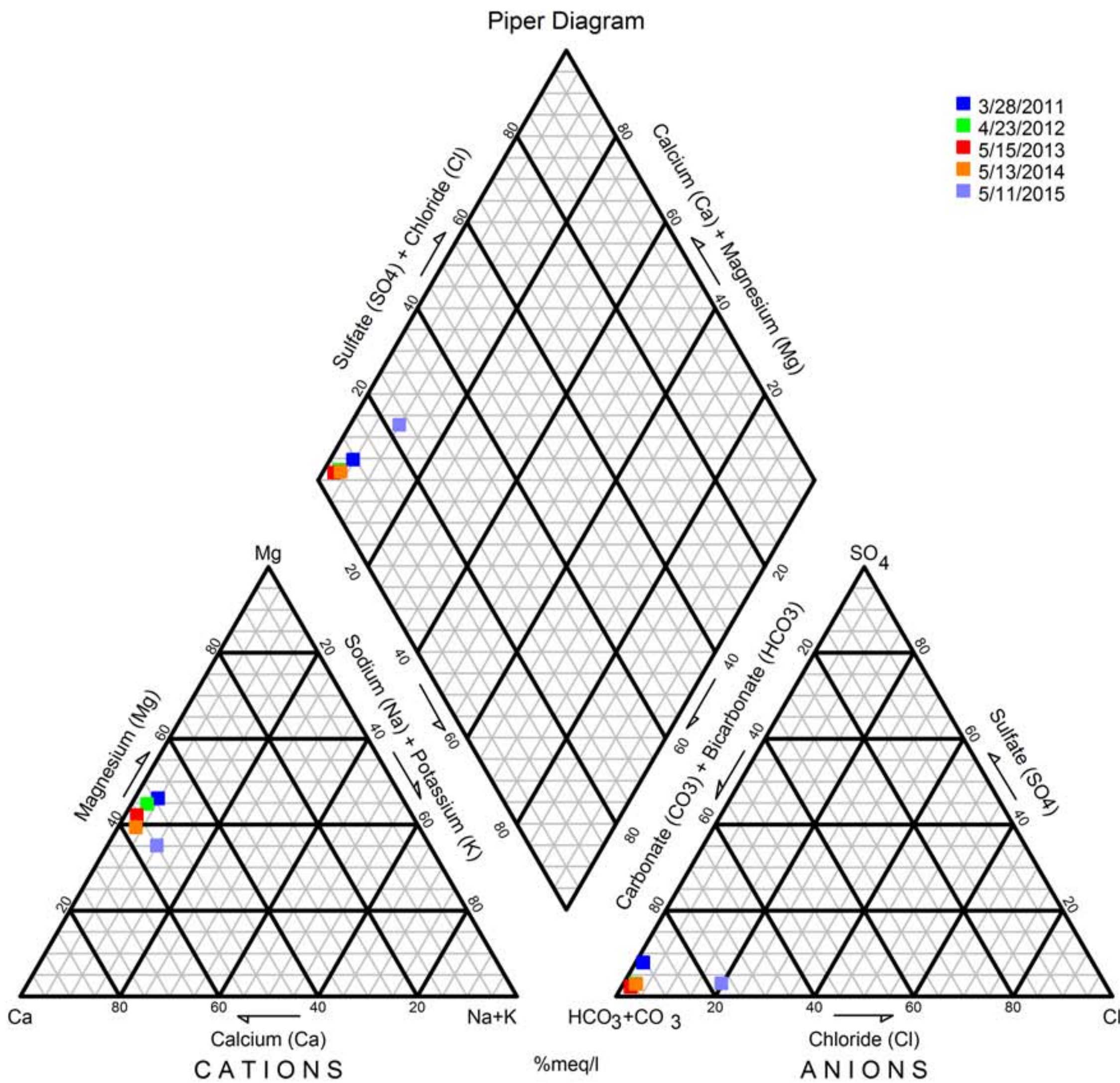
QAL066D
Piper Diagram
3/28/2011
4/23/2012
5/15/2013
5/13/2014
5/11/2015
Sulfate (SO4) + Chloride (Cl)
Calcium (Ca) + Magnesium (Mg)
Sodium (Na) + Potassium (K)
Carbonate (CO3) + Bicarbonate (HCO3)
Magnesium (Mg)
Sulfate (SO4)
Mg
SO4
Ca
Na+K
HCO3+CO3
Cl
Calcium (Ca)
Chloride (Cl)
CATIONS
%meq/l
ANIONS


QAL067A
Piper Diagram
8/10/2011
9/12/2011
4/23/2012
5/15/2013
5/13/2014
11/4/2014
12/18/2014
5/11/2015
Sulfate (SO4) + Chloride (Cl)
Calcium (Ca) + Magnesium (Mg)
Carbonate (CO3) + Bicarbonate (HCO3)
Sodium (Na) + Potassium (K)
Magnesium (Mg)
Mg
Ca
Na+K
Calcium (Ca)
CATIONS
%meq/l
SO4
Sulfate (SO4)
HCO3+CO3
Cl
Chloride (Cl)
ANIONS

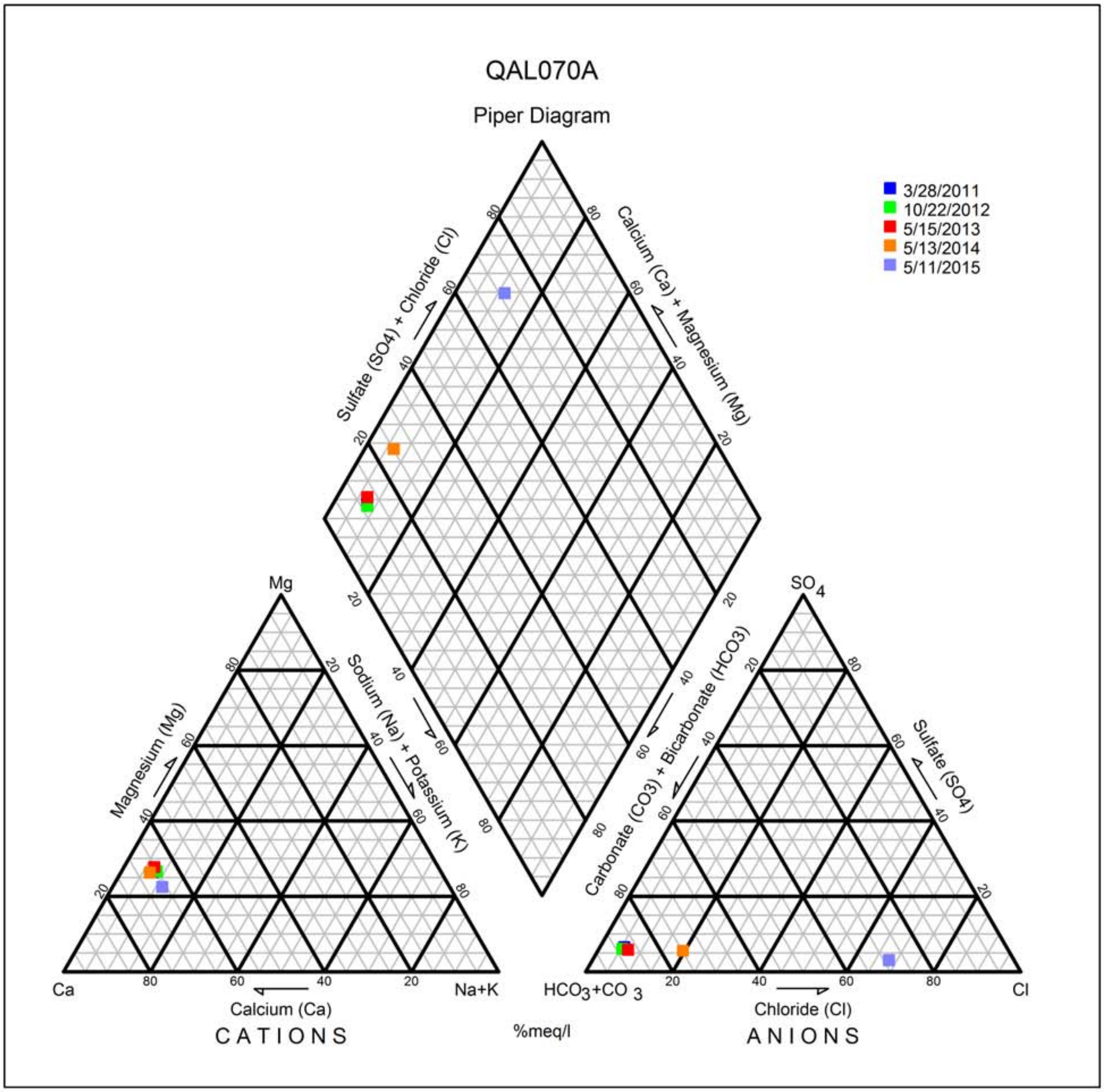


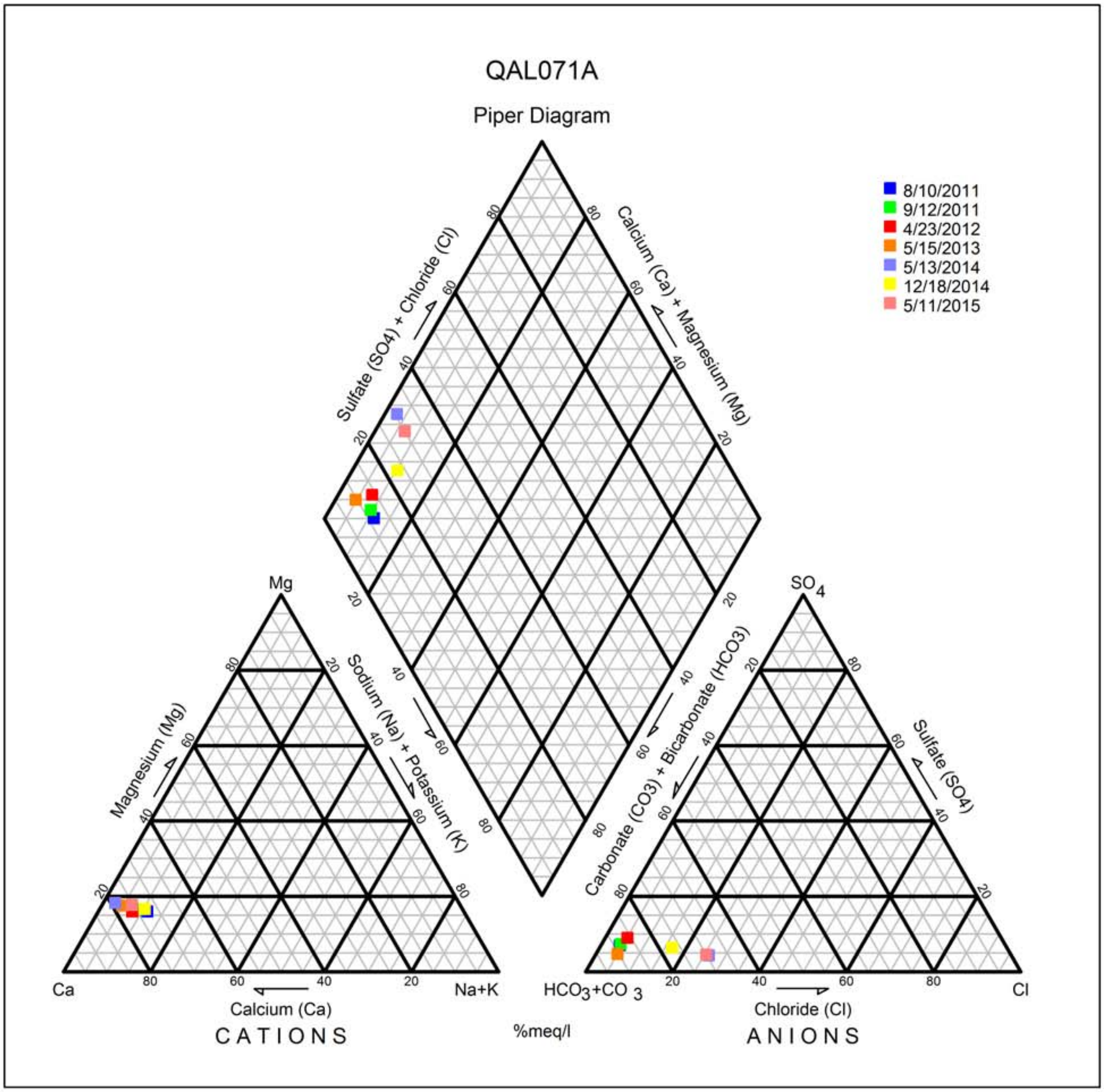
QAL068A
Piper Diagram
3/28/2011
4/23/2012
5/15/2013
5/13/2014
5/11/2015
Sulfate (SO4) + Chloride (Cl)
Calcium (Ca) + Magnesium (Mg)
Sodium (Na) + Potassium (K)
Carbonate (CO3) + Bicarbonate (HCO3)
Magnesium (Mg)
Sulfate (SO4)
Mg
SO4
Ca
Na+K
HCO3+CO3
Cl
Calcium (Ca)
Chloride (Cl)
CATIONS
%meq/l
ANIONS

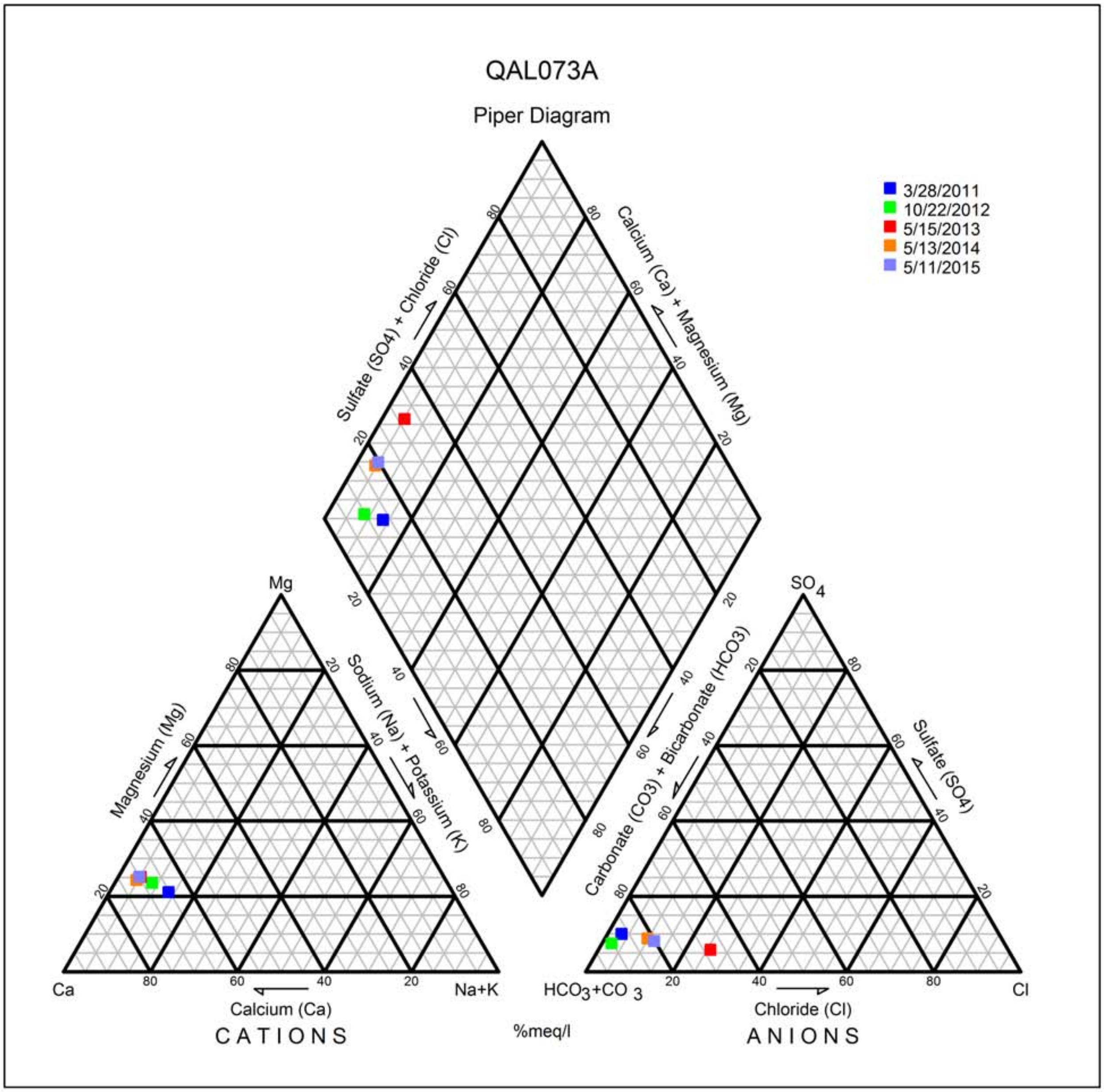
QAL069A



Piper Diagram
3/28/2011
4/23/2012
5/15/2013
5/13/2014
5/11/2015
Sulfate (SO4) + Chloride (Cl)
Calcium (Ca) + Magnesium (Mg)
Sodium (Na) + Potassium (K)
Carbonate (CO3) + Bicarbonate (HCO3)
Mg
Magnesium (Mg)
Ca
Na+K
Calcium (Ca)
CATIONS
%meq/l
SO4
Sulfate (SO4)
HCO3+CO3
Cl
Chloride (Cl)
ANIONS


QAL070A
Piper Diagram
3/28/2011
10/22/2012
5/15/2013
5/13/2014
5/11/2015
Sulfate (SO4) + Chloride (Cl)
Calcium (Ca) + Magnesium (Mg)
Sodium (Na) + Potassium (K)
Carbonate (CO3) + Bicarbonate (HCO3)
Magnesium (Mg)
Sulfate (SO4)
Mg
SO4
Ca
Na+K
HCO3+CO3
Cl
Calcium (Ca)
Chloride (Cl)
CATIONS
%meq/l
ANIONS

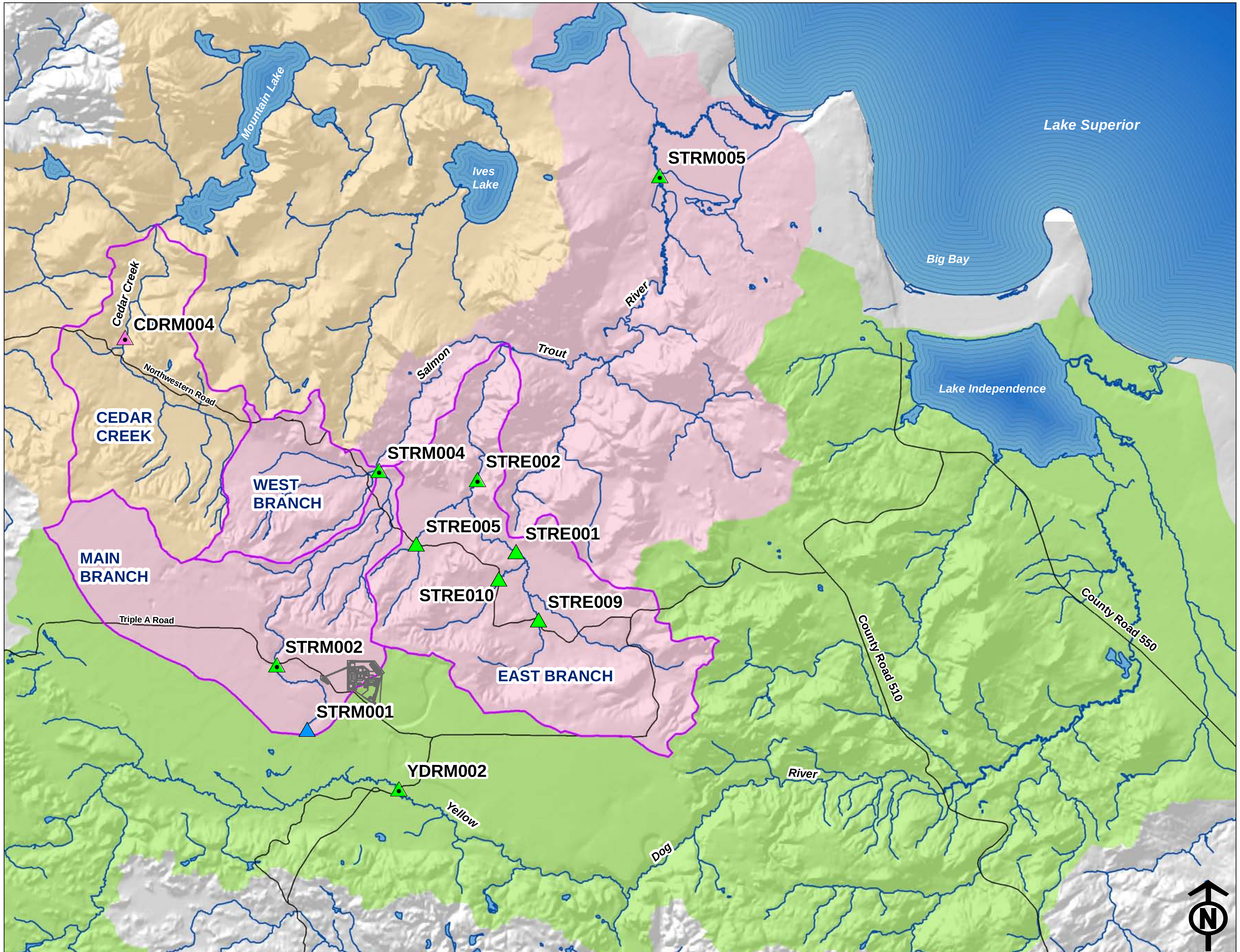

QAL071A
Piper Diagram
8/10/2011
9/12/2011
4/23/2012
5/15/2013
5/13/2014
12/18/2014
5/11/2015
Sulfate (SO4) + Chloride (Cl)
Calcium (Ca) + Magnesium (Mg)
Sodium (Na) + Potassium (K)
Carbonate (CO3) + Bicarbonate (HCO3)
Magnesium (Mg)
Sulfate (SO4)
Mg
SO 4
Ca
Na+K
HCO3+CO 3
Cl
Calcium (Ca)
Chloride (Cl)
CATIONS
%meq/l
ANIONS


QAL073A
Piper Diagram
3/28/2011
10/22/2012
5/15/2013
5/13/2014
5/11/2015
Sulfate (SO4) + Chloride (Cl)
Calcium (Ca) + Magnesium (Mg)
Sodium (Na) + Potassium (K)
Carbonate (CO3) + Bicarbonate (HCO3)
Magnesium (Mg)
Sulfate (SO4)
Mg
SO4
Ca
Na+K
HCO3+CO3
Cl
Calcium (Ca)
Chloride (Cl)
CATIONS
%meq/l
ANIONS

Appendix I

Eagle Mine

Surface water Location Map



MINE PERMIT SURFACE WATER MONITORING LOCATIONS

- COMPLIANCE WATER QUALITY
- BACKGROUND WATER QUALITY
- REFERENCE WATER QUALITY
- *Instrumented for continuous monitoring*
- PINE RIVER WATERSHED
- SALMON TROUT RIVER WATERSHED
- YELLOW DOG RIVER WATERSHED
- SUBWATERSHED
- ROAD
- HYDROGRAPHY
- MINE FACILITY

Reference

Data provided by: Eagle Mine and North Jackson Company

Projection & Datum: UTM NAD 83 Zone 16N

0 1 2 Miles

Scale: 1:90,000

Eagle Mine
a subsidiary of lundin mining

North Jackson Company
ENVIRONMENTAL SCIENCE & ENGINEERING

Appendix J

Eagle Mine

Surface Water Results

and

Benchmark Summary Table

Eagle Mine
2015 Mine Permit Surface Water Monitoring
Benchmark Comparison Summary

Location	Location Classification	Q1	Q2	Q3	Q4
STRM001	Background	**pH**	pH		mercury, TDS
STRM002	Compliance				
STRM004	Compliance			**mercury**	
STRM005	Compliance			pH	
STRE001	Compliance		sodium		**iron**, mercury
STRE002	Compliance		**mercury**		**TDS**
STRE005	Compliance	sulfate	alkalinity-bicarbonate, magnesium		
STRE009	Compliance		**alkalinity-bicarbonate, calcium, magnesium, hardness**	pH	iron, **pH**, sulfate
STRE010	Compliance		alkalinity-bicarbonate, calcium, magnesium, hardness	iron, pH	
YDRM002	Compliance		aluminum,copper		sulfate, TDS
CDRM004	Reference	pH			

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 seasonal (e.g., Q1 2014 and Q1 2015) sampling events. If the location is classified as background, Department notification is not required for an exceedance.

Table 2
Mine Permit Surface Water Quality Monitoring Data 2015
STRM001 (Background)
Eagle Mine

Parameter	Unit	Permit RL	STRM001 Seasonal Benchmark				STRM001 Data (Q1-Q4 2015)			
			Q1	Q2	Q3	Q4	Q1 2015	Q2 2015	Q3 2015	Q4 2015
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
							2/25/15	5/4/15	8/18/15	10/26/15
Field										
D.O.	ppm	--	--	--	--	--	**5.1**	**6.4**	**5.7**	**8.7**
Flow	cfs	--	--	--	--	--	<0.1	**0.6**	<0.1	<0.1
pH	SU	--	6.5-7.5 p	6.4-7.4	6.1-7.1 p	6.0-7.0	**6.4**	**6.1**	**6.7**	**6.8**
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	**16**	**38**	**56**	**48**
Temperature	°C	--	--	--	--	--	**0.0**	**15**	**16**	**8.4**
Metals										
Aluminum	ug/L	50	--	200	--	--	--	<50	--	--
Antimony	ug/L	2.0	--	8.0	--	--	--	<2.0	--	--
Arsenic	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Barium	ug/L	10	--	25	--	--	--	**11**	--	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Boron	ug/L	50	200	200	200	200	<50	<50	<50	<50
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Cobalt	ug/L	10	40	40	40	40	<10	<10	<10	<10
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	**1.1**	<1.0
Iron	ug/L	20	1521 p	1,861	8077 p	760	**650**	**510**	**760**	**400**
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Lithium	ug/L	10	--	40	--	--	--	<10	--	--
Manganese	ug/L	10	149 p	187	508 p	33	**36**	**27**	**53**	**31**
Mercury	ng/L	0.500	2.80 p	3.41	3.89 p	1.07	**1.06**	**1.52**	**1.07**	**1.34** e
Molybdenum	ug/L	10	--	40	--	--	--	<10	--	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Selenium	ug/L	2.0	8.0	8.0	8.0	8.0	<2.0	<2.0	<2.0	<2.0
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Zinc	ug/L	10	40	40	40	40	<10	<10	<10	<10
Major Anions										
Alkalinity, Bicarbonate	mg/L	2.0	--	42	--	--	--	**30**	--	--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0	--	--
Chloride	mg/L	1.0	--	8.6 p	--	--	--	<1.0	--	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.050	--	0.20	--	--	--	<0.050	--	--
Sulfate	mg/L	1.0	4.0	10 p	4.0	4.0	<1.0	<1.0	<1.0	**1.4**
Major Cations										
Calcium	mg/L	0.50	--	12	--	--	--	**5.4**	--	--
Magnesium	mg/L	0.50	--	2.6	--	--	--	**1.2**	--	--
Potassium	mg/L	0.50	--	0.77	--	--	--	**0.61**	--	--
Sodium	mg/L	0.50	--	1.1	--	--	--	**0.86**	--	--
General										
Hardness	mg/L	3	--	40	--	--	--	**18**	--	--
TDS	mg/L	50	125 p	127	200	66	<50	**54**	**98**	**102** e

Table 2
Mine Permit Surface Water Quality Monitoring Data 2015
STRM002 (Compliance)
Eagle Mine

Parameter	Unit	Permit RL	STRM002 Seasonal Benchmark				STRM002 Data (Q1-Q4 2015)			
			Q1	Q2	Q3	Q4	Q1 2015	Q2 2015	Q3 2015	Q4 2015
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
							2/17/15	4/29/15	8/17/15	10/26/15
Field										
D.O.	ppm	--	--	--	--	--	**13**	**10**	**7.4**	**11**
Flow	cfs	--	--	--	--	--	**1.7**	**3.9**	**1.2**	**1.6**
pH	SU	--	6.8-7.8	6.7-7.7	6.3-7.3 p	6.6-7.6	**7.2**	**6.7**	**7.3**	**7.3**
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	**60**	**42**	**76**	**65**
Temperature	°C	--	--	--	--	--	**0.3**	**10**	**19**	**5.0**
Metals										
Aluminum	ug/L	50	--	200	--	--	--	**79**	--	--
Antimony	ug/L	2.0	--	8.0	--	--	--	<2.0	--	--
Arsenic	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Barium	ug/L	10	--	40	--	--	--	<10	--	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Boron	ug/L	50	200	200	200	200	<50	<50	<50	<50
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Cobalt	ug/L	10	40	40	40	40	<10	<10	<10	<10
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Iron	ug/L	20	329	720	794 p	540	**180**	**220**	**270**	**170**
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Lithium	ug/L	10	--	40	--	--	--	<10	--	--
Manganese	ug/L	10	15	62	31 p	20	<10	<10	**10**	<10
Mercury	ng/L	0.500	1.76	4.77 t	2.79 p	3.19	**0.518**	**4.09**	**1.60**	**1.06** e
Molybdenum	ug/L	10	--	40	--	--	--	<10	--	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Selenium	ug/L	2.0	8.0	8.0	8.0	8.0	<2.0	<2.0	<2.0	<2.0
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Zinc	ug/L	10	40	40	40	40	<10	<10	<10	<10
Major Anions										
Alkalinity, Bicarbonate	mg/L	2.0	--	35	--	--	--	**21**	--	--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0	--	--
Chloride	mg/L	1.0	--	1.7	--	--	--	**1.3**	--	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.050	--	0.20	--	--	--	<0.050	--	--
Sulfate	mg/L	1.0	4.0	6.2 p	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Major Cations										
Calcium	mg/L	0.50	--	10	--	--	--	**5.9**	--	--
Magnesium	mg/L	0.50	--	2.1	--	--	--	**1.3**	--	--
Potassium	mg/L	0.50	--	0.87	--	--	--	**0.51**	--	--
Sodium	mg/L	0.50	--	0.91	--	--	--	**0.60**	--	--
General										
Hardness	mg/L	3	--	34	--	--	--	**20**	--	--
TDS	mg/L	50	79	123	200	73	<50	<50	**50**	**58** e

Table 2
Mine Permit Surface Water Quality Monitoring Data 2015
STRM004 (Compliance)
Eagle Mine

Parameter	Unit	Permit RL	STRM004 Seasonal Benchmark				STRM004 Data (Q1-Q4 2015)			
			Q1	Q2	Q3	Q4	Q1 2015	Q2 2015	Q3 2015	Q4 2015
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
							2/24/15	4/30/15	8/17/15	10/27/15
Field										
D.O.	ppm	--	--	--	--	--	**14**	**12**	**9.3**	**12**
Flow	cfs	--	--	--	--	--	**1.6**	**8.4**	**3.2**	**4.3**
pH	SU	--	6.9-7.9 p	7.3-8.3 p	7.2-8.2 p	7.2-8.2 p	**7.3**	**7.4**	**7.9**	**7.8**
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	**97**	**73**	**103**	**93**
Temperature	°C	--	--	--	--	--	**0.0**	**5.7**	**16**	**6.7**
Metals										
Aluminum	ug/L	50	--	444 p	--	--	--	**120**	--	--
Antimony	ug/L	2.0	--	8.0	--	--	--	<2.0	--	--
Arsenic	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	**1.2**	<1.0
Barium	ug/L	10	--	40	--	--	--	<10	--	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Boron	ug/L	50	200	200	200	200	<50	<50	<50	<50
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Cobalt	ug/L	10	40	40	40	40	<10	<10	<10	<10
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Iron	ug/L	20	362 p	555 p	336 p	472	**210**	**210**	**190**	**110**
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Lithium	ug/L	10	--	40	--	--	--	<10	--	--
Manganese	ug/L	10	40	37 p	30 p	50 p	**19**	**13**	**13**	<10
Mercury	ng/L	0.500	2.80 p	8.34 p	1.62 p	3.67	**1.89**	**4.23**	**1.9**	**1.07** e
Molybdenum	ug/L	10	--	40	--	--	--	<10	--	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Selenium	ug/L	2.0	8.0	8.0	8.0	8.0	<2.0	<2.0	<2.0	<2.0
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Zinc	ug/L	10	40	40	40	40	<10	<10	<10	<10
Major Anions										
Alkalinity, Bicarbonate	mg/L	2.0	--	53 p	--	--	--	**37**	--	--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0	--	--
Chloride	mg/L	1.0	--	4.0	--	--	--	<1.0	--	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.050	--	0.12 p	--	--	--	<0.050	--	--
Sulfate	mg/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Major Cations										
Calcium	mg/L	0.50	--	18 p	--	--	--	**9.5**	--	--
Magnesium	mg/L	0.50	--	3.2 p	--	--	--	**2.0**	--	--
Potassium	mg/L	0.50	--	2.0	--	--	--	**0.51**	--	--
Sodium	mg/L	0.50	--	1.0 p	--	--	--	**0.76**	--	--
General										
Hardness	mg/L	3	--	58 p	--	--	--	**32**	--	--
TDS	mg/L	50	200	200	200	87	**52**	**70**	**68**	**54** e

Table 2
Mine Permit Surface Water Quality Monitoring Data 2015
STRM005 (Compliance)
Eagle Mine

Parameter	Unit	Permit RL	STRM005 Seasonal Benchmark				STRM005 Data (Q1-Q4 2015)			
			Q1	Q2	Q3	Q4	Q1 2015	Q2 2015	Q3 2015	Q4 2015
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
							2/17/15	4/30/15	8/18/15	10/26/15
Field										
D.O.	ppm	--	--	--	--	--	**15**	**12**	**8.9**	**12**
Flow	cfs	--	--	--	--	--	**39**	**64**	**24**	**29**
pH	SU	--	7.1-8.1 p	7.0-8.0 p	6.6-7.6 p	7.4-8.4 p	**7.5**	**7.4**	**8.1**	**7.8**
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	**121**	**88**	**142**	**127**
Temperature	°C	--	--	--	--	--	**0.0**	**7.4**	**16**	**4.6**
Metals										
Aluminum	ug/L	50	--	395 p	--	--	--	**86**	--	--
Antimony	ug/L	2.0	--	8.0	--	--	--	<2.0	--	--
Arsenic	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	**1.1**	<1.0
Barium	ug/L	10	--	40	--	--	--	**10**	--	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Boron	ug/L	50	200	200	200	200	<50	<50	<50	<50
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Cobalt	ug/L	10	40	40	40	40	<10	<10	<10	<10
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Iron	ug/L	20	187 p	423 p	207 p	265 p	**140**	**160**	**150**	**120**
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Lithium	ug/L	10	--	40	--	--	--	<10	--	--
Manganese	ug/L	10	40	40	40	40	**11**	**13**	**12**	**13**
Mercury	ng/L	0.500	1.31 p	9.64 p	1.91 p	3.28 p	**0.678**	**3.81**	**0.961**	**0.981** e
Molybdenum	ug/L	10	--	40	--	--	--	<10	--	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	**1.6**	<1.0	<1.0	<1.0
Selenium	ug/L	2.0	8.0	8.0	8.0	8.0	<2.0	<2.0	<2.0	<2.0
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Zinc	ug/L	10	40	89 p	40	40	<10	<10	<10	**10**
Major Anions										
Alkalinity, Bicarbonate	mg/L	2.0	--	73 p	--	--	--	**46**	--	--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0	--	--
Chloride	mg/L	1.0	--	4.0	--	--	--	<1.0	--	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.050	--	0.20	--	--	--	<0.050	--	--
Sulfate	mg/L	1.0	6.6 p	4.0	4.0	4.0	**3.8**	<1.0	**2.3**	**2.2**
Major Cations										
Calcium	mg/L	0.50	--	23 p	--	--	--	**12**	--	--
Magnesium	mg/L	0.50	--	4.6 p	--	--	--	**2.5**	--	--
Potassium	mg/L	0.50	--	1.5 p	--	--	--	<0.50	--	--
Sodium	mg/L	0.50	--	1.4 p	--	--	--	**0.91**	--	--
General										
Hardness	mg/L	3	--	76 p	--	--	--	**40**	--	--
TDS	mg/L	50	200	200	200	200	**56**	**68**	66	**112** e

Table 2
Mine Permit Surface Water Quality Monitoring Data 2015
STRE001 (Compliance)
Eagle Mine

Parameter	Unit	Permit RL	STRE001 Seasonal Benchmark				STRE001 Data (Q1-Q4 2015)			
			Q1	Q2	Q3	Q4	Q1 2015	Q2 2015	Q3 2015	Q4 2015
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
							2/24/15	5/5/15	8/19/15	10/28/15
Field										
D.O.	ppm	--	--	--	--	--	**13**	**11**	**9.7**	<0.1
Flow	cfs	--	--	--	--	--	**16**	**15**	**9.7**	**19**
pH	SU	--	7.3-8.3 p	7.2-8.2	7.1-8.1 p	7.4-8.4 p	**7.7**	**7.6**	**7.8**	**7.7**
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	**122**	**117**	**125**	**121**
Temperature	°C	--	--	--	--	--	**0.0**	**9.6**	**14**	**7.3**
Metals										
Aluminum	ug/L	50	--	149 p	--	--	--	**82**	--	--
Antimony	ug/L	2.0	--	8.0	--	--	--	<2.0	--	--
Arsenic	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	**1.1**	**1.4**	**1.1**
Barium	ug/L	10	--	40	--	--	--	<10	--	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Boron	ug/L	50	200	200	200	200	<50	<50	<50	<50
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Cobalt	ug/L	10	40	40	40	40	<10	<10	<10	<10
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	1.2
Iron	ug/L	20	102 p	235	105 p	160 p	**72**	**160**	**81**	**360**
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Lithium	ug/L	10	--	40	--	--	--	<10	--	--
Manganese	ug/L	10	40	40	40	151 p	<10	**23**	**14**	**34**
Mercury	ng/L	0.500	2.00	6.05	2.00	1.83 p	**0.901**	**2.13**	**0.885**	**2.10** e
Molybdenum	ug/L	10	--	40	--	--	--	<10	--	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Selenium	ug/L	2.0	8.0	8.0	8.0	8.0	<2.0	<2.0	<2.0	<2.0
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Zinc	ug/L	10	40	40	40	40	<10	<10	<10	<10
Major Anions										
Alkalinity, Bicarbonate	mg/L	2.0	--	82	--	--	--	**59**	**--**	--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0	--	--
Chloride	mg/L	1.0	--	3.9 p	--	--	--	<1.0	**--**	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.050	--	0.091	--	--	--	<0.050	--	--
Sulfate	mg/L	1.0	4.9 p	4.0	4.0	4.0	**4.5**	<1.0	**2.7**	**1.3**
Major Cations										
Calcium	mg/L	0.50	--	25	--	--	--	**16**	**--**	--
Magnesium	mg/L	0.50	--	4.7	--	--	--	**3.4**	**--**	--
Potassium	mg/L	0.50	--	2.0	--	--	--	**0.56**	--	--
Sodium	mg/L	0.50	--	1.1	--	--	--	**1.1**	--	--
General										
Hardness	mg/L	3	--	82	--	--	--	**54**	**--**	--
TDS	mg/L	50	200	133	200	200	**64**	**88**	**92**	**106** e

Table 2
Mine Permit Surface Water Quality Monitoring Data 2015
STRE002 (Compliance)
Eagle Mine

Parameter	Unit	Permit RL	STRE002 Seasonal Benchmark				STRE002 Data (Q1-Q4 2015)			
			Q1	Q2	Q3	Q4	Q1 2015	Q2 2015	Q3 2015	Q4 2015
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
							2/24/15	4/30/15	8/17/15	10/28/15
Field										
D.O.	ppm	--	--	--	--	--	**13**	**12**	**9.7**	**11**
Flow	cfs	--	--	--	--	--	**3.8**	NM	**6.6**	**20**
pH	SU	--	7.3-8.3 p	7.6-8.6 p	7.5-8.5 p	7.3-8.3 t	**7.6**	**7.7**	**8.0**	**7.8**
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	**113**	**102**	**141**	**125**
Temperature	°C	--	--	--	--	--	**0.0**	**5.5**	**15**	**6.9**
Metals										
Aluminum	ug/L	50	--	200	--	--	--	**140**	--	--
Antimony	ug/L	2.0	--	8.0	--	--	--	<2.0	--	--
Arsenic	ug/L	1.0	4.0	4.0	4.0	3.0 p	**1.0**	**1.1**	**1.2**	**1.1**
Barium	ug/L	10	--	40	--	--	--	**11**	--	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Boron	ug/L	50	200	200	200	200	<50	<50	<50	<50
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Cobalt	ug/L	10	40	40	40	40	<10	<10	<10	<10
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Iron	ug/L	20	202 p	194 p	185 p	155	**82**	**170**	**81**	**130**
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Lithium	ug/L	10	--	40	--	--	--	<10	--	--
Manganese	ug/L	10	40	40	40	40	**11**	**18**	**10**	**15**
Mercury	ng/L	0.500	2.31 p	4.84 p	2.00	2.22	**1.14**	**5.49**	**0.994**	**1.56** e
Molybdenum	ug/L	10	--	40	--	--	--	<10	--	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Selenium	ug/L	2.0	8.0	8.0	8.0	8.0	<2.0	<2.0	<2.0	<2.0
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Zinc	ug/L	10	40	34 p	40	40	<10	<10	<10	<10
Major Anions										
Alkalinity, Bicarbonate	mg/L	2.0	--	82 p	--	--	--	**52**	**--**	--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0	--	--
Chloride	mg/L	1.0	--	4.0	--	--	--	<1.0	**--**	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.050	--	0.20	--	--	--	**0.069**	--	--
Sulfate	mg/L	1.0	5.1 p	4.0	4.0	4.0	**4.5**	<1.0	**2.9**	**3.4**
Major Cations										
Calcium	mg/L	0.50	--	25 p	--	--	--	**14**	**--**	--
Magnesium	mg/L	0.50	--	4.8 p	--	--	--	**3.0**	**--**	--
Potassium	mg/L	0.50	--	2.0	--	--	--	**0.52**	--	--
Sodium	mg/L	0.50	--	1.4 p	--	--	--	**0.99**	--	--
General										
Hardness	mg/L	3	--	82 p	--	--	--	**47**	**--**	--
TDS	mg/L	50	200	200	200	87	**70**	**72**	**86**	**98** e

Table 2
Mine Permit Surface Water Quality Monitoring Data 2015
STRE005 (Compliance)
Eagle Mine

Parameter	Unit	Permit RL	STRE005 Seasonal Benchmark				STRE005 Data (Q1-Q4 2015)			
			Q1	Q2	Q3	Q4	Q1 2015	Q2 2015	Q3 2015	Q4 2015
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
							2/16/15	4/30/15	8/17/15	10/27/15
Field										
D.O.	ppm	--	--	--	--	--	**14**	**12**	**8.8**	**11**
Flow	cfs	--	--	--	--	--	**0.8**	**1.1**	**0.2**	**0.1**
pH	SU	--	7.0-8.0	6.6-7.6	7.1-8.1	6.8-7.8	**7.8**	**7.5**	**8.0**	**7.7**
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	**68**	**97**	**138**	**107**
Temperature	°C	--	--	--	--	--	**0.0**	**5.7**	**18**	**6.7**
Metals										
Aluminum	ug/L	50	--	2,239	--	--	--	<50	--	--
Antimony	ug/L	2.0	--	8.0	--	--	--	<2.0	--	--
Arsenic	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Barium	ug/L	10	--	40	--	--	--	<10	--	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Boron	ug/L	50	200	200	200	200	<50	<50	<50	<50
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Cobalt	ug/L	10	40	40	40	40	<10	<10	<10	<10
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Iron	ug/L	20	649	1,731	503	253	**130**	**110**	**230**	**120**
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Lithium	ug/L	10	--	40	--	--	--	<10	--	--
Manganese	ug/L	10	88	136	40	40	**20**	**14**	**25**	<10
Mercury	ng/L	0.500	2.00	23.0	2.00	2.16	**0.73**	**2.26**	**1.16**	**1.37** e
Molybdenum	ug/L	10	--	40	--	--	--	<10	--	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Selenium	ug/L	2.0	8.0	8.0	8.0	8.0	<2.0	<2.0	<2.0	<2.0
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Zinc	ug/L	10	40	40	40	40	<10	<10	<10	<10
Major Anions										
Alkalinity, Bicarbonate	mg/L	2.0	--	50	--	--	--	**50**	--	--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0	--	--
Chloride	mg/L	1.0	--	4.0	--	--	--	<1.0	--	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.050	--	0.20	--	--	--	**0.060**	--	--
Sulfate	mg/L	1.0	5.2	4.0	4.0	p	**5.5**	<1.0	<1.0	**6.3**
Major Cations										
Calcium	mg/L	0.50	--	16	--	--	--	**14**	--	--
Magnesium	mg/L	0.50	--	2.6	--	--	--	**2.6**	--	--
Potassium	mg/L	0.50	--	2.0	--	--	--	<0.50	--	--
Sodium	mg/L	0.50	--	2.0	--	--	--	**0.77**	--	--
General										
Hardness	mg/L	3	--	51	--	--	--	**46**	--	--
TDS	mg/L	50	200	200	200	200	**68**	**68**	**92**	**80** e

Table 2
Mine Permit Surface Water Quality Monitoring Data 2015
STRE009 (Compliance)
Eagle Mine

Parameter	Unit	Permit RL	STRE009 Seasonal Benchmark				STRE009 Data (Q1-Q4 2015)			
			Q1	Q2	Q3	Q4	Q1 2015	Q2 2015	Q3 2015	Q4 2015
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
							2/17/15	4/29/15	8/17/15	10/27/15
Field										
D.O.	ppm	--	--	--	--	--	**14**	**11**	**7.5**	**12**
Flow	cfs	--	--	--	--	--	**3.4**	**4.8**	**2.7**	**3.4**
pH	SU	--	7.2-8.2	6.7-7.7	6.8-7.8	6.5-7.5	**7.8**	**7.7**	**8.4**	**7.7**
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	**59**	**99**	**75**	**110**
Temperature	°C	--	--	--	--	--	**0.3**	**9.4**	**16**	**5.7**
Metals										
Aluminum	ug/L	50	--	393	--	--	--	**85**	--	--
Antimony	ug/L	2.0	--	8.0	--	--	--	<2.0	--	--
Arsenic	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	**1.4**	<1.0
Barium	ug/L	10	--	40	--	--	--	<10	--	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Boron	ug/L	50	200	200	200	200	<50	<50	<50	<50
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Cobalt	ug/L	10	40	40	40	40	<10	<10	<10	<10
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Iron	ug/L	20	86	393	264	94	**58**	**94**	**170**	**98**
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Lithium	ug/L	10	--	40	--	--	--	<10	--	--
Manganese	ug/L	10	40	40	35	40	<10	<10	**30**	<10
Mercury	ng/L	0.500	2.00	5.98	3.09	2.00	<0.500	**2.17**	**1.99**	**1.14** e
Molybdenum	ug/L	10	--	40	--	--	--	<10	--	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Selenium	ug/L	2.0	8.0	8.0	8.0	8.0	<2.0	<2.0	<2.0	<2.0
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Zinc	ug/L	10	40	40	40	40	<10	<10	<10	<10
Major Anions										
Alkalinity, Bicarbonate	mg/L	2.0	--	33	--	--	--	**51**	--	--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0	--	--
Chloride	mg/L	1.0	--	4.0	--	--	--	<1.0	--	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.050	--	0.20	--	--	--	<0.050	--	--
Sulfate	mg/L	1.0	4.8	4.0	4.0	4.0	**4.2**	<1.0	**1.1**	**6.5**
Major Cations										
Calcium	mg/L	0.50	--	10	--	--	--	**15**	--	--
Magnesium	mg/L	0.50	--	2.0	--	--	--	**2.9**	--	--
Potassium	mg/L	0.50	--	2.0	--	--	--	<0.50	--	--
Sodium	mg/L	0.50	--	2.0	--	--	--	**0.81**	--	--
General										
Hardness	mg/L	3	--	33	--	--	--	**49**	--	--
TDS	mg/L	50	200	200	200	200	**68**	**54**	**72**	**68** e

Table 2
Mine Permit Surface Water Quality Monitoring Data 2015
STRE010 (Compliance)
Eagle Mine

Parameter	Unit	Permit RL	STRE010 Seasonal Benchmark				STRE010 Data (Q1-Q4 2015)				
			Q1	Q2	Q3	Q4	Q1 2015	Q2 2015	Q3 2015	Q4 2015	
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	
							2/17/15	4/30/15	8/17/15	10/27/15	
Field											
D.O.	ppm	--	--	--	--	--	**14**	**12**	**10**	**12**	
Flow	cfs	--	--	--	--	--	**2.8**	**3.4**	**1.9**	**2.6**	
pH	SU	--	7.3-8.3	6.7-7.7	7.1-8.1	6.9-7.9	**7.8**	**7.5**	**8.3**	**7.8**	
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	**112**	**100**	**124**	**104**	
Temperature	°C	--	--	--	--	--	**0.5**	**4.7**	**11**	**6.6**	
Metals											
Aluminum	ug/L	50	--	421	--	--	--	**63**	--	**--**	
Antimony	ug/L	2.0	--	8.0	--	--	--	<2.0	--	--	
Arsenic	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0	
Barium	ug/L	10	--	40	--	--	--	<10	--	--	
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--	
Boron	ug/L	50	200	200	200	200	<50	<50	<50	<50	
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--	
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--	
Cobalt	ug/L	10	40	40	40	40	<10	<10	<10	<10	
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0	
Iron	ug/L	20	168	555	104	80	**130**	**110**	**120**	**45**	
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--	
Lithium	ug/L	10	--	40	--	--	--	<10	--	--	
Manganese	ug/L	10	40	46	40	40	**14**	<10	**16**	<10	
Mercury	ng/L	0.500	2.67	8.07	2.00	2.00	**1.15**	**2.64**	**1.44**	**0.709**	e
Molybdenum	ug/L	10	--	40	--	--	--	<10	--	--	
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0	
Selenium	ug/L	2.0	8.0	8.0	8.0	8.0	<2.0	<2.0	<2.0	<2.0	
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--	
Zinc	ug/L	10	40	40	40	40	<10	<10	<10	<10	
Major Anions											
Alkalinity, Bicarbonate	mg/L	2.0	--	33	--	--	--	**50**	**--**	**--**	
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0	--	--	
Chloride	mg/L	1.0	--	4.0	--	--	--	**1.1**	**--**	**--**	
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10	--	--	
Nitrogen, Nitrate	mg/L	0.050	--	0.20	--	--	--	**0.082**	--	**--**	
Sulfate	mg/L	1.0	4.6	4.0	4.0	4.0	**3.1**	<1.0	<1.0	**1.0**	
Major Cations											
Calcium	mg/L	0.50	--	13	--	--	--	**14**	**--**	**--**	
Magnesium	mg/L	0.50	--	2.4	--	--	--	**2.7**	**--**	**--**	
Potassium	mg/L	0.50	--	2.0	--	--	--	<0.50	--	**--**	
Sodium	mg/L	0.50	--	2.0	--	--	--	**0.80**	--	**--**	
General											
Hardness	mg/L	3	--	43	--	--	--	**46**	**--**	**--**	
TDS	mg/L	50	200 p	200	200	200	**62**	**70**	**86**	**72**	e

Table 2
Mine Permit Surface Water Quality Monitoring Data 2015
YDRM002 (Compliance)
Eagle Mine

Parameter	Unit	Permit RL	YDRM002 Seasonal Benchmark				YDRM002 Data (Q1-Q4 2015)			
			Q1	Q2	Q3	Q4	Q1 2015	Q2 2015	Q3 2015	Q4 2015
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
							2/25/15	5/4/15	8/18/15	10/26/15
Field										
D.O.	ppm	--	--	--	--	--	**11**	**8.8**	**7.6**	**11**
Flow	cfs	--	--	--	--	--	**15**	**86**	**8.5**	**12**
pH	SU	--	6.5-7.5 p	6.3-7.3	6.7-7.7 p	6.7-7.7	**6.7**	**6.3**	**7.7**	**7.5**
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	**63**	**29**	**90**	**79**
Temperature	°C	--	--	--	--	--	**0.0**	**12**	**18**	**5.2**
Metals										
Aluminum	ug/L	50	--	155 p	--	--	--	**160**	--	--
Antimony	ug/L	2.0	--	8.0	--	--	--	<2.0	--	--
Arsenic	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Barium	ug/L	10	--	40	--	--	--	<10	--	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Boron	ug/L	50	200	200	200	200	<50	<50	<50	<50
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Cobalt	ug/L	10	40	40	40	40	<10	<10	<10	<10
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	**4.1** s	<1.0	<1.0
Iron	ug/L	20	711	1,352	1172 p	1,200	**640**	**460**	**1,000**	**580**
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Lithium	ug/L	10	--	40	--	--	--	<10	--	--
Manganese	ug/L	10	40 t	57	38 p	41	**33**	**19**	**26**	**21**
Mercury	ng/L	0.500	2.86 p	7.86	3.40 p	5.67	**2.04**	**6.91**	**1.67**	**1.54** e
Molybdenum	ug/L	10	--	40	--	--	--	<10	--	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Selenium	ug/L	2.0	8.0	8.0	8.0	8.0	<2.0	<2.0	<2.0	<2.0
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Zinc	ug/L	10	114 p	40	40	40	<10	<10	<10	<10
Major Anions										
Alkalinity, Bicarbonate	mg/L	2.0	--	35	--	--	--	**11**	--	--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0	--	--
Chloride	mg/L	1.0	--	1.4	--	--	--	<1.0	--	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.050	--	0.16	--	--	--	<0.050	--	--
Sulfate	mg/L	1.0	6.7	10 p	4.0	4.0	<1.0	<1.0	<1.0	**5.5**
Major Cations										
Calcium	mg/L	0.50	--	11	--	--	--	**4.8**	--	--
Magnesium	mg/L	0.50	--	2.3	--	--	--	**1.1**	--	--
Potassium	mg/L	0.50	--	0.67	--	--	--	<0.50	--	--
Sodium	mg/L	0.50	--	1.2	--	--	--	**0.63**	--	--
General										
Hardness	mg/L	3	--	36	--	--	--	**17**	--	--
TDS	mg/L	50	200	86	200	97	**64**	**58**	**84**	**112** e

Table 2
Mine Permit Surface Water Quality Monitoring Data 2015
CDRM004 (Reference)
Eagle Mine

Parameter	Unit	Permit RL	CDRM004 Seasonal Benchmark				CDRM004 Data (Q1-Q4 2015)			
			Q1	Q2	Q3	Q4	Q1 2015	Q2 2015	Q3 2015	Q4 2015
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
							2/16/15	5/5/15	8/19/15	10/28/15
Field										
D.O.	ppm	--	--	--	--	--	**14**	**12**	**9.8**	**11**
Flow	cfs	--	--	--	--	--	**8.8**	**15**	**6.7**	**14**
pH	SU	--	7.3-8.3 p	7.3-8.3	7.1-8.1 p	7.2-8.2 p	**7.2**	**7.3**	**7.9**	**7.8**
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	**129**	**116**	**152**	**130**
Temperature	°C	--	--	--	--	--	**0.0**	**7.1**	**14**	**6.8**
Metals										
Aluminum	ug/L	50	--	200	--	--	--	<50	--	--
Antimony	ug/L	2.0	--	8.0	--	--	--	<2.0	--	--
Arsenic	ug/L	1.0	1.5	2.4	3.7 p	2.5	<1.0	**1.2**	**3.0**	**1.8**
Barium	ug/L	10	--	15	--	--	--	**10**	--	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Boron	ug/L	50	200	200	200	200	<50	<50	<50	<50
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Cobalt	ug/L	10	40	40	40	40	<10	<10	<10	<10
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Iron	ug/L	20	102 p	177	264 p	168	**80**	**110**	**170**	**140**
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0	--	--
Lithium	ug/L	10	--	40	--	--	--	<10	--	--
Manganese	ug/L	10	13	19	46 p	129 p	<10	**16**	**30**	**20**
Mercury	ng/L	0.500	2.00	4.62	2.00	1.90 t	**0.589**	**1.43**	**1.12**	**1.23** e
Molybdenum	ug/L	10	--	40	--	--	--	<10	--	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	<1.0	<1.0
Selenium	ug/L	2.0	8.0	8.0	8.0	8.0	<2.0	<2.0	<2.0	<2.0
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20	--	--
Zinc	ug/L	10	40	40	40	40	<10	<10	<10	<10
Major Anions										
Alkalinity, Bicarbonate	mg/L	2.0	--	88	--	--	--	**60**	--	--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0	--	--
Chloride	mg/L	1.0	--	4.0	--	--	--	<1.0	--	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.050	--	0.20	--	--	--	**0.098**	--	--
Sulfate	mg/L	1.0	5.8	4.0	4.0 p	4.0	<1.0	<1.0	<1.0	<1.0
Major Cations										
Calcium	mg/L	0.50	--	26	--	--	--	**17**	--	--
Magnesium	mg/L	0.50	--	4.0	--	--	--	**3.0**	--	--
Potassium	mg/L	0.50	--	0.63	--	--	--	**0.57**	--	--
Sodium	mg/L	0.50	--	1.2	--	--	--	**1.0**	--	--
General										
Hardness	mg/L	3	--	81	--	--	--	**55**	--	--
TDS	mg/L	50	118 p	128	200	102	**80**	**78**	**144**	**100** e

Table 2
Mine Permit Surface Water Quality Monitoring Data
Explanation of Abbreviations and Data Qualifiers
Eagle Project

Footnote	Explanation
a	Estimated value. Duplicate precision for this parameter exceeded quality control limit.
b	Estimated value. Sample received after EPA established hold time expired.
e	Estimated value. The laboratory statement of data qualifications indicates that a quality control limit for this parameter was exceeded.
NM	Not measured.
p	Pending. Some parameters/locations require additional baseline data to calculate a benchmark.
R	Measured value was rejected based on quality control procedures.
RL	Laboratory reporting limit.
s	Potential false positive value. Compound present in blank sample.
t	Trending. Trend analysis is recommended in adition to benchmark screening for parameters that appear to be trending (i.e., the data do not represent a random distribution about the baseline mean).
	Value is equal to or above site-specific benchmark.

Appendix K

Eagle Mine

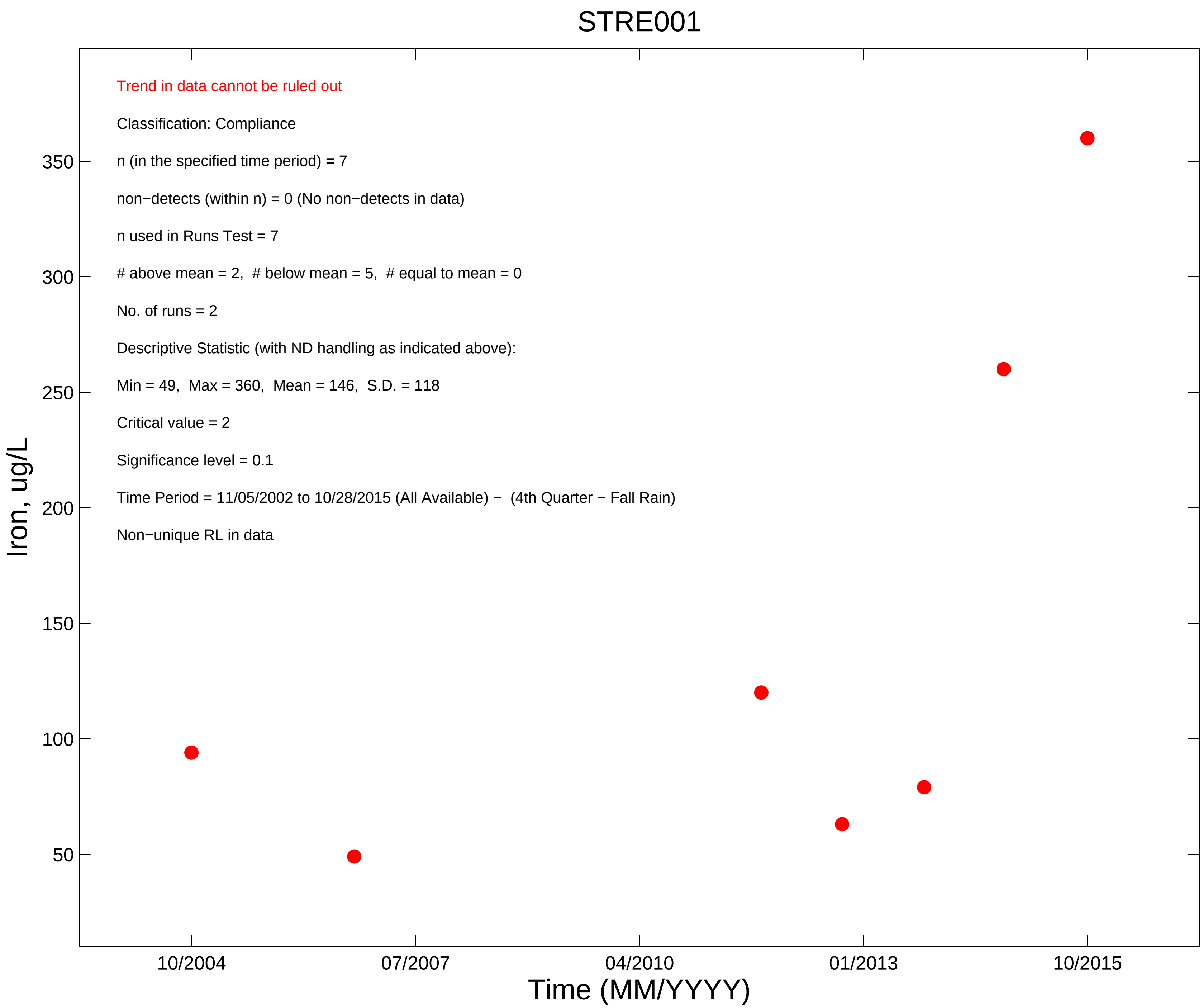
Surface Water Monitoring

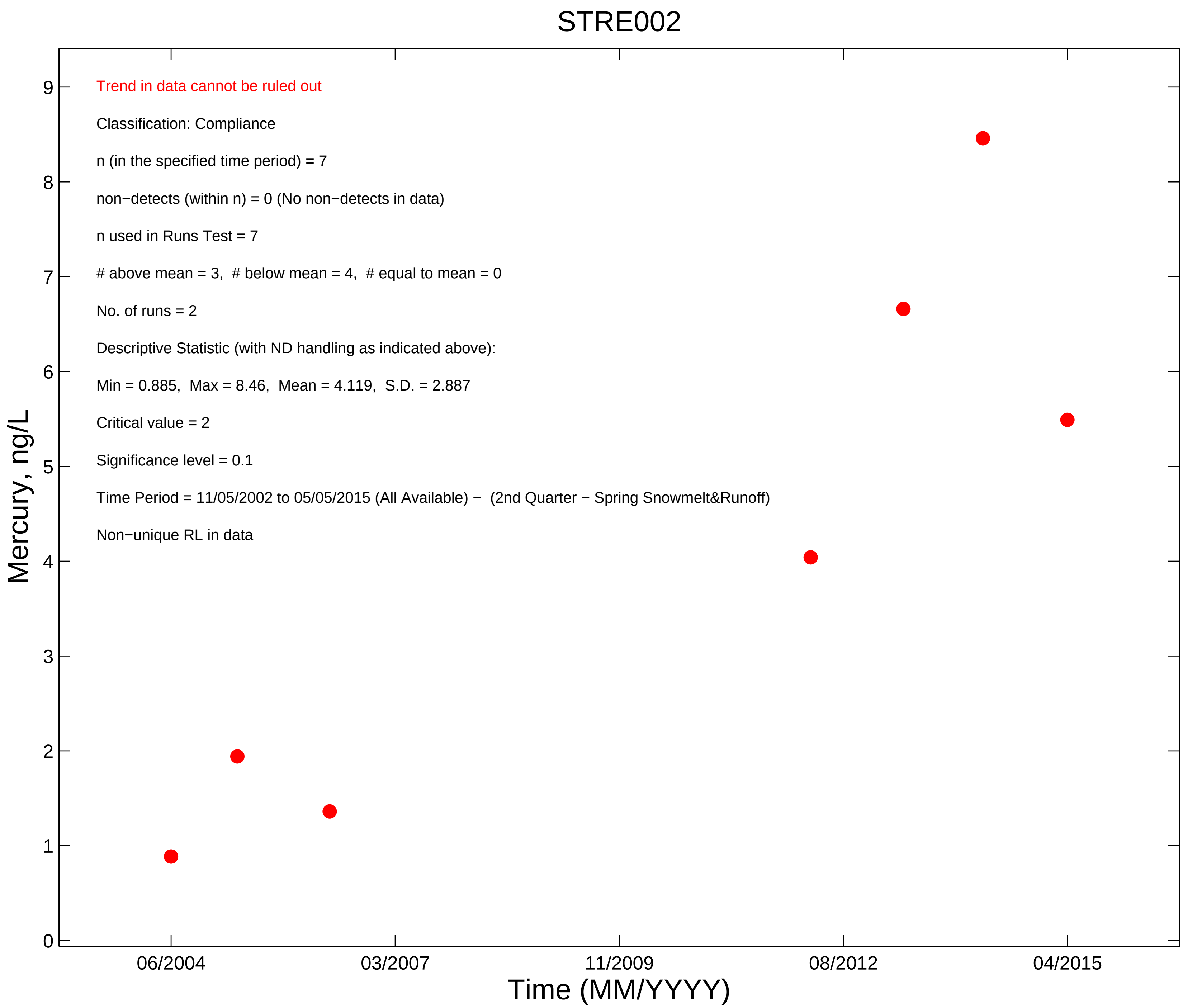
Trend Analysis Summary & Trending Charts

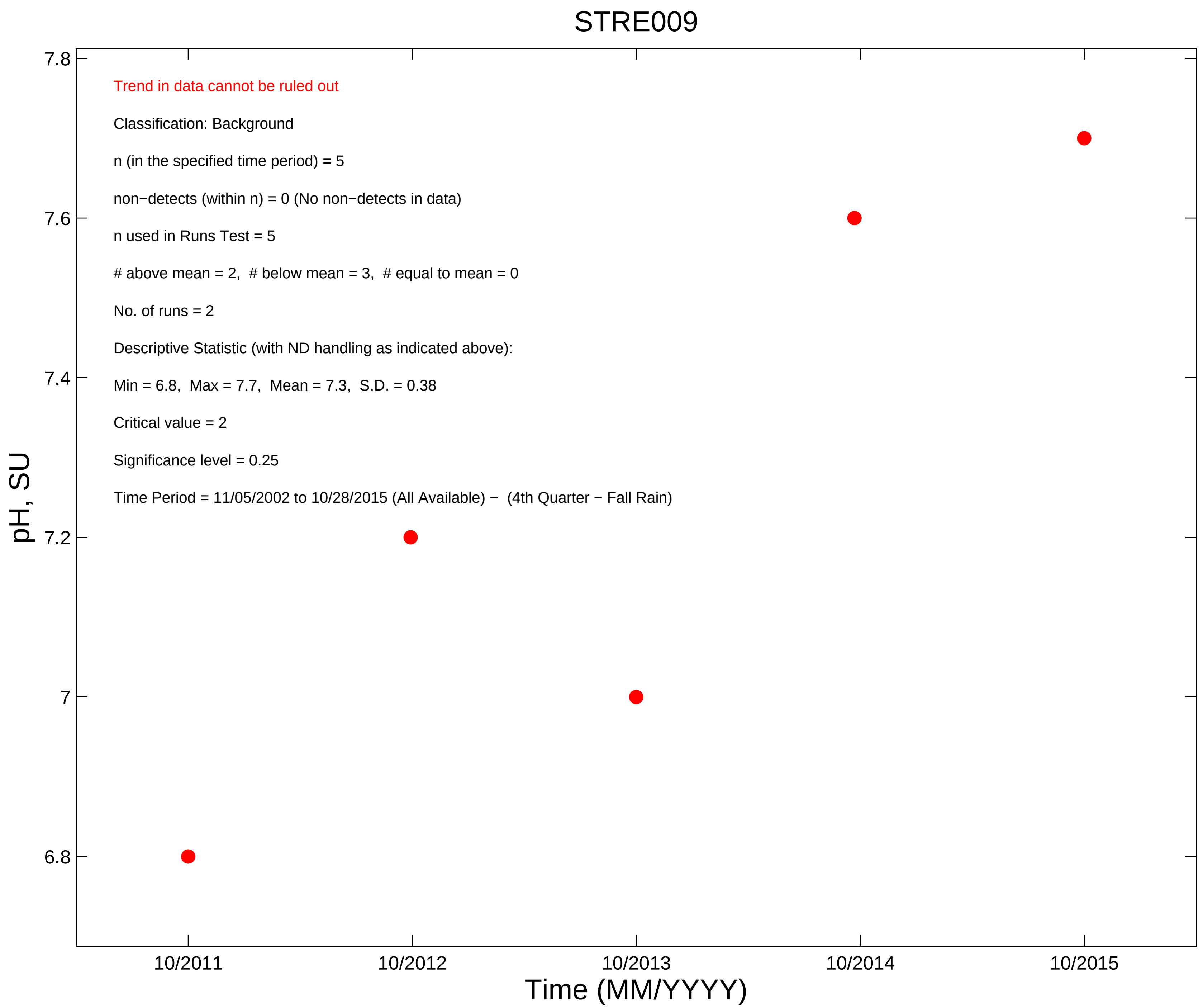
2015 Mine Permit Surface Water
Trend Analysis Summary
Eagle Mine

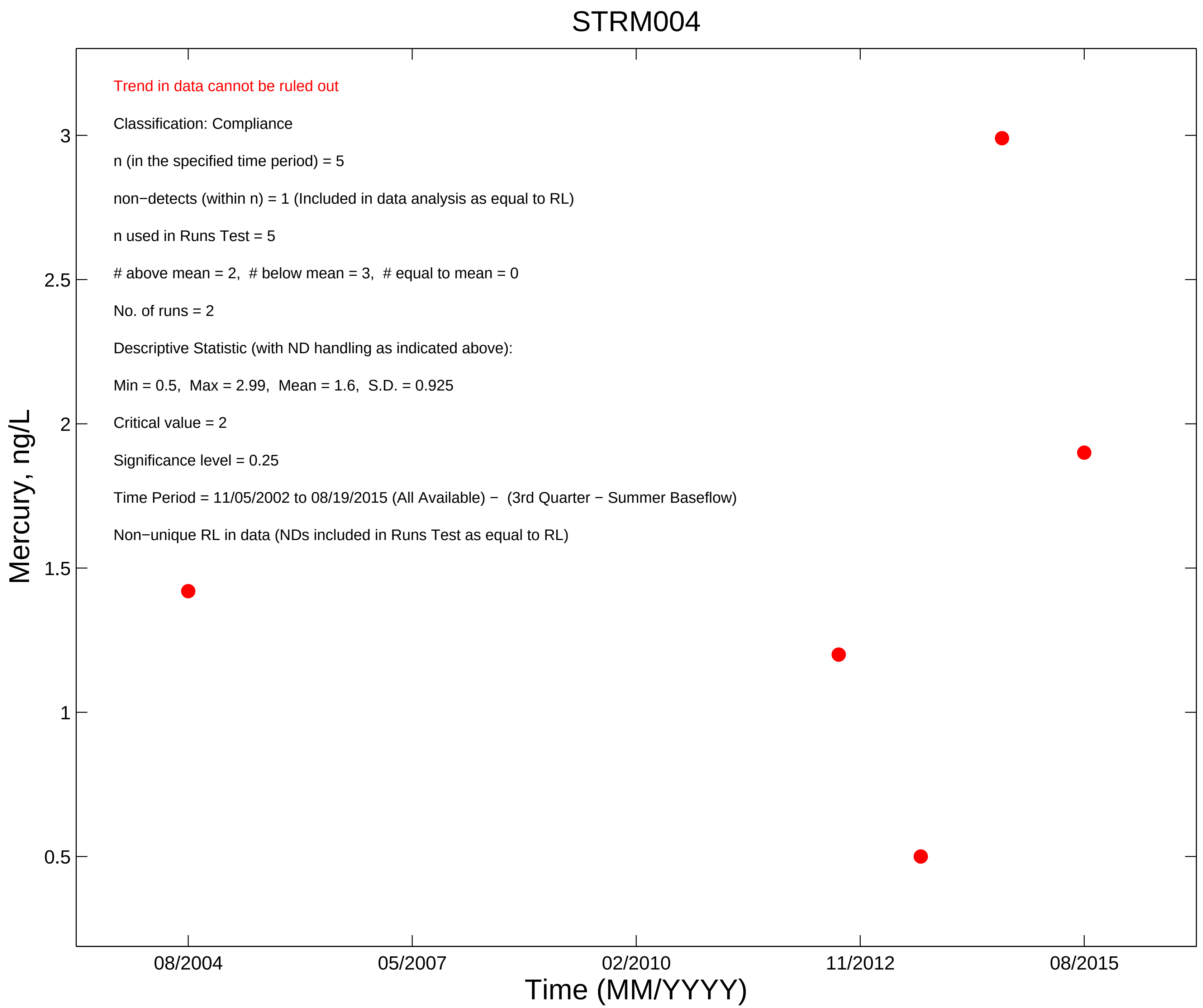
Location	Quarter	Classification	Parameter	Unit	# Samples	# NDs	Non-detects handling	# used in Runs Test	Min	Max	Mean	St. Dev.	# Above Mean	# Below Mean	# Equal Mean	# Runs	Criti-cal value	Statistical Significance Level	Trend Present	Remarks
CDRM004	Q1	Reference	pH	SU	7	0	No NDs	7	7.2	8.2	7.7	0.38	2	3	2	2	2	0.25	Y	
CDRM004	Q1	Reference	TDS	mg/L	7	0	No NDs	7	42	102	74	19.20	4	3	0	2	2	0.10	Y	Non-unique RL in data
STRE002	Q1	Compliance	Iron	ug/L	6	0	No NDs	6	68	150	98	33.80	2	4	0	2	2	0.25	Y	
STRE002	Q1	Compliance	Specific Conductance	µS/cm @ 25°C	5	0	No NDs	5	110	138	124	12.20	3	2	0	2	2	0.25	Y	
STRE002	Q1	Compliance	TDS	mg/L	6	1	Included as RL	6	20	94	64	27.00	4	2	0	2	2	0.25	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRM001	Q1	Background	pH	SU	7	0	No NDs	7	6.1	7.8	6.7	0.63	2	5	0	2	2	0.10	Y	
STRM001	Q1	Background	Sulfate	mg/L	7	6	Included as RL	7	1.0	7.1	3.0	2.60	3	4	0	2	2	0.10	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRM005	Q1	Compliance	TDS	mg/L	5	1	Included as RL	5	50	88	69	16.00	3	2	0	2	2	0.25	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
CDRM004	Q2	Reference	Nitrogen, Nitrate	mg/L	8	4	Included as RL	8	0.050	0.10	0.069	0.02	3	5	0	2	2	0.05	Y	
STRE001	Q2	Compliance	Sulfate	mg/L	8	7	Included as RL	8	1.0	5.0	2.0	2.00	2	6	0	2	2	0.10	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRE002	Q2	Compliance	Aluminum	ug/L	6	1	Included as RL	6	50	210	122	72.20	3	3	0	2	2	0.10	Y	
STRE002	Q2	Compliance	Cadmium	ug/L	6	5	Included as RL	6	0.20	0.50	0.27	0.12	2	4	0	2	2	0.25	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRE002	Q2	Compliance	Calcium	mg/L	7	0	No NDs	7	8.1	21	15	4.96	3	4	0	2	2	0.10	Y	
STRE002	Q2	Compliance	Iron	ug/L	7	0	No NDs	7	76	240	148	58.70	4	3	0	2	2	0.10	Y	Non-unique RL in data
STRE002	Q2	Compliance	Manganese	ug/L	7	3	Included as RL	7	10	18	12	3.20	2	5	0	2	2	0.10	Y	
STRE002	Q2	Compliance	Mercury	ng/L	7	0	No NDs	7	0.885	8.46	4.12	2.89	3	4	0	2	2	0.10	Y	Non-unique RL in data
STRE002	Q2	Compliance	Nitrogen, Nitrate	mg/L	7	3	Included as RL	7	0.050	0.10	0.062	0.02	3	4	0	2	2	0.10	Y	
STRE002	Q2	Compliance	pH	SU	7	0	No NDs	7	7.1	8.9	7.8	0.67	3	4	0	2	2	0.10	Y	
STRE002	Q2	Compliance	Zinc	ug/L	6	4	Included as RL	6	10	25	13	6.10	2	4	0	2	2	0.25	Y	
STRM001	Q2	Background	Sulfate	mg/L	10	8	Included as RL	10	1.0	8.4	3.1	2.90	4	6	0	2	3	0.05	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRM002	Q2	Compliance	Sulfate	mg/L	10	8	Included as RL	10	1.0	5.7	2.7	2.20	4	6	0	2	3	0.05	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRM004	Q2	Compliance	pH	SU	7	0	No NDs	7	7.0	8.3	7.6	0.52	3	4	0	2	2	0.10	Y	
YDRM002	Q2	Compliance	Sulfate	mg/L	10	8	Included as RL	10	1.0	8.3	3.0	2.80	4	6	0	2	3	0.05	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
CDRM004	Q3	Reference	Arsenic	ug/L	6	0	No NDs	6	1.900	3.3	2.7	0.53	4	2	0	2	2	0.25	Y	
CDRM004	Q3	Reference	Specific Conductance	µS/cm @ 25°C	6	0	No NDs	6	116	153	138	17.40	4	2	0	2	2	0.25	Y	
STRE001	Q3	Compliance	Iron	ug/L	5	0	No NDs	5	72	100	85	12.00	2	3	0	2	2	0.25	Y	
STRE001	Q3	Compliance	Sulfate	mg/L	5	1	Included as RL	5	2.700	5.0	3.5	0.90	2	3	0	2	2	0.25	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRM001	Q3	Background	Iron	ug/L	6	0	No NDs	6	700	5860	2190	2003.00	2	4	0	2	2	0.25	Y	
STRM001	Q3	Background	Manganese	ug/L	6	0	No NDs	6	40	369	131	131.00	2	4	0	2	2	0.25	Y	
STRM001	Q3	Background	Specific Conductance	µS/cm @ 25°C	6	0	No NDs	6	55	99	67	17.00	2	4	0	2	2	0.25	Y	
STRM002	Q3	Compliance	Iron	ug/L	6	0	No NDs	6	220	580	368	167.00	2	4	0	2	2	0.25	Y	
STRM002	Q3	Compliance	Manganese	ug/L	6	2	Included as RL	6	10	23	14	6.10	2	4	0	2	2	0.25	Y	
STRM002	Q3	Compliance	TDS	mg/L	6	2	Included as RL	6	50	67	55	7.30	2	4	0	2	2	0.25	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRM004	Q3	Compliance	Mercury	ng/L	5	1	Included as RL	5	0.500	3.0	1.6	0.93	2	3	0	2	2	0.25	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRM005	Q3	Compliance	pH	SU	5	0	No NDs	5	7.000	8.1	7.4	0.42	2	3	0	2	2	0.25	Y	
STRM005	Q3	Compliance	Sulfate	mg/L	5	1	Included as RL	5	1.400	5.0	2.6	1.40	2	3	0	2	2	0.25	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRM005	Q3	Compliance	TDS	mg/L	5	1	Included as RL	5	50	82	67	14.00	2	3	0	2	2	0.25	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRE001	Q4	Compliance	Iron	ug/L	7	0	No NDs	7	49	360	146	118.00	2	5	0	2	2	0.10	Y	Non-unique RL in data
STRE001	Q4	Compliance	Specific Conductance	µS/cm @ 25°C	7	0	No NDs	7	106	136	123	11.40	4	3	0	2	2	0.10	Y	
STRE005	Q4	Compliance	Manganese	ug/L	5	2	Included as RL	5	10	20	14	4.60	2	3	0	2	2	0.25	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRE005	Q4	Compliance	Specific Conductance	µS/cm @ 25°C	5	0	No NDs	5	98	118	107	8.65	2	3	0	2	2	0.25	Y	
STRE009	Q4	Compliance	Mercury	ng/L	5	1	Included as RL	5	0.500	1.14	0.728	0.25	2	3	0	2	2	0.25	Y	
STRE009	Q4	Compliance	pH	SU	5	0	No NDs	5	6.8	7.7	7.3	0.38	2	3	0	2	2	0.25	Y	
STRE010	Q4	Compliance	Specific Conductance	µS/cm @ 25°C	5	0	No NDs	5	93	129	110	14.60	2	3	0	2	2	0.25	Y	
STRM001	Q4	Background	Sulfate	mg/L	10	9	Included as RL	10	1.0	5.0	2.7	2.00	4	6	0	2	3	0.05	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
YDRM002	Q4	Compliance	Sulfate	mg/L	11	9	Included as RL	11	1.0	15	4.2	4.08	6	5	0	3	3	0.05	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)

Explanations of abbreviations provided at the end of this table.


STRE001
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 7
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 7
above mean = 2, # below mean = 5, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 49, Max = 360, Mean = 146, S.D. = 118
Critical value = 2
Significance level = 0.1
Time Period = 11/05/2002 to 10/28/2015 (All Available) − (4th Quarter − Fall Rain)
Non−unique RL in data
Iron, ug/L
350
300
250
200
150
100
50
10/2004
07/2007
04/2010
01/2013
10/2015
Time (MM/YYYY)


STRE002
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 7
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 7
above mean = 3, # below mean = 4, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 0.885, Max = 8.46, Mean = 4.119, S.D. = 2.887
Critical value = 2
Significance level = 0.1
Time Period = 11/05/2002 to 05/05/2015 (All Available) − (2nd Quarter − Spring Snowmelt&Runoff)
Non−unique RL in data
Mercury, ng/L
0
1
2
3
4
5
6
7
8
9
06/2004
03/2007
11/2009
08/2012
04/2015
Time (MM/YYYY)


STRE009
Trend in data cannot be ruled out
Classification: Background
n (in the specified time period) = 5
non−detects (within n) = 0 (No non−detects in data)
n used in Runs Test = 5
above mean = 2, # below mean = 3, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 6.8, Max = 7.7, Mean = 7.3, S.D. = 0.38
Critical value = 2
Significance level = 0.25
Time Period = 11/05/2002 to 10/28/2015 (All Available) − (4th Quarter − Fall Rain)
pH, SU
7.8
7.6
7.4
7.2
7
6.8
10/2011
10/2012
10/2013
10/2014
10/2015
Time (MM/YYYY)

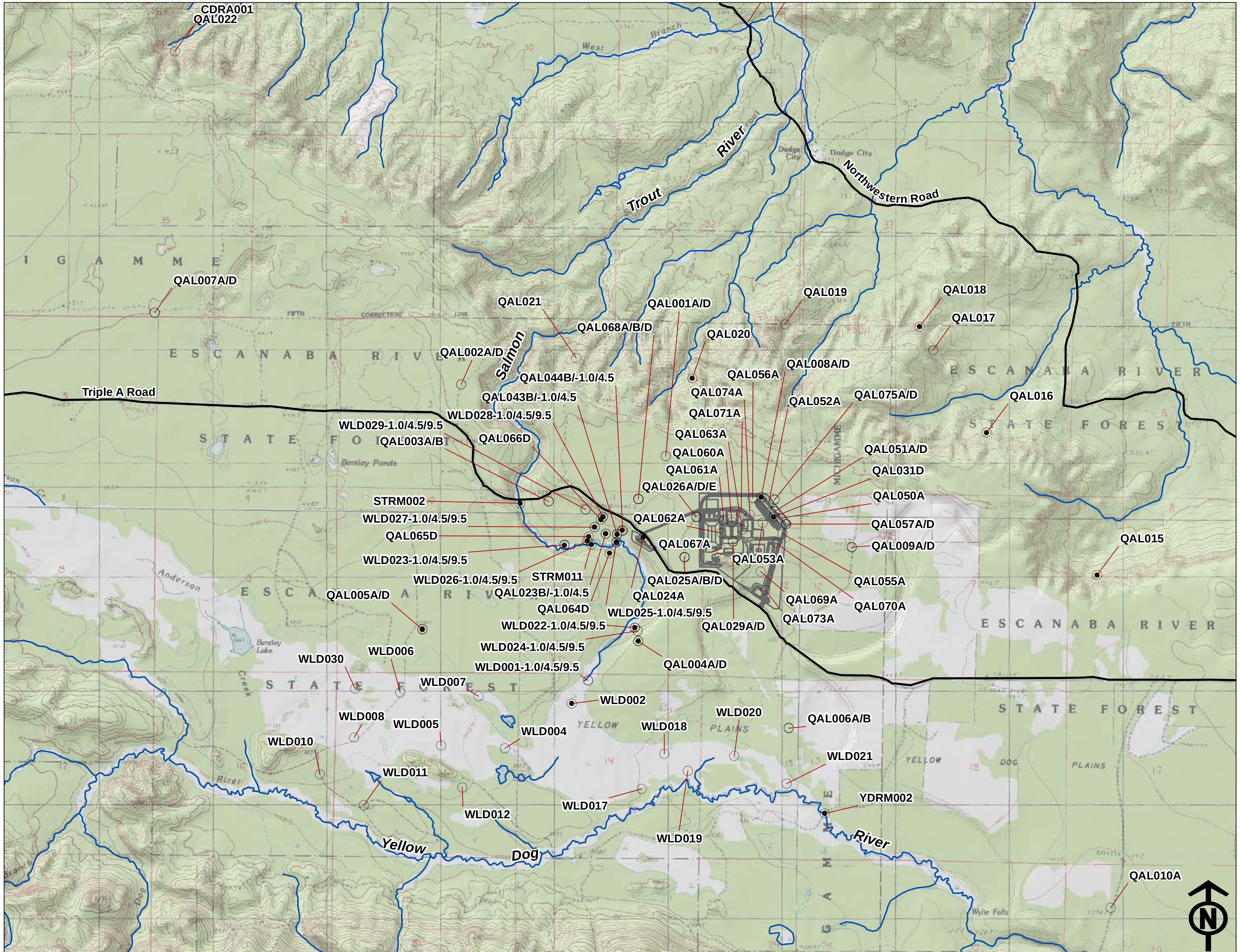


STRM004
Trend in data cannot be ruled out
Classification: Compliance
n (in the specified time period) = 5
non−detects (within n) = 1 (Included in data analysis as equal to RL)
n used in Runs Test = 5
above mean = 2, # below mean = 3, # equal to mean = 0
No. of runs = 2
Descriptive Statistic (with ND handling as indicated above):
Min = 0.5, Max = 2.99, Mean = 1.6, S.D. = 0.925
Critical value = 2
Significance level = 0.25
Time Period = 11/05/2002 to 08/19/2015 (All Available) − (3rd Quarter − Summer Baseflow)
Non−unique RL in data (NDs included in Runs Test as equal to RL)
Mercury, ng/L
3
2.5
2
1.5
1
0.5
08/2004
05/2007
02/2010
11/2012
08/2015
Time (MM/YYYY)

Appendix L

Eagle Mine

Water Level Monitoring Location Map



MINE PERMIT WATER LEVEL MONITORING LOCATION MAP

ELEVATION

Instrumented for continuous monitoring

ROAD

HYDROGRAPHY

MINE FACILITY

Reference

Data provided by: Eagle Mine and North Jackson Company

Projection & Datum: UTM NAD 83 Zone 16N

0 1 Miles

Scale: 1:36,000

Eagle Mine

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North Jackson Company

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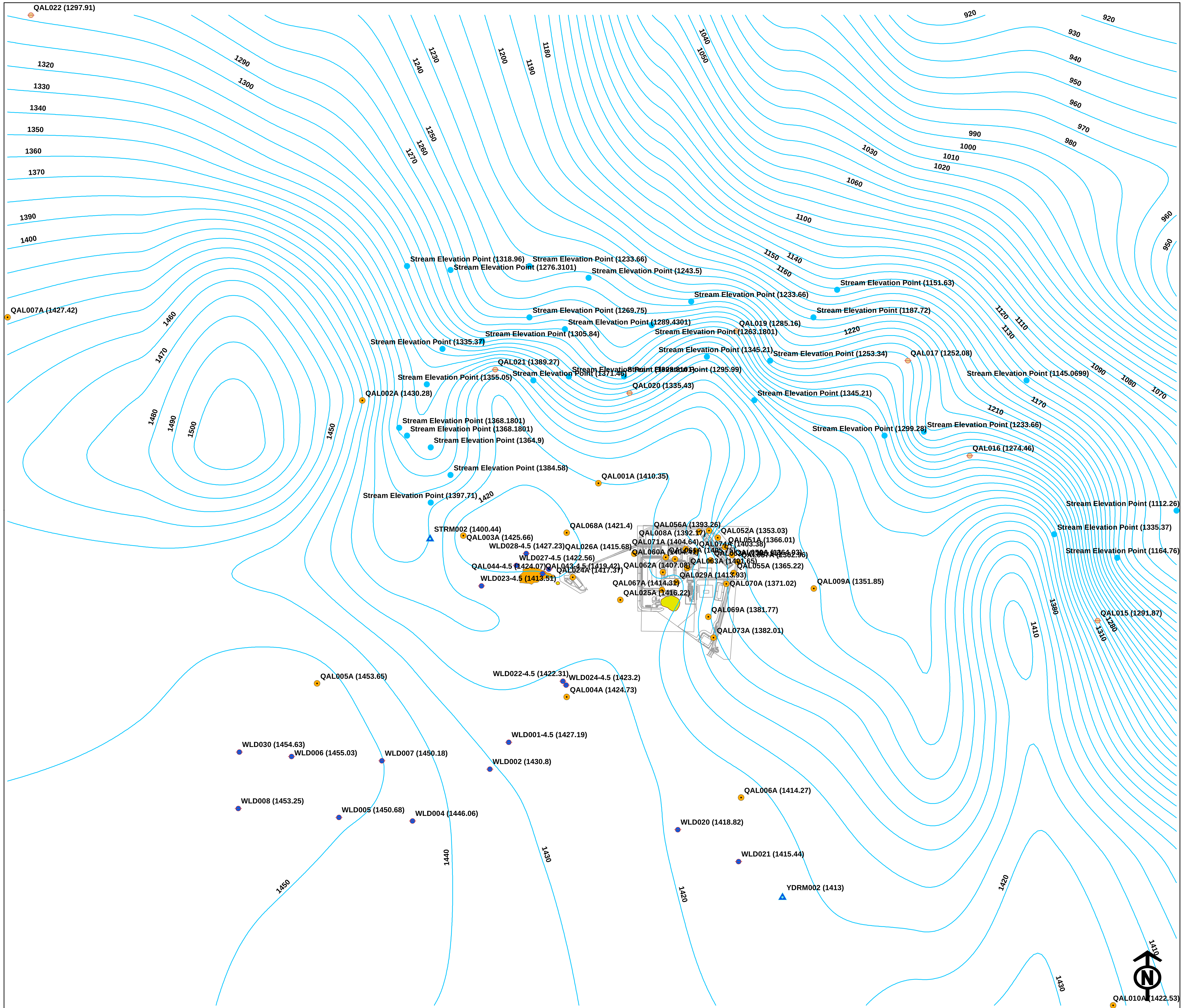
Appendix M

Eagle Mine

Groundwater Contour Maps



A-ZONE GROUNDWATER ELEVATION CONTOURS
WINTER BASEFLOW, JANUARY - MARCH 2015
HS VIEW

Legend

- Monitoring Well
- Seep Piezometer
- Surface Water Monitoring Location
- Wetland Piezometer
- Stream Elevation Point (Source: Digital Elevation Model: 98 ft resolution)
- Groundwater Elevation Contour (10' interval)
- Mine Facilities
- Ore Body
- Outcrop

Reference

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

0 2,000 4,000 Feet

1:16,000

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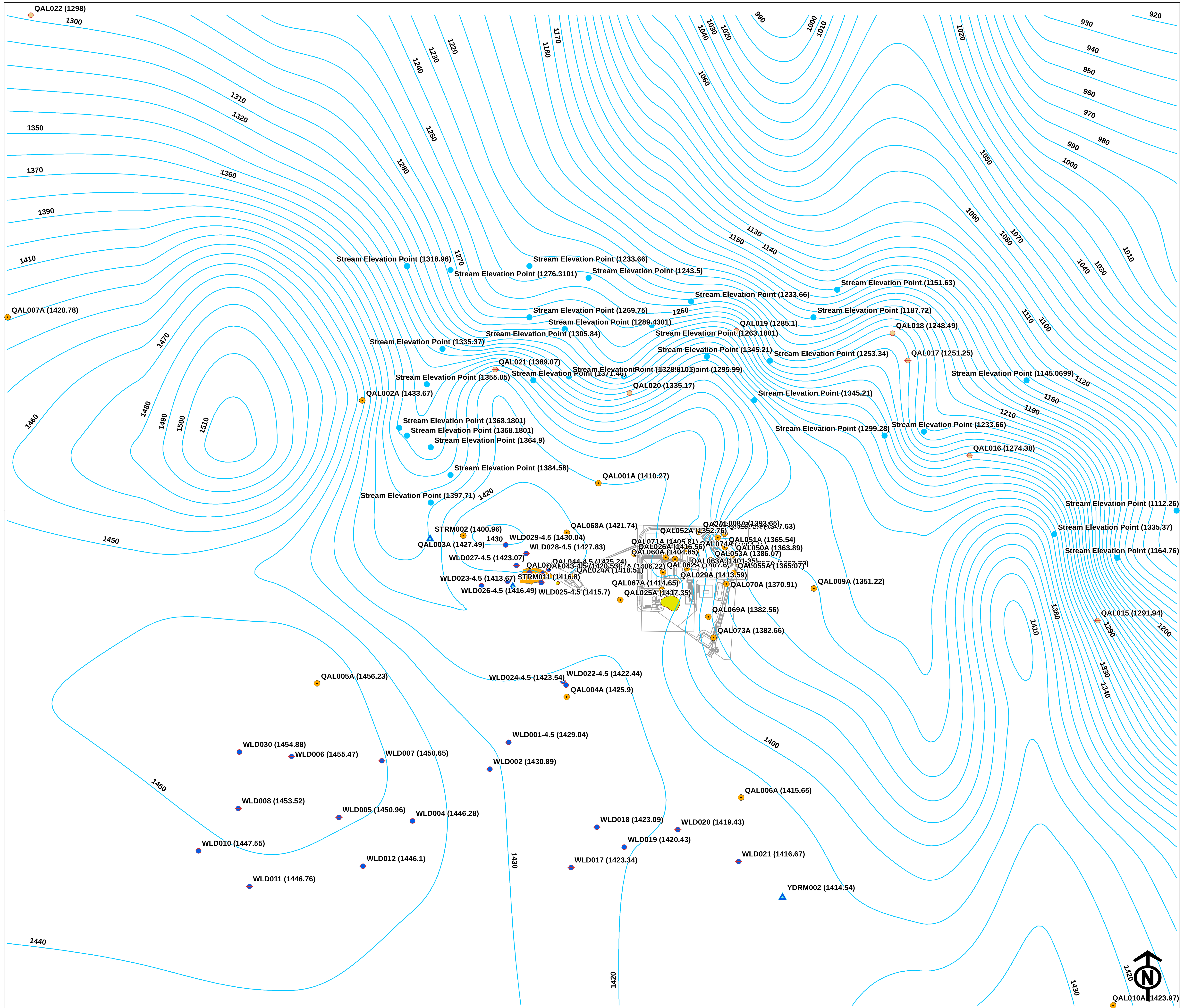
North Jackson Company
ENVIRONMENTAL SCIENCE & ENGINEERING

Figure: 1



A-ZONE GROUNDWATER ELEVATION CONTOURS
SPRING BASEFLOW, MAY - JUNE 2015
HS VIEW

Legend

- Monitoring Well
- Seep Piezometer
- Surface Water Monitoring Location
- Wetland Piezometer
- Stream Elevation Point (Source: Digital Elevation Model: 98 ft resolution)
- Groundwater Elevation Contour (10' interval)
- Mine Facilities
- Ore Body
- Outcrop

Note: Water elevation for QAL022 was estimated as 1298 feet above mean sea level.

Reference

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

0 2,000 4,000 Feet

1:16,000

Eagle Mine
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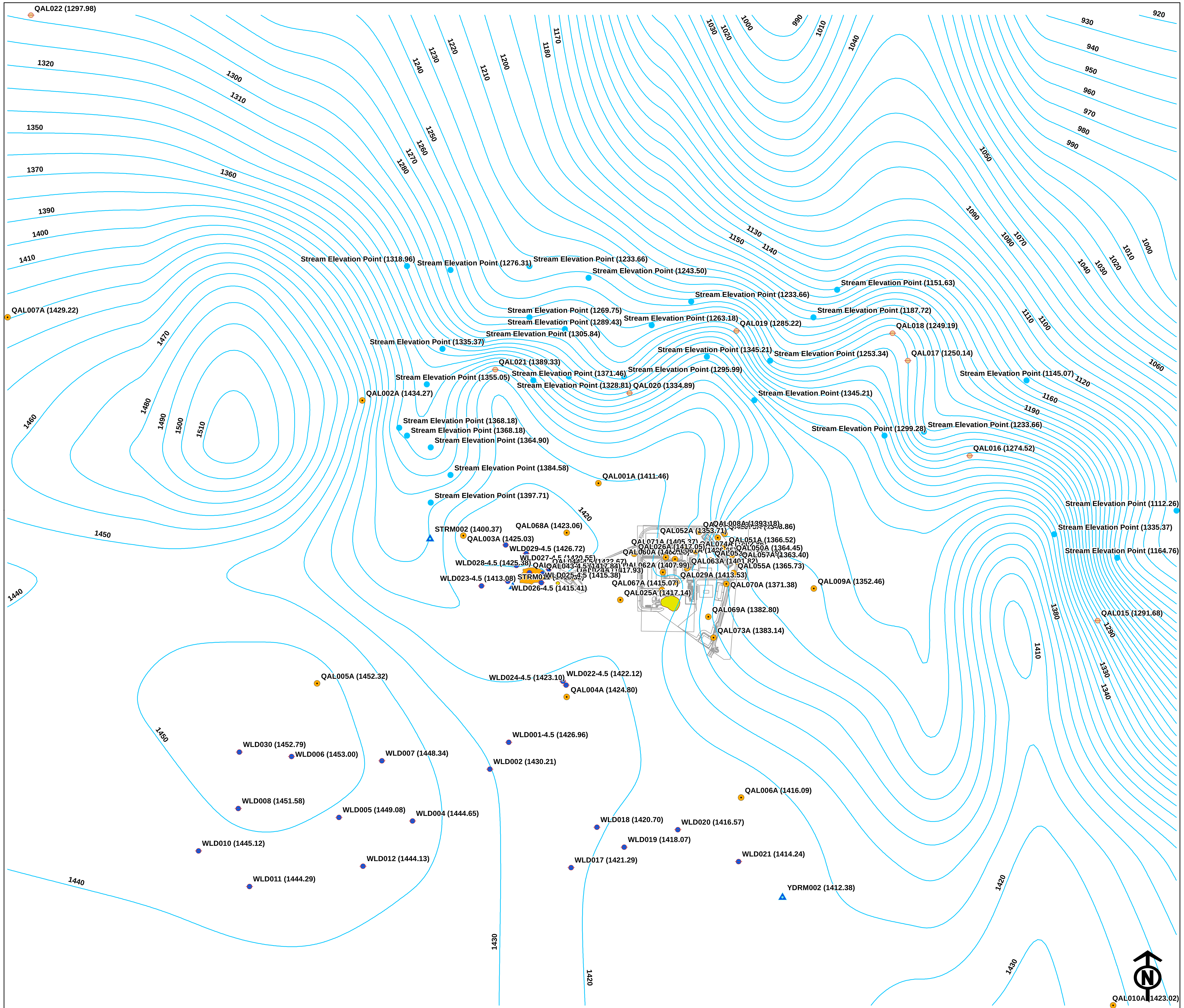
North Jackson Company
ENVIRONMENTAL SCIENCE & ENGINEERING

Figure: 1



A-ZONE GROUNDWATER ELEVATION CONTOURS
SUMMER BASEFLOW, SEPTEMBER 2015
HS VIEW

Legend

- Monitoring Well
- Seep Piezometer
- Surface Water Monitoring Location
- Wetland Piezometer
- Stream Elevation Point (Source: Digital Elevation Model: 98 ft resolution)
- Groundwater Elevation Contour (10' interval)
- Mine Facilities
- Ore Body
- Outcrop

Reference

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

0 2,000 4,000 Feet

1:16,000

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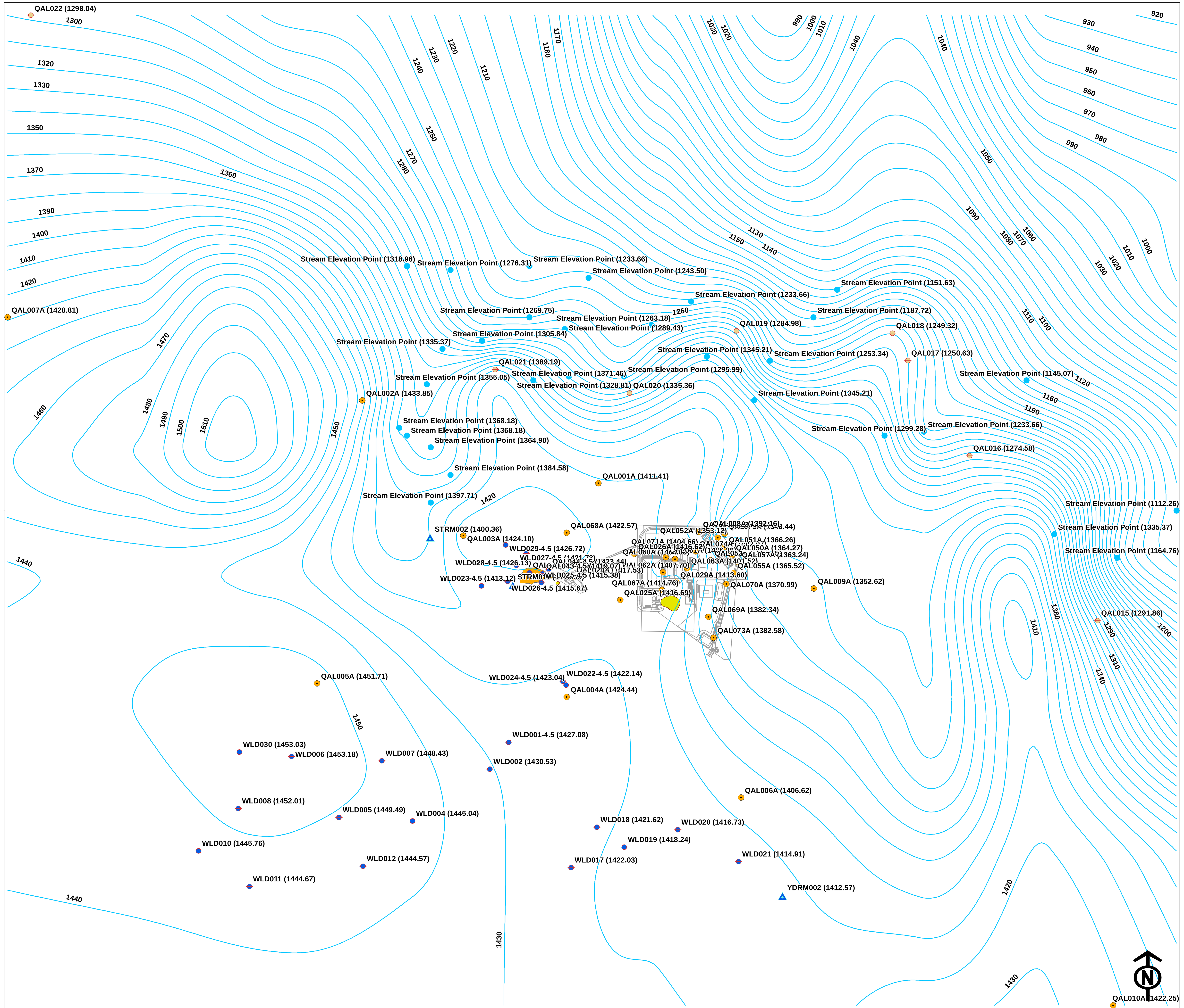
Figure: 1



A-ZONE GROUNDWATER ELEVATION CONTOURS
FALL BASEFLOW, NOVEMBER 2015
HS VIEW

Legend

- Monitoring Well
- Seep Piezometer
- Surface Water Monitoring Location
- Wetland Piezometer
- Stream Elevation Point (Source: Digital Elevation Model: 98 ft resolution)
- Groundwater Elevation Contour (10' interval)
- Mine Facilities
- Ore Body
- Outcrop

Reference

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

0 2,000 4,000 Feet

1:16,000

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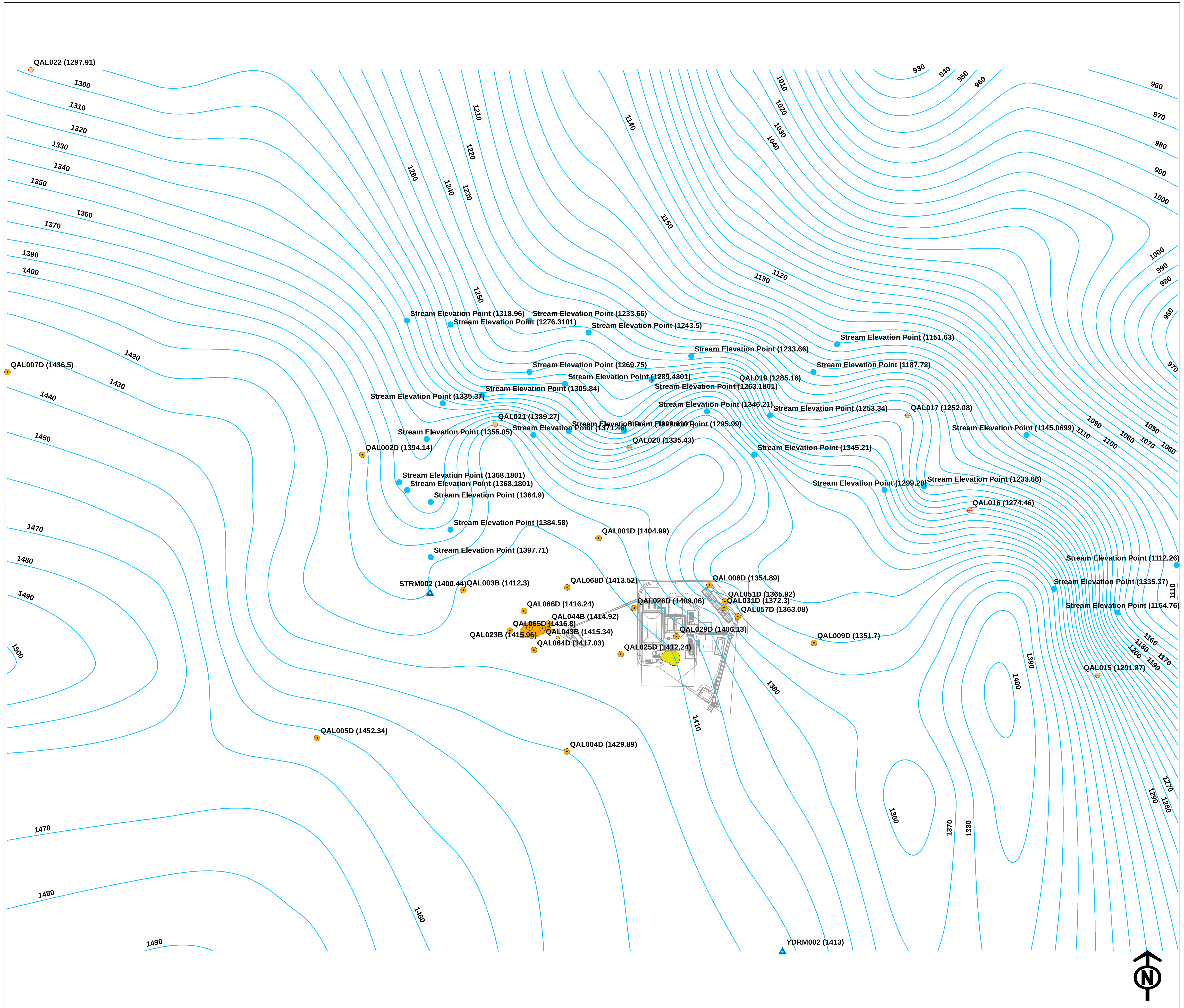
ENVIRONMENTAL SCIENCE & ENGINEERING

Figure: 1

D-ZONE GROUNDWATER ELEVATION CONTOURS
WINTER BASEFLOW, JANUARY - MARCH 2015
HS VIEW



Legend

- Monitoring Well
- Seep Piezometer
- Surface Water Monitoring Location
- Wetland Piezometer
- Stream Elevation Point (Source: Digital Elevation Model: 98 ft resolution)
- Groundwater Elevation Contour (10' interval)
- Mine Facilities
- Ore Body
- Outcrop

Reference

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

0 1,950 3,900 Feet

1:16,000

Eagle Mine
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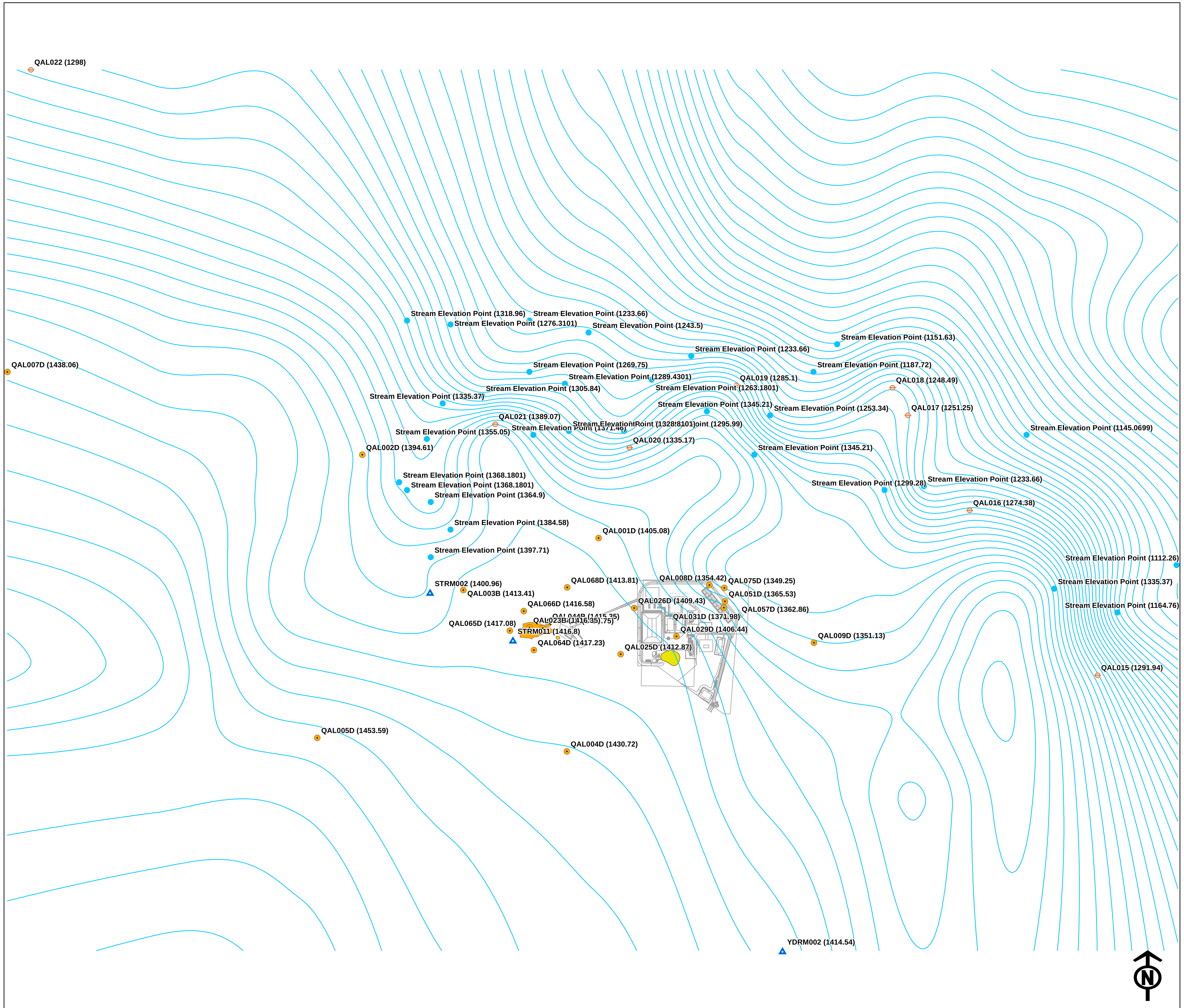
Figure: 1



D-ZONE GROUNDWATER ELEVATION CONTOURS
SPRING BASEFLOW, MAY - JUNE 2015
HS VIEW

Legend

- Monitoring Well
- Seep Piezometer
- Surface Water Monitoring Location
- Wetland Piezometer
- Stream Elevation Point (Source: Digital Elevation Model: 98 ft resolution)
- Groundwater Elevation Contour (10' interval)
- Mine Facilities
- Ore Body
- Outcrop

Note: Water elevation for QAL022 was estimated as 1298 feet above mean sea level.

Reference

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

0 2,000 4,000 Feet

1:16,000

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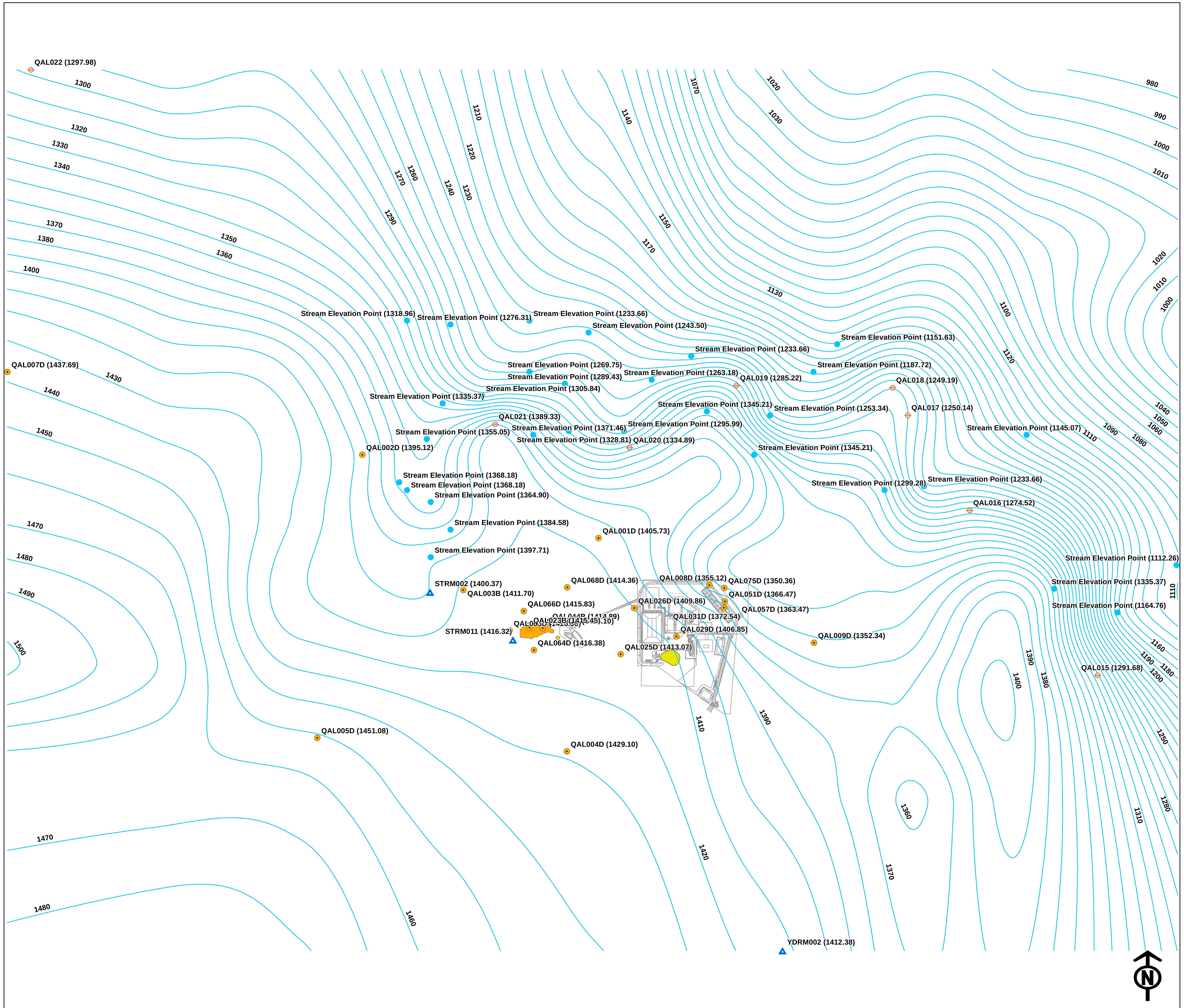
Figure: 1



D-ZONE GROUNDWATER ELEVATION CONTOURS
SUMMER BASEFLOW, SEPTEMBER 2015
HS VIEW

Legend

- Monitoring Well
- Seep Piezometer
- Surface Water Monitoring Location
- Wetland Piezometer
- Stream Elevation Point (Source: Digital Elevation Model: 98 ft resolution)
- Groundwater Elevation Contour (10' interval)
- Mine Facilities
- Ore Body
- Outcrop

Reference

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

0 1,950 3,900 Feet

1:16,000

Eagle Mine
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North Jackson Company
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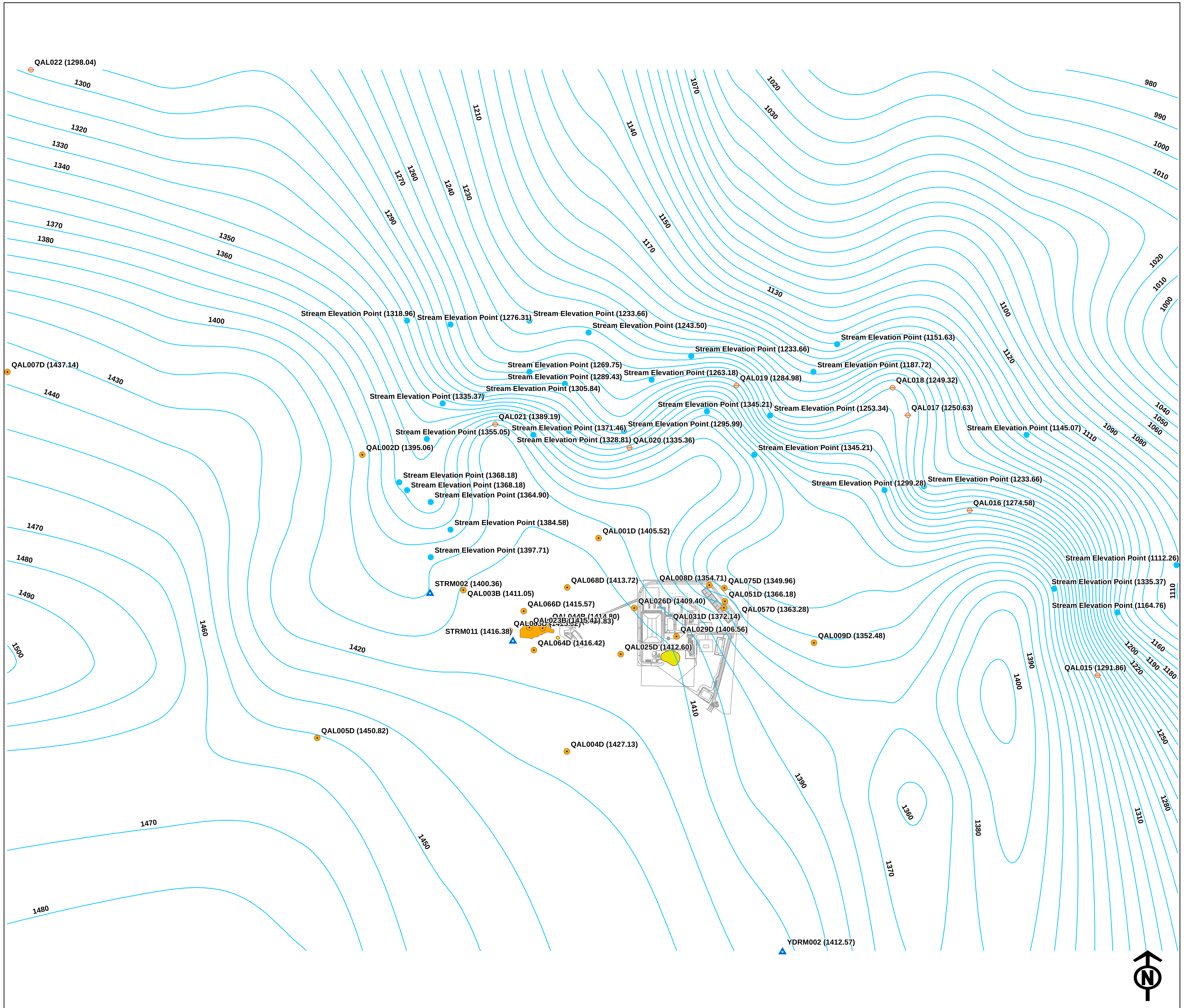
Figure: 1



D-ZONE GROUNDWATER ELEVATION CONTOURS
FALL BASEFLOW, NOVEMBER 2015
HS VIEW

Legend

- Monitoring Well
- Seep Piezometer
- Surface Water Monitoring Location
- Wetland Piezometer
- Stream Elevation Point (Source: Digital Elevation Model: 98 ft resolution)
- Groundwater Elevation Contour (10' interval)
- Mine Facilities
- Ore Body
- Outcrop

Reference

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

0 1,950 3,900 Feet

1:16,000

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Figure: 1

Appendix N

Eagle Mine

Continuous Groundwater Level Results

2015 Water Year
Continuous Monitoring Results
Monitoring Well Locations
Eagle Mine

	QAL023B	QAL024A	QAL044B	QAL064D	QAL065D	QAL066D
Background						
Mean	1416.9	1417.8	1416.2	1418.7	1417.1	1416.9
Standard Dev.	0.4	0.4	0.4	0.7	0.4	0.3
Minimum	1415.7	1417.2	1414.9	1415.7	1416.1	1416.1
Maximum	1417.6	1418.5	1416.9	1419.6	1417.8	1417.5
Oct-14						
Mean	1416.4	1417.5	1415.5	1417.6	1416.9	1416.7
Minimum	1416.4	1417.5	1415.4	1417.3	1416.9	1416.6
Maximum	1416.6	1417.5	1415.6	1417.9	1417.0	1416.8
Nov-14						
Mean	1416.4	1417.5	1415.4	1417.6	1417.0	1416.7
Minimum	1416.3	1417.5	1415.2	1417.2	1417.0	1416.6
Maximum	1416.5	1417.5	1415.5	1417.8	1417.1	1416.8
Dec-14						
Mean	1416.3	1417.4	1415.3	1417.4	1416.9	1416.6
Minimum	1416.2	1417.4	1415.1	1417.2	1416.9	1416.5
Maximum	1416.5	1417.5	1415.4	1417.7	1417.1	1416.7
Jan-15						
Mean	1416.0	1417.3	1415.0	1417.0	1416.7	1416.3
Minimum	1415.7	1417.2	1414.5	1415.9	1416.5	1416.0
Maximum	1416.3	1417.4	1415.2	1417.4	1416.9	1416.5
Feb-15						
Mean	1415.9	1417.1	1414.8	1416.8	1416.6	1416.1
Minimum	1415.8	1417.1	1414.7	1416.7	1416.5	1416.0
Maximum	1416.0	1417.2	1414.9	1416.9	1416.7	1416.2
Mar-15						
Mean	1415.8	1417.0	1414.7	1416.7	1416.5	1415.9
Minimum	1415.7	1417.0	1414.6	1416.3	1416.4	1415.8
Maximum	1415.9	1417.1	1414.8	1416.8	1416.6	1416.0
Apr-15						
Mean	1416.0	1417.1	1414.9	1416.9	1416.8	1416.2
Minimum	1415.8	1417.0	1414.6	1416.5	1416.5	1415.9
Maximum	1416.3	1417.4	1415.1	1417.2	1417.1	1416.4
May-15						
Mean	1416.2	1418.0	1415.2	1417.0	1416.9	1416.4
Minimum	1415.9	1417.5	1414.8	1416.4	1416.7	1416.1
Maximum	1416.4	1418.4	1415.4	1417.3	1417.1	1416.6

2015 Water Year
Continuous Monitoring Results
Monitoring Well Locations
Eagle Mine

	QAL023B	QAL024A	QAL044B	QAL064D	QAL065D	QAL066D
Background						
Mean	1416.9	1417.8	1416.2	1418.7	1417.1	1416.9
Standard Dev.	0.4	0.4	0.4	0.7	0.4	0.3
Minimum	1415.7	1417.2	1414.9	1415.7	1416.1	1416.1
Maximum	1417.6	1418.5	1416.9	1419.6	1417.8	1417.5
Jun-15						
Mean	1416.2	1418.4	1415.3	1416.9	1416.9	1416.6
Minimum	1416.1	1418.4	1415.2	1416.7	1416.7	1416.5
Maximum	1416.3	1418.4	1415.4	1417.2	1417.0	1416.7
Jul-15						
Mean	1416.0	1418.2	1415.2	1416.6	1416.6	1416.5
Minimum	1415.4	1418.1	1414.6	1415.3	1416.1	1416.1
Maximum	1416.4	1418.3	1415.6	1417.3	1416.9	1416.7
Aug-15						
Mean	1415.7	1418.0	1415.2	1416.5	1416.3	1416.2
Minimum	1415.6	1417.9	1415.0	1416.2	1416.1	1416.1
Maximum	1415.9	1418.1	1415.3	1416.7	1416.4	1416.4
Sep-15						
Mean	1415.4	1417.7	1414.8	1416.1	1416.0	1415.8
Minimum	1415.2	1417.6	1414.5	1415.5	1415.8	1415.6
Maximum	1415.7	1417.9	1415.1	1416.5	1416.2	1416.1

Source: North Jackson Company, REACH System

* All results are calculated based on mean daily values from continuous monitoring.

NM = Not measured because water in well column was frozen.

Results in red indicate values outside of the background range.

2015 Water Year
Continuous Monitoring Results
Wetland Monitoring Locations
Eagle Mine

	WLD022-4.5	WLD023-4.5	WLD025-4.5	WLD025-9.5	WLD026-4.5	WLD026-9.5	WLD027-4.5	WLD027-9.5	WLD028-4.5	WLD028-9.5
Background										
Mean	1422.6	1413.5	1415.5	1415.9	1416.3	1416.2	1422.1	1422.2	1427.2	1427.0
Standard Dev.	0.2	0.5	0.3	0.2	0.3	0.3	0.7	0.7	0.5	0.5
6'' limit	1421.6	1411.4	1414.3	1414.6	1415.3	1415.3	1419.8	1419.8	1424.5	1424.7
Minimum	1422.1	1411.9	1414.8	1415.1	1415.8	1415.8	1420.3	1420.3	1425.0	1425.2
Maximum	1422.9	1414.7	1416.5	1416.7	1417.0	1416.7	1423.1	1423.1	1428.3	1428.3
Oct-14										
Mean	1422.3	1413.2	1416.0	1416.1	1416.7	1416.6	1422.6	1422.7	1427.6	1427.3
Minimum	1422.2	1413.1	1416.0	1416.0	1416.5	1416.4	1422.4	1422.4	1426.8	1426.7
Maximum	1422.5	1413.5	1416.1	1416.2	1416.9	1416.9	1422.9	1423.0	1427.9	1427.7
Nov-14										
Mean	1422.3	1413.2	NM	1416.0	1416.7	1416.6	1422.6	1422.7	1427.8	1427.4
Minimum	1422.3	1413.2	NM	1416.0	1416.7	1416.5	1422.6	1422.6	1427.7	1427.3
Maximum	1422.4	1413.3	NM	1416.1	1416.8	1416.7	1422.8	1422.9	1428.0	1427.6
Dec-14										
Mean	1422.2	NM	NM	NM	NM	NM	1422.6	1422.7	1427.8	1427.4
Minimum	1422.2	NM	NM	NM	NM	NM	1422.6	1422.6	1427.7	1427.2
Maximum	1422.4	NM	NM	NM	NM	NM	1422.8	1422.8	1427.9	1427.8
Jan-15										
Mean	1422.2	1413.5	NM	NM	NM	NM	1422.5	1422.6	1427.5	1427.1
Minimum	1422.2	1413.5	NM	NM	NM	NM	1422.5	1422.5	1427.4	1427.0
Maximum	1422.2	1413.5	NM	NM	NM	NM	1422.6	1422.7	1427.7	1427.3
Feb-15										
Mean	1422.2	1413.4	NM	1415.7	NM	NM	1422.4	1422.5	1427.0	1426.7
Minimum	1422.2	1413.4	NM	1415.7	NM	NM	1422.4	1422.5	1426.8	1426.6
Maximum	1422.2	1413.5	NM	1415.7	NM	NM	1422.5	1422.6	1427.3	1426.9
Mar-15										
Mean	1422.2	1413.4	NM	1415.7	1416.6	NM	1422.6	1422.6	1427.3	1426.9
Minimum	1422.2	1413.4	NM	1415.6	1416.5	NM	1422.4	1422.4	1426.6	1426.5
Maximum	1422.3	1413.6	NM	1415.8	1416.8	NM	1422.8	1422.9	1427.8	1427.3
Apr-15										
Mean	1422.4	1413.5	1415.7	1415.8	1416.8	1416.9	1422.8	1422.9	1428.0	1427.6
Minimum	1422.2	1413.5	1415.7	1415.7	1416.6	1416.6	1422.6	1422.7	1427.7	1427.2
Maximum	1422.7	1413.6	1415.9	1415.9	1417.1	1417.2	1423.1	1423.1	1428.3	1428.1
May-15										
Mean	1422.4	1413.5	1415.7	1415.8	1416.7	1416.8	1422.6	1422.6	1427.6	1427.4
Minimum	1422.3	1413.4	1415.7	1415.7	1416.6	1416.6	1422.5	1422.5	1427.5	1427.3
Maximum	1422.6	1413.6	1415.8	1415.9	1416.9	1417.0	1422.9	1422.9	1427.9	1427.7

2015 Water Year
Continuous Monitoring Results
Wetland Monitoring Locations
Eagle Mine

	WLD022-4.5	WLD023-4.5	WLD025-4.5	WLD025-9.5	WLD026-4.5	WLD026-9.5	WLD027-4.5	WLD027-9.5	WLD028-4.5	WLD028-9.5
Background										
Mean	1422.6	1413.5	1415.5	1415.9	1416.3	1416.2	1422.1	1422.2	1427.2	1427.0
Standard Dev.	0.2	0.5	0.3	0.2	0.3	0.3	0.7	0.7	0.5	0.5
6'' limit	1421.6	1411.4	1414.3	1414.6	1415.3	1415.3	1419.8	1419.8	1424.5	1424.7
Minimum	1422.1	1411.9	1414.8	1415.1	1415.8	1415.8	1420.3	1420.3	1425.0	1425.2
Maximum	1422.9	1414.7	1416.5	1416.7	1417.0	1416.7	1423.1	1423.1	1428.3	1428.3
Jun-15										
Mean	1422.2	1413.5	1415.6	1415.7	1416.6	1416.6	1422.6	1422.6	1427.6	1427.4
Minimum	1422.2	1413.3	1415.4	1415.5	1416.4	1416.4	1422.4	1422.4	1427.5	1427.3
Maximum	1422.4	1413.6	1415.7	1415.8	1416.8	1416.8	1422.7	1422.8	1427.8	1427.6
Jul-15										
Mean	1422.1	1413.3	1415.3	1415.4	1416.3	1416.2	1422.2	1422.2	1427.2	1427.1
Minimum	1422.1	1412.9	1415.2	1415.1	1415.9	1416.0	1421.2	1421.2	1426.3	1426.5
Maximum	1422.3	1413.5	1415.5	1415.6	1416.5	1416.5	1422.7	1422.7	1427.7	1427.5
Aug-15										
Mean	1422.1	1413.0	1415.4	1415.4	1415.9	1415.9	1420.8	1420.9	1425.8	1426.1
Minimum	1422.1	1412.8	1415.3	1415.3	1415.8	1415.8	1420.6	1420.6	1425.5	1425.8
Maximum	1422.2	1413.3	1415.5	1415.6	1416.1	1416.0	1421.3	1421.3	1426.1	1426.4
Sep-15										
Mean	1422.1	1413.1	1415.5	1415.5	1415.8	1415.9	1420.4	1420.5	1425.3	1425.6
Minimum	1422.1	1412.9	1415.5	1415.4	1415.7	1415.8	1420.2	1420.2	1425.1	1425.5
Maximum	1422.2	1413.3	1415.6	1415.7	1415.9	1416.0	1420.8	1420.9	1425.6	1425.9

Source: North Jackson Company, REACH System

* All results are calculated based on mean daily values from continuous monitoring.

NM = Not measured because water in well column was frozen.

Results in red indicate values outside of the background range.

Appendix O

Eagle Mine

Groundwater and Wetland

Hydrographs


Mine Permit Groundwater Hydrograph
Water Year 2015
Water Elevation (ft MSL)
1416.75
1416.5
1416.25
1416
1415.75
1415.5
1415.25
1415
1414.75
1414.5
1414.25
Oct '14
Nov '14
Dec '14
Jan '15
Feb '15
Mar '15
Apr '15
May '15
Jun '15
Jul '15
Aug '15
Sep '15
Oct '15
QAL023B Elevation
QAL044B Elevation

Mine Permit Groundwater Hydrograph
Water Year 2015
Water Elevation (ft MSL)
1418.6
1418.4
1418.2
1418
1417.8
1417.6
1417.4
1417.2
1417
1416.8
Oct '14
Nov '14
Dec '14
Jan '15
Feb '15
Mar '15
Apr '15
May '15
Jun '15
Jul '15
Aug '15
Sep '15
Oct '15
QAL024A Elevation

Mine Permit Groundwater Hydrograph
Water Year 2015
Water Elevation (ft MSL)
1418.25
1418
1417.75
1417.5
1417.25
1417
1416.75
1416.5
1416.25
1416
1415.75
1415.5
1415.25
1415
1414.75
Oct '14
Nov '14
Dec '14
Jan '15
Feb '15
Mar '15
Apr '15
May '15
Jun '15
Jul '15
Aug '15
Sep '15
Oct '15
QAL064D Elevation
QAL065D Elevation
QAL066D Elevation


Mine Permit Groundwater Hydrograph
Water Year 2015
Water Elevation (ft MSL)
1424
1423
1422
1421
1420
1419
1418
1417
1416
1415
1414
1413
1412
Oct '14
Nov '14
Dec '14
Jan '15
Feb '15
Mar '15
Apr '15
May '15
Jun '15
Jul '15
Aug '15
Sep '15
Oct '15
WLD022-4.5 Elevation
WLD023-4.5 Elevation

Mine Permit Groundwater Hydrograph
Water Year 2015
Water Elevation (ft MSL)
1416.4
1416.3
1416.2
1416.1
1416
1415.9
1415.8
1415.7
1415.6
1415.5
1415.4
1415.3
1415.2
1415.1
1415
Oct '14
Nov '14
Dec '14
Jan '15
Feb '15
Mar '15
Apr '15
May '15
Jun '15
Jul '15
Aug '15
Sep '15
Oct '15
WLD025-4.5 Elevation
WLD025-9.5 Elevation


Mine Permit Groundwater Hydrograph
Water Year 2015
1417.4
1417.2
1417
1416.8
1416.6
1416.4
1416.2
1416
1415.8
1415.6
Water Elevation (ft MSL)
Oct '14
Nov '14
Dec '14
Jan '15
Feb '15
Mar '15
Apr '15
May '15
Jun '15
Jul '15
Aug '15
Sep '15
Oct '15
WLD026-4.5 Elevation
WLD026-9.5 Elevation


Mine Permit Groundwater Hydrograph
Water Year 2015
Water Elevation (ft MSL)
1423.5
1423.25
1423
1422.75
1422.5
1422.25
1422
1421.75
1421.5
1421.25
1421
1420.75
1420.5
1420.25
1420
Oct '14
Nov '14
Dec '14
Jan '15
Feb '15
Mar '15
Apr '15
May '15
Jun '15
Jul '15
Aug '15
Sep '15
Oct '15
WLD027-4.5 Elevation
WLD027-9.5 Elevation


Mine Permit Groundwater Hydrograph
Water Year 2015
Water Elevation (ft MSL)
1428.5
1428
1427.5
1427
1426.5
1426
1425.5
1425
1424.5
Oct '14
Nov '14
Dec '14
Jan '15
Feb '15
Mar '15
Apr '15
May '15
Jun '15
Jul '15
Aug '15
Sep '15
Oct '15
WLD028-4.5 Elevation
WLD028-9.5 Elevation

Appendix P

Eagle Mine

Discrete Water Level Results

Mine Permit Water Elevation Data
2015 Full Network Quarterly Discrete Measurements
Eagle Project

Location	1st Qtr 2015		2nd Qtr 2015		3rd Qtr 2015		4th Qtr 2015	
	Elev. (ft MSL)	Meas. Date	Elev. (ft MSL)	Meas. Date	Elev. (ft MSL)	Meas. Date	Elev. (ft MSL)	Meas. Date
QAL001A	1410.35	02/02/15	1410.27	05/28/15	1411.46	09/14/15	1411.41	11/09/15
QAL001D	1404.99	02/02/15	1405.08	05/28/15	1405.73	09/14/15	1405.52	11/09/15
QAL002A	1430.28	01/29/15	1433.67	05/27/15	1434.27	09/14/15	1433.85	11/09/15
QAL002D	1394.14	01/29/15	1394.61	05/27/15	1395.12	09/14/15	1395.06	11/09/15
QAL003A	1425.66	02/02/15	1427.49	05/27/15	1425.03	09/14/15	1424.10	11/09/15
QAL003B	1412.30	02/02/15	1413.41	05/27/15	1411.70	09/14/15	1411.05	11/09/15
QAL004A	1424.73	02/03/15	1425.90	05/28/15	1424.80	09/14/15	1424.44	11/09/15
QAL004D	1429.89	02/03/15	1430.72	06/02/15	1429.10	09/14/15	1427.13	11/09/15
QAL005A	1453.65	01/29/15	1456.23	05/27/15	1452.32	09/14/15	1451.71	11/09/15
QAL005D	1452.34	01/29/15	1453.59	05/27/15	1451.08	09/14/15	1450.82	11/09/15
QAL006A	1414.27	01/28/15	1415.65	05/27/15	1416.09	09/14/15	NM	11/09/15
QAL006B	1398.19	01/30/15	1399.58	05/27/15	1399.07	09/14/15	1398.42	11/09/15
QAL007A	1427.42	01/29/15	1428.78	05/27/15	1429.22	09/14/15	1428.81	11/09/15
QAL007D	1436.50	01/29/15	1438.06	05/27/15	1437.69	09/14/15	1437.14	11/09/15
QAL008A	1392.17	02/03/15	1393.65	06/04/15	1393.18	09/14/15	1392.16	11/09/15
QAL008D	1354.89	02/03/15	1354.42	06/04/15	1355.12	09/14/15	1354.71	11/09/15
QAL009A	1351.85	01/28/15	1351.22	05/27/15	1352.46	09/14/15	1352.62	11/09/15
QAL009D	1351.70	01/28/15	1351.13	05/27/15	1352.34	09/14/15	1352.48	11/09/15
QAL010A	1422.53	01/28/15	1423.97	05/27/15	1423.02	09/14/15	1422.25	11/09/15
QAL015	1291.87	01/28/15	1291.94	06/02/15	1291.68	09/14/15	1291.86	11/09/15
QAL016	1274.46	01/28/15	1274.38	06/04/15	1274.52	09/14/15	1274.58	11/10/15
QAL017	1252.08	01/28/15	1251.25	06/04/15	1250.14	09/14/15	1250.63	11/10/15
QAL018	F	01/28/15	1249.49	06/04/15	1249.19	09/14/15	1249.32	11/10/15
QAL019	1285.16	01/28/15	1285.10	06/04/15	1285.22	09/14/15	1284.98	11/10/15
QAL020	1335.43	01/28/15	1335.17	06/04/15	1334.89	09/14/15	1335.36	11/10/15
QAL021	1389.27	01/28/15	1389.07	06/04/15	1389.33	09/14/15	1389.19	11/10/15
QAL022	1297.91	01/29/15	NM	05/27/15	1297.98	09/14/15	1298.04	11/09/15
QAL023-1.0	F	02/02/15	1418.48	05/27/15	D	09/14/15	1418.26	11/05/15
QAL023-4.5	F	02/02/15	1418.50	05/27/15	1416.58	09/14/15	1418.23	11/05/15
QAL023B	1415.96	02/02/15	1416.35	05/27/15	1415.45	09/14/15	1415.41	11/05/15
QAL024A	1417.37	02/03/15	1418.51	05/27/15	1417.93	09/14/15	1417.53	11/05/15
QAL025A	1416.22	02/02/15	1417.35	05/27/15	1417.14	09/14/15	1416.69	11/03/15
QAL025B	1416.13	02/02/15	1417.23	05/27/15	1417.05	09/14/15	1416.57	11/03/15
QAL025D	1412.24	02/02/15	1412.87	05/27/15	1413.07	09/14/15	1412.60	11/02/15
QAL026A	1415.68	02/02/15	1416.56	05/27/15	1417.05	09/14/15	1416.62	11/02/15
QAL026D	1409.06	02/02/15	1409.43	05/27/15	1409.86	09/14/15	1409.40	11/02/15
QAL026E	1409.01	02/02/15	1409.36	05/27/15	1409.80	09/14/15	1409.22	11/03/15
QAL029A	1413.93	02/09/15	1413.59	05/27/15	1413.53	09/14/15	1413.60	11/02/15
QAL029D	1406.13	02/10/15	1406.44	05/27/15	1406.85	09/14/15	1406.56	11/02/15
QAL031D	1372.30	02/03/15	1371.98	05/27/15	1372.54	09/14/15	1372.14	11/09/15
QAL043-1.0	1419.42	02/02/15	1420.60	05/27/15	D	09/14/15	1419.06	11/09/15
QAL043-4.5	1419.42	02/02/15	1420.53	05/27/15	1417.84	09/14/15	1419.07	11/09/15
QAL043B	1415.34	02/02/15	1415.75	05/27/15	1415.10	09/14/15	1414.83	11/09/15
QAL044-1.0	F	02/02/15	1425.62	05/27/15	D	09/14/15	D	11/05/15
QAL044-4.5	1424.07	02/02/15	1425.24	05/27/15	1422.67	09/14/15	1423.44	11/05/15
QAL044B	1414.92	02/02/15	1415.35	05/27/15	1414.89	09/14/15	1414.80	11/05/15
QAL050A	1364.03	02/10/15	1363.89	05/27/15	1364.45	09/14/15	1364.27	11/02/15
QAL051A	1366.01	02/09/15	1365.54	05/27/15	1366.52	09/14/15	1366.26	11/02/15
QAL051D	1365.92	02/09/15	1365.53	05/27/15	1366.47	09/14/15	1366.18	11/02/15
QAL052A	1353.03	02/09/15	1352.76	05/27/15	1353.71	09/14/15	1353.12	11/03/15
QAL053A	1385.95	02/09/15	1386.07	05/27/15	1386.69	09/14/15	1386.35	11/02/15
QAL055A	1365.22	02/10/15	1365.07	05/27/15	1365.73	09/14/15	1365.52	11/02/15
QAL056A	1393.26	02/09/15	1394.51	05/27/15	1394.38	09/14/15	1393.59	11/02/15
QAL057A	1362.96	02/10/15	1362.79	05/27/15	1363.40	09/14/15	1363.24	11/02/15
QAL057D	1363.08	02/10/15	1362.86	05/27/15	1363.47	09/14/15	1363.28	11/02/15
QAL060A	1404.41	03/02/15	1404.85	05/27/15	1405.28	09/14/15	1404.99	11/04/15
QAL061A	1405.75	03/02/15	1406.22	05/27/15	1406.65	09/14/15	1406.36	11/04/15
QAL062A	1407.08	03/02/15	1407.60	05/27/15	1407.99	09/14/15	1407.70	11/04/15
QAL063A	1401.65	03/03/15	1401.35	05/27/15	1401.82	09/14/15	1401.52	11/04/15
QAL064D	1417.03	01/29/15	1417.23	05/28/15	1416.38	09/14/15	1416.42	11/05/15
QAL065D	1416.80	02/02/15	1417.08	05/27/15	1416.06	09/14/15	1415.92	11/09/15
QAL066D	1416.24	02/02/15	1416.58	05/27/15	1415.83	09/14/15	1415.57	11/05/15
QAL067A	1414.31	03/02/15	1414.65	05/27/15	1415.07	09/14/15	1414.76	11/04/15
QAL068A	1421.40	02/02/15	1421.74	05/27/15	1423.06	09/14/15	1422.57	11/03/15

Mine Permit Water Elevation Data
2015 Full Network Quarterly Discrete Measurements
Eagle Project

Location	1st Qtr 2015		2nd Qtr 2015		3rd Qtr 2015		4th Qtr 2015	
	Elev. (ft MSL)	Meas. Date	Elev. (ft MSL)	Meas. Date	Elev. (ft MSL)	Meas. Date	Elev. (ft MSL)	Meas. Date
QAL068B	1413.48	02/02/15	1413.78	05/27/15	1414.31	09/14/15	1413.69	11/03/15
QAL068D	1413.52	02/02/15	1413.81	05/27/15	1414.36	09/14/15	1413.72	11/03/15
QAL069A	1381.77	03/02/15	1382.56	05/27/15	1382.80	09/14/15	1382.34	11/03/15
QAL070A	1371.02	03/03/15	1370.91	05/27/15	1371.38	09/14/15	1370.99	11/09/15
QAL071A	1404.64	03/02/15	1405.81	05/27/15	1405.37	09/14/15	1404.66	11/04/15
QAL073A	1382.01	03/03/15	1382.66	05/27/15	1383.14	09/14/15	1382.58	11/09/15
QAL074A	1403.38	03/03/15	1403.10	05/27/15	1402.86	09/14/15	1402.07	11/04/15
QAL075A	NM	01/25/15	1347.63	06/04/15	1348.86	09/14/15	1348.44	11/03/15
QAL075D	NM	01/25/15	1349.25	06/04/15	1350.36	09/14/15	1349.96	11/03/15
STRM002	1400.44	02/17/15	1400.96	05/27/15	1400.37	09/14/15	1400.36	11/09/15
STRM011	F	01/29/15	1416.80	05/28/15	1416.32	09/14/15	1416.38	11/05/15
WLD001-1.0	1430.13	01/28/15	1428.39	05/28/15	1427.92	09/14/15	1428.00	11/09/15
WLD001-4.5	1427.19	01/28/15	1429.04	05/28/15	1426.96	09/14/15	1427.08	11/09/15
WLD001-9.5	1428.71	01/28/15	1428.93	05/28/15	1428.36	09/14/15	1428.30	11/09/15
WLD002	1430.80	01/28/15	1430.89	05/28/15	1430.21	09/14/15	1430.53	11/09/15
WLD004	1446.06	01/26/15	1446.28	06/05/15	1444.65	09/14/15	1445.04	11/09/15
WLD005	1450.68	01/26/15	1450.96	06/05/15	1449.08	09/14/15	1449.49	11/09/15
WLD006	1455.03	01/26/15	1455.47	06/05/15	1453.00	09/14/15	1453.18	11/09/15
WLD007	1450.18	01/30/15	1450.65	06/05/15	1448.34	09/14/15	1448.43	11/09/15
WLD008	1453.25	01/26/15	1453.52	06/05/15	1451.58	09/14/15	1452.01	11/09/15
WLD010	NM	01/25/15	1447.55	06/05/15	1445.12	09/14/15	1445.76	11/09/15
WLD011	NM	01/25/15	1446.76	06/05/15	1444.29	09/14/15	1444.67	11/09/15
WLD012	F	01/26/15	1446.10	06/05/15	1444.13	09/14/15	1444.57	11/09/15
WLD017	NM	01/29/15	1423.34	06/05/15	1421.29	09/14/15	1422.03	11/09/15
WLD018	NM	01/29/15	1423.09	06/05/15	1420.70	09/14/15	1421.62	11/09/15
WLD019	NM	01/29/15	1420.43	06/05/15	1418.07	09/14/15	1418.24	11/09/15
WLD020	1418.82	01/29/15	1419.43	06/05/15	1416.57	09/14/15	1416.73	11/09/15
WLD021	1415.44	01/28/15	1416.67	05/28/15	1414.24	09/14/15	1414.91	11/09/15
WLD022-1.0	1422.20	02/03/15	1421.97	05/28/15	1421.95	09/14/15	1422.06	11/09/15
WLD022-4.5	1422.31	02/03/15	1422.44	05/28/15	1422.12	09/14/15	1422.14	11/09/15
WLD022-9.5	1422.58	02/03/15	1422.63	05/28/15	1422.38	09/14/15	1422.44	11/09/15
WLD023-1.0	F	01/29/15	1413.82	05/27/15	1413.33	09/14/15	1413.33	11/09/15
WLD023-4.5	1413.51	01/29/15	1413.67	05/27/15	1413.08	09/14/15	1413.12	11/09/15
WLD023-9.5	F	01/29/15	1415.93	05/27/15	1414.99	09/14/15	1414.91	11/09/15
WLD024-1.0	1422.98	02/03/15	1423.20	05/28/15	1422.86	09/14/15	1422.85	11/09/15
WLD024-4.5	1423.20	02/03/15	1423.54	05/28/15	1423.10	09/14/15	1423.04	11/09/15
WLD024-9.5	F	02/03/15	1424.21	05/28/15	1423.30	09/14/15	1423.20	11/09/15
WLD025-1.0	F	02/02/15	1415.69	05/27/15	1415.38	09/14/15	1415.44	11/09/15
WLD025-4.5	F	02/02/15	1415.70	05/27/15	1415.38	09/14/15	1415.38	11/09/15
WLD025-9.5	F	02/02/15	1415.73	05/27/15	1415.33	09/14/15	1415.32	11/09/15
WLD026-1.0	F	02/02/15	1415.81	05/27/15	1415.36	09/14/15	1415.44	11/09/15
WLD026-4.5	F	02/02/15	1416.49	05/27/15	1415.41	09/14/15	1416.04	11/09/15
WLD026-9.5	F	02/02/15	1416.65	05/27/15	1415.58	09/14/15	1415.75	11/09/15
WLD027-1.0	F	02/02/15	1423.29	05/27/15	D	09/14/15	D	11/09/15
WLD027-4.5	1422.56	02/02/15	1423.07	05/27/15	1420.55	09/14/15	1421.73	11/09/15
WLD027-9.5	1422.56	02/02/15	1423.04	05/27/15	1420.54	09/14/15	1421.76	11/09/15
WLD028-1.0	1427.21	02/02/15	1427.86	05/27/15	D	09/14/15	D	11/05/15
WLD028-4.5	1427.23	02/02/15	1427.83	05/27/15	1425.38	09/14/15	1426.13	11/05/15
WLD028-9.5	1426.76	02/02/15	1427.59	05/27/15	1425.49	09/14/15	1426.07	11/05/15
WLD029-1.0	NM	03/03/15	1430.08	05/27/15	D	09/14/15	D	11/09/15
WLD029-4.5	NM	03/03/15	1430.04	05/27/15	1426.72	09/14/15	1426.72	11/09/15
WLD029-9.5	1427.84	03/03/15	1430.10	05/27/15	1427.28	09/14/15	1426.16	11/09/15
WLD030	1454.63	01/26/15	1454.88	06/05/15	1452.79	09/14/15	1453.03	11/09/15
YDRM002	1413.00	02/25/15	1414.54	05/28/15	1412.38	09/15/15	1412.57	11/09/15

Notes:
BP = Below pump. Maxiumum water elevation is shown.
D = Dry
F = Frozen
NM = Not measured

Appendix Q

Eagle Mine

Continuous Surface Water Monitoring Results

2015 Water Year
Continuous Monitoring Results
Surface Water Locations
Eagle Mine

STRE002								
Parameter	**Month**	**Background MEAN**	**Background Min**	**Background MAX**	**Background SD**	**Water Year MEAN**	**Water Year MIN**	**Water Year MAX**
Temperature	Oct-14	7.5	3.2	14.6	1.5	7.0	3.5	10.8
	Nov-14	3.4	-0.1	9.3	0.5	1.4	-0.1	5.6
	Dec-14	0.8	-0.2	3.2	0.4	1.0	-0.2	2.6
	Jan-15	0.6	-0.2	0.8	0.5	0.4	-0.2	1.8
	Feb-15	0.5	-0.2	2.4	0.2	0.0	-0.2	1.0
	Mar-15	1.5	-0.2	4.7	0.3	1.3	-0.1	3.0
	Apr-15	4.2	-0.1	10.8	1.6	3.5	0.8	7.1
	May-15	9.7	1.3	17.8	1.0	10.2	6.7	13.8
	Jun-15	13.0	8.1	17.0	0.7	12.1	9.5	13.6
	Jul-15	14.1	10.6	18.2	1.0	14.3	10.7	16.2
	Aug-15	13.5	10.0	17.6	0.7	13.5	10.6	16.5
	Sep-15	11.4	7.0	16.6	0.8	12.9	7.9	16.6
Flow	Oct-14	22.9	12.0	119.0	7.1	81.0	81.0	81.0
	Nov-14	18.5	12.4	37.8	3.1	NA	NA	NA
	Dec-14	17.8	12.1	58.8	4.1	NA	NA	NA
	Jan-15	18.1	12.0	45.0	3.5	NA	NA	NA
	Feb-15	17.3	12.0	50.0	5.6	NA	NA	NA
	Mar-15	23.3	12.0	110.9	5.7	NA	NA	NA
	Apr-15	37.0	12.0	131.5	10.3	NA	NA	NA
	May-15	22.2	11.8	160.6	6.3	NA	NA	NA
	Jun-15	18.0	12.0	90.1	3.5	NA	NA	NA
	Jul-15	14.0	11.8	33.0	1.5	NA	NA	NA
	Aug-15	14.5	11.8	74.4	2.3	NA	NA	NA
	Sep-15	16.9	11.7	69.8	3.2	NA	NA	NA
Specific Conductivity	Oct-14	127.8	70.0	146.0	14.4	113.3	65.8	132.0
	Nov-14	130.2	80.0	148.0	9.2	110.4	82.5	120.6
	Dec-14	132.9	89.0	153.0	6.7	111.3	87.3	123.5
	Jan-15	133.3	115.0	145.0	3.9	127.9	118.2	136.2
	Feb-15	133.2	111.0	144.0	3.1	NA	NA	NA
	Mar-15	122.0	54.0	148.0	13.6	130.1	112.3	140.8
	Apr-15	95.6	50.0	146.0	18.2	92.8	50.6	132.6
	May-15	122.0	37.0	149.0	9.3	114.0	77.4	129.0
	Jun-15	129.1	94.0	169.0	6.4	112.5	99.2	120.0
	Jul-15	146.4	119.0	165.0	7.4	124.5	114.7	138.1
	Aug-15	146.1	107.0	163.0	6.5	NA	NA	NA
	Sep-15	138.2	80.0	149.0	6.0	NA	NA	NA

2015 Water Year
Continuous Monitoring Results
Surface Water Locations
Eagle Mine

STRM004								
Parameter	**Month**	**Background MEAN**	**Background Min**	**Background MAX**	**Background SD**	**Water Year MEAN**	**Water Year MIN**	**Water Year MAX**
Temperature	Oct-14	7.5	2.3	15.2	1.6	7.1	3.7	11.1
	Nov-14	3.0	0.0	9.6	0.5	1.1	-0.1	5.2
	Dec-14	0.3	-0.1	2.5	0.2	0.4	-0.1	1.5
	Jan-15	0.2	-0.1	1.9	0.3	0.1	-0.1	0.7
	Feb-15	0.1	0.0	1.3	0.1	-0.1	-0.1	0.0
	Mar-15	0.9	-0.1	5.0	0.4	0.3	-0.1	1.8
	Apr-15	4.2	-0.1	11.3	1.9	3.5	0.5	7.4
	May-15	10.1	1.9	18.2	1.0	10.4	6.9	14.5
	Jun-15	13.8	7.9	18.6	1.2	12.5	9.2	14.2
	Jul-15	14.8	11.0	19.0	1.3	14.8	10.8	16.7
	Aug-15	14.2	10.4	18.1	0.7	14.2	11.0	17.4
	Sep-15	11.8	7.3	17.3	4.5	13.7	7.8	17.4
Flow	Oct-14	7.7	3.9	41.1	2.2	11.2	7.3	27.8
	Nov-14	6.8	4.2	23.1	2.5	9.8	8.3	12.4
	Dec-14	6.7	4.6	18.9	1.6	NA	NA	NA
	Jan-15	5.6	3.5	13.2	1.8	NA	NA	NA
	Feb-15	5.7	2.8	15.5	1.8	NA	NA	NA
	Mar-15	8.2	3.1	56.7	3.0	NA	NA	NA
	Apr-15	14.9	5.2	44.5	2.5	13.7	7.2	39.5
	May-15	8.3	4.4	59.9	2.5	7.5	5.5	20.5
	Jun-15	5.7	3.0	27.4	1.1	6.3	4.9	12.2
	Jul-15	4.6	2.8	9.9	0.4	5.3	4.5	8.0
	Aug-15	4.8	2.8	28.0	1.1	4.2	3.6	5.2
	Sep-15	5.2	2.8	24.0	2.2	4.3	3.8	5.7
Specific Conductivity	Oct-14	87.3	56.0	140.0	9.2	NA	NA	NA
	Nov-14	87.1	59.0	96.0	4.2	NA	NA	NA
	Dec-14	84.7	61.0	95.0	11.6	NA	NA	NA
	Jan-15	91.3	67.0	97.0	1.6	NA	NA	NA
	Feb-15	94.5	58.0	103.0	3.5	NA	NA	NA
	Mar-15	88.6	44.0	105.0	8.1	NA	NA	NA
	Apr-15	69.5	33.0	105.0	12.6	73.2	50.5	90.8
	May-15	85.6	37.0	114.0	9.2	93.7	75.8	112.0
	Jun-15	88.5	57.0	116.0	14.3	96.8	84.7	116.9
	Jul-15	97.1	82.0	114.0	6.2	146.2	115.3	173.5
	Aug-15	100.6	70.0	119.0	9.2	129.7	100.7	155.3
	Sep-15	81.3	57.0	130.0	48.8	98.6	91.2	109.1

2015 Water Year
Continuous Monitoring Results
Surface Water Locations
Eagle Mine

STRM005								
Parameter	**Month**	**Background MEAN**	**Background Min**	**Background MAX**	**Background SD**	**Water Year MEAN**	**Water Year MIN**	**Water Year MAX**
Temperature	Oct-14	7.9	2.6	15.5	2.4	8.2	6.3	11.6
	Nov-14	3.1	0.0	7.6	0.2	NA	NA	NA
	Dec-14	0.3	-0.1	2.2	0.2	NA	NA	NA
	Jan-15	0.3	-0.1	2.6	0.2	NA	NA	NA
	Feb-15	0.0	-0.1	1.4	0.1	NA	NA	NA
	Mar-15	0.5	-0.1	3.7	0.3	NA	NA	NA
	Apr-15	4.2	0.1	11.1	1.4	NA	NA	NA
	May-15	10.4	2.1	17.5	1.0	11.4	7.5	15.7
	Jun-15	15.4	9.2	20.5	1.0	13.4	9.9	15.3
	Jul-15	17.2	11.9	21.3	1.1	16.5	11.9	19.2
	Aug-15	16.6	12.7	21.1	0.4	15.8	12.4	18.9
	Sep-15	13.1	9.2	18.7	1.1	14.8	9.6	18.8
Flow	Oct-14	64.2	29.2	346.6	29.2	65.7	42.2	131.0
	Nov-14	52.8	29.2	188.7	24.1	NA	NA	NA
	Dec-14	55.7	33.6	131.3	17.6	NA	NA	NA
	Jan-15	44.9	38.0	83.3	2.7	NA	NA	NA
	Feb-15	59.6	40.7	119.3	0.0	NA	NA	NA
	Mar-15	126.0	36.0	456.2	115.0	NA	NA	NA
	Apr-15	126.8	41.7	459.4	21.5	NA	NA	NA
	May-15	67.2	32.5	781.5	28.7	50.9	33.6	150.6
	Jun-15	40.5	26.3	164.1	9.9	42.6	31.1	84.5
	Jul-15	29.8	24.0	52.0	2.2	30.1	24.5	51.0
	Aug-15	28.8	23.2	82.0	4.0	25.2	23.8	28.8
	Sep-15	38.6	21.8	155.5	14.2	24.7	23.5	30.2
Specific Conductivity	Oct-14	112.0	29.0	147.0	26.8	114.2	85.4	136.5
	Nov-14	123.5	65.0	143.0	15.9	NA	NA	NA
	Dec-14	126.6	79.0	145.0	8.4	NA	NA	NA
	Jan-15	129.3	99.0	145.0	4.7	NA	NA	NA
	Feb-15	128.1	91.0	143.0	5.3	NA	NA	NA
	Mar-15	119.1	55.0	141.0	9.4	NA	NA	NA
	Apr-15	77.5	36.0	121.0	11.3	NA	NA	NA
	May-15	112.5	30.0	141.0	8.1	NA	NA	NA
	Jun-15	130.9	78.0	149.0	4.2	NA	NA	NA
	Jul-15	142.9	111.0	161.0	8.4	NA	NA	NA
	Aug-15	145.0	101.0	163.0	11.4	135.8	134.1	138.0
	Sep-15	133.3	90.0	150.0	15.7	136.5	130.3	138.4

2015 Water Year
Continuous Monitoring Results
Surface Water Locations
Eagle Mine

YDRM002								
Parameter	**Month**	**Background MEAN**	**Background Min**	**Background MAX**	**Background SD**	**Water Year MEAN**	**Water Year MIN**	**Water Year MAX**
Temperature	Oct-14	8.5	2.7	17.2	1.9	7.1	3.3	11.8
	Nov-14	2.4	0.0	9.3	0.5	0.7	-0.1	4.2
	Dec-14	0.1	0.0	1.4	0.0	-0.1	-0.1	0.1
	Jan-15	0.0	-0.1	1.0	0.1	-0.1	-0.1	-0.1
	Feb-15	0.0	0.0	0.2	0.0	-0.1	-0.1	-0.1
	Mar-15	0.4	-0.1	4.9	0.3	0.2	-0.1	1.1
	Apr-15	4.3	0.0	11.4	2.1	3.5	0.4	8.6
	May-15	11.5	0.8	21.6	1.4	12.3	7.8	16.8
	Jun-15	16.5	9.8	22.2	1.2	15.3	12.0	17.7
	Jul-15	18.6	12.4	23.6	1.4	18.4	13.3	21.3
	Aug-15	17.9	11.7	23.2	0.9	17.5	13.5	21.3
	Sep-15	14.3	8.5	21.0	0.7	16.5	11.4	21.1
Flow	Oct-14	34.6	7.1	214.9	25.4	36.7	13.8	82.6
	Nov-14	26.8	10.0	94.0	9.9	38.3	34.6	46.7
	Dec-14	21.1	10.6	74.0	6.9	30.9	30.3	31.3
	Jan-15	18.4	10.0	41.1	4.1	NA	NA	NA
	Feb-15	16.8	12.2	29.7	2.9	NA	NA	NA
	Mar-15	25.7	11.4	173.1	11.1	NA	NA	NA
	Apr-15	91.8	14.9	306.2	29.0	100.0	39.0	227.5
	May-15	47.2	8.1	204.3	22.2	56.9	39.4	84.1
	Jun-15	21.2	8.0	61.2	8.6	30.6	16.7	49.2
	Jul-15	11.6	6.2	32.6	1.9	14.4	6.7	33.5
	Aug-15	9.0	4.3	45.6	2.7	9.2	6.1	12.4
	Sep-15	13.1	5.5	68.5	5.9	8.6	7.5	11.0
Specific Conductivity	Oct-14	61.3	30.0	102.0	18.8	52.0	40.1	92.4
	Nov-14	53.1	32.0	74.0	7.6	43.8	38.1	49.5
	Dec-14	62.0	32.0	91.0	9.0	54.8	44.3	64.6
	Jan-15	64.6	52.0	76.0	5.8	68.9	60.1	76.2
	Feb-15	69.6	55.0	79.0	5.6	74.2	67.9	80.6
	Mar-15	57.0	28.0	75.0	12.4	75.3	66.0	82.3
	Apr-15	35.2	19.0	72.0	7.1	28.8	18.8	52.1
	May-15	45.9	20.0	92.0	11.7	38.0	25.4	52.3
	Jun-15	67.1	44.0	94.0	4.6	45.3	30.9	59.3
	Jul-15	81.6	53.0	105.0	7.7	67.5	49.5	84.3
	Aug-15	87.4	47.0	107.0	10.2	86.9	81.6	94.6
	Sep-15	80.3	42.0	103.0	11.0	90.6	86.7	100.3

Source: North Jackson Company, REACH System

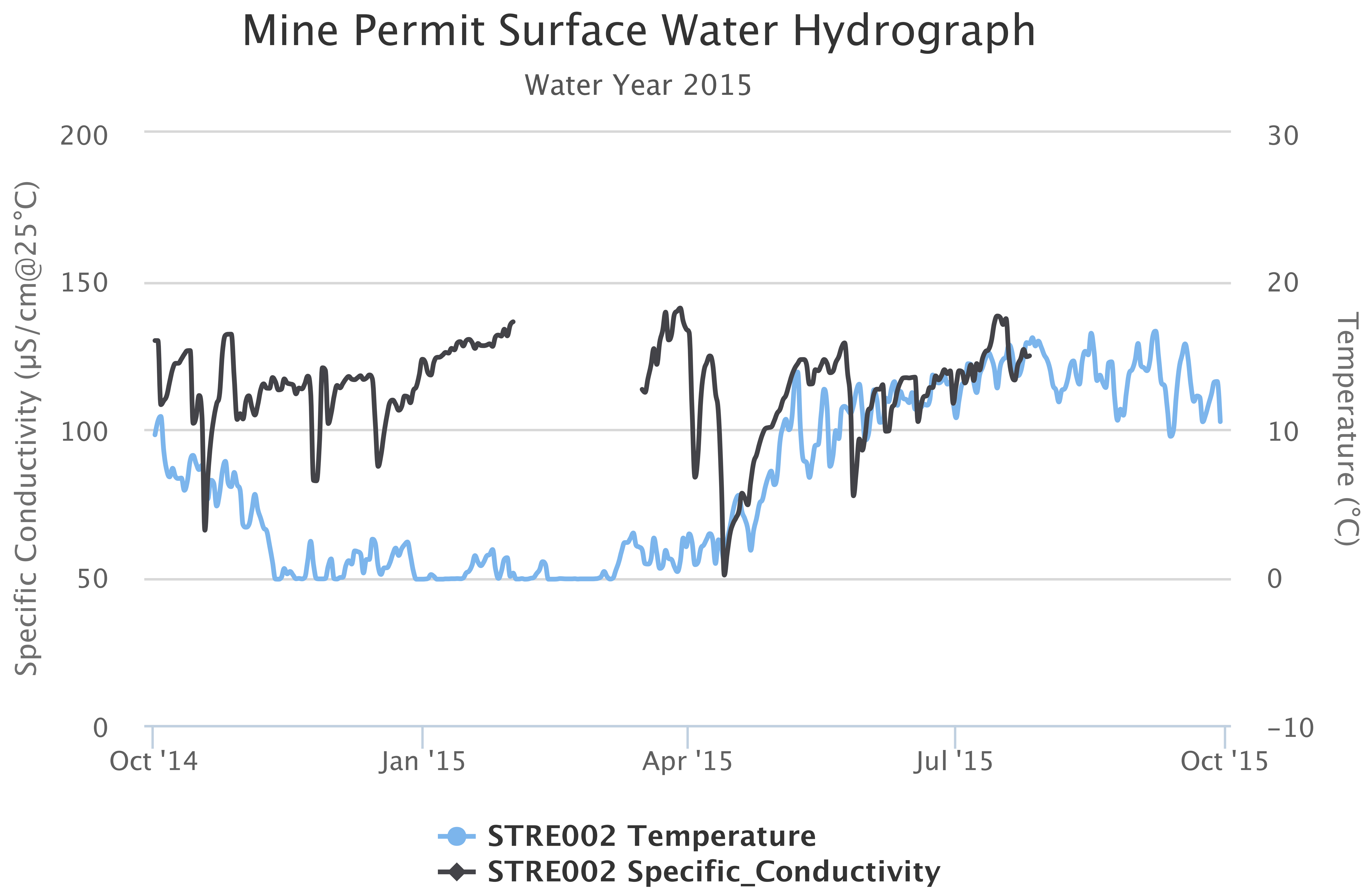
NA =Continuous record suppressed where it failed to meet quality control measures (e.g., due to ice or beaver activity).

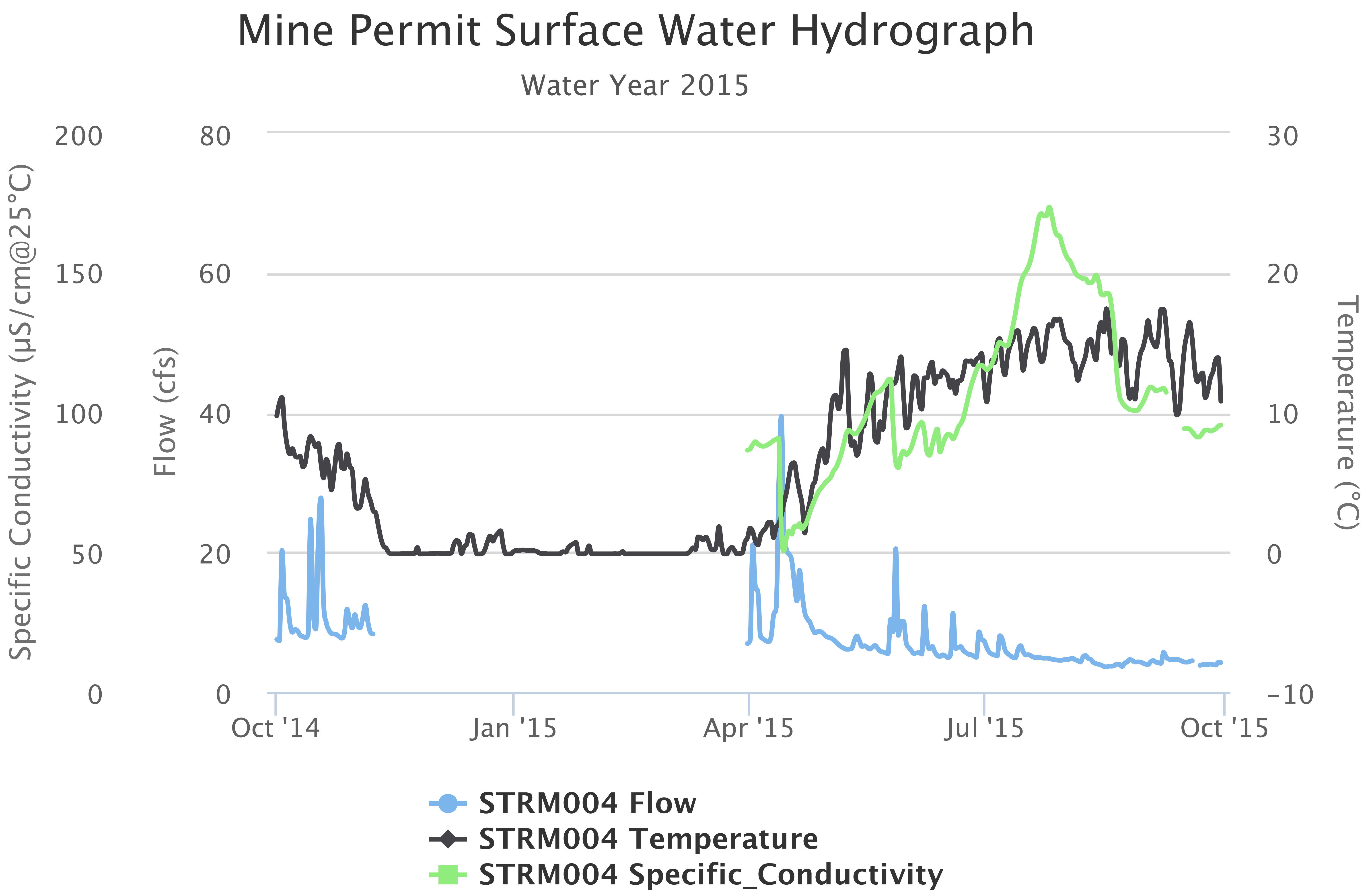
Results in red indicate mean monthly value is outside background range.

Appendix R

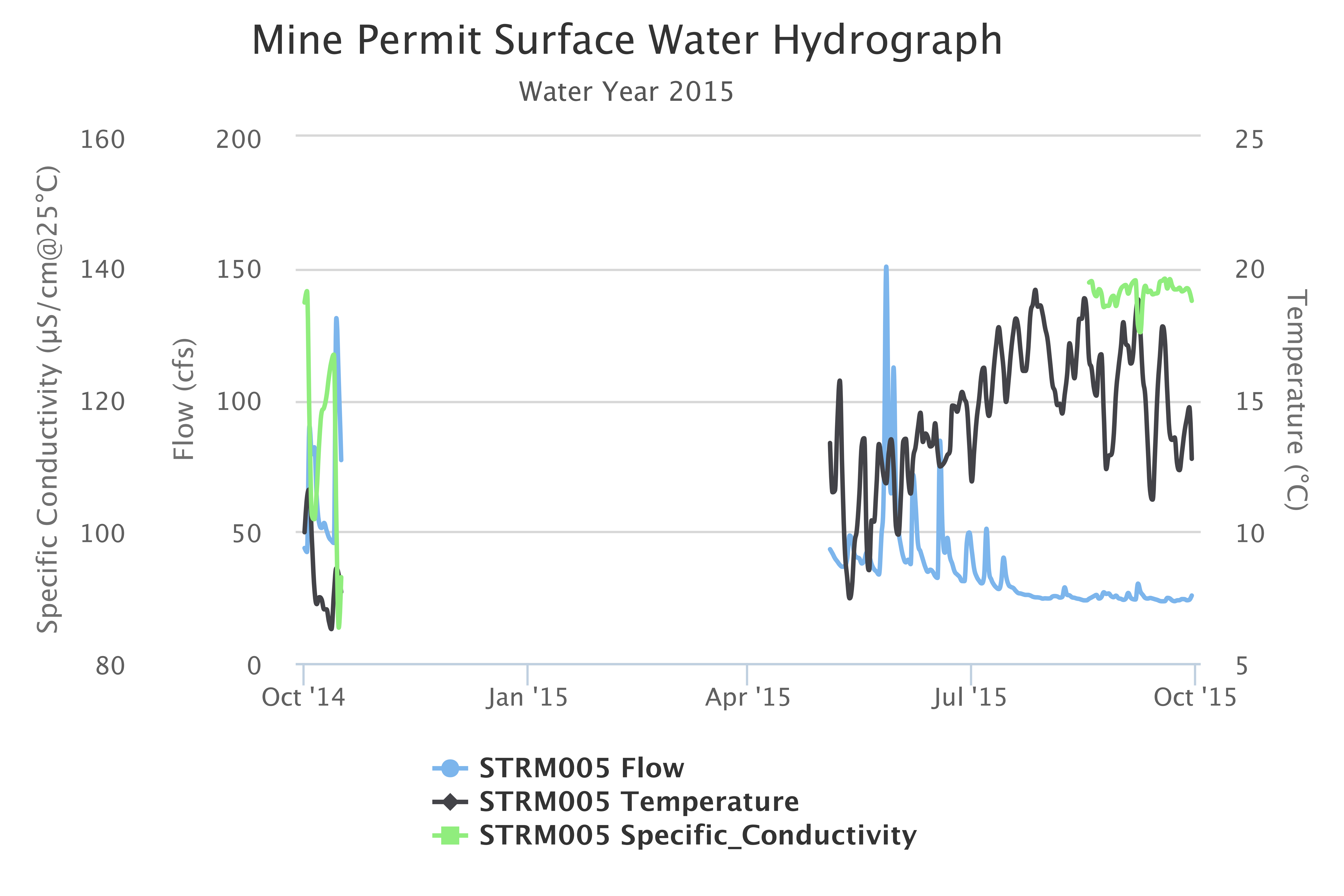
Eagle Mine

Surface Water Hydrographs


Mine Permit Surface Water Hydrograph
Water Year 2015
Specific Conductivity (µS/cm@25°C)
Temperature (°C)
200
150
100
50
0
30
20
10
0
−10
Oct '14
Jan '15
Apr '15
Jul '15
Oct '15
STRE002 Temperature
STRE002 Specific_Conductivity



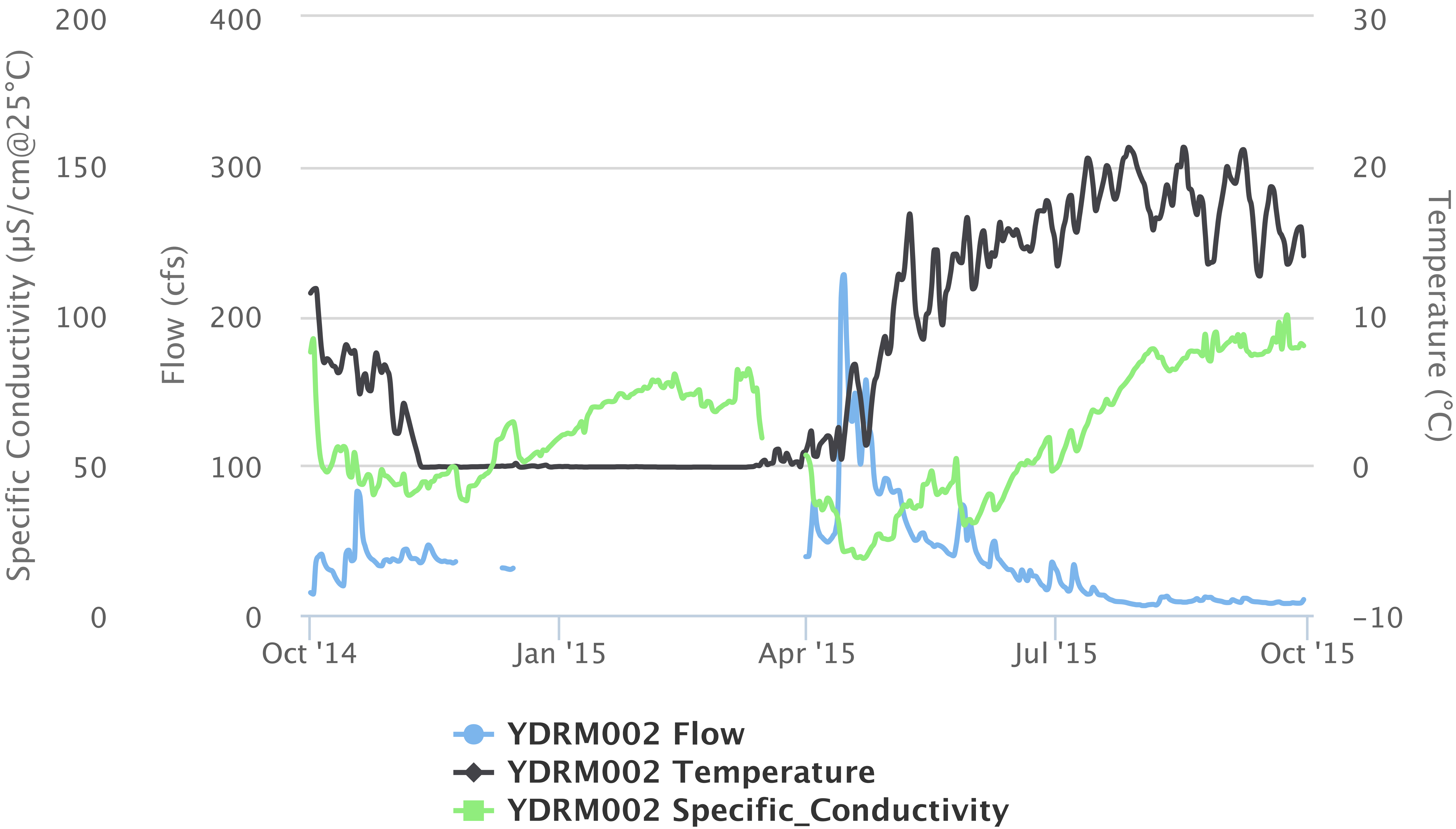
Mine Permit Surface Water Hydrograph
Water Year 2015
Specific Conductivity (µS/cm@25°C)
Flow (cfs)
Temperature (°C)
200
150
100
50
0
80
60
40
20
0
30
20
10
0
−10
Oct '14
Jan '15
Apr '15
Jul '15
Oct '15
STRM004 Flow
STRM004 Temperature
STRM004 Specific_Conductivity



Mine Permit Surface Water Hydrograph
Water Year 2015
Specific Conductivity (µS/cm@25°C)
160
140
120
100
80
Flow (cfs)
200
150
100
50
0
Temperature (°C)
25
20
15
10
5
Oct '14
Jan '15
Apr '15
Jul '15
Oct '15
STRM005 Flow
STRM005 Temperature
STRM005 Specific_Conductivity

Mine Permit Surface Water Hydrograph

Water Year 2015



Appendix S

Eagle Mine

Updated Contingency Plan

1 Contingency Plan – Eagle Mine Site

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 at the Eagle Mine. Engineering or operational controls to protect human health and the environment are discussed in Section 4 and Section 5 of this document. The focus of this contingency plan is on possible HSE risks and contingency measures. Possible HSE risks to on- site workers will be addressed by Eagle Mine through HSE procedures in accordance with Occupational Safety and Health Administration (OSHA) and Mine Safety and Health Administration (MSHA) requirements.

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

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
- Unplanned subsidence, and
- Leaks from containment systems for stockpiles or disposal and storage facilities.
- Basin berm failures.

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

1.1.1 Release of Toxic or Acid-Forming Materials

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

1.1.1.1 Coarse Ore Storage Area (COSA)

Coarse ore from the underground mine is trucked to the surface and placed in the COSA. The COSA is a steel sided building with a full roof that is used for temporary storage of stockpiled coarse ore. The COSA has a concrete floor that is sloped to a floor drain that collects any contact water associated with the ore. This contact water is collected in an epoxy lined sump in the COSA and pumped into the composite lined contact water basins (CWB) where it is stored until treatment at the water treatment plant. Contingency measures associated with the CWB liner systems are discussed in Section 1.1.12. Also, in accordance with Air Permit (No. 50-06B) 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 Temporary Development Rock Storage Area (TDRSA)

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

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

Accordingly, Eagle Mine has designed and constructed a state-of-the-art TDRSA to contain the development rock. The TDRSA is constructed of the following components to minimize the potential generation of ARD, and if formed, prevent it from being released to the environment:

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

As development rock is placed in the TDRSA it is amended with high-calcium limestone at a rate of two percent. This is added as an additional contingency measure to offset the formation of ARD. Moreover, if development or mining is suspended for an extended period of time the development rock will be covered to further limit the generation of ARD by minimizing contact with precipitation. As an added measure, the time in which development rock will be stored in the TDRSA has been modified. Development rock was originally scheduled for storage on the TDRSA for approximately seven years before being returned underground. Eagle Mine has chosen to immediately return the rock underground as cemented rock fill in order to further reduce the risk of ARD generation. The short term nature of this project significantly reduces the potential for release of toxic and acid-forming materials.

If the water that comes in contact with the development rock does become acidic, it will not be exposed to the environment due to the design of the TDRSA. Further, all contact water from the TDRSA is collected in the contact water basins and treated at the WTP. The contingency actions that address potential failure of the liner contact water collection system are discussed in Section 1.1.12.

1.1.1.3 Ore Transportation

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

The following 66 mile route is being utilized for moving the ore from the Eagle Mine site to the Humboldt Mill on existing roadways:

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

Eagle Mine, in cooperation with the Marquette County Road Commission (MCRC), upgraded the portions of the 66 mile route that were not currently “all season” status. These upgrades included widening of roadways and addition of passing lanes all of which add a level of safety for all drivers on the road.

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

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

Potential truck accidents are possible while transporting ore from the Mine to the Mill. In the event of a truck roll over, ore could be spilled onto the road and adjacent areas. Since the coarse ore is run of mine rock and not crushed, it will be relatively easy to pick the material up with conventional earthmoving equipment and place the ore back into a truck. If such an event should occur, removal action would take place as soon as possible. Although geochemical testing of the ore has shown that Acid Rock Drainage (ARD) will not occur in this short of a time period, it is important to respond appropriately to any spills. If an accident results in spillage of ore into a water body, specialized equipment and procedures may be required. Items such as temporary dams/cofferdams and large backhoes may be required to remove the material from the water. Eagle Mine has an emergency response contractor on call to immediately respond to environmental incidents, assist with clean-up efforts, and conduct environmental monitoring associated with any spills. In addition a transportation spill response standard operating procedure has been developed.

The Mill Coarse Ore Facility is designed such that all unloading of ore will occur in an enclosed building with a concrete floor. These features will prevent release of dust and prevent precipitation from contacting the ore. After the ore is unloaded into the Coarse Ore Facility, it is crushed and transferred, with loading and transfer points featuring dust control in accordance with the Air Permit to Install (50-06B).

1.1.2 Storage, Transportation and Handling of Explosives

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

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

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

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

1.1.3 Fuel Storage and Distribution

The fuel storage area is located within the contact area of the Eagle Mine Site. The entire surface operations are located within a fenced area and controlled by a gate house and fence system. The fuel storage area contains two off-road diesel fuel storage tanks with a capacity of 20,000 gallons each and one smaller 560 gallon tank for on-road diesel. An additional 1,700 gallon diesel fuel storage tank is located in the non-contact area near the power house generator. All fuel tanks are made of double-walled construction for added protection against leaks. In addition, the mine site currently has a propane storage capacity of approximately 85,500 gallons. All propane tanks, currently on site, are located adjacent to the buildings that require the fuel for heating purposes.

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

- A Spill Prevention Control and Countermeasures Plan (SPCC) has been written and implemented.
- Training of personnel responsible for handling fuel in proper procedures and emergency response;
- Regular equipment inspections and documentation of findings;

- Double-walled construction of all above ground tanks and/or additional secondary containment, and
- Staging of on-site emergency response equipment to quickly respond to unanticipated spills or leaks.

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

Diesel fuel and propane (fuels) are transported to the Eagle Mine by tanker truck from local petroleum distributors. The probability of an accidental release during transportation will be dependent on the location of the supplier(s) and the frequency of shipment. A fuel release resulting from a vehicular accident during transportation is 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.

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

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

<u>Construction/Reclamation Phase Release</u> - A major fuel spill during the construction or reclamation phases could occur from a mobile storage tank failure or mishandling of fuels. Such a release is 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.

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

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

1.1.4 Fires

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

1.1.4.1 Mine Fire

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

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

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

1.1.4.2 Surface Fire

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

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

In order to minimize the risk of a fire on-site, stringent safety standards are being followed during both the construction and operation phases of surface facilities. All vehicles/equipment are required to be equipped with fire extinguishers and all personnel trained in their use. 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.

1.1.5 Wastewater Collection and Treatment

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

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

1.1.5.1 Contact Water Basins

The CWBs were very conservatively designed to handle a combined 100 year peak snow melt and rain event.

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

- The CWBs are designed to hold approximately 14,00,000 gallons of water allowing sufficient time for maintenance of WTP equipment.
- In the unlikely event that a runoff event exceeds capacity of the CWBs the following actions will be taken:
- By-pass CWBs and divert underground mine water directly to the WTP.
    - Transfer water from CWBs to the TDRSA (During a true emergency, more than one foot of head can be stored on the TDRSA with consent from the MDEQ).
- Water can be pumped into vacant underground mine workings for additional temporary storage of water.

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

1.1.5.2 Non-Contact Storm Water

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

As an additional conservative design measure, the NCWIBs have been sized assuming the ground is frozen 6 months out of the year with no infiltration during this time period. In the event that the infiltration capacity of the CWB soils is reduced over time by the presence of silt, the solids will be removed to restore the infiltration capacity.

1.1.5.3 Treated Water Infiltration System

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

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

1.1.6 Berm Failures

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

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

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

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

1.1.7 Air Emissions

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

1.1.7.1 Air Emissions during Operations

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

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

To minimize dust emissions from development rock and coarse ore storage areas, such areas will either be fully or partially enclosed. Materials will be moved to and from these areas during the course of operations. Given the relatively large size and moisture content of these materials, it is anticipated that the risk of excessive fugitive dust emissions from these activities is low. Any development rock crushed in preparation for use in backfill will be watered prior to crushing and conveyors will be equipped with water sprays to minimize dust emissions. The TDRSA will also be temporary in nature, in that development rock will be moved back underground to fill stopes that have been mined.

The coarse ore storage building is designed as an enclosed structure to control fugitive emissions from ore transfer between underground production vehicles and offsite haul trucks. No crushing will occur in the COSA, so the risk of fugitive dust emissions from this activity is low due to the enclosed nature of the building and moisture content of the ore. If necessary, water sprays are used to control dust within the building and best housekeeping practices apply to ensure cleanliness of the building (i.e. sweeping and washing down of floors). Although the risk of fugitive dust during transport of coarse ore material off-site is considered to be low due to its large size, this risk is further reduced as all trucks will be equipped with covers. Trucks undergo a tire wash prior to exiting the facility to reduce the potential for ore dust migration from the property.

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

1.1.7.2 Air Emissions during Reclamation

Once underground mining and ore transfer activities are completed at the site, reclamation will commence 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.

1.1.8 Spills of Hazardous Substances

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

Table 1-1

Chemical Reagents Used at the Water Treatment Plant

Item No.	Chemical Name	Trade Name	CAS No.	Storage Volumes	Storage Containers
1	sodium hydroxide	caustic soda; Hydrex 1565	1310-73-2	5,000 gal	Liquid
2	sodium hypochlorite	Chlorine Bleach	7681-52-9	110 gal	Liquid
3	sodium carbonate anhydrous	soda ash; Hydrex 1564	497-19-8	22,000 lbs	Solid
4	sodium aluminate	sodium aluminate	1302-42-7	110 gal	Liquid
5	sodium metabisulfite	Sodium bisulfite, dry	7681-57-4	1,000 lbs	Solid
6	iron (III) chloride solution	Ferric Chloride; Hydrex 3250	7705-08-0	900 gal	Liquid
7	Antiscalant	Hydrex 4114	20592-85-2	330 gal	Liquid
8	hydrochloric acid	Hydrex 4507	7647-01-0	5,000 gal	Liquid
9	Antifoam	Suppressor 1615	-	110 gal	Liquid
10	nitric acid	Nitric acid, 34%	7697-37-2	900 gal	Liquid
11	sulfuric acid	Hydrex 1925	7664-93-9	880 gal	Liquid
12	polymer	Hydrex 6511	-	125 gal	Liquid
13	Citric Acid	Hydrex 4702	-	Up to 1600 lbs	Solid
14	RO Membrane Cleaner - Basic (Hydrex 4501)	Hydrex 4501	-	800 lbs	Solid

Chemical storage and delivery systems follow current standards that are designed to prevent and to contain spills. All use areas and indoor storage areas were designed, constructed and/or protected to prevent run-on and run-off to surface or groundwater. This includes development of secondary containment areas for liquids. The secondary containment area is constructed of materials that are compatible with and impervious to the liquids that are being stored. In addition, the truck off-loading area for bulk chemicals is an enclosed facility curbed with a sloped pad, such that spills are directed and contained within the secondary containment area. A release in the WTP from the associated piping would be contained within the curbed and contained plant area and neutralized. Absorbent materials are available to contain acid or caustic spills. 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 to the atmosphere during a spill incident are likely to be negligible. Off-site exposures are not expected. It is therefore anticipated that management and handling of WTP reagents will not pose a significant risk to human health or the environment.

1.1.9 Other Natural Risks

Earthquakes – The Upper Peninsula of Michigan is in a seismically stable area. The USGS seismic impact zone maps show the maximum horizontal acceleration to be less than 0.1 g in 250 years at 90% probability. Therefore, the mine site is not located in a seismic impact zone and the risk of an earthquake is minimal. Therefore, no contingency measures are discussed in this section.

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

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

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

Forest Fires – Forest fires were discussed in Section 1.1.4.

1.1.10 Power Disruption

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

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

1.1.11 Unplanned Subsidence

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

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

A comprehensive evaluation of the stability of the crown pillar and surface subsidence was completed as part of the mine design. The conclusion of the stability assessment was that the pillar is predicted to be stable with the typical rock mass classification values obtained prior to the start of mining. The crown pillar assessment also predicted the vertical displacement of the crown pillar. The modeling results predicted vertical displacement at the top of bedrock less than 2 cm (<1 in). Given that the bedrock is covered by overburden, this displacement of the crown pillar and this subsidence will be imperceptible at the ground surface. As a contingency, subsidence monitoring is being performed at two locations above the ore body, adjacent to the overlying wetland. In the event of unanticipated subsidence, the mining sequence and backfill methods as described above and in Section 4, will be evaluated and adjusted to reduce the subsidence. Adjustments to the stope sequence, backfill methods, crown pillar thickness, and backfill mix would be adjusted as needed to minimize subsidence. In addition, ground support inspections are completed on a daily basis by onsite staff to ensure safe working conditions for miners.

1.1.12 Containment System Leaks

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

1.2 Emergency Procedures

This section includes the emergency notification procedures and contacts for the Eagle Mine. 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 IC safety and environmental officers.

In the event evacuation of mine personnel is required, Eagle Mine has developed emergency response procedures for underground facilities as well as surface facilities. All evacuation procedures were developed in compliance with MSHA regulations and practiced on a regular basis. In addition, in accordance with MSHA, Eagle Mine is required to have a Mine Rescue Team that is routinely and adequately trained to respond to underground emergency situations. The Mine Rescue team is comprised of three, six member teams that train approximately 8-10 hours per month which includes at least two hours "under air" using the Draeger BG-4 closed-circuit breathing apparatus. Training activities may include familiarization with the mine map and underground navigation, understanding ventilation and air flow in the mine, mine gases, rescue and recovery, basic extrication, fires and firefighting, first aid, and operation and maintenance of the BG-4 breathing apparatus.

In addition to the Mine Rescue Team, security personnel at the Eagle Mine site are EMTs and paramedics who are trained in accordance with state and federal regulations. Eagle Mine also maintains a state licensed ALS ambulance onsite for immediate response to emergency situations.

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

- ABC Rechargeable fire extinguishers
- Telephone mine communication system
- Radios
- First aid kits, stretchers, backboards, and appropriate medical supplies with a licensed transporting advance life support ambulance on site properly staffed at all times.

- BG 4 Self Contained Breathing Apparatus
- Gas detection monitors that detect 5 gases and LEL.
- Cap lamps
- Self-rescuers
- Portable Refuge Stations
- Mine elevator
- Spill Kits (hydrocarbon and chemical)
- High expansion Foam Machines
- Portable Drift Seal.

This equipment is located both underground and at the surface facilities. Fire extinguishers are located at appropriate locations throughout the facility, in accordance with MSHA requirements. Mine and 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. In addition, the Eagle Mine has two ambulances (surface and underground) and certified EMTs and paramedics onsite at all times to respond in the event of an emergency.

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

- Mine Security: (906) 339-7018
- Local Ambulance Services: Mine ALS Ambulance Service provided by G4S Security they can be contacted at Extension 7018, or on the radio system using the Security, Emergency, or UG out Channels.
- Hospitals: Marquette General Hospital – (906) 225-3560
Bell Hospital – (906) 485-2200
- Local Fire Departments: Powell 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
- Michigamme Township Supervisor: Alvar Maki, (906) 323-6547

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 T

Eagle Mine

Organizational Information Update

Eagle Mine
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Organizational Information

Eagle Mine LLC

March 1, 2016

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