

# Eagle Mine

a subsidiary of **lundin mining**

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Monday, March 15, 2021

Ms. Melanie Humphrey  
Michigan Department of Environment, Great Lakes, and Energy  
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 Ms. Humphrey:

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 2020 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 906-339-7139.

Sincerely,



Alexa Young  
Environmental Advisor

Cc: Michigamme Township

Enclosure

## 2020 Annual Mining and Reclamation Report Mine Permit MP 01 2007

March 15, 2021



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## **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
EGLE	Michigan Department of Environment, Great Lakes & Energy
ft	feet
gal	gallon
gpd	gallons per day
gpm	gallons per minute
GWDP	Groundwater Discharge Permit
in	inches
KME	King and MacGregor Environmental
m	meter
m <sup>3</sup>	cubic meters
MG	million gallons
MDNR	Michigan Department of Natural Resources
AMSL	Above mean sea level
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
NCWIB	Non-Contact Water Infiltration Basin
NJC	North Jackson Company
NLG	Narrow-Leaved Gentian
NREPA	Natural Resources & Environmental Protection Act
ORP	Oxidation Reduction Potential
Q1	Quarter 1
SESC	Soil Erosion and Sedimentation Control
SU	standard units
t	metric ton (tonne)
TDRSA	Temporary Development Rock Storage Area
TDS	total dissolved solids
TWIS	Treated Water Infiltration System
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 1.1 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 1.1 – Document Preparation – List of Contributors**

Organization	Name	Title
<b>Individuals responsible for the preparation of the report</b>		
Eagle Mine LLC	Amanda Zeidler	HSE & Permitting Manager
Eagle Mine LLC	Alexxa Young	Environmental Advisor
<b>Report Contributors</b>		
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Eagle Mine LLC	Cedric de Chermont	Mining Engineer
Eagle Mine LLC	Lars Olausen	Technical Services Principal
Eagle Mine LLC	Kathryn Dorfschmidt	Geotechnical Mining Engineer
Eagle Mine LLC	Jonathan Dale	Water Treatment Plant Supervisor
Eagle Mine LLC	Karen Carlson	HSE Administrative Assistant
Eagle Mine LLC	Jennifer Nutini	Environmental Superintendent
Eagle Mine LLC	Matthew Taylor	Surface Supervisor
Eagle Mine LLC	Christine Bekkala	Finance
Cementation USA	Ken Groves	Safety, Health & Mine Rescue Coordinator
Barr Engineering	Matt MacGregor	Wetland Scientist/Biologist
Advanced Ecological Management, LLC.	Doug Workman	Aquatic Scientist
North Jackson Company	Dan Wiitala	Professional 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

Table 3.1 below lists the notifications and required submittals and approvals that were provided to the Department in 2020 as required under the Part 632 Mining Permit. Table 3.2 lists submittals and approvals under other required permits. A copy of the current site map is provided in Appendix A.

**Table 3.1 – Submittals and Approvals Required Under Part 632**

Date	Description	Approval
02/19/20	Q4 2019 Groundwater and Surface Water Monitoring Data	N/A
03/15/20	2019 Annual Mining and Reclamation Report	N/A
03/27/20	Revised 2019 Annual Mining and Reclamation Report	N/A
04/21/20	Q1 2020 Groundwater and Surface Water Monitoring Data	N/A
09/21/20	Q2 2020 Groundwater and Surface Water Monitoring Data	N/A
12/03/20	Q3 2020 Groundwater and Surface Water Monitoring Data	N/A

**Table 3.2 – Submittals and Approvals Under Other Permits**

Date	Description	Approval
01/03/20	Water Resource Division General Wetland Permit for Borehole Abandonment	01/14/20
06/20/19	Eagle Mine Air Permit Renewal	05/29/20
10/01/20	Water Treatment Plant 3 <sup>rd</sup> Crystallizer Addition	N/A

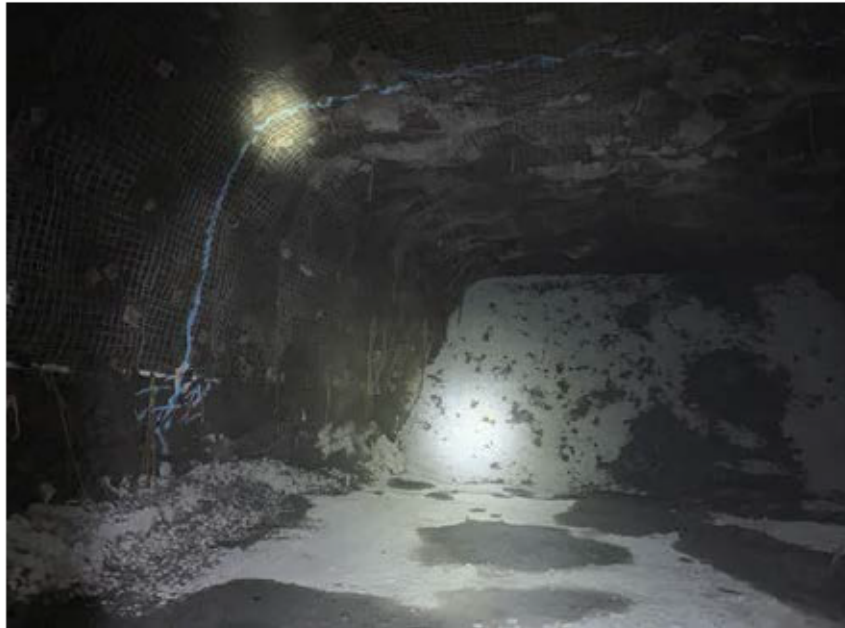
- The general wetland permit for borehole abandonment was to support removal of exploration boreholes in the event the area around the metal casing needed to be excavated to abandon the drill casing. These locations were not abandoned in 2020 and will be addressed in closure.
- The Eagle Mine air permit renewal includes uncovered aggregate and sand storage piles with a maximum area of 5 acres, an annual trucking limit, and the option for a Temporary Development Rock Storage Area (TDRSA) screening unit with material throughput limits and operational requirements.
- The two updates completed at the water treatment plant (WTP), including the installation of a 3<sup>rd</sup> crystallizer and a crystallizer chiller, are explained in further detail below in Section 4.3.5.

#### **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**

2020 marked the sixth year of production mining which is being conducted by underground mining contractor, Cementation. Two mining methods are being utilized at Eagle Mine; longhole open stoping, and cut and fill stoping. Longhole open stoping is utilized in the Eagle orebody while Eagle East uses both longhole stoping and cut and fill mining method. When utilizing the longhole stoping method, 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 stopes below the 327.5 meter (m) above mean sea level (AMSL) levels. Both primary and secondary stopes were mined and backfilled in Eagle in 2020.



Jam backfill in the 381-1405

Cut and fill mining areas in Eagle East are being mined in lifts from the bottom up and jam filled with CRF as they are completed. Cut and fill is utilized in Eagle East as it is a more efficient mining method for higher grade irregular shaped orebodies. 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 or offsite aggregate, sand, cement, water, and a concrete admixture.

In accordance with special condition E-8 of the mining permit, an annual 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 Operations Manager, can be found in Appendix B.

Subsidence monitoring was also conducted in 2020 as required by permit condition L-17. Eagle currently monitors the crown pillar area using multi-point bore hole extensometers (MPBXs); one installed at the surface and another underground MPBX array installed in the backs of the highest present elevation sill drives. In addition, the crown pillar is also monitored through the surveying of monuments within the crown pillar footprint.

The surface and underground MPBX's are grouted in vertical holes and have six anchor points with a potentiometer at each for monitoring displacement at incremental depth. Underground MPBX data loggers are tied into a radio telemetry system for on-demand data retrieval. The surface MPBX is monitored monthly with data manually downloaded using a handheld data logger. Crown pillar monitoring is supplemented with monument surveys at five stations on the crown pillar, where changes in elevation are measured in reference to a backsight location fixed to exposed bedrock. Surveys are completed on a monthly basis to detect vertical subsidence. Accuracy of these measurements is to within less than one millimeter of movement. All monitoring is conducted in accordance with Eagle's Subsidence Monitoring Plan and results did not indicate any deflection of the bedrock surface in 2020.

In addition to the subsidence monitoring required by permit condition L-17, additional extensometers are installed at various locations in Eagle and Eagle East to better understand the ground conditions throughout the mine. The data is routinely downloaded and used as an early



indicator of potential changing conditions. The information is used to guide mitigation measures to help ensure the safety of Eagle employees and contractors.

To ensure the safety of miners in the event of an emergency, there were eight (8) twelve-person and four (4) four-person 36-hour self-contained Mine Arc refuge chambers stationed underground in 2020.



Bolter installing ground support in Eagle East heading

#### 4.1.1 Underground Development Progress

An additional 4,501 m of development occurred in 2020 in Eagle and Eagle East. Eagle development included 300 m of sill development which is required in order to access the stopes and 56 m of general development. No vertical development was required in 2020 as all ventilation and escape raises have been completed in Eagle. Eagle East development included 3,445 m of sill development, 678 m of general development, and 22 m of vertical development for ventilation. In addition, our 2020 definition drilling program completed 44 drill holes, totaling 7,653 meters for the purpose of geologic model optimization.

Table 4.1.1a below summarizes the total 2020 development meters by type completed in Eagle, and Table 4.1.1b breaks out the development completed in the Eagle East in 2020. A map showing 2020 Eagle East development progress can be found in Appendix C.

**Table 4.1.1a – 2020 Eagle Underground Meters of Development**

<b>Eagle Mine Development</b>	<b>Meters</b>
Sills	300
Vertical	0
General/Horizontal	56
<b>Total</b>	<b>356</b>

Source: Mine Engineering Department

**Table 4.1.1b – 2020 Eagle East Decline Meters of Development**

<b>Eagle East Decline Development</b>	<b>Meters</b>
Sills	3,445
Vertical	22
General/Horizontal	678
<b>Total</b>	<b>4,145</b>

Source: Mine Engineering Department

#### 4.1.2 Underground Ore Production – Stopping & Backfilling

A total of 20 primary stopes were mined and backfilled in 2020. Primary stopes are backfilled with CRF after extraction of ore. In 2020, 359,489 t of CRF was produced at the onsite batch plant and returned to stopes and completed lateral development by underground haul trucks. Backfill to stopes accounted for approximately 46% of the CRF made with the remaining 54% used for jamming lateral development. There were 11 secondary stopes mined in 2020, of which nine were backfilled with development rock. Table 4.1.2a summarizes the number of stopes that were mined and backfilled in 2020. In addition, the total tonnes (t) of ore mined in 2020 is listed in Table 4.1.2b and is categorized as either sill or stope. Eagle East produced a total of 304,736 t of sill ore in 2020. A bulk adjustment is applied to the total ore mass based on Coarse Ore Storage Area (COSA) surveys and over-the-road truck scale readings. Ore categorized as sill is excavated using horizontal drill holes and is the material that is removed to access the stope in the stope mining areas. In the cut and fill areas of Eagle East, sills are mined and then jammed after excavation is complete. The stope is excavated using vertical drill holes and is mucked via a remote loader. Appendix C illustrates the current configuration of each mining level and production mining progress through 2020.

**Table 4.1.2a – Number of Stopes Fully Mined & Backfilled in 2020**

<b>Stope Type</b>	<b>Total (number)</b>
Primary Stopes	20
Secondary Stopes	11

Source: Mine Engineering Department

**Table 4.1.2b – Tonnes of Ore Mined in 2020**

<b>Ore Mined</b>	<b>Tonnage of ore mined (tonnes)</b>
Eagle Sills	26,370
Eagle East Sills	304,736
Eagle Stopes	373,970
Eagle East Stopes	32,625
Survey Actual Adjustment	20,697
<b>Total</b>	<b>758,398</b>

Source: Mine Engineering Department

### 4.1.3 Dewatering Volume and Quality

Water is required underground in order to complete drilling, bolting, dust suppression activities, and to knock down loose material that remains suspended after a stope blast. In 2020, 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 flows are continuously tracked and stored within a database system that is reviewed by Environmental staff.

Average water use decreased from approximately 69 gpm in 2019 to 43 gpm in 2020, with underground operations continuing throughout the entire year. The decrease is likely attributed to the shift in mining from Eagle to Eagle East where the cut and fill mining method was predominantly utilized in 2020. In longhole stoping, water is used to help remove loose rock (i.e. scaling) prior to advancing the mining cycle. The cut and fill mining method does not use water to the same extent in the scaling process and therefore less water is needed when utilizing that mining method. Water is also still utilized for dust suppression in both Eagle and Eagle East, as well as dust control on the roadways. The amount of water supplied for underground operations in 2020 ranged from an average of 43,007 gallons per day (gpd)/(30 gallons per minute (gpm)) in June, to 82,458 gpd (57 gpm) in January. 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 40,823 gpd (28 gpm) in April to 75,231 gpd (52 gpm) in January.

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. Similar to previous years, the overall calculated dewatering volume for the mine was negative during the majority of 2020, with only three instances in May, July, and August in which dewatering volumes were net positive. No specific events were noted during these three months, however, small, isolated pockets of water are periodically encountered during the drilling and blasting operations which may temporarily result in increased water flow. The negative values were likely the result of 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 2020.

**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	82,458	75,231	-7,227	-5.02
February	80,785	72,686	-8,098	-5.62
March	60,453	50,601	-9,852	-6.84
April	49,212	40,823	-8,389	-5.83
May	52,855	57,714	4,859	3.37
June	43,007	41,906	-1,102	-0.77
July	51,945	52,794	848	0.59
August	56,827	64,394	7,556	5.25
September	57,247	56,532	-714	-0.50
October	73,819	60,673	-13,147	-9.13
November	68,090	58,296	-9,793	-6.80
December	66,801	48,210	-18,591	-12.91

\* 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 2020. 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 220,920 t of development rock was crushed in 2020.



TDRSA, October 2020

### 4.2.1 Development Rock Storage Volume

In 2020, the total volume of development rock mined was 40,192 m<sup>3</sup>, however only 816 m<sup>3</sup> of development rock was placed on the TDRSA from the underground. The remaining 39,375 m<sup>3</sup> was utilized as uncemented backfill in secondary stopes. Also, in 2020, 95,757.5 m<sup>3</sup> of development rock was removed from the TDRSA for use in cemented rock fill, resulting in an overall reduction of

storage volume. The development rock volumes were derived from survey volumes, densities, and operational factors for development rock mined or used in cemented rock fill. The total TDRSA rock volume accounts for material mined from 2011 through 2020.

No limestone was added to the TDRSA in 2020. The effectiveness of limestone added in previous years continues to be verified through quarterly pH readings of the TDRSA contact water. Table 4.2.1 summarizes the surveyed volume of material stored in the TDRSA as well as the volumes of development rock and limestone added and/or removed for use in backfill in 2020.

**Table 4.2.1 – 2020 TDRSA Volume Totals**

Month	Volume of Waste Rock Added to TDRSA (m <sup>3</sup> )	Limestone Delivered (m <sup>3</sup> )	Development Rock Used for Backfill (m <sup>3</sup> )	TDRSA Surveyed Volume 01/05/2021 (m <sup>3</sup> )
<b>2020 Total*</b>	816	0	135,132.5	45,450

\*Note: Waste rock volume added to the TDRSA was based on the difference between the amount of development rock mined and the amount of development rock remaining underground as GOB fill. In May 2020, a TDRSA survey error of -107,091 m<sup>3</sup> occurred for the development rock on the TDRSA. The 01/05/2021 TDRSA surveyed volume represents the total volume of development rock stored on the TDRSA at the end of the year.

#### **4.2.2 Mining Forecast**

The 2021 mining forecast calls for the continued development of extraction drifts and stope accesses for a total of 5,422 meters of lateral advance. Eagle East will make up approximately 82% of the planned development with a total of 4,431 meters in 2020. Total ore (tonnes) produced for 2020 is forecasted to be approximately 747,000 t with approximately 47% coming from Eagle East. Of the 355,000 t from Eagle East, around 80% will be from sills including the cut and fill mining zones, with the remaining 20% from stopes. All estimates are contingent upon the current production schedule and are 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 purpose of the leak detection sump is to capture water within the secondary liner system in the event of a failure of the primary liner. The water currently in the leak detection sump is rainwater that has been encapsulated in the secondary lining system 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 the 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 2020, approximately 8.4 MG 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, April, September, and November. The chemistry analytical results from the TDRSA contact water sump fluctuated between sampling quarters which was expected as material from both Eagle and Eagle East was added and removed during the year and precipitation/snow melt events contributed fresh water to the system. The concentration-based results for several parameters increased in 2019, but decreased in 2020, notably specific conductivity, sodium, and chloride. The aforementioned parameters are generally more indicative of water quality from Eagle East. Since much of the material removed from the TDRSA in 2020 consisted of Eagle East waste rock which is brinier, it is appropriate that concentrations of constituents from brine residues would decrease in TDRSA leachate.

pH remained in the neutral range of 6.3 – 7.3 SU indicating that the limestone present is providing sufficient neutralizing capacity. In addition, a comparison of the TDRSA contact water sump results to those from the TDRSA leak detection sump, as well as the volume of water removed from the leak sump indicate that the integrity of the contact water liner is intact and functioning as designed.

A summary of the 2020 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 2020, four samples were collected, and the accumulation rates were calculated. The daily rate of accumulation was estimated throughout the year at 0.02 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 for sampling events from the TDRSA leak detection sump for 2020. A total of approximately 55 gallons of water was purged from the leak detection sump in 2020, a larger volume than 2019. These values are estimated as the flow did not consistently totalize on the flow meter. It was determined that the flow meter may seize from infrequent use or the flow rate was too low to register on the meter. The total volume of water purged to date is only a fraction of the estimated 26,000 gallons of rainfall that entered the secondary collection system during construction. In an effort to ensure that the flow rate is accurately tracked and mitigate the risk of pump failure, the frequency of pumping to prevent the flow meter and pump from seizing has been increased since the October 2016 approval was received from the Department. A minimal volume of water was pumped in 2020 to keep the flow meter from seizing and still allow sufficient volume to continue quarterly sampling.

Samples were collected from the leak detection sump in February, April, September, and November 2020. Upon sample collection, the pH and specific conductance of the sample are immediately determined, and the remaining sample aliquot is sent to an offsite 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 2020. The pH results were fairly consistent and ranged from a low of 7.5 to a high of 7.8 which is neutral to slightly basic in nature, similar to 2019 results. Sulfate results fluctuated throughout the year, with levels falling below 500 mg/L for the first time since 2013 in Q1 but increasing again in Q2 2020. Levels ranged from a maximum of 1,570 mg/L in November to a minimum of 447 mg/L in February, fluctuating across quarters. These concentrations were not consistent to previous years. However, review of historical TDRSA data shows that the water levels in the leak sump did not increase from 2019 to 2020, confirming that no leaks are present in the liner system and therefore no excess water is present to possibly dilute the sulfate results. In addition, other parameters continue to be monitored and compared to results from the contact water sump. No correlation in the water quality has been found between the two sumps for sulfate or other parameters. Other than in February, the sulfate concentrations for the remaining samples collected in 2020 were above the 500 mg/L threshold identified in the permit.

As required, Michigan Department of Environment, Great Lakes & Energy (EGLE) was notified of the elevated sulfate results in the quarterly benchmark summary letters. Comparison 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 is likely not from the primary contact sump and the integrity of the liner is intact. The source of sulfate was likely introduced during construction of the lining system. Results will continue to be reviewed and any potential trends documented. Any upward trending will be reported to the Department. A summary of the 2020 monitoring results and graphs comparing results from the TDRSA leak detection and contact water sump can be found in Appendix D.

**Table 4.2.3 – TDRSA Leak Detection Sump Results for 2020**

<b>Parameter</b>	<b>02/04/20</b>	<b>04/16/20</b>	<b>09/08/20</b>	<b>11/16/20</b>
Magnesium (mg/L)	20	19	22	22
Sodium (mg/L)	607	592	582	643
Chloride (mg/L)	40	36	42	51
Sulfate (mg/L)	447	1110	933	1570
Nitrate (mg/L)	121	116	50	52
Nitrite (mg/L)	<0.010	0.030	<0.010	<0.010
Ammonia (mg/L)	<0.10	<0.10	<0.10	<0.10
Average Daily Flow Rate (gal/acre/day)*	0.02	0.02	0.02	0.02
Purged Volume (gal)*	5.0	5.0	5.0	5.0
pH	7.6	7.8	7.5	7.8
Specific Conductivity (µS/cm)	2878	2848	2989	3120

\*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 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.



Domestic Well at the Mine Site

The domestic well (QALPSW001) is used to supply potable water to the surface facilities, final rinse for the truck wash, and fire water tank if necessary. During 2020, the approximate water use was 6,847 gpd (4.8 gpm) which was slightly more than the average of 6,779 gpd (4.7 gpm) utilized in 2019.

In 2020, the mine services well (QAL011D) was primarily used to supply water for exploration hole grouting, the truck wash recycled water bay, underground operations, dust suppression, and the fire water tank which supplies water to the network of fire hydrants onsite. Approximately 78,336 gpd (54 gpm) of water was utilized in 2020 which was also down from an average of 112,546 gpd (78 gpm) supplied in 2019.

The third source of water on the mine site is the treated utility water which is supplied and utilized 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. This water source is required in various stages of the water treatment process including for dilution, backwash, and in various cleaning processes. In 2020, the total volume of recycled water within the WTP was approximately 23,836 gpd (16.5 gpm) which is an increase from 1.8 gpm reported in 2019.

### 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 COSA, truck wash, fuel area, batch plant, boot wash, and truck shop.

CWB levels are continuously recorded and saved to a database maintained by WTP operators. This log is available on request. All rainfall and snow melt that occurred in 2020 was collected and managed within the capacity of the CWBs.



View from NW corner of CWB #1, December 2020

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, April, September, and November 2020. The annual parameter list was collected during each quarter in 2020 in order to compare results to downgradient water quality to confirm the liners are intact and functioning as designed. Similar to previous years, the CWB monitoring results fluctuate from quarter to quarter and are dependent on the areas being mined underground, TDRSA sump inputs, and the amount of dilution occurring due to precipitation rates. pH results ranged from 7.7 SU in Q4 (November) to 9.7 in Q3 (September). This shift is likely related to the material storage of development rock and limestone, used to amend the development rock on the TDRSA, during rain events and changes in water chemistry observed in Eagle East. Sodium and chloride decreased in 2020 from levels observed in 2019. The decrease is likely related to material management on the TDRSA, with much of the Eagle East and Eagle development rock removed from the TDRSA for backfill. Results from the TDRSA contact water sump also experienced similar decreases which correlates since the water from the TDRSA reports to the CWBs. 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 downgradient 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 and #3 are monitored on an annual basis. Monitoring wells QAL071A and QAL024A are located downgradient of NCWIB #1 and #4 and are monitored on a quarterly basis as part of the overall mine monitoring well network.

The analytical results from QAL070A and QAL073A were compared to the established benchmarks calculated for each. Similar to 2019, 2020 results indicated that no metals were detected and a small number of cations and/or anions including alkalinity bicarbonate, sodium, chloride, nitrate, sulfate, calcium, magnesium, and hardness were outside of calculated benchmarks at one or both locations. The majority of the results were consistent with those reported in 2019 at both locations with the exception of alkalinity bicarbonate, calcium, magnesium, potassium, and hardness at location QAL070A that appear to be trending up. Location QAL070A had elevated levels of chloride, nitrate, and sodium similar to 2019. This well is located adjacent to the site's main access road which is graded in a manner in which run-off from the roadway could potentially impact the location. It is expected that the elevated levels of sodium and chloride at location QAL070A are likely due to a sand/salt mixture that is applied to the roadway during winter conditions. Groundwater monitoring results from QAL071A and QAL073A are further discussed in Section 5.1 and all results are summarized in Appendix F of this report.

#### **4.3.5 Water Treatment Plant Operations and Discharge**

The WTP successfully treated and discharged over 49 MG of water in 2020. 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 (GWDP) GW1810162 with discharge volume and analytical results reported to the EGLE on a monthly basis through the online MiWaters reporting system. In October 2017, Eagle submitted an application to the Water Resources Division via MiWaters for approval to continue discharge under the current permit. This is a routine application that is required to be completed every five years. At this time, the permit is still under review by the Department.

**Table 4.3.5 – Volume of Water Discharged in 2020**

<b>Month</b>	<b>Volume of Water Discharged (gallons)</b>
January	3,203,944
February	4,000,605
March	3,777,568
April	6,174,760
May	5,576,930
June	3,946,699
July	4,235,595
August	4,074,209
September	3,374,107
October	4,301,499
November	4,132,253
December	2,906,902
<b>Total</b>	<b>49,705,071</b>

Source: Eagle Mine WTP Results – All Data

The water treatment process generates two waste streams; filter press and crystallizer. The filter press waste stream is dewatered solids from the clarification treatment process and is primarily comprised of calcium and magnesium, while the crystallizer waste is mainly sodium chloride. Samples of the waste streams were sent to the laboratory for waste characterization as required by the landfill. All results indicate that the wastes are non-hazardous. In 2020, 722 t of crystallizer waste and approximately 222 t of filter press wastes were disposed at a landfill.

In 2020, Eagle completed two construction project updates at the WTP to assist with improving operations. As required by GWDP requirements (Part II, 3), Eagle supplied notification of changes in facility operations to the local district water quality division. Those two updates included the addition of a 3<sup>rd</sup> crystallizer and a crystallizer chiller.

In late 2020, Eagle Mine received delivery of an additional crystallizer unit. This crystallizer operates parallel to two existing crystallizers. The primary purpose of this addition was to de-bottleneck the crystallized waste production portion of the operation. In addition, a chiller was installed in August 2020. This was installed due to an increase in dissolved solids that were projected in the Eagle East feasibility study to require treatment and disposal. The Eagle engineers began investigating optimizations that could improve the efficiency of the existing equipment while additional crystallization capacity was being designed, procured, and installed.

During the summer of 2019, the team conducted a pilot test of a chiller unit to prove that it would be beneficial if installed permanently. The purpose of a chiller is to have a consistent chilled water supply of 43°F to the crystallizer units which enables proper heat exchange to thicken the brine to a solid for disposal. This could be done effectively without the chiller (especially during the winter) when two crystallizers were operating, but with the addition of the unit, cycle times were notably reduced by two to three hours, and the chiller would be required to supply enough chilled water to operate when a third crystallizer would be installed. During the winter of 2019 – 2020, planning started for a permanent chiller and it was installed as part of the crystallizer project in the summer of 2020.



Crystallizer installation, August 2020

## **4.4 Materials Handling**

### **4.4.1 Chemical Handling, Storage, and Reporting**

Eagle Mine's goal is 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 2020, 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 February 2020 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. 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 January, May, August, and October 2020. The Eagle Mine Permit prescribes both a long parameter list for annual monitoring events (conducted in Q2 2020) and a short list to be used quarterly (Q1, Q3, Q4 2020). 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 2020 at these three locations and all results were found to be non-detect (i.e. below laboratory reporting limit). 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, where applicable, in the tables found in Appendix F.



Groundwater Monitoring Location QAL008A

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. In late 2015, results were reviewed and statistically analyzed. The consultant calculated an updated benchmark value for those results that were not trending. These updated benchmarks were used for comparison in 2020.

#### Monitoring Results

Twenty-three monitoring well samples were collected during each of the four quarterly sampling events. Samples collected from two additional monitoring wells were collected on an annual basis and summarized in Section 4.3.4. Samples were collected using low-flow sampling techniques, and field parameters (dissolved oxygen (DO), oxidation reduction potential (ORP), pH, specific conductivity, temperature, and turbidity) are collected and analyzed using a flow-through cell and YSI probe. All samples were shipped overnight to Pace Analytical 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. In certain wells, the measured value for bicarbonate alkalinity has increased over the previous several quarters to years. Bicarbonate levels in background A-zone wells are typically from 20-60 mg/L, but in some wells the bicarbonate concentrations are over 100 mg/L. These wells generally have trends that increase from the baseline followed by a period of current stabilization or new equilibrium. The most likely explanation for this is related to changes in recharge patterns compared to baseline. By concentrating recharge in specific areas (i.e. non-contact water basins, snow piles) in places

differently than how this existed prior to the mine facilities being built, the fundamental recharge distribution has changed. As such, there is increased recharge available in certain locations to drive this normal environmental phenomenon. There is also a potential for there to be a relationship between higher chloride concentrations and bicarbonate concentrations in that the bicarbonate formation could be enhanced by increased chloride in the water. 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 EGLE and determine the potential source or cause resulting in the deviation from the benchmark. The following is a summary of the events that occurred in 2020:

- Location QAL024A, near the vent raise, reported benchmark deviations for the following anions/cations during 2020: alkalinity bicarbonate, chloride, nitrate, and sodium. Elevated levels of sodium chloride were first reported at this location in 2013 and resulted from the use of a sand/salt mixture to minimize ice build-up and subsequent storage of stockpiled snow near the monitoring well location. Results for chloride and sodium have both decreased since 2013. Q4 2020 results for sodium and chloride were approximately 92% less than the peak concentrations reported in Q2 2013. Nitrate results were near baseline levels in Q1 – Q3 2020 but still remained above the benchmark for the year. Alkalinity results remained elevated from baseline but were consistent with results reported since 2016.
- Sodium levels were above the benchmark at QAL044B, located above the Eagle ore body, for all four sampling quarters in 2020. The sodium results trended up slightly from 2019 to 2020 but are only just above the calculated benchmark for the location and remain well below the peak concentrations reported in 2013.
- Nitrates were detected above benchmarks during all four sampling quarters in 2020 at monitoring wells QAL060A and QAL061A located downgradient of the TDRSA and CWBs. Fluctuating nitrate results may be a function of the historic use of salt at the mine site, as described in other monitoring locations on site. Road salts have the potential to affect general nutrient cycling (such as for nitrogen/ammonia) and cation exchange reactions within the affected soil profiles. Changes in these parameters, in groundwater measurements, are characteristic of the sand/salt applications, causing ion exchange processes to occur in shallow groundwater. In addition, alkalinity bicarbonate, calcium, and magnesium were greater than benchmarks at QAL061A. Results for calcium, magnesium, and nitrates have all trended up in 2020 but remain only slightly greater than established benchmarks. Results from QAL060A and QAL061A were compared to the TDRSA contact water sump and CWB results to determine if they were a potential source of the elevated values. Elevated levels of chloride, sulfate, and metals were reported in the sump and CWB and were non-detect in the monitoring wells indicating that the elevated results are likely not related to the immediately upgradient facilities.
- QAL062A, located on the eastern berm of the TDRSA, had results for pH, alkalinity bicarbonate, chloride, nitrate, and sodium that were outside calculated benchmarks for each sampling event in 2020. Calcium, magnesium, potassium, and hardness were also above benchmark levels for three consecutive Q2 sampling events (2018 – 2020). Although the monitoring well is located next to the TDRSA it is unlikely the source of the elevated results because the results from the TDRSA and monitoring well do not correlate. For example,

metals are present in the contact water of the TDRSA but are not above benchmark in QAL062A. The constituents present, above benchmark levels, are most likely the result of the chloride plume that, as predicted, is slowly moving across the site. This plume is the result of historical salt use on the contact area. A review of the trend data indicates that concentrations peaked for each of these parameters in late 2019 and results trended down in 2020 which would correlate with this slow mitigation of the chloride plume.

The pH results at QAL062A continued to be below the calculated benchmark range by at least 0.5 SU for more than two consecutive sampling quarters therefore meeting the action level for pH. The pH results have consistently been between 7.5 – 7.8 SU for the past eight sampling quarters indicating a period of stabilization and equilibrium. Results for pH at surrounding locations downgradient of QAL062A (i.e. QAL060A and QAL061A) are within benchmark values. Upgradient location QAL067A was just over the calculated benchmark the last two quarters of 2020. There is not an indication of a site wide trend of decreasing pH values at this time.

- Alkalinity bicarbonate, chloride, sodium, and nitrate were above benchmark levels at QAL063A, located east of the CWBs near the WTP, and pH levels were below the benchmark for all sampling events in 2020. Calcium and magnesium were also above benchmark levels for two consecutive Q2 sampling events (2019 – 2020). The constituents including pH, reported outside of established benchmark are consistent to those reported in QAL062A which is located upgradient of this monitoring location indicating that the elevated results are likely attributed to the chloride plume that is moving across the site from historical salt use to melt ice on the contact area. As stated above, the concentrations of constituents at QAL062A decreased in 2020 and concentrations at QAL063A increased slightly which again correlates to the slow migration of the chloride plume across site. pH results were below the benchmark range by at least 0.5 SU for more than two consecutive sampling quarters meeting the action level for pH. No correlation was found between QAL063A and the CWBs exists as metal levels for nickel, copper, and iron are present in the CWB water that are not detected at QAL063A.
- QAL066D had results for iron, sodium, and alkalinity bicarbonate that were above benchmark levels for all sampling events in 2020. The elevated iron is likely the result of iron oxides or iron hydroxides in the soils (clay) within the formation in which this well is located. Arsenic was above the benchmark at QAL066D for two consecutive quarters, with arsenic fluctuation typical at this location from baseline through operational periods. Aluminum results were also greater than benchmarks for two consecutive Q2 sampling events (2018 – 2020) and are also likely the result of the aluminosilicates found in the clay formation. Sodium results trended upwards in 2020 and were consistent with results reported in 2016. Sodium concentrations at QAL066D will continue to be monitored.
- Location QAL067A, located on the southeast corner of the TDRSA, reported benchmark deviations for chloride, sodium, alkalinity bicarbonate, sulfate, and nitrate for all 2020 sampling events. Calcium, magnesium, potassium, and hardness were also above established benchmarks for at least two consecutive Q2 annual sampling events. In 2020, sodium and chloride results trended down while alkalinity bicarbonate, nitrate and sulfate trended up through 2020. Although the overall concentration of chloride and sodium were slightly higher in 2020 compared to 2019, the results were trending down in Q3 and Q4 2020. In addition, the results are currently only a fraction of the peak detections reported in

2015. The elevated results at this location continue to be suspected to be associated with the historic use of salt on the contact area as no additional changes have occurred in the area. Jersey barriers were placed at this location in December 2020 to assist with preventing snow from being pushed into the vicinity of well QAL067A. The purpose of the barriers is to observe whether or not adjusting snow management in this area will have any effect on the sodium or chloride levels at this well. By comparing future Q1 2021 monitoring results to Q4 2020 at QAL067A, the goal is to see levels of chloride and sodium decreasing due to this change. In addition, as the chloride plume moves across site, the results will likely continue to trend back towards baseline levels similar to what was observed in 2019 as well.



Barriers installed near QAL067A; December 2020

- QAL071A which is located near the northwest corner of the septic drain field, reported detections of anions/cations that were outside of calculated benchmarks in each of the four sampling events. The annual 2019 and 2020 Q2 results for calcium, hardness and magnesium have been above benchmarks since 2013 and have trended upwards since 2019. Results for sulfate were above the benchmark in Q2 – Q4 2020. In addition, results for pH remained consistent from 2019 through 2020 and chloride, nitrate, and sodium trended down overall from 2019 to 2020. Copper results were above the Q2 and Q3 benchmark but decreased in Q4 2020. As noted in previous annual reports, it is still suspected that the elevated values are the result of the well's location near the septic drain field. In Q3 2014, the action level for nitrate was met at QAL071A requiring Eagle Mine to conduct supplementary sampling at location QAL074A located downgradient of the septic system and investigate the source of the elevated results. Results continue to meet the action level for nitrate and as such the investigation continued in 2020. Results from the investigation are summarized below.
  - A review of upgradient wells, TDRSA, and CWB analytical data indicated that there is no correlation between those results and elevated levels of nitrates detected at QAL071A. In addition, activities that were identified as occurring near NCWIB #1 (i.e. snow storage) 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 #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.
- A review of monitoring results from locations downgradient of QAL071A and QAL074A, near the TWIS, do not show any signs of elevated nitrate levels. At this time, there is no threat of elevated nitrate levels migrating offsite from monitoring location QAL071A.

Based on the review of data collected in 2020, the septic tank effluent still cannot be excluded as a source of the elevated nitrate levels reported at QAL071A.

- QAL074A is located directly downgradient of the septic system and has been sampled quarterly since 2014 when the action level for nitrate was met at QAL071A. Similar to QAL071A, results for pH, alkalinity bicarbonate, chloride, nitrate, and sodium were greater than benchmarks for at least two consecutive sampling events. Although the concentrations differ between locations, the septic can also not be excluded as the source of the elevated values reported at this monitoring location.

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 fourteen compliance locations and ten background monitoring locations using data collected from baseline sampling events (2011) through October 2020. Sodium, alkalinity bicarbonate, alkalinity carbonate, arsenic, barium, calcium, pH, potassium, specific conductance, strontium, vanadium, copper, iron, mercury, sulfate, nitrate, magnesium, and chloride were the most frequently noted as possibly trending. Changes in these parameters are indicative of the overall change in site storm water infiltration changes and ion exchange processes occurring from the use of de-icing products early in mine life.

A trend analysis will continue to be conducted in 2021 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. 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, QAL061A, QAL064D, QAL068A, 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 nine samples collected during Q2, 2012 – 2020 were plotted. The water type was originally classified as calcium bicarbonate in 2012, then drifted into the sodium chloride classification in 2013. From 2014 through 2020 the water chemistry was classified as mixed-cation chloride but has started to migrate back towards the classification of calcium bicarbonate. The change in chemistry from 2013 to present may have been associated with the previous construction of the vent raise as well as salt use and snow storage practices near monitoring well QAL024A. Future quarterly sampling will increase understanding of the water chemistry at this location.
- QAL029A & QAL029D – Water chemistry data from these locations were originally classified as calcium bicarbonate from 2008 to 2012 but have migrated towards sodium chloride in the recent years. However, at QAL029D specifically as of 2019 and continuing through 2020, trends look to be moving back towards calcium bicarbonate.
- QAL062A & QAL063A – Water chemistry data from these locations were originally classified as calcium bicarbonate in 2011 and continue to be in 2020, but there has been a slight shift towards sodium chloride chemistry within the last three years. This shift is indicative of historic road salt use that occurred on the contact area and corresponding chloride plume that is slowly moving across site.
- QAL066D – Water chemistry data from ten samples collected from 2011 – 2020 were plotted. Samples prior to 2016 were classified as calcium bicarbonate and then shifted towards sodium bicarbonate in 2016 – 2017, back to calcium bicarbonate in 2018, and back towards sodium bicarbonate since 2019 into 2020. Results at this location have fluctuated and are believed to be attributed to fine grained sediment that is present in the well resulting from improper grouting during installation. This well requires aggressive purging on a routine basis to remove the accumulating sediment in order to achieve an accurate assessment of water quality.
- QAL067A – Water chemistry data from ten samples collected during 2011 – 2020 were plotted. All samples prior to May 2014 were classified as having a water type of calcium bicarbonate. In 2014, the water chemistry began to change and was classified as mixed-cation chloride and then continued to shift to the classification of sodium chloride waters from 2015 – 2020. 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.
- QAL069A – Water chemistry from this location was classified as calcium bicarbonate until 2018 when it shifted towards mixed-cation chloride classification. Water chemistry then shifted back towards the historical classification of calcium bicarbonate in 2019 and remained there in 2020. This well is located near the security building and site access road where salt is used as a deicer.
- QAL070A – Water chemistry from ten samples collected during 2011 – 2020 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 through 2020, a shift in water chemistry occurred in which the water was classified as calcium sulfate waters, nearing the sodium chloride classification. This monitoring location is also found near the site access road where salt is used a deicer and drainage from the roadway is routed in close proximity to this well.

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 2020 at 11 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/run-off, summer base flow, and the fall rain season. Samples were collected in February, May, August, and October 2020. 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 in Appendix J. In 2015, all surface water benchmarks were reviewed and updated using results that were not determined to be trending based on statistical analysis. These updated benchmarks were used for comparison in 2020.



Surface Water Monitoring Location CDRM004, August 2020

#### Monitoring Results

Grab samples were collected from each location during the quarterly sampling events completed in February, May, August, and October 2020. The Eagle Mine Permit prescribes a long parameter list for annual monitoring events (completed in Q2 2020) and a short list to be used quarterly (Q1, Q3, and Q4 2020). In addition to the grab samples, field measurements (DO, pH, specific conductivity, and temperature) were collected and determined through the use of a YSI probe. The stream stage and flow measurements were obtained using a wading rod and current meter. All water quality samples were shipped overnight to Pace Analytical, in Grand Rapids, Michigan, for analysis. Following is a summary of the 2020 events that occurred.

- At compliance monitoring location STRM005, the results for iron were above the benchmark for two consecutive Q4 sampling events. This location is the most northern surface water monitoring point and is well outside of the direct influence of the mine site. pH was also above benchmark for two consecutive 2019 and 2020 Q3 sampling events. pH results in Q1, Q2, and Q4 2020 were well within benchmarks indicating the change may have been the result of seasonal variation.

- Compliance location STRE001 reported results for iron above the established benchmark for three consecutive Q3 sampling events. Results for iron for the remaining sampling quarters were within established benchmarks as were iron results at nearby upstream monitoring locations STRE009 and STRE010 indicating the results at STRE001 are likely due to seasonal variation and unrelated to mining activities.

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 nine of the eleven monitoring locations using data collected from baseline sampling events (2011) through October 2020. Iron and pH were the most frequently noted as possibly trending. The largest number of the trends identified occurred in Q3. 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 2021 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. 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. Water level meters were connected to a telemetry network in 2020 which allows for real-time data review and analysis rather than monthly downloads as was previously the practice. A map of these locations can be found in Appendix L.

Continuous groundwater monitoring locations are reported by water year (October 1 – September 30). Calculated background water levels and monthly water level results are based on mean daily values and summarized in Appendix N. The following is a summary of the findings:

- QAL023B – The mean water level readings from October 2019 – September 2020 were a maximum of 1.7 feet (ft) below the calculated minimum background baseline level. The lowest reading was recorded in March 2020.
- QAL024A – The mean water level readings were greater than the maximum background baseline levels from October – November 2019, and May – September 2020. The highest reading was recorded in June and was 0.7 ft above the max baseline level. The observed increases may be the result of spring melt and seasonal precipitation events.
- QAL044B – The mean water level readings from February 2020 – May 2020 were a maximum of 0.4 ft below the minimum baseline level calculated for this location. The lowest reading was recorded in March 2020.

- QAL064D – The mean water level readings were all within baseline levels in 2020.
- QAL065D – The mean water level readings from October 2019 – April 2020 and June – September 2020 were a maximum of 0.5 ft below the minimum baseline level calculated for this location. The lowest water level was recorded in February and March 2020.
- QAL066D – The mean water level readings from October 2019 – September 2020 were a maximum of 1.1 ft below the minimum baseline level calculated for this location. The lowest reading was reported in March 2020.

Similar to 2019, the changes in groundwater levels observed in 2020 are most likely attributed to two main sources; pumping of the mine services well and groundwater infiltration into the mine. In addition, some of the short-lived fluctuations in groundwater levels may be attributed to blasting events. In a confined aquifer, the impacts of blasting may be observed due to increased pressure or changes in pressure. These changes are short-lived and water levels return to pre-blast levels shortly after the blasting cycle is complete. In addition, seasonal precipitation and frozen conditions can also impact water levels. During winter months, water levels may decrease as little recharge from precipitation and infiltration occurs. During spring melt or heavy rain, water levels may increase as recharge occurs within the proximity of the monitoring location, this is especially true for shallower A zone wells.

#### Mine Services Well

As stated in section 4.3.1 above, the mine services well (QAL011D) is used to supply water for underground operations, dust suppression, fire water, etc. A study completed in May 2016 found that when the mine services well is operating, monitoring location QAL004D shows drawdown of the water level which slowly rebounds when the well is not in use. Based on a review of hydrographs from area monitoring locations, it appears that there is some degree of influence from the use of the mine service well on water levels in the confined aquifer (B and D zones) that extends to the area above the orebody. The change in water levels is not reflected in either the A zone water table aquifer hydrographs or the wetland hydrographs. In addition, wetlands lying above the deeper aquifer and orebody do not currently show any hydrological response to the mine service well or potable water supply well pumping.



Piezometer with a level trol located at QAL008A

## Groundwater Infiltration

In 2020, multiple stopes were mined between the 352 and 381 levels, and one additional sill was developed. No discrete inflows of greater than 5 gpm were identified during mining. The wireless radio telemetry network continued to provide continuous, real-time monitoring of water levels from bedrock piezometers, quaternary wells, and wetland piezometers. Monitoring data is reviewed regularly for potential impacts from mining on water levels. In a discrete inflow event, this data could also be used to identify any response in water levels and aid in the selection and initiation of appropriate response actions. In the event of a discrete inflow greater than 5 gpm, additional information would be collected by the mining crews including the elevation at which water is intercepted, flow rates, and collection of water quality samples.

Water levels at the wetland locations did not fall more than six inches (in) below pre-mining baseline levels in accordance with permit condition L4c. The following deviations were reported from baseline levels.

- WLD022-4.5 reported a water level one tenth of a foot below baseline minimum in February – March 2020.
- WLD025-9.5 mean water level was one tenth of a foot below minimum baseline in November 2019 and January, June, July, and August 2020. The furthest deviation was two tenths of a foot below baseline minimum in February and March 2020. One tenth of a foot below minimum baseline was again recorded in June – August 2020.
- WLD028-4.5 mean water level was 0.1 ft above the background maximum level in April 2020.

Water levels returned to baseline ranges following the deviations. Precipitation is one of the main contributors to the wetland which helps to explain why water levels were within baseline levels during snow melt and following heavy precipitation events and below baseline levels during winter conditions before recharge to the wetland in spring, or in drier summer months. 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 120 locations. Several wetland locations were unable to be monitored due to frozen or unsafe conditions throughout the quarters.

A map of the hydrologic monitoring locations can be found in Appendix L and a map of the A and D zone groundwater 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 ground contours were reported for calendar year 2020.
- Regionally, the overall water levels have been increasing since the fall of 2013 with many monitoring locations near record high levels in 2020. The exception, as described above, remains in the D zone water levels in monitoring wells located above the ore body and near the mine services well (QAL011D) extraction area.

- QAL004D is located within the direct influence of the mine services well and water levels fluctuate based on the use of the well.
- Changes in water level in the monitoring wells located within the vicinity of the orebody are most likely attributed to water withdrawal from the mine services well and/or infiltration of water encountered during mine development activities.
- 2020 water levels at monitoring locations above the orebody (i.e. QAL023B, QAL044B, QAL064D, QAL065D, and QAL066D) remained fairly consistent with 2019 levels.
- Wetland water levels above the orebody (e.g. reflected in wetland wells WLD025-4.5, WLD027-4.5 and WLD028-4.5) did not fall more than 6 in below pre-mining baseline levels in accordance with permit condition L4c. In several instances the water levels were at or near seasonal highs for one or more reporting months.

There were several new maximum water levels reported in one or more sampling quarters in 2020.

Water levels were in a sustained wet period for the past several years. There are increased groundwater levels in the region, with groundwater wells that are not directly influenced by Eagle are seeing increases as well. Water levels can be cyclical depending on precipitation and regional climate conditions. A summary of discrete water elevation results from Q1 – Q4 2020 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 water year were averaged over each month of operation from October 1, 2019 through September 30, 2020 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. The following is a summary of the findings:

- Due to ice build-up, continuous flow readings were not collected from location STRE002 from December 2019 – May 2020; STRM004 from December 2019 – February 2020; STRM005 from November 2019 – February 2020 and YDRM002 from December 2019 – February 2020.
- Specific conductance measurements were not reported in January – July 2020 at location STRE002 and STRM005 from December 2019 – February 2020. This is due to missing values or data that failed to meet quality control requirements.
- Overall results were consistent with previous years. As expected, changes in temperature correlate with changes in specific conductivity because temperature affects conductivity by increasing ionic mobility as well as the solubility of many salts and minerals. In addition, higher flow rates, as observed during spring melt, result in lower specific conductivity due to dilution.

- Location YDRM002 mean specific conductivity was slightly below the background minimum levels by 6.3 and 0.5 (uS/cm) in January and February 2020. Results were back to normal in the months following at this location.

Hydrographs for each location are found in Appendix R.

### 5.3 Biological Monitoring

Biological monitoring events conducted in 2020 included flora and fauna surveys, wetland monitoring, fish and macro invertebrate surveys, and a Narrow-Leaved Gentian (NLG) 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 2020 flora, fauna, and wetland vegetation surveys were conducted by Barr Engineering (formerly King & MacGregor Environmental, Inc. (KME)). Table 5.3.1 below summarizes the type and duration of the surveys that were completed in 2020. A map of the survey locations is available in Appendix S.

**Table 5.3.1 – Type and Duration of 2020 Flora, Fauna, and Wetland Surveying Events**

Survey Type	Survey Date
Bird	June 17-18; September 17-19
Small Mammals	September 24-26
Large Mammals	May 1 and May 28; June 16-18; July 9; August 11-12; September 17-19 and 24-26
Toads/Frogs	May 1, May 28, and July 9
Wetland Vegetative Monitoring	June 16-17
Upland Vegetative Monitoring	June 16-17; August 11-12
Narrow-Leaved Gentian	August 12, 2020

The wildlife and plant species identified during the 2020 surveys within the Study Area are similar to those identified during previous KME surveys. Following is a summary of the survey results:

- A combined total of 814 birds representing 56 species, none of which are threatened or endangered, were observed during the bird surveys conducted in June and September 2020. The number of birds increased from the 2019 survey when 801 birds were observed. Consistent with previous studies, the Nashville warbler was the most abundant bird observed during the June survey and the blue jay was the most abundant recorded during the September surveys. Overall, the bird species identified during the 2020 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.
- Forty-three small mammals representing six species were collected during the September survey period. The most common small mammal identified in the 2020 survey was the deer mouse, when previously, red squirrels and chipmunk species were most observed in 2019. No threatened, endangered, or special concern small mammals were observed during any of the surveys. Red squirrels appeared to be relatively common throughout the Study Area, but usually appear to be highly adept at trap avoidance. The small mammals encountered



within the Study Area during the 2020 surveys are typical of those expected in the habitats present and are generally consistent with previous survey results. Other regionally common species possibly present or previously observed within the Study Area but not noted during the 2020 surveys include beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), fisher (*Martes pennanti*), raccoon (*Procyon lotor*), and river otter (*Lutra canadensis*). Small mammals appear to be distributed throughout wooded and open areas, in both upland and wetland habitats.

- Evidence of white-tailed deer (*Odocoileus virginianus*), American black bear (*Ursus americanus*) and moose (*Alces alces*) were observed during the 2020 surveys. Similar to previous years, fresh scat and tracks of coyote (*Canis latrans*) were observed occasionally throughout the Study Area.
- Three frog species (Gray Treefrog, Green Frog and Northern Spring Peeper) 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 Northern Spring Peeper exhibited the highest Call Index Values. The frog species identified are typical of those expected in the habitats present in the Study Area and results are consistent with observations made during previous surveys. Operations noise from the vent raise area fan was again noted at all three surveys. At Survey Points 2 and 3, the fan sounds may be enough to diminish the ability for observers to hear and/or distinguish calls.
- 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 2020 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 NLG observed within the Study Area remains 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.



Upland Vegetation Survey, Plot 25W, South View



Wetland Vegetation Survey, Plot 9W, Quadrat View

### 5.3.2 Threatened and Endangered Species

The Michigan Natural Features Inventory (MNFI) maintains a database of rare plants and animals in Michigan. Barr 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), Barr surveyed for any MNFI listed species and their habitats during the appropriate season.

Similar to previous years, Kirtland’s warbler was not detected at any time during any of the 2020 ecological surveys. Spruce grouse is a state special concern species; this species was again occasionally observed during the 2020 ecological surveys near the Salmon-Trout River. Scat and tracks of moose (state special concern) was observed, and no observations of the yellow-banded bumble bee or gray wolf were recorded.

### **5.3.3 Narrow-Leaved Gentian (NLG)**

The methods used to conduct the 2020 NLG field investigation were consistent with the previous NLG studies. Photographic and Global Positioning System documentation were collected on August 12, 2020. In addition, the local climate changes and overall health of the NLG colonies were assessed relative to previous years.

According to the National Oceanic and Atmospheric Administration data, mean precipitation totals were between 4 and 6 in above normal for the area during the 2020 water year. Flow in the Salmon-Trout River and Yellow Dog River appeared low in August during the study period. The NLG colonies continued to appear healthy in 2020. As in previous years, flowering NLG were found in abundance (hundreds of individual plants) both along the Salmon-Trout River and in the area north of the Yellow Dog River.



Large Colony of NLG North of Yellow Dog River, August 2020

### **5.3.4 Fisheries and Macro Invertebrate Report**

The 2020 fisheries and macro-invertebrate annual surveys were conducted by Advanced Ecological Management (AEM). A total of ten stations were surveyed during the summer of 2020, 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 map of the aquatic sampling locations is available in Appendix T.

A total of 429 fish were collected from all stations in 2020, with 77% of the total being captured at Station 6 located on the main branch of the Salmon-Trout River. In total, there were 247 fewer fish collected in 2019 than 2020. A total of nine species of fish were observed during the 2020 aquatic survey, which was two more species than were observed in the 2019 aquatic survey. Northern

redbelly dace (*Chrosomus eos*), brook sticklebacks (*Culaea inconstans*), and brook trout (*Salvelinus fontinalis*), were the most frequently collected species. No MNFI listed threatened or endangered fish species were identified in the stations investigated in 2020. A total of 329 fish were collected from Station 6 in 2020, which was 193 more than collected in 2019. The total number of fish collected from Station 6 has fluctuated annually because of nearby beaver dams, which influence water levels within the station.

Using the State of Michigan P-51 survey protocol, a total of 3,281 macroinvertebrates were collected from all ten stations that were investigated in 2020, which was 961 more specimens than the total number collected in 2019. 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 macro-invertebrate communities within the Salmon-Trout River have been scored by AEM as excellent or acceptable communities.

The aquatic and stream habitat at stations sampled during 2020 were rated as “Good” or “Excellent” habitat quality. Station 9 habitat changed from an “Excellent” rating in previous years to a “Good” rating for the first time since 2014. The change in the habitat rating of Station 9 was due to sand moving into the station from upstream and filling the pools. The 2020 P-51 habitat ratings for all other stations have remained consistent with previous surveys. A copy of the full report is available upon request.



Aquatic Monitoring Location Station 6, June 2020

### 5.3.5 Fish Tissue Survey

On September 23, 2020, as required, AEM notified the MDNR Fisheries Division in Baraga of the intention to complete the annual aquatic survey and fish tissue survey that occurs every three years. The MDNR Fisheries Manager responded to the request indicating that the agency approved the survey proposal but was not comfortable supporting the fish removal recommendations required for the fish tissue study. This was based on concerns about the limited brook trout population in the Salmon-Trout River.

On October 13, 2020, Eagle and AEM had a phone conference with MDNR Fisheries Division, EGLE Department of Oil, Gas, and Minerals, and EGLE Water Resources Division representatives to discuss the concerns regarding the fish tissue survey, permit requirements, and to determine a path forward. The decision was made to not conduct the fish tissue survey in 2020 due to concerns around the brook trout population and to review alternative options for future sampling of the aquatic biota for metals within the network of streams that are monitored for the Eagle project.

Previous fish tissue survey results have not indicated increasing metals concentrations and surface water quality is closely monitored at all aquatic survey locations and can be used as an indicator of changing conditions that could impact the health of the aquatic environment. To date, the surface water quality has not deviated from baseline conditions.

## **5.4 Miscellaneous Monitoring**

### **5.4.1 Soil Erosion Control Measures (SESC)**

There were no SESC measures in place on site in 2020. If areas are identified that need SESC measures in the future, the measures will be installed and maintained in compliance with the requirements of Part 91 (NREPA, 1994 PA 451, as amended).

### **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 2020 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. There was some vegetation noted and subsequently removed on the western berm of the TDRSA berm near the liner. Follow-up inspection (and repairs if needed) will be completed in the spring of 2021.

### **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 2020 include the WTP, truck wash, truck shop floors, sumps, trench drains, the 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 2020. Inspections of the contact area and travel ways were completed during the months of May 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.

The following observations were made as a result of the contact area inspections completed in 2020. As expected, some wear was identified in high traffic areas where repairs were made in 2019 (i.e. truck wash exit, fuel station area, entrance of the TDRSA and entrance to the Portal). Those locations will continue to be assessed and plans for repair or replacement made in 2021 if necessary. No crack sealing was completed in 2020 but repairs are planned for 2021.

#### **5.4.4 Geochemistry Program**

Previously, the geochemistry program was comprised of two parts; the water quality of the underground as it is representative of ore, and sampling of development rock from the Eagle East decline.

Four underground water quality samples were collected in February, April, September, and November 2020 from Jump Tank 1 located in the main decline underground. Water from the lower levels of the mine are pumped to Jump Tank 1 which then pumps the water to the CWBs. Samples were analyzed for the annual parameter list in Q2 with analysis of the quarterly parameters list in Q1, Q3 and Q4. Results to date have been within predicted levels and can be treated and removed by the WTP. A summary table and graph of the results and are available in Appendix D.

The development rock sampling program began in September 2016 and concluded in November 2019, with the final sample results being received from the laboratory in early 2020. The development rock results were consistent in siltstone, hornfels and sulfides across the duration of the sampling program.

#### **5.4.5 NCWIB & CWB Sediment Accumulation Measurements**

Sediment accumulation is monitored and measured at both the non-contact and 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 2020. No visible changes were observed. The sand that is currently present in the basins 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. If the vegetation persists it may require removal if it begins to impact infiltration rates. Visible sediment accumulations were observed at NCWIB #2, located near the cold storage warehouse. Sand continues to accumulate in the northwest corner of NCWIB #2 due to snow that is stored there in the winter and when the snow melts the sand is left behind.

##### *Contact Water Basins*

Two sediment thickness measurements were completed in CWB #1 and #2 utilizing a boat and Sludge Judge to measure the accumulation. The first inspection was conducted in May 2020, and the second sediment thickness measurements were completed in October 2020.

The sediment accumulation in CWB #1 was over 50 inches in some locations near the south end of the water basin where the underground water is pumped into the basins, but on average, was approximately 20 in. The south side of the basin will continue to be monitored for sediment accumulation from the underground sump system.

The average sediment accumulation in CWB #2 was approximately 8 in, with some locations measuring over one foot. The highest sediment accumulations, ranging from 12 in to 18 in, were in the north end of the basin near the CWB #2 pump house. The WTP outfall is located in the northwest corner of CWB #2 and is likely the cause of sediment accumulation. 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 north end of CWB #2 will continue to be monitored for sediment accumulation.



Sediment thickness test being performed on the basins, May 2020

A geo-membrane leak detection survey and dredging of the CWBs was planned for 2020 but was not completed due to COVID-19 visitor restrictions. Dredging is tentatively planned for 2021 with a leak location survey for CWB #1 and #2 following the dredging.

## **6. Reclamation Activities**

No reclamation activities occurred in 2020 and there are currently no plans to conduct any reclamation activities in 2021. The Department will be notified, in advance, if any activities do commence in 2021.

Closure planning continued in 2020 and included detailed planning and commencement or continuation of technical studies needed to support closure planning for the facility (ex: civil engineering design for re-grading of the site, further discussion of re-vegetation concepts with several parties, and scoping studies to enhance the level of detail of underground mine closure designs). This process was initiated in 2017 due of the Lundin corporate requirement to have a written closure plan in place five years in advance of anticipated closure. The closure plan will remain flexible to support change or growth within the business.

## **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. Unlike previous years where a mock test was scheduled, in March 2020, the pandemic required Eagle to activate their contingency plan, specifically the Crisis Management Team (CMT), to manage the situation and oversee necessary planning and implementation of controls. At the onset of the pandemic, the Eagle CMT met on a daily basis and established three strategic objectives; employee health and safety, site safety, and business continuity. These objectives were the basis of the actions and decisions that were taken by the CMT. The Eagle CMT continued to meet at least weekly throughout 2020 with a continued focus on risk mitigation.

In accordance with Mine Safety Health Administration (MSHA) regulations, 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 maintained an average of 17 team members (two teams) over the course of 2020. Teams are comprised of volunteers from Cementation and Eagle. In 2020, training included exploration in smoke (theatrical), basic first aid, CPR, firefighting, and operation and maintenance of both the BG4 closed-circuit breathing apparatus (CCBA), and MX6 gas instruments. In addition, the team assessed ventilation with the use of anemometers and smoke tubes.

In addition to the Mine Rescue team, 15 Cementation employees are certified in Basic First and CPR. 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.

As stated above, a mock training or table-top exercise is generally completed on an annual basis to test the Eagle CMT to ensure they know how to respond in the event of an emergency or crisis. Since the CMT was activated throughout 2020, an exercise was not conducted, instead in May 2020, a third-party consultant developed a virtual training session for the team. The session focused on sharing successes and learnings to date from Eagle's CMT response to the pandemic and exploring ways of mitigating risks that may arise in the next phases of the crisis. Once the session was complete, the consultant and crisis management team held a debrief session to capture feedback from each participant. The overall feedback and recommendations for improvement were compiled into a summary report and shared with the team.

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

## **8. Financial Assurance Update**

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

## **9. Organizational Information**

An updated organization report can be found in Appendix W.

## **Appendix A**

### **Eagle Mine**

#### **Site Map**



# Eagle Mine LLC Mine Monitoring Map



## Legend

- |   |  |                            |                                       |
|---|--|----------------------------|---------------------------------------|
| • 1 - Main Ventilation Air Raise              | • 9 - Aggregate Storage and Batch Plant      | • 17 - Powerhouse          | ● Ground Water Discharge Permit Wells |
| • 2 - Air Intake / Alimak Emergency Egress    | • 10 - Truck Wash                            | • 18 - Guardhouse          | ● Part 632 Mining Permit Wells        |
| • 3 - Non-Contact Water Basin #4              | • 11 - Truck Shop                            | • 19 - Ambulance Garage    | ▨ Mine Septic Field                   |
| • 4 - Treated Water Infiltration System       | • 12 - Administration Building and Mine Drys | • 20 - Explosives Magazine | ▨ Contact Area                        |
| • 5 - Water Treatment Plant                   | • 13 - Non-Contact Water Basin #1            | • 21 - Fuel Storage Area   |                                       |
| • 6 - Contact Water Basins                    | • 14 - Non-Contact Water Basin #2            | • 22 - Portal              |                                       |
| • 7 - Temporary Development Rock Storage Area | • 15 - Non-Contact Water Basin #3            | • 23 - Compressor Building |                                       |
| • 8 - Coarse Ore Storage Area                 | • 16 - Warehouse                             |                            |                                       |

Date: 4/17/2015



## **Appendix B**

### **Eagle Mine**

### **Rock Stability Certification**

Thursday, March 11, 2021

Ms. Melanie Humphrey  
Michigan Department of Environment, Great Lakes, and Energy  
1504 W. Washington Street  
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. Rock mass and hydrologic conditions encountered during mining in 2020 are consistent with inputs used in the coupled geologic/hydrologic stress model, which indicates that the modelling is still representative of site conditions. In addition, daily visual inspections are conducted by Eagle Mine representatives and/or contractor mining personnel to verify ground stability.

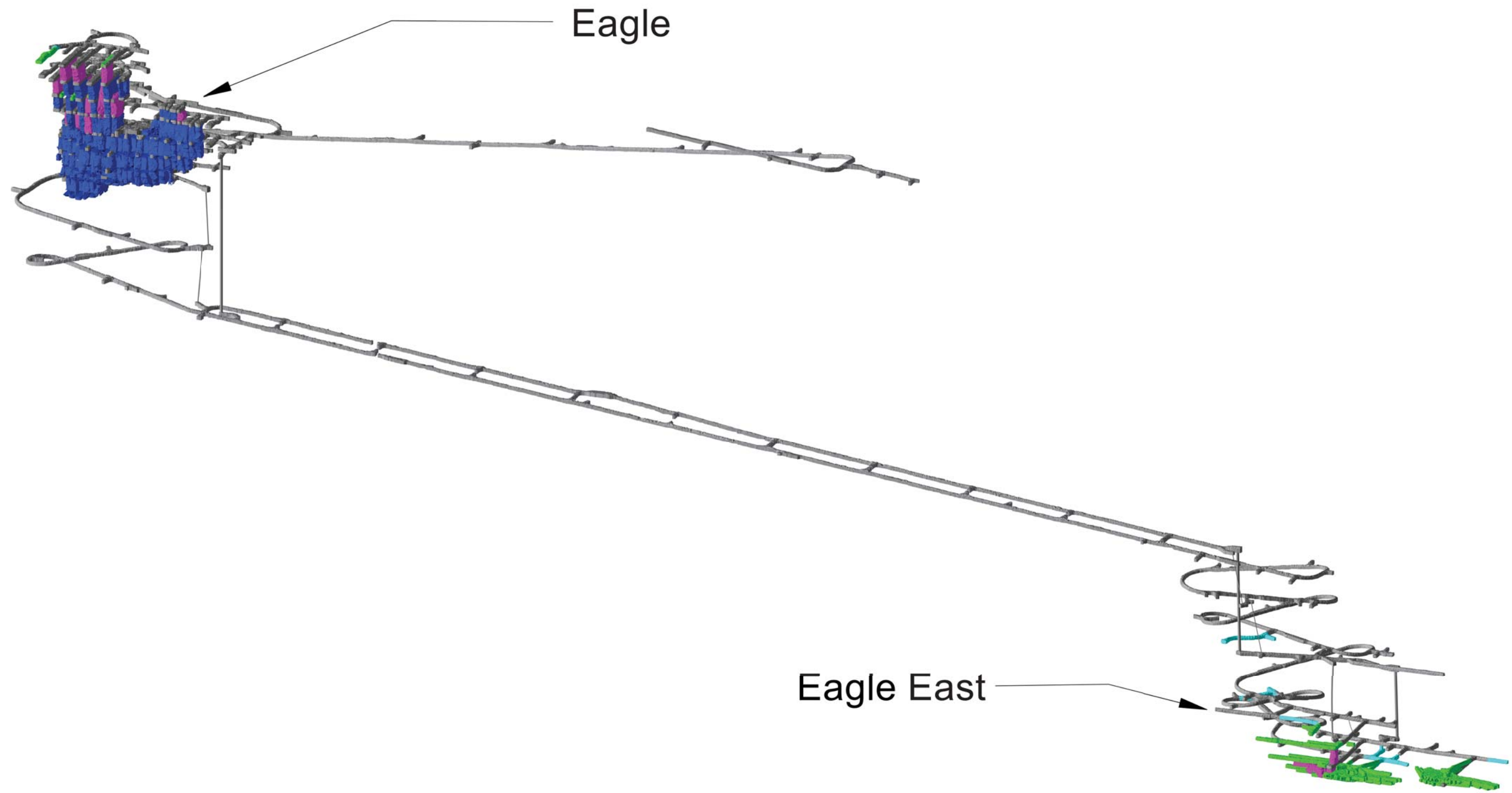
Sincerely,



Jeff Murray  
Operations Manager  
Eagle Mine, LLC.

## **Appendix C**

### **Eagle Mine Maps of Eagle East Development and Eagle Production Mining Progress**



Eagle

Eagle East

	2020 STOPES
	2020 PRODUCTION SILLS
	2020 DEVELOPMENT
	PRE 2020 STOPES
	PRE 2020 DEVELOPMENT



Drawing Title:

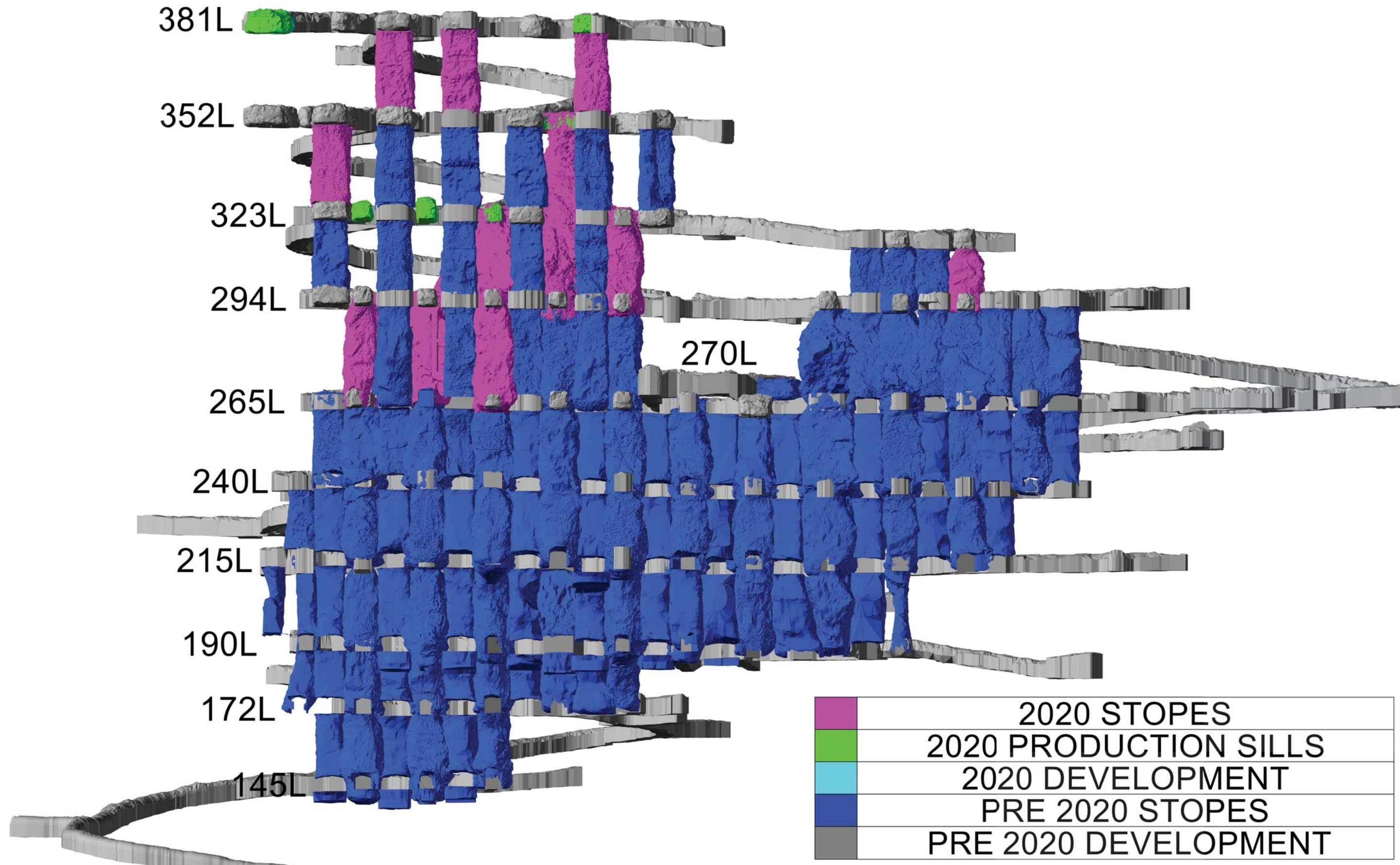
**2020 MINING**

Author: Cody.Gobbs

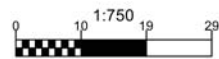
Date: 1/19/2021

Scale: 1:4250

**Eagle Mine**



	2020 STOPES
	2020 PRODUCTION SILLS
	2020 DEVELOPMENT
	PRE 2020 STOPES
	PRE 2020 DEVELOPMENT



Drawing Title:

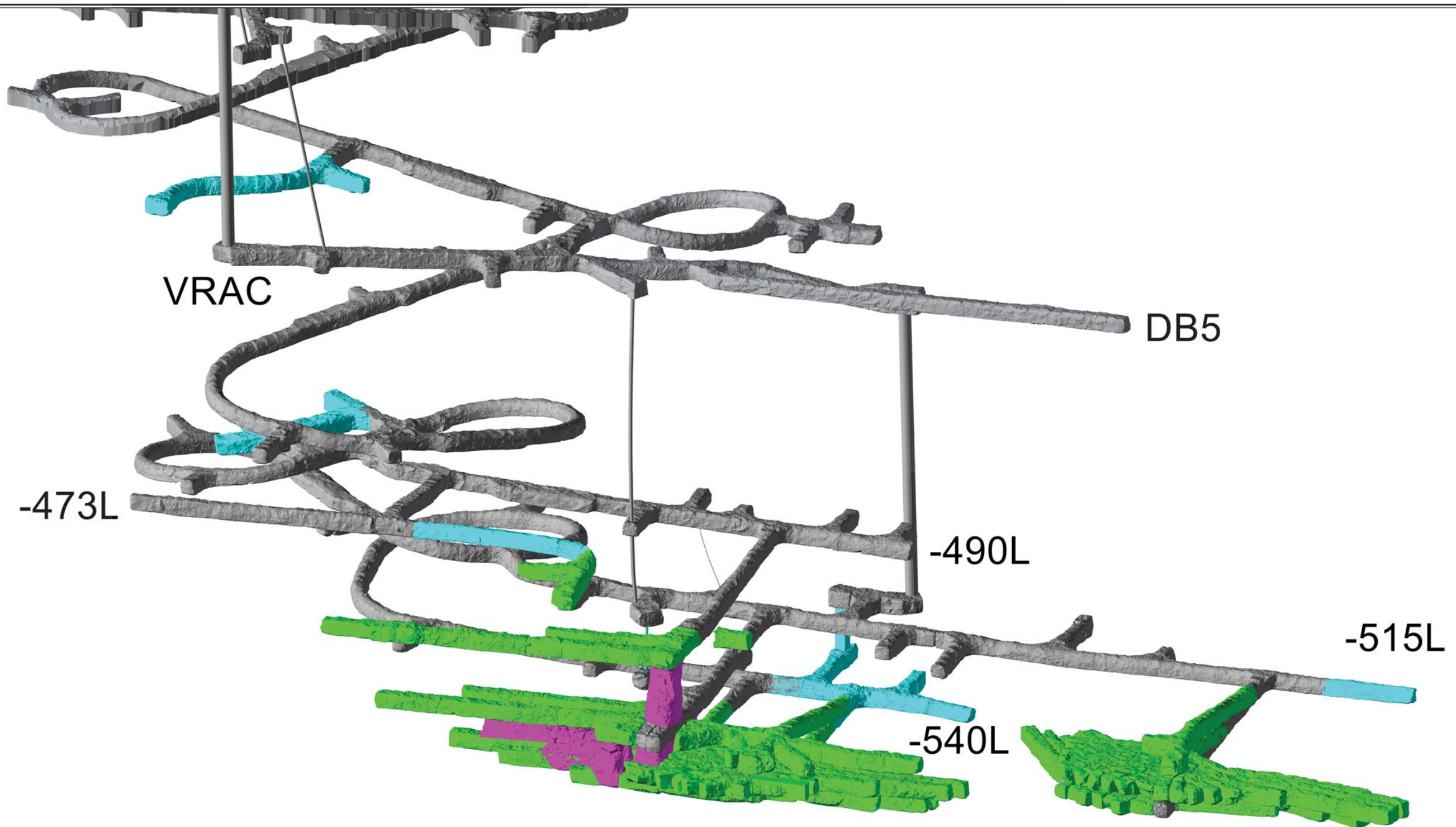
**2020 EAGLE**

Author: Cody.Gobbs

Date: 1/19/2021

Scale: 1:750

**Eagle Mine**



	2020 STOPES
	2020 PRODUCTION SILLS
	2020 DEVELOPMENT
	PRE 2020 STOPES
	PRE 2020 DEVELOPMENT



Drawing Title:

**2020 EE**

Author: Cody.Gobbs

Date: 1/19/2021

Scale: 1:1000

**Eagle Mine**

## **Appendix D**

### **Eagle Mine**

#### **Facilities Water Quality Monitoring Results**



**2020**  
**Mine Permit Water Quality Monitoring Data**  
**Contact Water Basins**  
**Eagle Mine**

		Q1 2020	Q2 2020	Q3 2020	Q4 2020
Parameter	Unit	2/4/2020	4/16/2020	9/8/2020	11/16/2020
<b>Field</b>					
pH	SU	8.8	9.5	9.7	7.7
Specific Conductivity	µS/cm	14720	9223	10040	5851
<b>Metals</b>					
Aluminum, Total	µg/L	<50.0	71	119	238
Antimony, Total	µg/L	35	11	7.4	4.1
Arsenic, Total	µg/L	3.9	2.2	5.3	2.8
Barium, Total	µg/L	52	34	58	47
Beryllium, Total	µg/L	<1.0	<1.0	<1.0	<1.0
Boron, Total	µg/L	1440	817	1270	728
Cadmium, Total	µg/L	0.68	0.24	0.42	0.73
Chromium, Total	µg/L	7.5	4.7	1.7	3.4
Cobalt, Total	µg/L	37	24	21	37
Copper, Total	µg/L	7.6	7.2	9.3	19
Iron, Total	µg/L	297	295	245	598
Lead, Total	µg/L	<1.0	<2.0	<2.0	<1.0
Lithium, Total	µg/L	112	60	75	42
Manganese, Total	µg/L	136	66	54	148
Mercury, Total	µg/L	0.001	0.001	0.001	0.002
Molybdenum, Total	µg/L	91	53	72	48
Nickel, Total	µg/L	719	917	448	1000
Selenium, Total	µg/L	32	16	17	12
Silver, Total	µg/L	<0.20	<0.20	<0.20	<0.20
Strontium, Total	µg/L	4090	1990	3550	2920
Thallium, Total	µg/L	<2.0	<4.0	<4.0	<2.0
Vanadium, Total	µg/L	1.7	2.3	3.5	2.1
Zinc, Total	µg/L	24	12	19	67
<b>Major Anions</b>					
Alkalinity, Bicarbonate	mg/L	147	83	57	91
Alkalinity, Carbonate	mg/L	23	35	74	<2.0
Chloride	mg/L	3590	1840	2280	1210
Fluoride	mg/L	0.19	<0.10	0.11	<0.10
Nitrogen, Nitrate	mg/L	322	481	147	81
Sulfate	mg/L	747	1230	1360	971
<b>Major Cations</b>					
Calcium, Total	mg/L	189	140	154	161
Magnesium, Total	mg/L	88	60	67	73
Potassium, Total	µg/L	169000	97100	128000	92600
Sodium, Total	mg/L	3130	1890	1970	1020

— Analyte not included in the quarterly parameter list.

**2020**  
**Mine Permit Water Quality Monitoring Data**  
**TDRSA Contact Water Sump**  
**Eagle Mine**

		Q1 2020	Q2 2020	Q3 2020	Q4 2020
Parameter	Unit	2/4/2020	4/16/2020	9/8/2020	11/16/2020
<b>Field</b>					
pH	SU	6.3	7.3	7.3	7.1
Specific Conductivity	µS/cm	8472	4557	5007	4614
<b>Metals</b>					
Aluminum, Total	µg/L	—	<50.0	—	—
Antimony, Total	µg/L	—	1.1	—	—
Arsenic, Total	µg/L	1.1	1.1	<1.0	<1.0
Barium, Total	µg/L	—	44	—	—
Beryllium, Total	µg/L	—	<1.0	—	—
Boron, Total	µg/L	1150	864	1240	1090
Cadmium, Total	µg/L	—	2.7	—	—
Chromium, Total	µg/L	—	1.1	—	—
Cobalt, Total	µg/L	—	179	—	—
Copper, Total	µg/L	7.4	4.8	5.0	8.3
Iron, Total	µg/L	788	137	56	<50.0
Lead, Total	µg/L	—	<1.0	—	—
Lithium, Total	µg/L	—	—	—	—
Manganese, Total	µg/L	1950	822	621	946
Mercury, Total	µg/L	0.001	0.001	0.001	0.001
Molybdenum, Total	µg/L	—	40	—	—
Nickel, Total	µg/L	6060	5860	4350	5270
Selenium, Total	µg/L	45	21	23	18
Silver, Total	µg/L	—	<0.20	—	—
Strontium, Total	µg/L	—	3380	—	—
Thallium, Total	µg/L	—	<2.0	—	—
Vanadium, Total	µg/L	—	<1.0	—	—
Zinc, Total	µg/L	1030	272	235	535
<b>Major Anions</b>					
Alkalinity, Bicarbonate	mg/L	50	30	36	45
Alkalinity, Carbonate	mg/L	<2.0	<2.0	<2.0	<2.0
Chloride	mg/L	784	371	313	350
Fluoride	mg/L	—	<0.10	—	—
Nitrogen, Ammonia	mg/L	4.2	0.33	<0.10	<0.10
Nitrogen, Nitrate	mg/L	486	499	181	131
Nitrogen, Nitrite	mg/L	<0.010	<0.010	<0.010	<0.010
Sulfate	mg/L	808	1590	1740	2050
<b>Major Cations</b>					
Calcium, Total	mg/L	—	625	684	—
Magnesium, Total	mg/L	380	192	248	255
Potassium, Total	µg/L	—	94	102	—
Sodium, Total	mg/L	836	384	353	281

— Analyte not included in the quarterly parameter list.

**2020**  
**Mine Permit Water Quality Monitoring Data**  
**TDRSA Leak Detection Sump**  
**Eagle Mine**

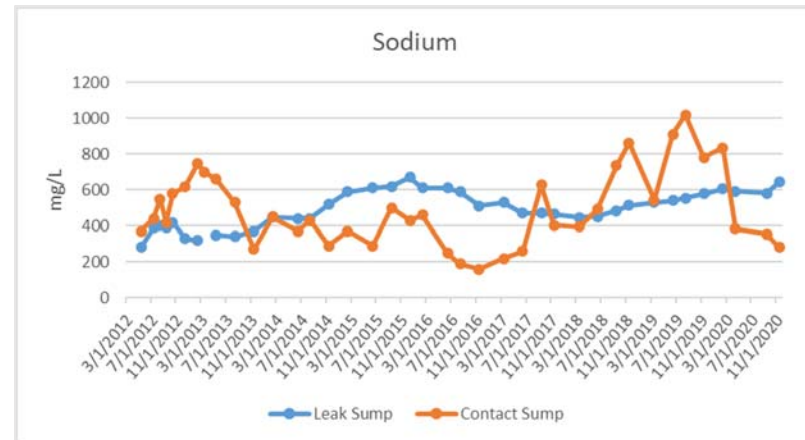
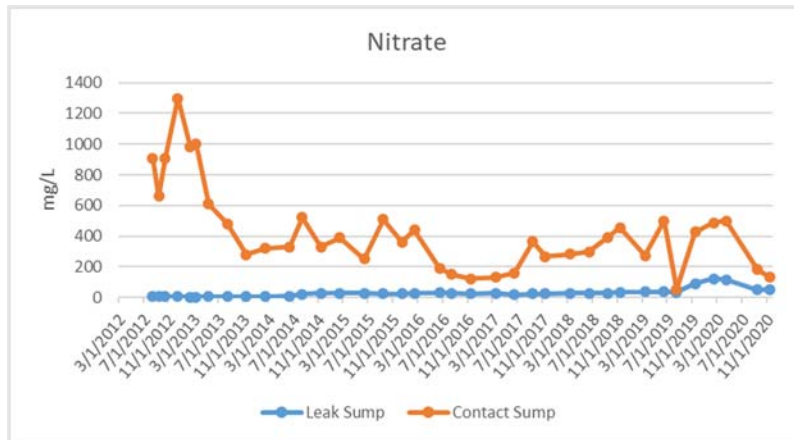
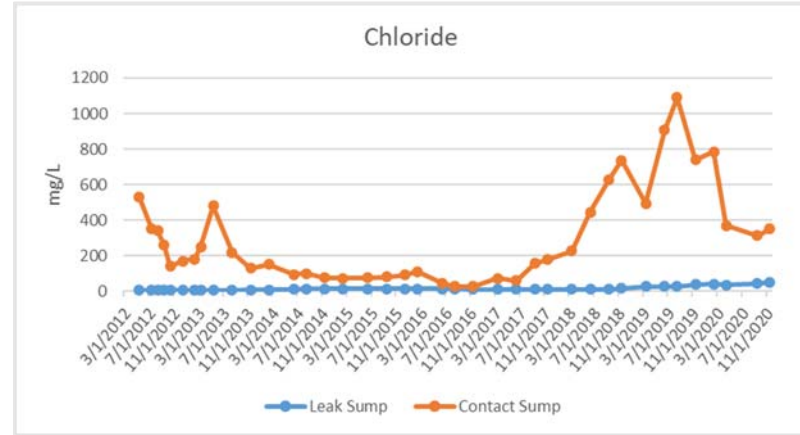
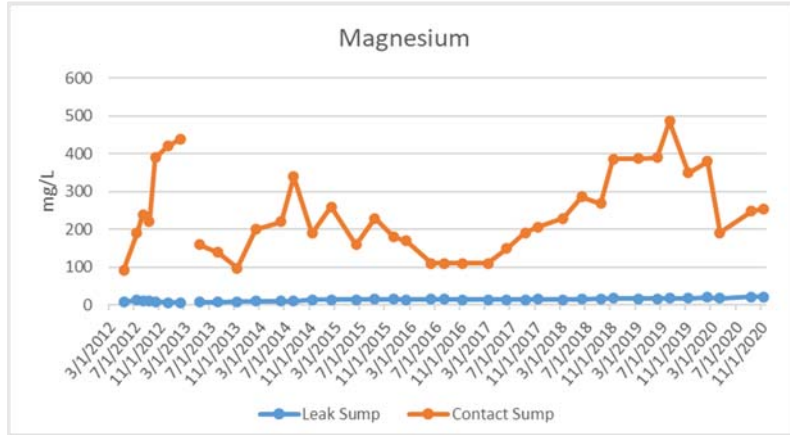
		Q1 2020	Q2 2020	Q3 2020	Q4 2020
Parameter	Unit	2/4/2020	4/16/2020	9/8/2020	11/16/2020
<b>Field</b>					
pH	SU	7.6	7.8	7.5	7.8
Specific Conductivity	µS/cm	2878	2848	2989	3120
<b>Major Anions</b>					
Chloride	mg/L	40	36	42	51
Nitrogen, Ammonia	mg/L	<0.10	<0.10	<0.10	<0.10
Nitrogen, Nitrate	mg/L	121	116	50	52
Nitrogen, Nitrite	mg/L	<0.010	0.03	<0.010	<0.010
Sulfate	mg/L	447	1110	933	1570
<b>Major Cations</b>					
Magnesium, Total	mg/L	20	19	22	22
Sodium, Total	mg/L	607	592	582	643

**2020**  
**Mine Permit Water Quality Monitoring Data**  
**Underground Influent**  
**Eagle Mine**

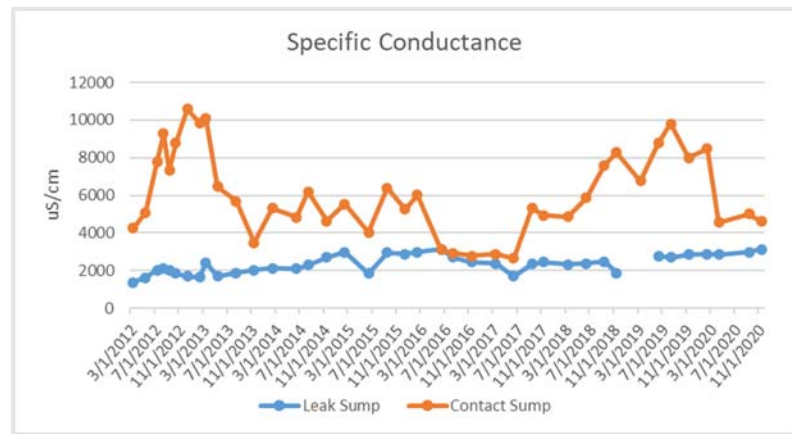
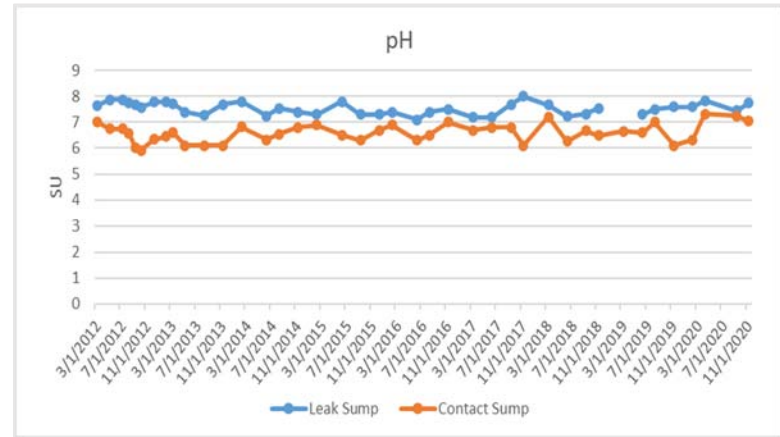
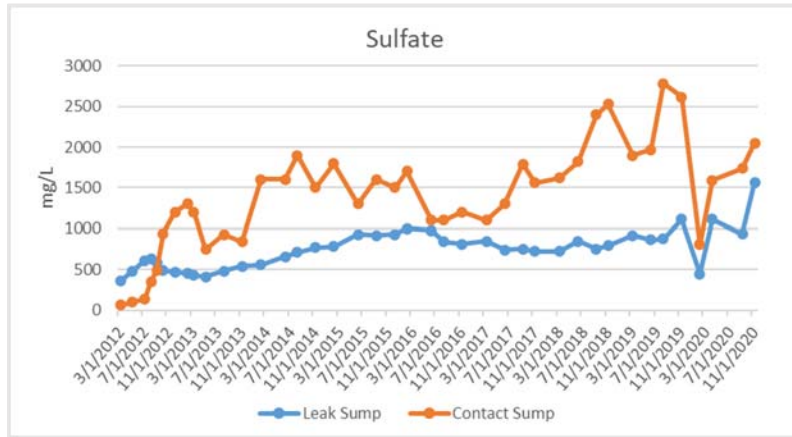
		Q1 2020	Q2 2020	Q3 2020	Q4 2020
Parameter	Unit	2/4/2020	4/16/2020	9/8/2020	11/16/2020
<b>Field</b>					
pH	SU	9.2	9.1	11	11
Specific Conductivity	µS/cm	4188	7673	6418	6244
<b>Metals</b>					
Aluminum, Total	µg/L	—	2770	—	—
Antimony, Total	µg/L	—	2.6	—	—
Arsenic, Total	µg/L	4.8	6.0	4.7	7.1
Barium, Total	µg/L	—	256	—	—
Beryllium, Total	µg/L	—	<10.0	—	—
Boron, Total	µg/L	321	564	616	395
Cadmium, Total	µg/L	—	0.41	—	—
Chromium, Total	µg/L	—	39	—	—
Cobalt, Total	µg/L	—	19	—	—
Copper, Total	µg/L	816	635	120	223
Iron, Total	µg/L	12100	11000	2030	8800
Lead, Total	µg/L	—	8.6	—	—
Lithium, Total	µg/L	—	106	—	—
Manganese, Total	µg/L	85	102	23	87
Mercury, Total	µg/L	0.032	0.019	0.006	0.053
Molybdenum, Total	µg/L	—	41	—	—
Nickel, Total	µg/L	779	757	152	228
Selenium, Total	µg/L	8.9	14	10	13
Silver, Total	µg/L	—	0.54	—	—
Strontium, Total	µg/L	—	11700	—	—
Thallium, Total	µg/L	—	<2.0	—	—
Vanadium, Total	µg/L	—	15	—	—
Zinc, Total	µg/L	61	32	11	82
<b>Major Anions</b>					
Alkalinity, Bicarbonate	mg/L	75	60	18	86
Alkalinity, Carbonate	mg/L	18	<2.0	221	48
Chloride	mg/L	889	1810	1470	1580
Fluoride	mg/L	—	0.15	—	—
Nitrogen, Nitrate	mg/L	234	321	86	63
Nitrogen, Nitrite	mg/L	—	—	—	—
Sulfate	mg/L	337	801	930	660
<b>Major Cations</b>					
Calcium, Total	mg/L	—	617	—	—
Magnesium, Total	mg/L	—	51	—	—
Potassium, Total	µg/L	—	116	—	—
Sodium, Total	mg/L	—	298	—	—

— Analyte not included in the quarterly parameter list.

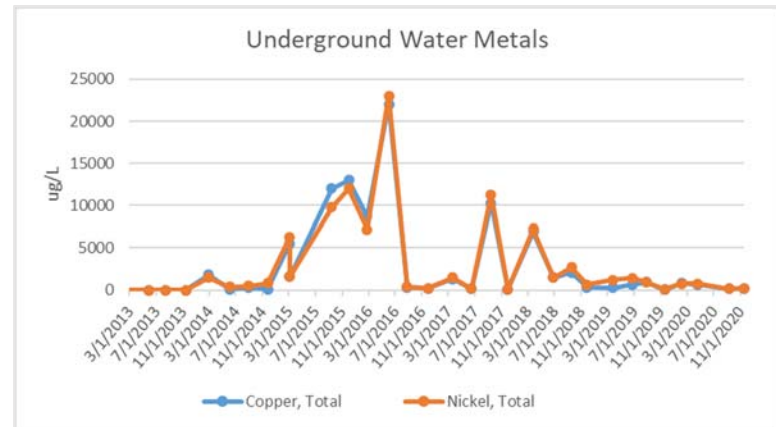
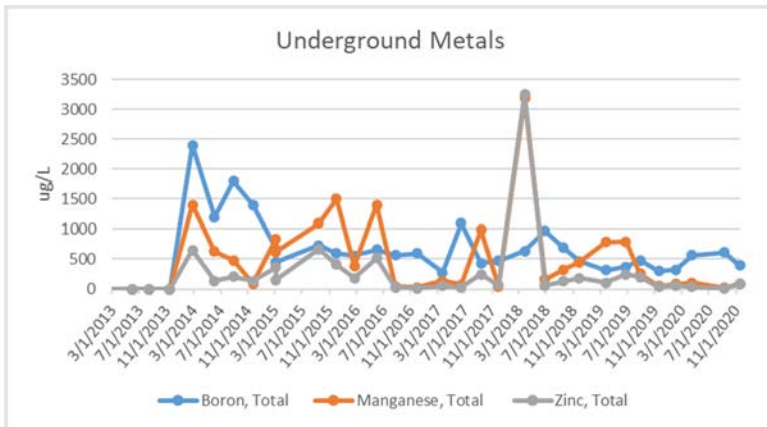
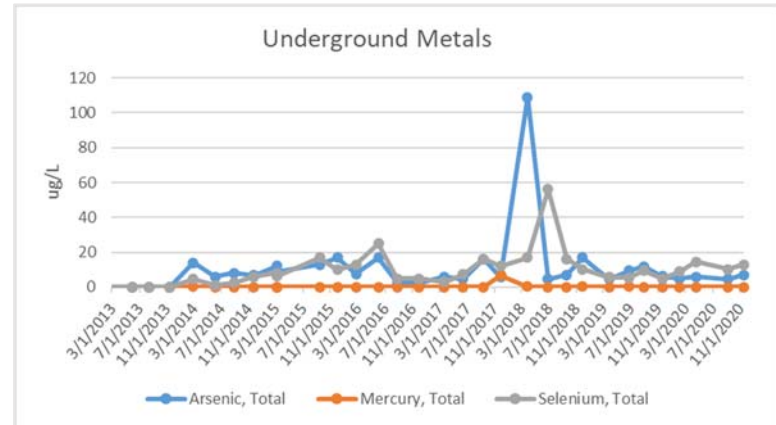
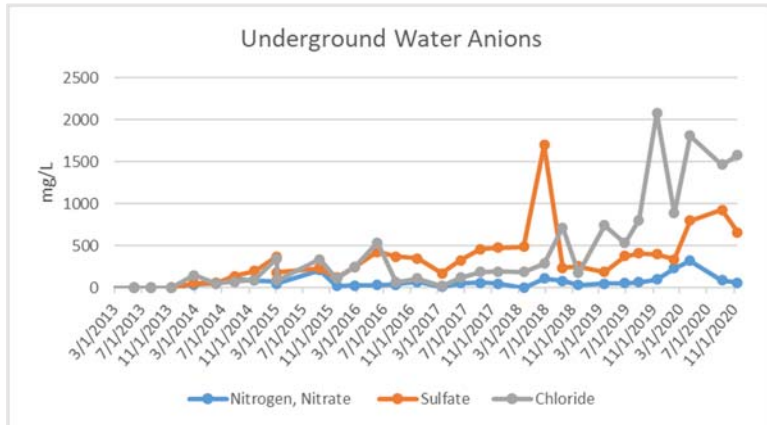
**2020**  
**Mine Permit Water Quality Monitoring Data**  
**TDRSA Contact Water & Leak Sump**  
**Eagle Mine**



**2020**  
**Mine Permit Water Quality Monitoring Data**  
**TDRSA Contact Water & Leak Sump**  
**Eagle Mine**



## 2020 Mine Permit Water Quality Monitoring Data Underground Influent Eagle Mine



## **Appendix E**

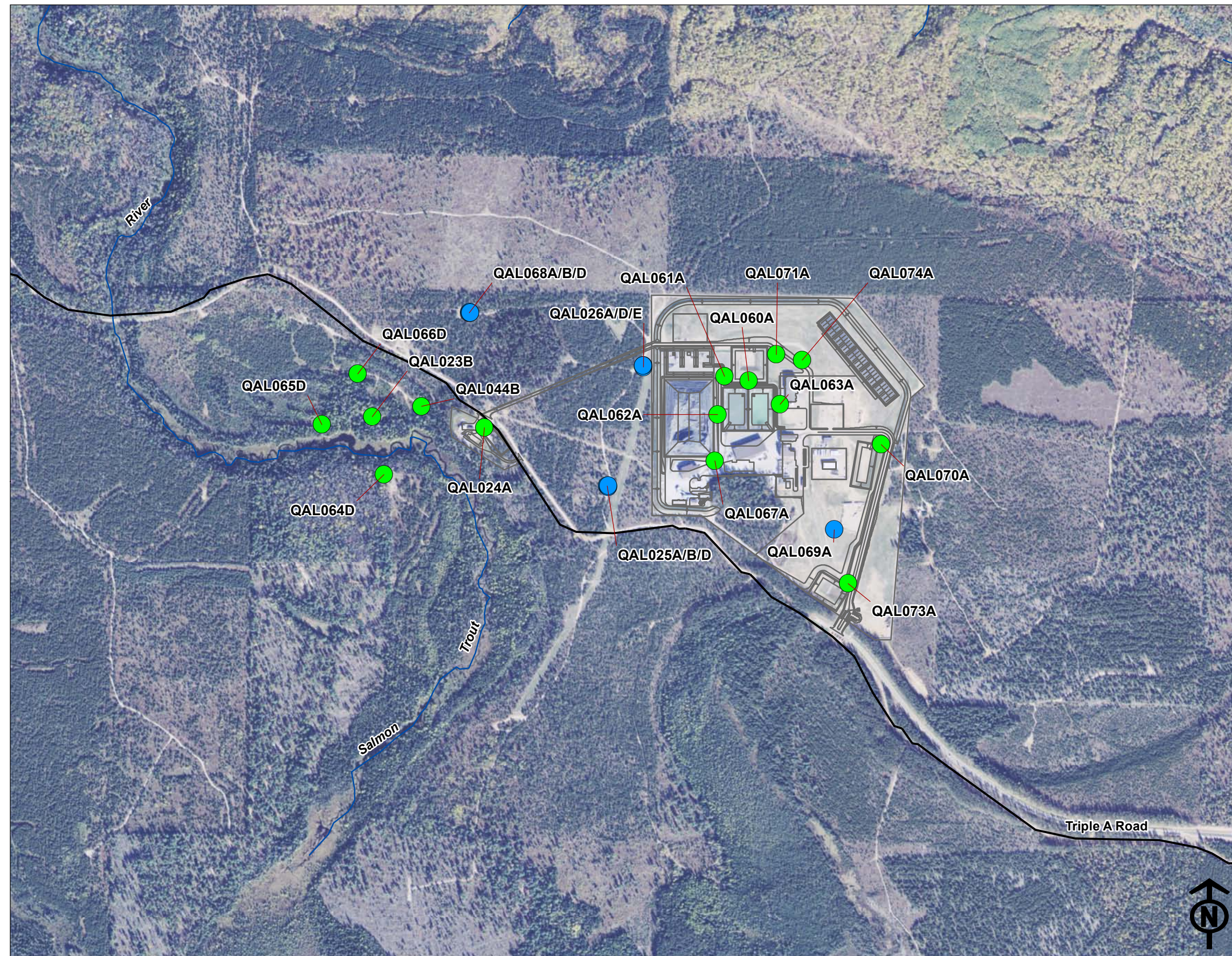
### **Eagle Mine**

#### **Groundwater Monitoring Well Location Map**

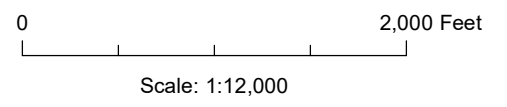


# MINE PERMIT GROUNDWATER QUALITY MONITORING LOCATIONS Project View

- 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



**Eagle Mine**  
 a subsidiary of **huntington**

**North Jackson Company**  
 ENVIRONMENTAL SCIENCE & ENGINEERING

# **Appendix F**

## **Eagle Mine**

### **Groundwater Monitoring Well Results**

**and**

### **Benchmark Summary Table**

Eagle Mine  
2020 Mine Permit Groundwater Monitoring  
Benchmark Comparison Summary

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

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 sampling quarters. If the location is classified as background, Department notification is not required for an exceedance.

\*Monitoring location is only sampled on an annual basis in Q2.

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL023B (UMB)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/28/20 <sup>T</sup>	Q2 2020 05/26/20 <sup>T</sup>	Q3 2020 08/12/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	<b>0.20</b>	<b>0.30</b>	<0.10	<b>0.10</b>
ORP	mV	--	<b>-70</b>	<b>-18</b>	<b>-99</b>	<b>-56</b>
pH	SU	7.8-8.8	<b>8.6</b>	<b>7.2</b>	<b>8.6</b>	<b>7.7</b>
Specific Conductance	µS/cm @ 25°C	--	<b>125</b>	<b>125</b>	<b>115</b>	<b>118</b>
Temperature	°C	--	<b>6.9</b>	<b>7.5</b>	<b>8.0</b>	<b>6.8</b>
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	<b>1414.07</b>	<b>1414.35</b>	<b>1414.49</b>	<b>1414.80</b>
<b>Metals</b>						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	6.5	<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	<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	159	<50	<50	<50	<50
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20	<20	<20	<20.0
Mercury	ng/L	2.00	<0.50	<0.50	<0.50	<0.50
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	67	<b>60</b>	<b>55</b>	<b>55</b>	<b>58</b>
Alkalinity, Carbonate	mg/L	8.0	<2.0 e	<2.0	<2.0	<2.0
Chloride	mg/L	4.0	<1.0	<1.0 e	<1.0	<1.0
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.20	<0.050 e	<0.050 e	<0.050 e	<0.050 e
Sulfate	mg/L	8.0	<b>4.8</b>	<b>5.1</b>	<b>4.7</b>	<b>5.3</b>
<b>Major Cations</b>						
Calcium	mg/L	16	--	<b>14</b>	--	--
Magnesium	mg/L	3.7	--	<b>3.5</b>	--	--
Potassium	mg/L	2.0	--	<0.50	--	--
Sodium	mg/L	11	<b>5.6</b>	<b>5.3</b>	<b>5.3</b>	<b>5.4</b>
<b>General</b>						
Hardness	mg/L	55	--	<b>50</b>	--	--

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

QAL023B (UMB)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL024A (UMB)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/28/20 <sup>T</sup>	Q2 2020 05/06/20 <sup>T</sup>	Q3 2020 08/11/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	11	11	11	11
ORP	mV	--	110	162	153	99
pH	SU	6.1-7.1	6.6	6.1	6.7	6.6
Specific Conductance	µS/cm @ 25°C	--	190	131	191	234
Temperature	°C	--	6.2	8.0	7.9	7.4
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1418.06	1418.14	1419.15	1418.44
<b>Metals</b>						
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	86	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100	<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	105	<50	<50	<50	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20.0	<20.0	<20.0
Mercury	ng/L	2.0	<0.50	<0.50	<0.50	<0.50
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	24	46	29	36	35
Alkalinity, Carbonate	mg/L	8.0	<2.0 e	<2.0	<2.0	<2.0
Chloride	mg/L	4.0	22	16 e	32	37
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.20	0.57 e	0.38 e	0.57 e	0.99 e
Sulfate	mg/L	8.0	7.0	3.9	3.4	4.5
<b>Major Cations</b>						
Calcium	mg/L	48	--	8.7	--	--
Magnesium	mg/L	8.1	--	1.4	--	--
Potassium	mg/L	3.7	--	1.1	--	--
Sodium	mg/L	2.0	18	14	19	20
<b>General</b>						
Hardness	mg/L	153	--	27	--	--

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

QAL024A (UMB)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL025A (Background)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/27/20 <sup>T</sup>	Q2 2020 05/06/20 <sup>T</sup>	Q3 2020 08/10/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	12	12	14	11
ORP	mV	--	147	161	300	100
pH	SU	6.4-7.4	6.7	6.1	6.6	6.8
Specific Conductance	µS/cm @ 25°C	--	71	70	65	69
Temperature	°C	--	7.5	7.5	7.5	6.6
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1417.23	1416.67	1412.82	1412.71
<b>Metals</b>						
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	<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	126	<50.0	<50.0	<50.0	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20.0	<20.0	<20.0
Mercury	ng/L	2.00	<0.50	<0.50	<0.50	<0.50
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	0.53	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	25	33	30	31	33
Alkalinity, Carbonate	mg/L	8.0	<2.0 e	<2.0	<2.0	<2.0
Chloride	mg/L	4.0	<1.0	<1.0 e	<1.0	<1.0
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	1.1	0.23 e	0.28 e	0.21 e	0.20 e
Sulfate	mg/L	8.0	2.0	2.1	<2.0	<2.0
<b>Major Cations</b>						
Calcium	mg/L	8.5	--	9.7	--	--
Magnesium	mg/L	2.0	--	2.0	--	--
Potassium	mg/L	2.0	--	0.90	--	--
Sodium	mg/L	2.0	1.0	1.1	<1.0	<1.0
<b>General</b>						
Hardness	mg/L	28	--	32	--	--

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

QAL025A (Background)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL025B (Background)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/27/20 <sup>T</sup>	Q2 2020 05/06/20 <sup>T</sup>	Q3 2020 08/10/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	11	11	13	11
ORP	mV	--	126	153	220	23
pH	SU	8.5-9.5	9.1	7.8	8.5	8.9
Specific Conductance	µS/cm @ 25°C	--	66	65	59	68
Temperature	°C	--	7.5	7.1	7.7	7.3
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1417.11	1416.60	1418.30	1417.52
<b>Metals</b>						
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	<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	56	<50.0	<50.0	<50.0	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20.0	<20.0	<20.0
Mercury	ng/L	2.00	<0.50	<0.50	<0.50	<0.50
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	1.1	<1.0	1.0	1.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	36	27	28	29	31
Alkalinity, Carbonate	mg/L	12	4.8 e	<2.0	<2.0	<2.0
Chloride	mg/L	4.0	<1.0	<1.0 e	<1.0	<1.0
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.20	0.14 e	0.20 e	0.28 e	0.33 e
Sulfate	mg/L	8.0	<2.0	<2.0	<2.0	<2.0
<b>Major Cations</b>						
Calcium	mg/L	10	--	9.3	--	--
Magnesium	mg/L	2.0	--	1.7	--	--
Potassium	mg/L	2.0	--	<0.50	--	--
Sodium	mg/L	4.5	1.4	1.4	1.3	1.4
<b>General</b>						
Hardness	mg/L	33	--	30	--	--

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

QAL025B (Background)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL025D (Background)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/27/20 <sup>T</sup>	Q2 2020 05/06/20 <sup>T</sup>	Q3 2020 08/10/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	5.3	6.1	6.5	5.3
ORP	mV	--	121	157	233	35
pH	SU	8.2-9.2	8.8	7.7	8.1	8.4
Specific Conductance	µS/cm @ 25°C	--	101	96	88	97
Temperature	°C	--	6.9	7.1	7.8	7.0
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1413.40	1412.73	1414.23	1413.74
<b>Metals</b>						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	6.5	2.9	3.3	2.8	3.0
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100	<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	<50.0	<50.0	<50.0	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20.0	<20.0	<20.0
Mercury	ng/L	2.00	<0.50	<0.50	<0.50	<0.50
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	4.0	4.0	4.3	4.1
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	52	42	40	40	43
Alkalinity, Carbonate	mg/L	14	2.6 e	<2.0	<2.0	<2.0
Chloride	mg/L	4.0	<1.0	1.1 e	1.4	1.8
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.20	0.11 e	0.11 e	0.12 e	0.11 e
Sulfate	mg/L	8.0	4.9	4.5	4.6	5.2
<b>Major Cations</b>						
Calcium	mg/L	12	--	12	--	--
Magnesium	mg/L	2.7	--	2.8	--	--
Potassium	mg/L	2.0	--	0.63	--	--
Sodium	mg/L	12	3.4	3.3	3.0	3.3
<b>General</b>						
Hardness	mg/L	42	--	42	--	--

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

QAL025D (Background)



**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL026A (Background)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/27/20 <sup>T</sup>	Q2 2020 05/07/20 <sup>T</sup>	Q3 2020 08/10/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	11	12	12	16
ORP	mV	--	350	304	168	297
pH	SU	6.2-7.2	6.0	6.4	5.7	6.2
Specific Conductance	μS/cm @ 25°C	--	76	108	81	70
Temperature	°C	--	6.5	6.4	8.8	6.9
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1417.38	1416.21	1418.16	1417.59
<b>Metals</b>						
Aluminum	ug/L	236	--	93	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	6.0	<2.0	<2.0	<2.0	<2.0
Barium	ug/L	80	--	35	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100	<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	368	82	<50	<50.0	98
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20	<20.0	<20.0
Mercury	ng/L	2.00	<0.50	0.80	<0.50	0.56
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	87	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	114	40	70	34	39
Alkalinity, Carbonate	mg/L	8.0	<2.0 e	<2.0	<2.0	<2.0
Chloride	mg/L	4.0	<1.0	<1.0 e	<1.0	<1.0
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.73	0.44 e	0.35 e	0.56 e	0.45 e
Sulfate	mg/L	8.0	2.0	2.2	<2.0	2.2
<b>Major Cations</b>						
Calcium	mg/L	40.0	--	57	--	--
Magnesium	mg/L	5.9	--	12	--	--
Potassium	mg/L	2.0	--	2.4	--	--
Sodium	mg/L	2.4	1.3	34	1.4	1.3
<b>General</b>						
Hardness	mg/L	124	--	194	--	--

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

QAL026A (Background)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL026D (Background)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 02/04/20 <sup>T</sup>	Q2 2020 05/06/20 <sup>T</sup>	Q3 2020 08/11/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	11	11	13	17
ORP	mV	--	288	164	251	336
pH	SU	8.4-9.4	8.7	8.2	8.4	8.5
Specific Conductance	μS/cm @ 25°C	--	61	69	61	59
Temperature	°C	--	6.9	7.5	7.9	7.2
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1410.46	1409.49	1410.83	1410.47
<b>Metals</b>						
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	<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	<50.0	<50.0	<50.0	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20	<20.0	<20.0
Mercury	ng/L	2.00	<0.50	<0.50	<0.50	<0.50
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	31	31	31	29	32
Alkalinity, Carbonate	mg/L	8.0	<2.0 e	<2.0	3.0	<2.0
Chloride	mg/L	4.0	<1.0	<1.0 e	<1.0	<1.0
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.20	0.12 e	0.09 e	0.11 e	0.10 e
Sulfate	mg/L	8.0	<2.0	<2.0	<2.0	<2.0
<b>Major Cations</b>						
Calcium	mg/L	13	--	11	--	--
Magnesium	mg/L	2.4	--	1.6	--	--
Potassium	mg/L	2.0	--	<0.50	--	--
Sodium	mg/L	2.0	<1.0	<1.0	<1.0	<1.0
<b>General</b>						
Hardness	mg/L	43	--	34	--	--

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

QAL026D (Background)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL026E (Background)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/27/20 <sup>T</sup>	Q2 2020 05/06/20 <sup>T</sup>	Q3 2020 08/10/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	<0.10	<b>0.30</b>	<0.10	<b>0.20</b>
ORP	mV	--	<b>145</b>	<b>125</b>	<b>-92</b>	<b>121</b>
pH	SU	8.1-9.1	<b>8.4</b>	<b>7.7</b>	<b>8.2</b>	<b>8.4</b>
Specific Conductance	µS/cm @ 25°C	--	<b>115</b>	<b>123</b>	<b>110</b>	<b>107</b>
Temperature	°C	--	<b>7.1</b>	<b>7.2</b>	<b>7.6</b>	<b>7.1</b>
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	<b>1410.27</b>	<b>1409.50</b>	<b>1410.77</b>	<b>1410.43</b>
<b>Metals</b>						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	7.8	<b>7.8</b>	<b>7.8</b>	<b>7.6</b>	<b>7.8</b>
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100	<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	<50.0	<50.0	<50.0	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20.0	<20.0	<20.0
Mercury	ng/L	2.00	<0.50	<0.50	<0.50	<0.50
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<b>63</b>	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	91	<b>57</b>	<b>53</b>	<b>53</b>	<b>56</b>
Alkalinity, Carbonate	mg/L	8.0	<2.0 e	<2.0	<2.0	<2.0
Chloride	mg/L	4.0	<1.0	<1.0 e	<1.0	<1.0
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.20	<0.05 e	<0.05 e	<0.05 e	<0.05 e
Sulfate	mg/L	8.6	<b>7.6</b>	<b>7.7</b>	<b>7.5</b>	<b>8.2</b>
<b>Major Cations</b>						
Calcium	mg/L	17	--	<b>17</b>	--	--
Magnesium	mg/L	4.3	--	<b>4.3</b>	--	--
Potassium	mg/L	2.0	--	<b>1.7</b>	--	--
Sodium	mg/L	2.0	<b>1.8</b>	<b>1.7</b>	<b>1.8</b>	<b>1.7</b>
<b>General</b>						
Hardness	mg/L	60	--	<b>59</b>	--	--

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

QAL026E (Background)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL044B (UMB)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/28/20 <sup>T</sup>	Q2 2020 05/07/20 <sup>T</sup>	Q3 2020 08/10/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	<b>0.20</b>	<b>0.80</b>	<b>3.1</b>	<b>2.8</b>
ORP	mV	--	<b>-9.0</b>	<b>-33</b>	<b>-154</b>	<b>-48</b>
pH	SU	8.3-9.3	<b>9.2</b>	<b>9.0</b>	<b>8.8</b>	<b>8.9</b>
Specific Conductance	μS/cm @ 25°C	--	<b>73</b>	<b>57</b>	<b>72</b>	<b>63</b>
Temperature	°C	--	<b>7.2</b>	<b>7.3</b>	<b>10</b>	<b>7.6</b>
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	<b>1414.85</b>	<b>1414.77</b>	<b>1415.34</b>	<b>1415.32</b>
<b>Metals</b>						
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	<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	<50.0	<50.0	<b>63</b>	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20.0	<20.0	<20.0
Mercury	ng/L	2.00	<0.50	<0.50	<0.50	<b>0.54</b>
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	64	<b>28</b>	<b>25</b>	<b>24</b>	<b>27</b>
Alkalinity, Carbonate	mg/L	8.0	<b>3.8</b> e	<2.0	<b>2.4</b>	<b>2.6</b>
Chloride	mg/L	4.0	<1.0	<1.0 e	<1.0	<1.0
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.20	<0.05 e	<0.05 e	<0.05 e	<0.05 e
Sulfate	mg/L	24	<b>6.8</b>	<b>6.2</b>	<b>4.5</b>	<b>5.6</b>
<b>Major Cations</b>						
Calcium	mg/L	17	--	<b>8.9</b>	--	--
Magnesium	mg/L	4.0	--	<1.0	--	--
Potassium	mg/L	2.0	--	<b>1.1</b>	--	--
Sodium	mg/L	2.6	<b>3.1</b>	<b>2.9</b>	<b>3.1</b>	<b>3.3</b>
<b>General</b>						
Hardness	mg/L	58	--	<3.0	--	--

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

QAL044B (UMB)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL060A (TDRSA-CWB)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/27/20 <sup>T</sup>	Q2 2020 05/07/20 <sup>T</sup>	Q3 2020 08/10/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	11	11	11	11
ORP	mV	--	118	141	64	2
pH	SU	8.1-9.1	8.9	8.0	8.9	8.7
Specific Conductance	µS/cm @ 25°C	--	101	95	97	106
Temperature	°C	--	7.9	7.5	8.7	7.6
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1405.67	1404.98	1406.12	1405.88
<b>Metals</b>						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	7.2	3.3	3.5	3.1	3.0
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100	<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	<50.0	<50.0	<50.0	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20.0	<20.0	<20.0
Mercury	ng/L	2.00	<0.50	<0.50	<0.50	<0.50
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	<1.0	1.2	1.1	<1.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	62	46	42	47	52
Alkalinity, Carbonate	mg/L	8.0	2.4 e	<2.0	<2.0	<2.0
Chloride	mg/L	4.0	<1.0	<1.0 e	<1.0	<1.0
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.20	0.33 e	0.29 e	0.33 e	0.30 e
Sulfate	mg/L	8.0	<2.0	<2.0	<2.0	2.0
<b>Major Cations</b>						
Calcium	mg/L	17	--	14	--	--
Magnesium	mg/L	4.2	--	3.1	--	--
Potassium	mg/L	2.0	--	0.84	--	--
Sodium	mg/L	2.1	<1.0	<1.0	<1.0	<1.0
<b>General</b>						
Hardness	mg/L	61	--	47	--	--

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

QAL060A (TDRSA-CWB)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL061A (TDRSA-CWB)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/27/20 <sup>T</sup>	Q2 2020 05/07/20 <sup>T</sup>	Q3 2020 08/10/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	11	11	11	11
ORP	mV	--	117	56	57	31
pH	SU	8.1-9.1	8.8	8.5	8.8	8.6
Specific Conductance	μS/cm @ 25°C	--	106	112	103	112
Temperature	°C	--	7.7	7.7	8.6	7.5
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1417.17	1406.36	1407.59	1407.28
<b>Metals</b>						
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	<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	<50.0	<50.0	<50.0	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20.0	<20.0	<20.0
Mercury	ng/L	2.00	<0.50	<0.50	<0.50	<0.50
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	40	47	51	50	56
Alkalinity, Carbonate	mg/L	8.0	3.0 e	<2.0	<2.0	<2.0
Chloride	mg/L	4.0	<1.0	<1.0 e	<1.0	<1.0
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.27	0.36 e	0.37 e	0.35 e	0.33 e
Sulfate	mg/L	8.0	<2.0	<2.0	<2.0	2.0
<b>Major Cations</b>						
Calcium	mg/L	15	--	17	--	--
Magnesium	mg/L	2.2	--	3.1	--	--
Potassium	mg/L	2.0	--	0.70	--	--
Sodium	mg/L	2.0	<1.0	<1.0	<1.0	<1.0
<b>General</b>						
Hardness	mg/L	37	--	54	--	--

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

QAL061A (TDRSA-CWB)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL062A (TDRSA-CWB)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/29/20 <sup>T</sup>	Q2 2020 05/07/20 <sup>T</sup>	Q3 2020 08/11/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	9.0	9.2	8.3	8.2
ORP	mV	--	100	51	100	49
pH	SU	8.3-9.3	7.8	7.5	7.8	7.5
Specific Conductance	µS/cm @ 25°C	--	536	544	484	488
Temperature	°C	--	7.9	8.0	11	7.9
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1408.37	1407.71	1407.88	1408.63
<b>Metals</b>						
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	--	35	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100	<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	<50.0	<50.0	73	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20.0	<20.0	<20.0
Mercury	ng/L	2.00	<0.50	<0.50	<0.50	<0.50
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	86	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	48	164	164	159	162
Alkalinity, Carbonate	mg/L	8.0	<2.0 e	<2.0	<2.0	<2.0
Chloride	mg/L	4.0	66	65 e	57	58
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.41	0.71 e	0.92 e	0.92 e	0.92 e
Sulfate	mg/L	8.0	2.9	2.8	2.8	3.1
<b>Major Cations</b>						
Calcium	mg/L	12	--	57	--	--
Magnesium	mg/L	2.2	--	12	--	--
Potassium	mg/L	2.0	--	2.4	--	--
Sodium	mg/L	2.0	37	33	31	29
<b>General</b>						
Hardness	mg/L	40	--	192	--	--

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

QAL062A (TDRSA-CWB)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL063A (TDRSA-CWB)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/27/20 <sup>T</sup>	Q2 2020 05/07/20 <sup>T</sup>	Q3 2020 08/10/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	8.2	8.8	8.4	13
ORP	mV	--	193	136	73	124
pH	SU	8.1-9.1	7.5	6.9	7.6	7.5
Specific Conductance	μS/cm @ 25°C	--	647	659	687	616
Temperature	°C	--	7.7	7.3	11	8.0
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1402.10	1401.54	1402.47	1402.31
<b>Metals</b>						
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	--	44	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100	<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	<50.0	<50.0	<50.0	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20.0	<20.0	<20.0
Mercury	ng/L	2.00	<0.50	<0.50	<0.50	<0.50
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	105	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	42	194	176	185	194
Alkalinity, Carbonate	mg/L	8.0	<2.0 e	<2.0	<2.0	<2.0
Chloride	mg/L	4.0	105	104 e	108	102
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.29	0.97 e	0.91 e	1.1 e	1.1 e
Sulfate	mg/L	8.0	2.8	2.7	3.2	3.5
<b>Major Cations</b>						
Calcium	mg/L	12	--	74	--	--
Magnesium	mg/L	2.0	--	15	--	--
Potassium	mg/L	2.0	--	2.5	--	--
Sodium	mg/L	2.0	33	37	41	42
<b>General</b>						
Hardness	mg/L	40	--	246	--	--

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

QAL063A (TDRSA-CWB)



**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL064D (UMB)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 02/04/20 <sup>T</sup>	Q2 2020 05/26/20 <sup>T</sup>	Q3 2020 08/11/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	<b>0.20</b>	<b>0.30</b>	<b>8.6</b>	<b>0.20</b>
ORP	mV	--	<b>-77</b>	<b>-4.0</b>	<b>-181</b>	<b>-144</b>
pH	SU	8.0-9.0	<b>8.7</b>	<b>7.9</b>	<b>8.1</b>	<b>8.2</b>
Specific Conductance	μS/cm @ 25°C	--	<b>146</b>	<b>150</b>	<b>144</b>	<b>116</b>
Temperature	°C	--	<b>6.5</b>	<b>7.1</b>	<b>7.1</b>	<b>6.8</b>
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	<b>1415.73</b>	<b>1416.35</b>	<b>1416.10</b>	<b>1416.69</b>
<b>Metals</b>						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	6.0	<2.0	<b>2.0</b>	<2.0	<2.0
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100	<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	<50.0	<50.0	<50.0	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20.0	<20.0	<20.0
Mercury	ng/L	2.00	<0.50	<0.50	<0.50	<0.50
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<b>106</b>	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	82	<b>68</b>	<b>68</b>	<b>65</b>	<b>67</b>
Alkalinity, Carbonate	mg/L	8.0	<2.0 e	<2.0	<2.0	<2.0
Chloride	mg/L	4.2	<b>2.3</b>	<b>2.3 e</b>	<b>2.3</b>	<b>2.5</b>
Fluoride	mg/L	0.40	--	<b>0.11</b>	--	--
Nitrogen, Nitrate	mg/L	0.20	<0.050 e	<0.050 e	<0.050 e	<0.050 e
Sulfate	mg/L	8.0	<2.0	<2.0	<2.0	<2.0
<b>Major Cations</b>						
Calcium	mg/L	22	--	<b>19</b>	--	--
Magnesium	mg/L	3.3	--	<b>4.0</b>	--	--
Potassium	mg/L	2.0	--	<b>1.2</b>	--	--
Sodium	mg/L	6.9	<b>4.2</b>	<b>4.1</b>	<b>4.2</b>	<b>4.0</b>
<b>General</b>						
Hardness	mg/L	51	--	<b>65</b>	--	--

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

QAL064D (UMB)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL065D (UMB)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 02/04/20 <sup>T</sup>	Q2 2020 05/26/20 <sup>T</sup>	Q3 2020 08/12/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	<b>0.30</b>	<b>0.20</b>	<0.10	<0.10
ORP	mV	--	<b>-89</b>	<b>-44</b>	<b>-135</b>	<b>-47</b>
pH	SU	7.9-8.9	<b>8.8</b>	<b>8.1</b>	<b>8.6</b>	<b>8.4</b>
Specific Conductance	µS/cm @ 25°C	--	<b>151</b>	<b>151</b>	<b>142</b>	<b>154</b>
Temperature	°C	--	<b>6.7</b>	<b>7.2</b>	<b>7.8</b>	<b>6.6</b>
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	<b>1415.64</b>	<b>1416.12</b>	<b>1415.74</b>	<b>1416.18</b>
<b>Metals</b>						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	6.6	<b>4.2</b>	<b>4.3</b>	<b>3.8</b>	<b>3.9</b>
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100	<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	<50.0	<50.0	<50.0	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20.0	<20.0	<20.0
Mercury	ng/L	2.00	<0.50	<0.50	<0.50	<0.50
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<b>184</b>	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	86	<b>72</b>	<b>69</b>	<b>72</b>	<b>72</b>
Alkalinity, Carbonate	mg/L	8.7	<b>4.4</b> e	<2.0	<2.0	<b>3.2</b>
Chloride	mg/L	4.0	<1.0	<1.0 e	<1.0	<1.0
Fluoride	mg/L	0.40	--	<b>0.16</b>	--	--
Nitrogen, Nitrate	mg/L	0.20	<0.05 e	<0.05 e	<0.05 e	<0.05 e
Sulfate	mg/L	8.0	<2.0	<2.0	<2.0	<2.0
<b>Major Cations</b>						
Calcium	mg/L	14	--	<b>14</b>	--	--
Magnesium	mg/L	4.8	--	<b>4.5</b>	--	--
Potassium	mg/L	3.0	--	<b>2.7</b>	--	--
Sodium	mg/L	12	<b>11</b>	<b>10</b>	<b>9.4</b>	<b>11</b>
<b>General</b>						
Hardness	mg/L	53	--	<b>52</b>	--	--

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

QAL065D (UMB)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL066D (UMB)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/28/20 <sup>T</sup>	Q2 2020 05/07/20 <sup>T</sup>	Q3 2020 08/11/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	1.9	2.2	10	0.8
ORP	mV	--	208	215	59	130
pH	SU	8.7-9.7	8.5	8.6	8.2	8.6
Specific Conductance	µS/cm @ 25°C	--	151	130	165	136
Temperature	°C	--	6.6	6.7	8.3	6.4
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1415.28	1415.52	1415.73	1415.80
<b>Metals</b>						
Aluminum	ug/L	557	--	937	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	8.9	8.9	8.7	9.8	9.5
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100	<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	288	572	550	745	320
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20	<20	<20.0	<20.0
Mercury	ng/L	2.00	1.3	1.8	2.2 s	0.89
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	367	--	54	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	1.2	1.2	1.4	<1.0
Zinc	ug/L	40	<10	<10	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	61	68	68	63	68
Alkalinity, Carbonate	mg/L	52	6.8 e	2.4	9.4	4.6
Chloride	mg/L	4.0	<1.0	<1.0 e	<1.0	<1.0
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.20	<0.05 e	<0.05 e	0.08 e	<0.05 e
Sulfate	mg/L	11	8.3	8.2	7.8	8.2
<b>Major Cations</b>						
Calcium	mg/L	58	--	12	--	--
Magnesium	mg/L	2.9	--	2.2	--	--
Potassium	mg/L	2.6	--	1.1	--	--
Sodium	mg/L	8.0	22	21	24	22
<b>General</b>						
Hardness	mg/L	146	--	40	--	--

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

QAL066D (UMB)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL067A (TDRSA-CWB)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/29/20 <sup>T</sup>	Q2 2020 05/07/20 <sup>T</sup>	Q3 2020 08/10/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	8.3	9.6	8.6	8.8
ORP	mV	--	110	84	88	71
pH	SU	5.6-6.6	6.7	6.4	6.7	6.7
Specific Conductance	µS/cm @ 25°C	--	670	641	605	614
Temperature	°C	--	8.7	9.2	9.6	8.5
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1415.48	1414.76	1415.97	1415.64
<b>Metals</b>						
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	--	63	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100	<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	<50.0	<50.0	<50.0	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20	<20.0	<20.0
Mercury	ng/L	2.00	1.3	1.2	0.91 s	1.1
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	154	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	51	66	72	80	94
Alkalinity, Carbonate	mg/L	8.0	<2.0 e	<2.0	<2.0	<2.0
Chloride	mg/L	4.0	149	158 e	131	111
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.25	0.97 e	1.4 e	1.7 e	1.8 e
Sulfate	mg/L	8.4	9.8	10	11	9.6
<b>Major Cations</b>						
Calcium	mg/L	8.2	--	28	--	--
Magnesium	mg/L	2.0	--	12	--	--
Potassium	mg/L	2.0	--	2.7	--	--
Sodium	mg/L	2.0	79	77	64	63
<b>General</b>						
Hardness	mg/L	26	--	121	--	--

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

QAL067A (TDRSA-CWB)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL068A (Background)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/30/20 <sup>T</sup>	Q2 2020 05/26/20 <sup>T</sup>	Q3 2020 08/10/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	12	13	12	18
ORP	mV	--	131	320	144	284
pH	SU	6.2-7.2	6.9	6.6	6.1	7.0
Specific Conductance	µS/cm @ 25°C	--	51	33	41	33
Temperature	°C	--	7.0	7.5	7.2	7.1
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1423.06	1421.83	1423.97	1423.36
<b>Metals</b>						
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	<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	<50.0	<50.0	<50.0	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20.0	<20.0	<20.0
Mercury	ng/L	2.00	<0.50	<0.50	<0.50	<0.50
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	35	24	16	17	17
Alkalinity, Carbonate	mg/L	8.0	<2.0 e	<2.0	<2.0	<2.0
Chloride	mg/L	4.0	<1.0	<1.0 e	<1.0	<1.0
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.20	<0.05 e	<0.05 e	<0.05 e	<0.05 e
Sulfate	mg/L	8.0	2.0	<2.0	<2.0	<2.0
<b>Major Cations</b>						
Calcium	mg/L	6.7	--	5.5	--	--
Magnesium	mg/L	2.0	--	<1.0	--	--
Potassium	mg/L	2.0	--	0.84	--	--
Sodium	mg/L	2.0	<1.0	<1.0	<1.0	<1.0
<b>General</b>						
Hardness	mg/L	21	--	<3	--	--

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

QAL068A (Background)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL068B (Background)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/30/20 <sup>T</sup>	Q2 2020 05/26/20 <sup>T</sup>	Q3 2020 08/10/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	12	13	11	17
ORP	mV	--	105	268	110	237
pH	SU	8.4-9.4	9.2	8.6	8.5	8.8
Specific Conductance	µS/cm @ 25°C	--	65	52	64	54
Temperature	°C	--	7.0	7.5	7.6	7.1
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1414.68	1414.05	<<1415.4 BP	1415.02
<b>Metals</b>						
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	<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	184	<50.0	<50.0	<50.0	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20.0	<20.0	<20.0
Mercury	ng/L	2.00	<0.50	<0.50	<0.50	<0.50
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	1.0	1.0	1.1	1.1
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	30	32	27	28	28
Alkalinity, Carbonate	mg/L	9.9	<2.0 e	<2.0	<2.0	2.4
Chloride	mg/L	4.0	<1.0	<1.0 e	<1.0	<1.0
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.20	0.06 e	0.06 e	0.07 e	0.06 e
Sulfate	mg/L	8.0	2.3	2.2	2.1	2.3
<b>Major Cations</b>						
Calcium	mg/L	9.4	--	8.9	--	--
Magnesium	mg/L	2.0	--	1.7	--	--
Potassium	mg/L	2.0	--	0.52	--	--
Sodium	mg/L	2.0	<1.0	<1.0	<1.0	<1.0
<b>General</b>						
Hardness	mg/L	31	--	29	--	--

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

QAL068B (Background)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL068D (Background)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/30/20 <sup>T</sup>	Q2 2020 05/26/20 <sup>T</sup>	Q3 2020 08/10/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	1.8	2.4	6.7	4.1
ORP	mV	--	234	256	106	240
pH	SU	8.0-9.0	8.3	8.1	8.0	8.1
Specific Conductance	μS/cm @ 25°C	--	111	97	121	103
Temperature	°C	--	4.7	8.9	10	6.5
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1414.76	1414.20	1415.50	1415.10
<b>Metals</b>						
Aluminum	ug/L	200	--	<50	--	--
Antimony	ug/L	5.5	--	<5.0	--	--
Arsenic	ug/L	7.2	6.2	6.8	6.3	6.5
Barium	ug/L	80	--	<20	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100	<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	119	<50.0	<50	<50.0	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20	<20.0	<20.0
Mercury	ng/L	2.12	<0.50	<0.50	<0.50	<0.50
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	4.6	3.2	3.3	3.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	67	56	53	53	56
Alkalinity, Carbonate	mg/L	8.0	<2.0 e	<2.0	<2.0	<2.0
Chloride	mg/L	4.0	<1.0	<1.0 e	<1.0	<1.0
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.21	<0.05 e	<0.05 e	0.08 e	0.92 e
Sulfate	mg/L	10	5.5	5.2	5.0	5.3
<b>Major Cations</b>						
Calcium	mg/L	16	--	14	--	--
Magnesium	mg/L	3.9	--	3.8	--	--
Potassium	mg/L	2.0	--	1.4	--	--
Sodium	mg/L	6.1	4.0	4.3	4.2	4.3
<b>General</b>						
Hardness	mg/L	52	--	52	--	--

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

QAL068D (Background)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL069A (Background)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/29/20 <sup>T</sup>	Q2 2020 05/06/20 <sup>T</sup>	Q3 2020 08/11/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	8.5	9.9	7.0	7.9
ORP	mV	--	228	225	93	80
pH	SU	7.8-8.8	6.9	6.9	7.1	6.9
Specific Conductance	µS/cm @ 25°C	--	289	181	363	387
Temperature	°C	--	6.9	9.0	8.9	7.9
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1384.86	1384.56	1386.32	1385.81
<b>Metals</b>						
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	<100
Cadmium	ug/L	2.0	--	<0.50	--	--
Chromium	ug/L	20	--	5.8	--	--
Cobalt	ug/L	40	--	<10	--	--
Copper	ug/L	20	<5.0	<5.0	<5.0	<5.0
Iron	ug/L	80	153	74.5	<50.0	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20.0	<20.0	<20.0
Mercury	ng/L	2.00	4.4	4.8	1.5 s	0.69
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	<50	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	138	146	107	130	110
Alkalinity, Carbonate	mg/L	8.0	<2.0 e	<2.0	<2.0	<2.0
Chloride	mg/L	4.0	8.1	1.6 e	33	43
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.57	0.49 e	0.27 e	0.54 e	0.74 e
Sulfate	mg/L	8.0	7.4	4.8	5.6	8.5
<b>Major Cations</b>						
Calcium	mg/L	35	--	27	--	--
Magnesium	mg/L	18	--	8.7	--	--
Potassium	mg/L	2.0	--	1.5	--	--
Sodium	mg/L	2.0	20	9.2	12	20
<b>General</b>						
Hardness	mg/L	162	--	102	--	--

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

QAL069A (Background)



**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL070A (NCWIB)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q2 2017 05/09/17 <sup>T</sup>	Q2 2018 05/08/18 <sup>T</sup>	Q2 2019 05/07/19 <sup>T</sup>	Q2 2020 05/06/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	10	13	11	11
ORP	mV	--	182	74	185	248
pH	SU	8.3-9.3	8.2	8.4	8.3	8.0
Specific Conductance	μS/cm @ 25°C	--	524	499	479	393
Temperature	°C	--	8.2	9.5	9.0	10
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1371.21	1372.25	1371.85	1372.70
<b>Metals</b>						
Aluminum	ug/L	200	<50	<50.0	<50.0	<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	28	27	27	30
Beryllium	ug/L	2.5	<1.0	<1.0	<1.0	<1.0
Boron	ug/L	400	<100 e	<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	<10.0	<10.0	<10
Copper	ug/L	20	<5.0 e	<5.0	<5.0	<5.0
Iron	ug/L	80	<20	<20.0	<50.0	<50
Lead	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Lithium	ug/L	32	<8.0	<8.0	<8.0	<8.0
Manganese	ug/L	80	<20	<20.0	<20.0	<20
Mercury	ng/L	2.0	<0.50	<0.50 e	0.62	<0.50
Molybdenum	ug/L	40	<10	<10.0	<10.0	<10
Nickel	ug/L	100	<25	<25.0	<25.0	<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	74	74	73	92
Thallium	ug/L	2.0	<2.0	<2.0	<1.0	<1.0
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10.0 e	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	42	56	63	75	81
Alkalinity, Carbonate	mg/L	8.0	<2.0	<2.0	<2.0 e	<2.0
Chloride	mg/L	4.0	120 e	110	107 e	102 e
Fluoride	mg/L	0.40	<0.10	<0.10	<0.10 e	<0.10
Nitrogen, Nitrate	mg/L	0.22	1.2 e	1.3	1.4 e	1.3 e
Sulfate	mg/L	8.0	6.7	7.9	10 e	8.9
<b>Major Cations</b>						
Calcium	mg/L	11	47	38	39 e	52
Magnesium	mg/L	3.0	9.9	7.1	7.0	9.8
Potassium	mg/L	2.0	2.0 e	1.8	1.9	2.2
Sodium	mg/L	2.0	40 e	47	48 e	28
<b>General</b>						
Hardness	mg/L	40	158	124	125	170

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

QAL070A (NCWIB)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL071A (TDRSA-CWB)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/29/20 <sup>T</sup>	Q2 2020 05/07/20 <sup>T</sup>	Q3 2020 08/11/20 <sup>T</sup>	Q4 2020 10/26/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	11	12	10	15
ORP	mV	--	107	163	74	191
pH	SU	8.1-9.1	8.0	7.6	7.9	7.7
Specific Conductance	µS/cm @ 25°C	--	438	527	473	316
Temperature	°C	--	9.0	8.5	9.2	8.1
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1405.15	1405.36	1406.62	1405.69
<b>Metals</b>						
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	--	39	--	--
Beryllium	ug/L	2.5	--	<1.0	--	--
Boron	ug/L	400	<100	<100	<100	<100
Cadmium	ug/L	2.0	--	<0.50	--	--
Chromium	ug/L	20	--	<5.0	--	--
Cobalt	ug/L	40	--	<10	--	--
Copper	ug/L	20	16	20	29	17
Iron	ug/L	178	<50.0	<50.0	<50.0	<50.0
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20.0	<20.0	<20.0	<20.0
Mercury	ng/L	2.00	<0.50	<0.50	<0.50	<0.50
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	<25.0	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	105	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10.0	<10.0	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	44	112	157	137	125
Alkalinity, Carbonate	mg/L	8.0	<2.0 e	<2.0	<2.0	<2.0
Chloride	mg/L	4.0	15	24 e	15	12
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.31	21 e	32 e	19 e	11 e
Sulfate	mg/L	8.0	7.5	10	13	11
<b>Major Cations</b>						
Calcium	mg/L	12	--	95	--	--
Magnesium	mg/L	2.0	--	13	--	--
Potassium	mg/L	2.0	--	1.8	--	--
Sodium	mg/L	2.0	15	15	19	15
<b>General</b>						
Hardness	mg/L	38	--	290	--	--

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

QAL071A (TDRSA-CWB)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL073A (NCWIB)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q2 2017 05/09/17 <sup>T</sup>	Q2 2018 05/08/18 <sup>T</sup>	Q2 2019 05/07/19 <sup>T</sup>	Q2 2020 05/06/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	10	12	11	11
ORP	mV	--	210	132	220	265
pH	SU	6.1-7.1	6.5	6.6	6.8	6.5
Specific Conductance	µS/cm @ 25°C	--	217	189	178	116
Temperature	°C	--	8.1	8.6	9.0	8.4
Turbidity	NTU	--	<1.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1381.91	1383.41	1383.74	1384.72
<b>Metals</b>						
Aluminum	ug/L	200	<50	<50	<50.0	73
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	<20.0	<20
Beryllium	ug/L	2.5	<1.0	<1.0	<1.0	<1.0
Boron	ug/L	400	<100 e	<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	<10.0	<10
Copper	ug/L	20	<5.0 e	<5.0	<5.0	<5.0
Iron	ug/L	132	<20	41	95	79
Lead	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Lithium	ug/L	32	<8.0	<8.0	<8.0	<8.0
Manganese	ug/L	80	<20	<20	<20.0	<20
Mercury	ng/L	2.0	<0.50	0.52 e	0.82	<0.50
Molybdenum	ug/L	40	<10	<10	<10.0	<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	90	99.2	92.7	68.7
Thallium	ug/L	2.0	<2.0	<2.0	<1.0	<1.0
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10 e	<10	<10	<10
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	44	100	88	79	53
Alkalinity, Carbonate	mg/L	8.0	<2.0	<2.0	<2.0 e	<2.0
Chloride	mg/L	20	3.6 e	2.1	3.4 e	3.0 e
Fluoride	mg/L	0.40	<0.10	<0.10	<0.10 e	<0.10
Nitrogen, Nitrate	mg/L	0.60	1.5 e	1.2	1.1 e	0.84 e
Sulfate	mg/L	8.0	9.2	9.0	7.5 e	7.0
<b>Major Cations</b>						
Calcium	mg/L	9.2	32	26	28 e	20
Magnesium	mg/L	2.5	7.1	5.6	5.2	4.0
Potassium	mg/L	2.0	1.4 e	1.3	1.3	1.1
Sodium	mg/L	2.0	3.0 e	2.5	2.4 e	2.6
<b>General</b>						
Hardness	mg/L	33	109	88	91	66

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

QAL073A (NCWIB)

**2020**  
**Mine Permit Groundwater Quality Monitoring Data**  
**QAL074A (Septic & WWTP)**  
**Eagle Mine**

Parameter	Unit	Benchmark	Q1 2020 01/29/20 <sup>T</sup>	Q2 2020 05/06/20 <sup>T</sup>	Q3 2020 08/11/20 <sup>T</sup>	Q4 2020 10/27/20 <sup>T</sup>
<b>Field</b>						
D.O. <sup>1</sup>	ppm	--	11	11	9.0	14
ORP	mV	--	94	136	89	107
pH	SU	8.4-9.4	8.2	8.1	7.7	8.2
Specific Conductance	µS/cm @ 25°C	--	337	285	342	302
Temperature	°C	--	6.0	9.0	10	7.0
Turbidity	NTU	--	2.0	<1.0	<1.0	<1.0
Water Elevation	ft MSL	--	1403.26	1403.67	1404.71	1403.92
<b>Metals</b>						
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	<100
Cadmium	ug/L	2.0	--	<0.50	--	--
Chromium	ug/L	20	--	28	--	--
Cobalt	ug/L	40	--	<10	--	--
Copper	ug/L	20	<5.0	<5.0	<5.0	<5.0
Iron	ug/L	212	345	123	168	195
Lead	ug/L	4.0	--	<1.0	--	--
Lithium	ug/L	32	--	<8.0	--	--
Manganese	ug/L	80	<20	<20	<20.0	<20.0
Mercury	ng/L	2.00	<0.50	<0.50	<0.50	<0.50
Molybdenum	ug/L	40	--	<10	--	--
Nickel	ug/L	100	27.9	<25.0	<25.0	<25.0
Selenium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Silver	ug/L	0.80	--	<0.20	--	--
Strontium	ug/L	200	--	50.2	--	--
Thallium	ug/L	2.0	--	<1.0	--	--
Vanadium	ug/L	4.0	<1.0	<1.0	<1.0	<1.0
Zinc	ug/L	40	<10	<10	<10.0	<10.0
<b>Major Anions</b>						
Alkalinity, Bicarbonate	mg/L	39	94	95	93	102
Alkalinity, Carbonate	mg/L	8.0	<2.0 e	<2.0	<2.0	<2.0
Chloride	mg/L	4.0	41	46 e	39	42
Fluoride	mg/L	0.40	--	<0.10	--	--
Nitrogen, Nitrate	mg/L	0.43	0.82 e	0.82 e	1.1 e	1.4 e
Sulfate	mg/L	8.0	8.2	7.5	7.0	7.5
<b>Major Cations</b>						
Calcium	mg/L	31	--	35	--	--
Magnesium	mg/L	5.9	--	7.2	--	--
Potassium	mg/L	2.0	--	1.4	--	--
Sodium	mg/L	3.5	23	24	24	24
<b>General</b>						
Hardness	mg/L	103	--	117	--	--

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

QAL074A (Septic & WWTP)







**2020**  
**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.
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.
J	Estimated value. Reported concentration is between the method detection limit and reporting limit.
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 at a compliance monitoring location. An exceedance occurs if there are 2 consecutive sampling events with a value equal to or greater than the benchmark. Color also indicates compliance monitoring location when applied to column headers.



## **Appendix G**

### **Eagle Mine**

#### **Groundwater Monitoring**

#### **Trend Analysis Summary & Trending Charts**

**Mine Permit Groundwater  
Identified Trends  
Eagle Mine**

Location	Classification	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	Sig Level	Trend?	Remarks
QAL023B	Compliance	Alkalinity, Bicarbonate	mg/L	24	0	No NDs	24	54.70	67.00	61.50	3.31	12	12	0	6	8	0.05	Y	
QAL023B	Compliance	Sodium	mg/L	24	0	No NDs	24	4.80	11.00	7.54	1.86	12	12	0	4	8	0.05	Y	Non-unique RL in data
QAL024A	Compliance	Alkalinity, Bicarbonate	mg/L	24	0	No NDs	24	28.50	58.60	40.80	6.84	13	11	0	7	8	0.05	Y*	
QAL024A	Compliance	Chloride	mg/L	24	0	No NDs	24	15.80	150.00	63.95	34.82	12	12	0	4	8	0.05	Y*	Non-unique RL in data
QAL024A	Compliance	Nitrogen, Nitrate	mg/L	24	0	No NDs	24	0.28	3.70	1.18	0.81	7	17	0	5	7	0.05	Y*	Non-unique RL in data
QAL024A	Compliance	Sodium	mg/L	24	0	No NDs	24	13.70	52.00	30.40	11.40	10	14	0	6	8	0.05	Y*	Non-unique RL in data
QAL024A	Compliance	Specific Conductance	µS/cm @ 25°C	24	0	No NDs	24	131.00	551.00	295.00	105.00	10	14	0	8	8	0.05	Y	
QAL025A	Background	Alkalinity, Bicarbonate	mg/L	24	0	No NDs	24	16.90	35.00	27.50	4.18	12	12	0	7	8	0.05	Y*	
QAL025A	Background	Nitrogen, Nitrate	mg/L	24	0	No NDs	24	0.18	0.92	0.42	0.21	10	14	0	2	8	0.05	Y	
QAL025B	Background	Alkalinity, Bicarbonate	mg/L	24	1	Included as RL	24	2.00	32.40	26.60	6.15	17	7	0	7	7	0.05	Y	
QAL025B	Background	Alkalinity, Carbonate	mg/L	24	7	Included as RL	24	2.00	35.00	6.30	6.85	7	17	0	7	7	0.05	Y	
QAL025B	Background	Nitrogen, Nitrate	mg/L	24	0	No NDs	24	0.10	0.33	0.15	0.06	7	17	0	4	7	0.05	Y*	
QAL025B	Background	Sodium	mg/L	24	0	No NDs	24	1.20	2.10	1.60	0.28	11	13	0	4	8	0.05	Y	Non-unique RL in data
QAL025B	Background	Sulfate	mg/L	24	15	Included as RL	24	2.00	2.30	2.10	0.11	8	16	0	6	7	0.05	Y	
QAL025B	Background	Vanadium	ug/L	23	5	Included as RL	23	1.00	2.00	1.10	0.21	6	17	0	4	6	0.05	Y	Non-unique RL in data (NDs included as RL)
QAL025D	Background	Alkalinity, Carbonate	mg/L	24	13	Included as RL	24	2.00	6.00	2.90	1.30	8	15	1	7	7	0.05	Y	
QAL025D	Background	Chloride	mg/L	24	17	Included as RL	24	1.00	1.80	1.10	0.18	7	17	0	6	7	0.05	Y	
QAL025D	Background	Magnesium	mg/L	10	0	No NDs	10	2.40	2.90	2.60	0.16	5	5	0	2	3	0.05	Y*	Non-unique RL in data
QAL025D	Background	Nitrogen, Nitrate	mg/L	24	0	No NDs	24	0.09	0.17	0.13	0.03	11	11	2	4	7	0.05	Y	
QAL025D	Background	Sodium	mg/L	24	0	No NDs	24	2.90	4.90	3.70	0.46	11	13	0	6	8	0.05	Y	Non-unique RL in data
QAL025D	Background	Specific Conductance	µS/cm @ 25°C	23	0	No NDs	23	85.00	135.00	96.40	10.50	9	14	0	6	7	0.05	Y	
QAL026A	Background	Chloride	mg/L	22	14	Included as RL	22	1.00	1.80	1.10	0.24	6	16	0	4	6	0.05	Y	
QAL026A	Background	Nitrogen, Nitrate	mg/L	22	0	No NDs	22	0.35	1.80	0.90	0.42	10	12	0	6	7	0.05	Y	Non-unique RL in data
QAL026E	Background	Alkalinity, Bicarbonate	mg/L	24	0	No NDs	24	37.40	60.00	55.20	4.39	14	10	0	7	8	0.05	Y	
QAL026E	Background	Arsenic	ug/L	24	0	No NDs	24	6.50	8.10	7.40	0.42	11	13	0	8	8	0.05	Y*	
QAL044B	Compliance	Alkalinity, Bicarbonate	mg/L	24	0	No NDs	24	3.00	51.00	25.40	13.00	11	13	0	5	8	0.05	Y	
QAL044B	Compliance	Alkalinity, Carbonate	mg/L	24	5	Included as RL	24	2.00	38.00	9.84	9.06	11	13	0	3	8	0.05	Y	
QAL044B	Compliance	Arsenic	ug/L	24	19	Included as RL	24	2.00	2.60	2.10	0.14	5	19	0	5	5	0.05	Y	
QAL044B	Compliance	Magnesium	mg/L	9	1	Included as RL	9	0.79	3.50	1.89	0.91	4	5	0	2	2	0.05	Y	Non-unique RL in data (NDs included as RL)
QAL044B	Compliance	pH	SU	24	0	No NDs	24	8.80	10.90	9.32	0.48	9	15	0	5	8	0.05	Y	
QAL044B	Compliance	Potassium	mg/L	9	3	Included as RL	9	0.50	1.70	0.87	0.44	4	5	0	2	2	0.05	Y	
QAL044B	Compliance	Sodium	mg/L	24	0	No NDs	24	2.10	3.30	2.60	0.33	11	13	0	5	8	0.05	Y*	Non-unique RL in data
QAL044B	Compliance	Sulfate	mg/L	24	0	No NDs	24	4.50	8.70	7.00	0.96	13	11	0	2	8	0.05	Y	Non-unique RL in data
QAL060A	Compliance	Alkalinity, Bicarbonate	mg/L	24	0	No NDs	24	29.60	53.30	40.70	6.13	11	13	0	2	8	0.05	Y	
QAL060A	Compliance	Arsenic	ug/L	24	0	No NDs	24	3.00	5.90	4.30	0.76	12	12	0	4	8	0.05	Y	
QAL060A	Compliance	Calcium	mg/L	11	0	No NDs	11	10.00	15.00	12.50	2.02	6	5	0	3	3	0.05	Y	Non-unique RL in data
QAL060A	Compliance	Magnesium	mg/L	11	0	No NDs	11	2.40	3.70	2.90	0.48	5	6	0	3	3	0.05	Y	Non-unique RL in data
QAL060A	Compliance	Nitrogen, Nitrate	mg/L	24	0	No NDs	24	0.14	0.48	0.26	0.09	13	11	0	4	8	0.05	Y*	
QAL060A	Compliance	Potassium	mg/L	11	0	No NDs	11	0.69	1.10	0.90	0.15	4	7	0	2	3	0.05	Y	
QAL060A	Compliance	Specific Conductance	µS/cm @ 25°C	24	0	No NDs	24	68.00	148.00	86.30	17.70	10	14	0	2	8	0.05	Y	
QAL060A	Compliance	Sulfate	mg/L	24	13	Included as RL	24	2.00	3.40	2.10	0.29	6	18	0	6	6	0.05	Y	
QAL060A	Compliance	Vanadium	ug/L	23	6	Included as RL	23	1.00	2.00	1.20	0.21	7	16	0	6	6	0.05	Y	Non-unique RL in data (NDs included as RL)
QAL061A	Compliance	Alkalinity, Bicarbonate	mg/L	24	0	No NDs	24	28.00	119.00	49.87	17.65	11	13	0	8	8	0.05	Y*	
QAL061A	Compliance	Calcium	mg/L	11	0	No NDs	11	11.00	20.40	13.40	3.52	4	7	0	2	3	0.05	Y*	Non-unique RL in data
QAL061A	Compliance	Magnesium	mg/L	11	0	No NDs	11	1.90	3.50	2.40	0.60	4	7	0	2	3	0.05	Y*	Non-unique RL in data
QAL061A	Compliance	Nitrogen, Nitrate	mg/L	24	0	No NDs	24	0.24	0.44	0.32	0.05	12	12	0	2	8	0.05	Y*	
QAL061A	Compliance	Specific Conductance	µS/cm @ 25°C	24	0	No NDs	24	68.00	155.00	98.50	22.20	13	11	0	4	8	0.05	Y	
QAL062A	Compliance	Alkalinity, Bicarbonate	mg/L	24	0	No NDs	24	71.00	214.00	148.00	41.70	13	11	0	2	8	0.05	Y*	
QAL062A	Compliance	Barium	ug/L	11	6	Included as RL	11	20.00	47.40	24.90	8.96	3	8	0	2	2	0.05	Y	
QAL062A	Compliance	Calcium	mg/L	11	0	No NDs	11	11.00	77.00	35.20	25.00	5	6	0	2	3	0.05	Y*	Non-unique RL in data
QAL062A	Compliance	Chloride	mg/L	24	0	No NDs	24	5.30	78.80	52.60	20.20	13	11	0	2	8	0.05	Y*	Non-unique RL in data
QAL062A	Compliance	Magnesium	mg/L	11	0	No NDs	11	2.00	15.90	7.05	5.29	5	6	0	2	3	0.05	Y*	Non-unique RL in data
QAL062A	Compliance	Nitrogen, Nitrate	mg/L	24	0	No NDs	24	0.24	1.40	0.72	0.33	12	12	0	4	8	0.05	Y*	Non-unique RL in data
QAL062A	Compliance	pH	SU	24	0	No NDs	24	7.40	8.50	7.90	0.35	11	13	0	4	8	0.05	Y*	
QAL062A	Compliance	Potassium	mg/L	11	0	No NDs	11	0.70	2.80	1.48	0.79	5	6	0	2	3	0.05	Y*	
QAL062A	Compliance	Sodium	mg/L	24	0	No NDs	24	1.10	36.60	18.20	10.80	13	11	0	2	8	0.05	Y*	Non-unique RL in data
QAL062A	Compliance	Specific Conductance	µS/cm @ 25°C	24	0	No NDs	24	151.00	630.00	443.00	148.00	13	11	0	2	8	0.05	Y	
QAL062A	Compliance	Strontium	ug/L	11	6	Included as RL	11	50.00	118.00	64.53	21.89	3	8	0	2	2	0.05	Y	
QAL062A	Compliance	Sulfate	mg/L	24	4	Included as RL	24	2.00	3.30	2.50	0.44	9	15	0	2	8	0.05	Y	Non-unique RL in data (NDs included as RL)
QAL063A	Compliance	Alkalinity, Bicarbonate	mg/L	24	0	No NDs	24	51.00	222.00	144.00	52.20	14	10	0	2	8	0.05	Y*	
QAL063A	Compliance	Barium	ug/L	11	8	Included as RL	11	20.00	45.50	25.30	10.00	3	8	0	2	2	0.05	Y	
QAL063A	Compliance	Calcium	mg/L	11	0	No NDs	11	11.00	85.20	34.60	28.60	4	7	0	2	3	0.05	Y*	Non-unique RL in data
QAL063A	Compliance	Chloride	mg/L	24	2	Included as RL	24	1.00	108.00	50.15	39.82	11	13	0	2	8	0.05	Y*	Non-unique RL in data (NDs included as RL)

**Mine Permit Groundwater  
Identified Trends  
Eagle Mine**

Location	Classification	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	Sig Level	Trend?	Remarks
QAL063A	Compliance	Magnesium	mg/L	11	0	No NDs	11	1.90	16.60	6.55	5.78	4	7	0	2	3	0.05	Y*	Non-unique RL in data
QAL063A	Compliance	Nitrogen, Nitrate	mg/L	24	0	No NDs	24	0.19	1.20	0.69	0.33	12	12	0	2	8	0.05	Y*	Non-unique RL in data
QAL063A	Compliance	pH	SU	24	0	No NDs	24	6.90	8.80	7.90	0.51	8	16	0	2	7	0.05	Y*	
QAL063A	Compliance	Potassium	mg/L	11	0	No NDs	11	0.62	3.00	1.30	0.84	4	7	0	2	3	0.05	Y*	
QAL063A	Compliance	Sodium	mg/L	24	0	No NDs	24	0.72	42.30	13.67	14.34	9	15	0	2	8	0.05	Y*	Non-unique RL in data
QAL063A	Compliance	Specific Conductance	µS/cm @ 25°C	24	0	No NDs	24	97.00	714.00	419.00	213.00	13	11	0	2	8	0.05	Y	
QAL063A	Compliance	Strontium	ug/L	11	7	Included as RL	11	50.00	116.00	65.68	24.81	4	7	0	2	3	0.05	Y	
QAL063A	Compliance	Sulfate	mg/L	24	4	Included as RL	24	2.00	3.50	2.40	0.43	9	15	0	4	8	0.05	Y	Non-unique RL in data (NDs included as RL)
QAL064D	Compliance	Magnesium	mg/L	10	0	No NDs	10	3.10	4.20	3.90	0.40	8	2	0	2	2	0.05	Y*	Non-unique RL in data
QAL065D	Compliance	Arsenic	ug/L	24	0	No NDs	24	2.40	4.30	3.30	0.52	11	13	0	6	8	0.05	Y	
QAL066D	Compliance	Arsenic	ug/L	24	0	No NDs	24	5.60	11.00	8.50	1.35	14	10	0	8	8	0.05	Y*	
QAL066D	Compliance	Iron	ug/L	24	6	Included as RL	24	20.00	1300.00	340.30	311.70	11	13	0	7	8	0.05	Y*	Non-unique RL in data (NDs included as RL)
QAL066D	Compliance	Sodium	mg/L	24	0	No NDs	24	5.10	23.50	15.70	5.46	14	10	0	4	8	0.05	Y*	Non-unique RL in data
QAL066D	Compliance	Sulfate	mg/L	24	0	No NDs	24	7.10	23.00	10.70	3.99	8	16	0	5	7	0.05	Y	Non-unique RL in data
QAL067A	Compliance	Alkalinity, Bicarbonate	mg/L	24	0	No NDs	24	25.00	93.70	57.10	14.10	12	12	0	4	8	0.05	Y*	
QAL067A	Compliance	Chloride	mg/L	24	0	No NDs	24	41.80	1300.00	395.16	378.07	9	15	0	2	8	0.05	Y*	Non-unique RL in data
QAL067A	Compliance	Mercury	ng/L	24	0	No NDs	24	0.91	3.53	1.83	0.68	11	13	0	6	8	0.05	Y	
QAL067A	Compliance	Nitrogen, Nitrate	mg/L	24	0	No NDs	24	0.24	2.40	1.52	0.67	14	10	0	4	8	0.05	Y*	Non-unique RL in data
QAL067A	Compliance	pH	SU	24	0	No NDs	24	6.00	6.70	6.30	0.23	10	14	0	8	8	0.05	Y*	
QAL067A	Compliance	Potassium	mg/L	12	0	No NDs	12	0.75	9.20	2.98	2.68	4	8	0	3	3	0.05	Y	
QAL067A	Compliance	Sodium	mg/L	24	0	No NDs	24	43.60	720.00	232.70	205.10	9	15	0	2	8	0.05	Y*	Non-unique RL in data
QAL067A	Compliance	Specific Conductance	µS/cm @ 25°C	24	0	No NDs	24	200.00	3915.00	1337.00	1062.00	9	15	0	2	8	0.05	Y	
QAL067A	Compliance	Sulfate	mg/L	24	0	No NDs	24	2.70	20.00	12.10	5.26	11	13	0	3	8	0.05	Y*	Non-unique RL in data
QAL068B	Background	Alkalinity, Bicarbonate	mg/L	24	0	No NDs	24	18.00	37.00	27.30	3.79	12	12	0	8	8	0.05	Y	
QAL068B	Background	Nitrogen, Nitrate	mg/L	24	3	Included as RL	24	0.05	0.10	0.06	0.01	9	15	0	6	8	0.05	Y	
QAL068D	Background	Alkalinity, Bicarbonate	mg/L	24	0	No NDs	24	48.70	68.30	57.80	3.57	14	10	0	6	8	0.05	Y	
QAL068D	Background	Arsenic	ug/L	24	0	No NDs	24	4.40	6.80	5.40	0.75	11	13	0	4	8	0.05	Y	
QAL068D	Background	Chloride	mg/L	24	15	Included as RL	24	1.00	1.20	1.00	0.08	7	17	0	7	7	0.05	Y	
QAL068D	Background	Magnesium	mg/L	10	0	No NDs	10	3.30	4.10	3.70	0.23	6	4	0	2	3	0.05	Y	Non-unique RL in data
QAL068D	Background	pH	SU	24	0	No NDs	24	8.00	8.90	8.40	0.22	14	10	0	8	8	0.05	Y	
QAL068D	Background	Sulfate	mg/L	24	0	No NDs	24	4.90	5.90	5.40	0.25	11	13	0	8	8	0.05	Y	Non-unique RL in data
QAL068D	Background	Vanadium	ug/L	23	0	No NDs	23	1.60	7.70	3.20	1.20	8	15	0	7	7	0.05	Y*	Non-unique RL in data
QAL069A	Background	Alkalinity, Bicarbonate	mg/L	24	0	No NDs	24	107.00	230.00	170.00	34.90	13	11	0	6	8	0.05	Y	
QAL069A	Background	Magnesium	mg/L	10	0	No NDs	10	5.40	24.00	15.50	6.23	5	5	0	3	3	0.05	Y	Non-unique RL in data
QAL069A	Background	Nitrogen, Nitrate	mg/L	24	0	No NDs	24	0.27	1.70	0.88	0.29	12	12	0	8	8	0.05	Y*	Non-unique RL in data
QAL069A	Background	Potassium	mg/L	10	0	No NDs	10	0.55	2.10	1.45	0.50	6	4	0	2	3	0.05	Y	
QAL069A	Background	Sodium	mg/L	24	0	No NDs	24	6.60	99.30	30.90	22.95	8	16	0	5	7	0.05	Y*	Non-unique RL in data
QAL070A	Compliance	Alkalinity, Bicarbonate	mg/L	6	0	No NDs	6	40.00	80.70	60.00	16.20	3	3	0	2	2	0.1	Y*	
QAL070A	Compliance	Barium	ug/L	10	5	Included as RL	10	20.00	30.20	23.60	4.09	5	5	0	2	3	0.05	Y	
QAL070A	Compliance	Calcium	mg/L	10	0	No NDs	10	8.50	51.90	30.00	17.80	6	4	0	2	3	0.05	Y*	Non-unique RL in data
QAL070A	Compliance	Magnesium	mg/L	10	0	No NDs	10	2.10	9.90	6.04	3.20	6	4	0	2	3	0.05	Y*	Non-unique RL in data
QAL070A	Compliance	Nitrogen, Nitrate	mg/L	6	0	No NDs	6	0.98	1.40	1.20	0.17	4	2	0	2	2	0.25	Y*	Non-unique RL in data
QAL070A	Compliance	Potassium	mg/L	10	0	No NDs	10	0.54	2.20	1.34	0.67	5	5	0	2	3	0.05	Y	
QAL070A	Compliance	Strontium	ug/L	10	4	Included as RL	10	50.00	92.20	64.90	15.10	5	5	0	2	3	0.05	Y	
QAL070A	Compliance	Sulfate	mg/L	6	0	No NDs	6	3.50	10.30	6.93	2.64	3	3	0	2	2	0.1	Y*	
QAL071A	Compliance	Barium	ug/L	11	5	Included as RL	11	20.00	39.00	26.80	8.44	4	7	0	2	3	0.05	Y	
QAL071A	Compliance	Calcium	mg/L	12	0	No NDs	12	11.00	94.90	51.00	31.60	7	5	0	2	3	0.05	Y*	Non-unique RL in data
QAL071A	Compliance	Chloride	mg/L	24	0	No NDs	24	11.60	44.00	23.50	6.86	11	13	0	8	8	0.05	Y*	Non-unique RL in data
QAL071A	Compliance	Copper	ug/L	24	13	Included as RL	24	5.00	28.60	9.17	6.31	9	15	0	3	8	0.05	Y*	
QAL071A	Compliance	Magnesium	mg/L	12	0	No NDs	12	1.40	15.00	7.57	4.96	7	5	0	2	3	0.05	Y*	Non-unique RL in data
QAL071A	Compliance	Nitrogen, Nitrate	mg/L	24	1	Included as RL	24	0.05	38.00	21.14	10.33	14	10	0	7	8	0.05	Y*	Non-unique RL in data (NDs included as RL)
QAL071A	Compliance	Sodium	mg/L	24	0	No NDs	24	5.70	25.00	14.50	4.54	14	10	0	6	8	0.05	Y*	Non-unique RL in data
QAL071A	Compliance	Specific Conductance	µS/cm @ 25°C	24	0	No NDs	24	280.00	699.00	488.00	104.00	14	10	0	7	8	0.05	Y	
QAL071A	Compliance	Strontium	ug/L	10	4	Included as RL	10	50.00	105.00	72.97	23.03	5	5	0	2	3	0.05	Y	
QAL071A	Compliance	Sulfate	mg/L	24	0	No NDs	24	5.70	12.60	8.12	1.72	9	15	0	7	8	0.05	Y*	Non-unique RL in data
QAL073A	Compliance	Alkalinity, Bicarbonate	mg/L	6	0	No NDs	6	52.50	100.00	86.05	18.41	4	2	0	2	2	0.25	Y*	
QAL073A	Compliance	Chloride	mg/L	6	0	No NDs	6	2.10	8.40	4.40	2.30	2	4	0	2	2	0.25	Y	
QAL073A	Compliance	Nitrogen, Nitrate	mg/L	6	0	No NDs	6	0.84	2.00	1.37	0.41	3	3	0	2	2	0.1	Y*	Non-unique RL in data
QAL074A	Compliance	Alkalinity, Bicarbonate	mg/L	24	0	No NDs	24	31.00	102.00	65.94	22.23	13	11	0	2	8	0.05	Y*	
QAL074A	Compliance	Calcium	mg/L	9	0	No NDs	9	9.10	38.10	25.90	10.80	5	4	0	2	2	0.05	Y*	Non-unique RL in data
QAL074A	Compliance	Magnesium	mg/L	9	0	No NDs	9	1.70	7.30	5.10	2.20	5	4	0	2	2	0.05	Y*	Non-unique RL in data
QAL074A	Compliance	Mercury	ng/L	24	14	Included as RL	24	0.50	1.92	0.75	0.40	9	15	0	7	8	0.05	Y	
QAL074A	Compliance	Nitrogen, Nitrate	mg/L	24	0	No NDs	24	0.75	2.40	1.18	0.43	8	16	0	4	7	0.05	Y*	Non-unique RL in data

**Mine Permit Groundwater  
Identified Trends  
Eagle Mine**

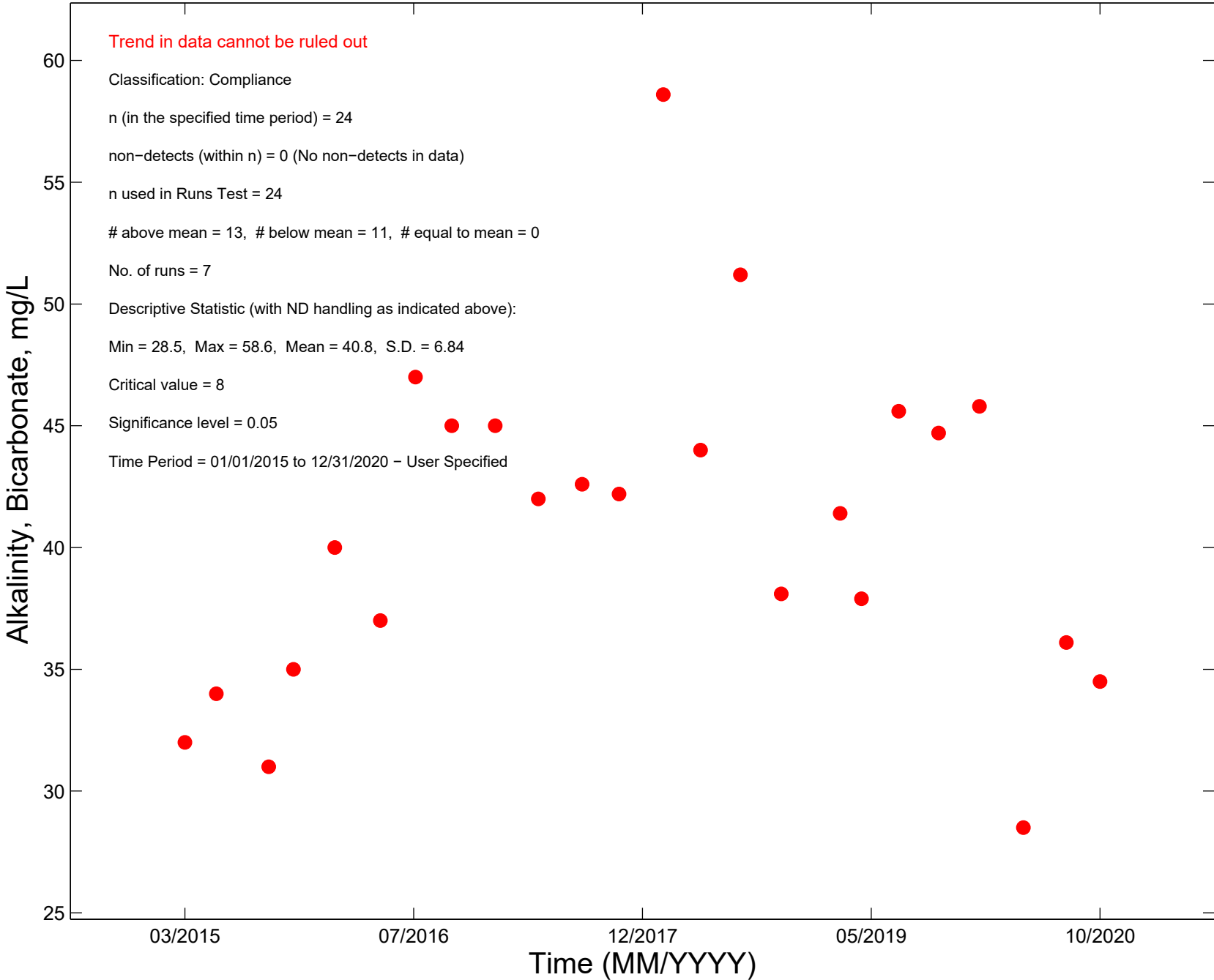
Location	Classification	Parameter	Unit	# Samples	# NDs	Non-detects handling	# used in Runs Test	Min	Max	Mean	St. Dev.	# Above Mean	# Below Mean	# Equal Mean	# Runs	Critical value	Sig Level	Trend?	Remarks
QAL074A	Compliance	pH	SU	24	0	No NDs	24	7.70	9.30	8.45	0.36	11	13	0	6	8	0.05	Y*	
QAL074A	Compliance	Potassium	mg/L	9	0	No NDs	9	0.59	1.70	1.07	0.37	5	4	0	2	2	0.05	Y	
QAL074A	Compliance	Sodium	mg/L	24	0	No NDs	24	1.50	26.10	14.80	7.81	12	12	0	4	8	0.05	Y*	Non-unique RL in data
QAL074A	Compliance	Specific Conductance	µS/cm @ 25°C	24	0	No NDs	24	124.00	439.00	281.00	63.70	13	11	0	4	8	0.05	Y	
QAL074A	Compliance	Sulfate	mg/L	24	0	No NDs	24	4.80	8.50	7.10	0.95	13	11	0	8	8	0.05	Y*	Non-unique RL in data

**Mine Permit Groundwater Trend Analysis**  
**Notes and Abbreviations Used in Statistical Summary Tables**  
**Eagle Mine**

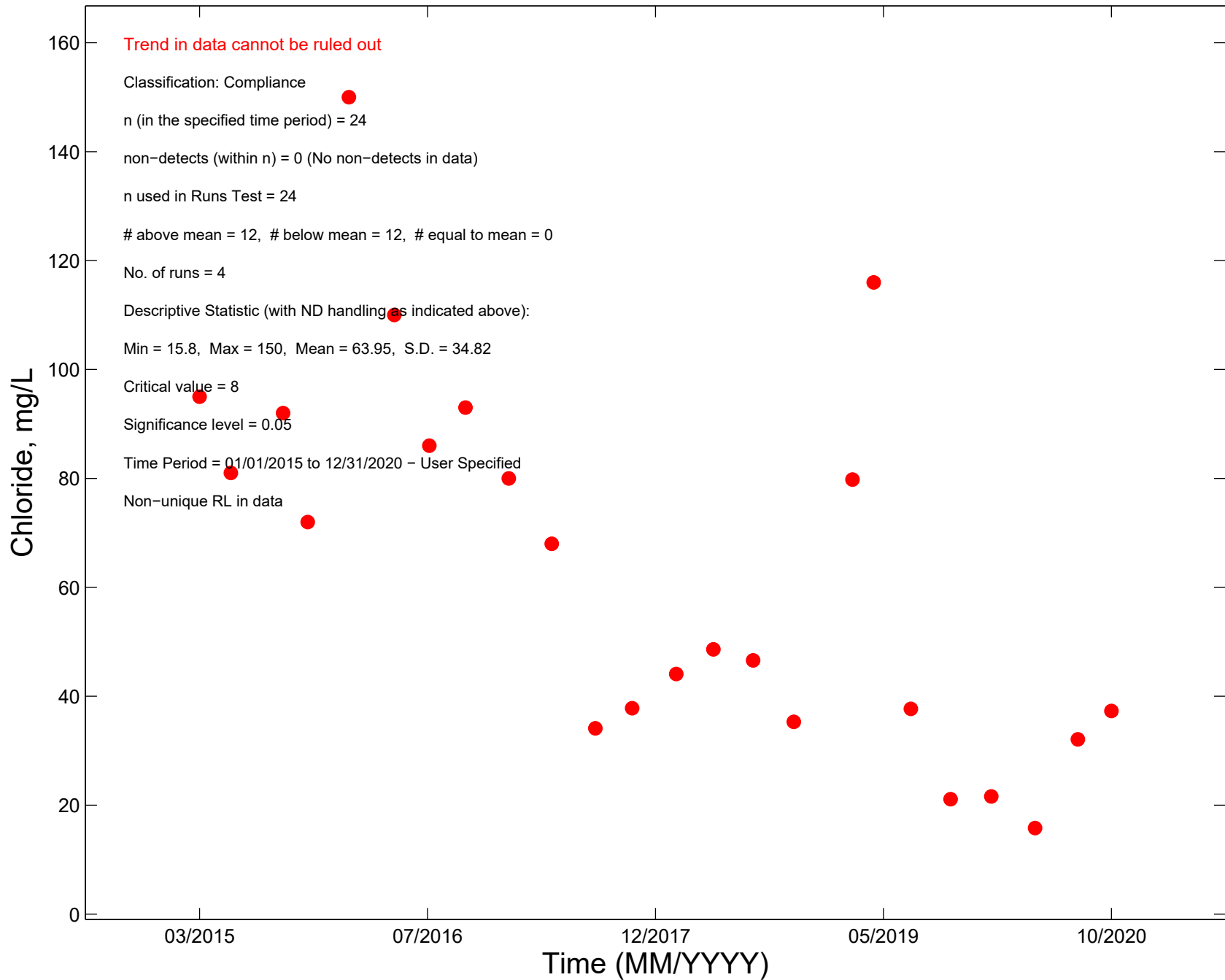
Abbreviation	Explanation
N	Null Hypothesis that the sequence was produced in a random manner cannot be rejected at the indicated significance level (i.e. a trend in data not indicated).
Y	Null Hypothesis that the sequence was produced in a random manner cannot be accepted at the indicated significance level (i.e. a trend in data cannot be ruled out).
Y*	In addition to a trend being identified, the parameter exceeded the limit at least two times in a row.
ND	Non detect (reported concentration was below the analytical reporting limit).
R	Trend rejected because it was an artifact of non-detect values and/or inconsistent RLs.
RL	Reporting limit.
TF	Too few observations to run the test.
TFA	Too few observations remaining after exclusion of values=mean.
TFPN	Too few + or - values in the logic series (n1 or n2 = 1).

Notes: Trend analysis period is baseline (March 2011) through Q4 2020 for parameters sampled annually and Q1 2015 through Q4 2020 for parameters sampled quarterly.

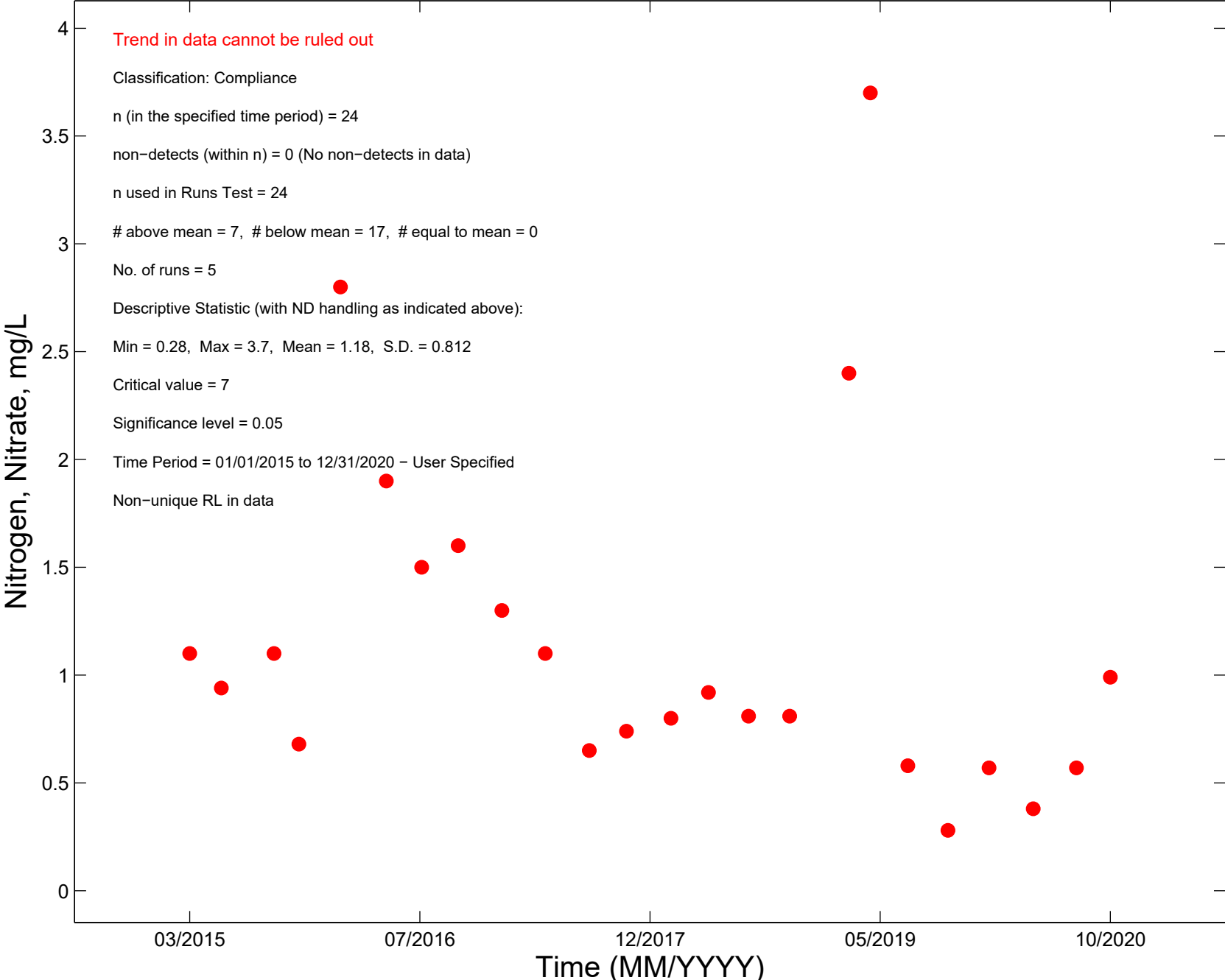
# QAL024A



# QAL024A

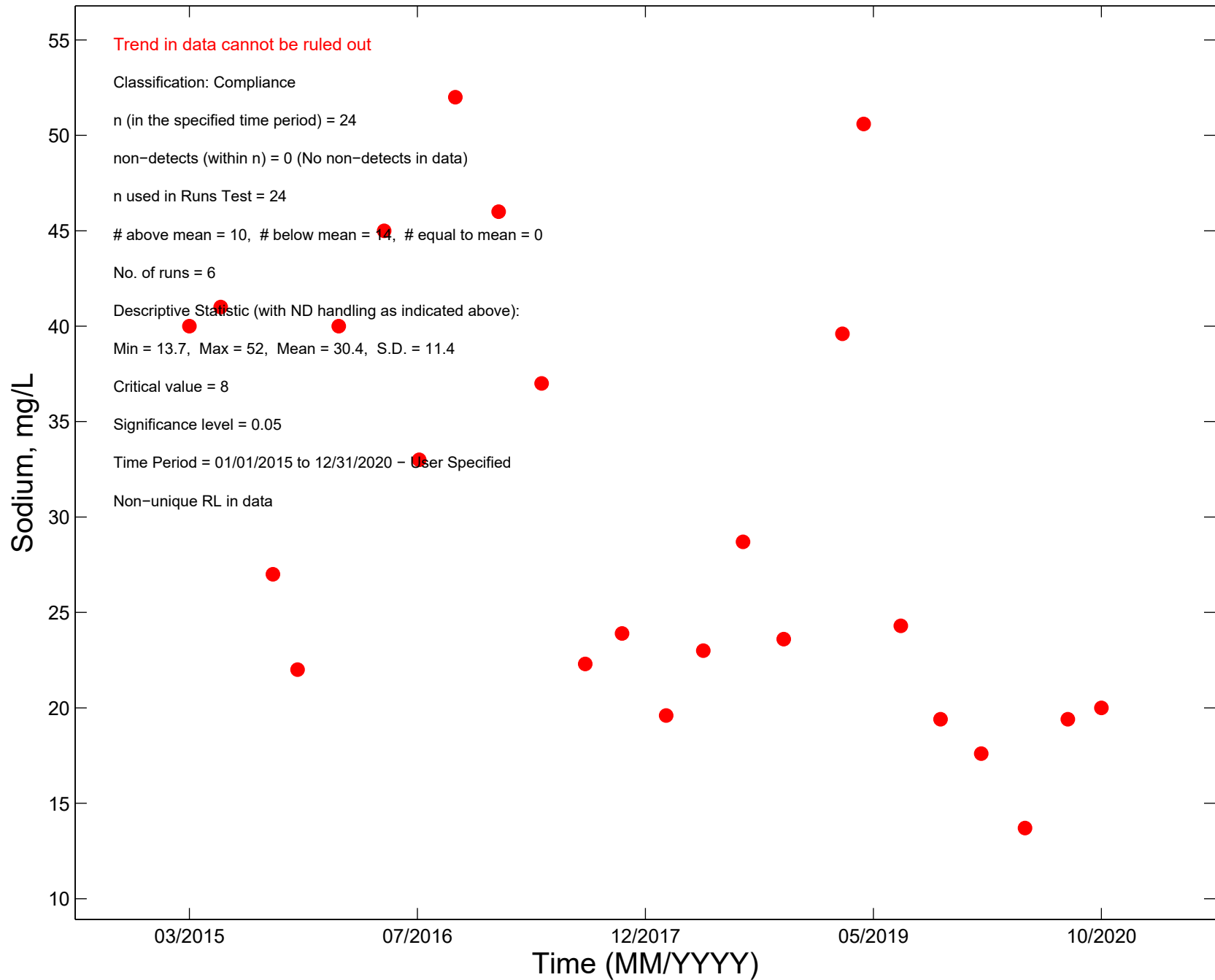


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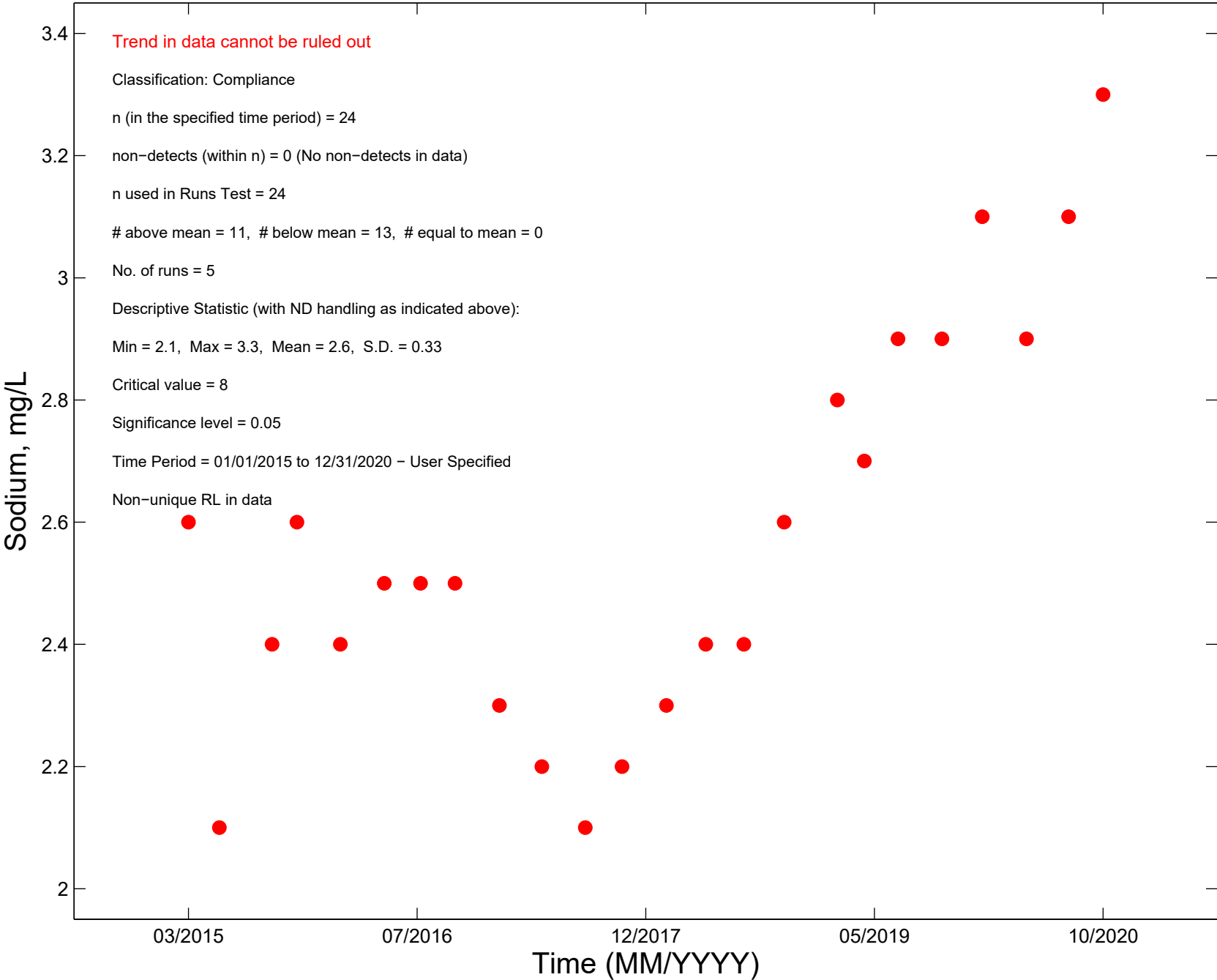




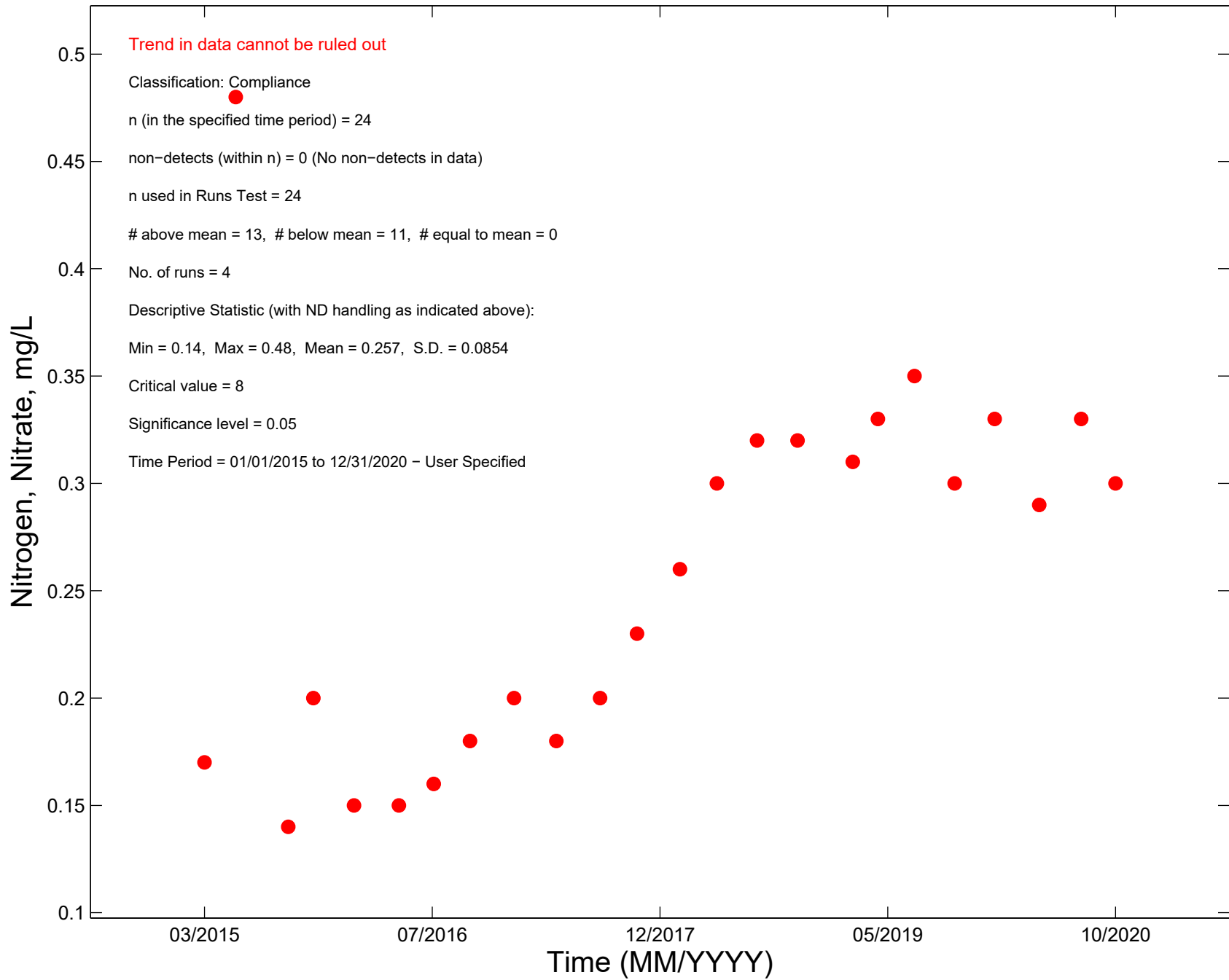
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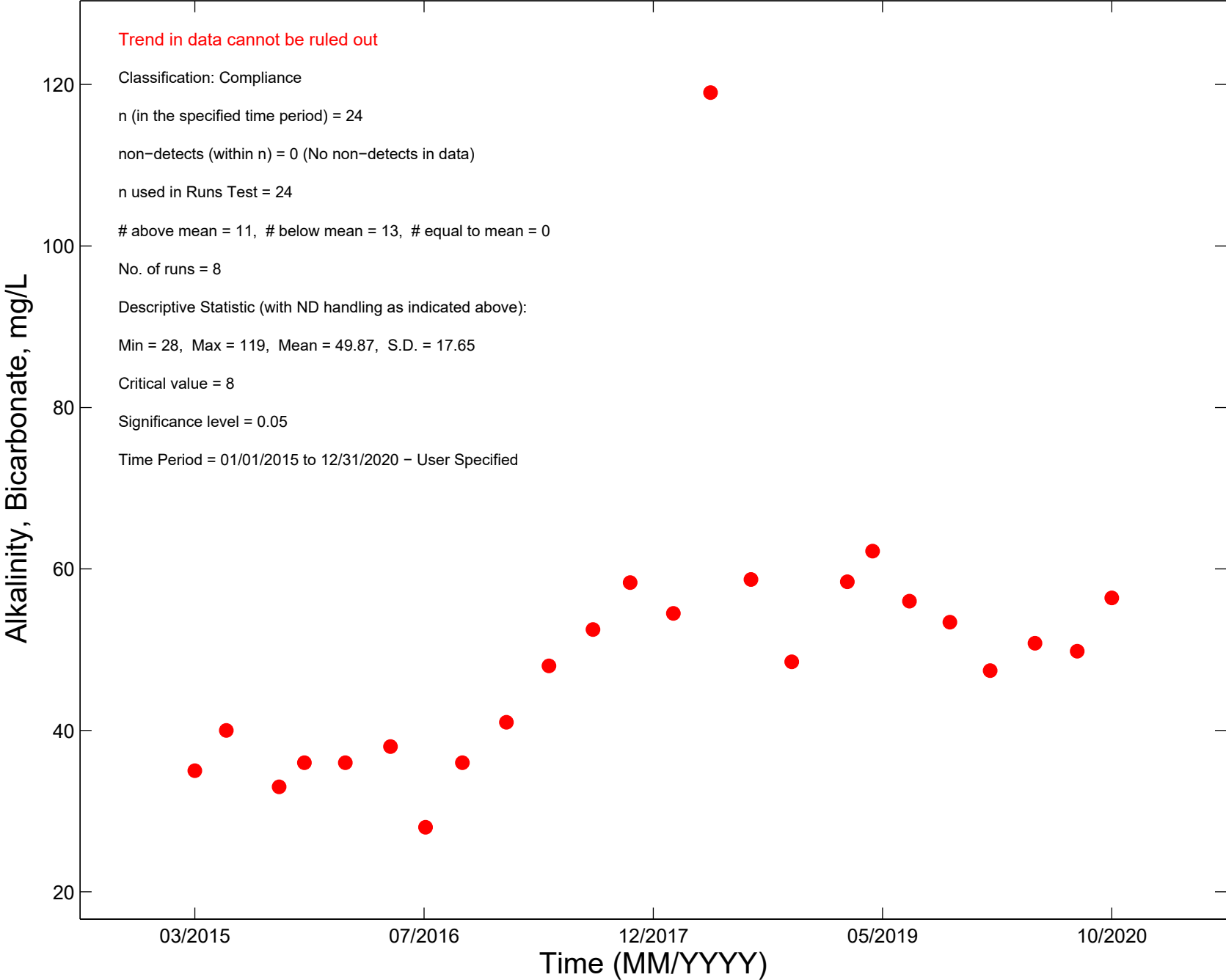
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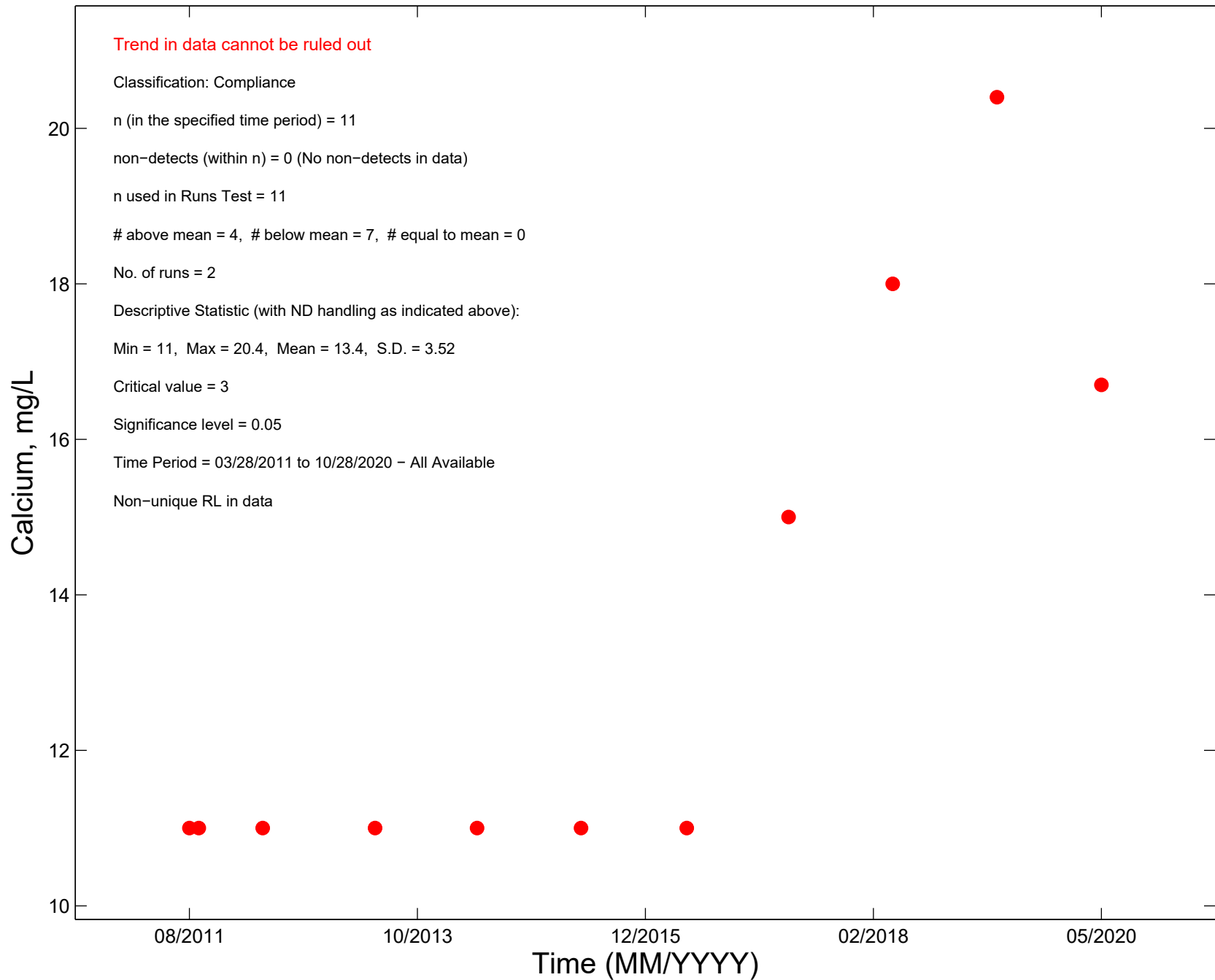
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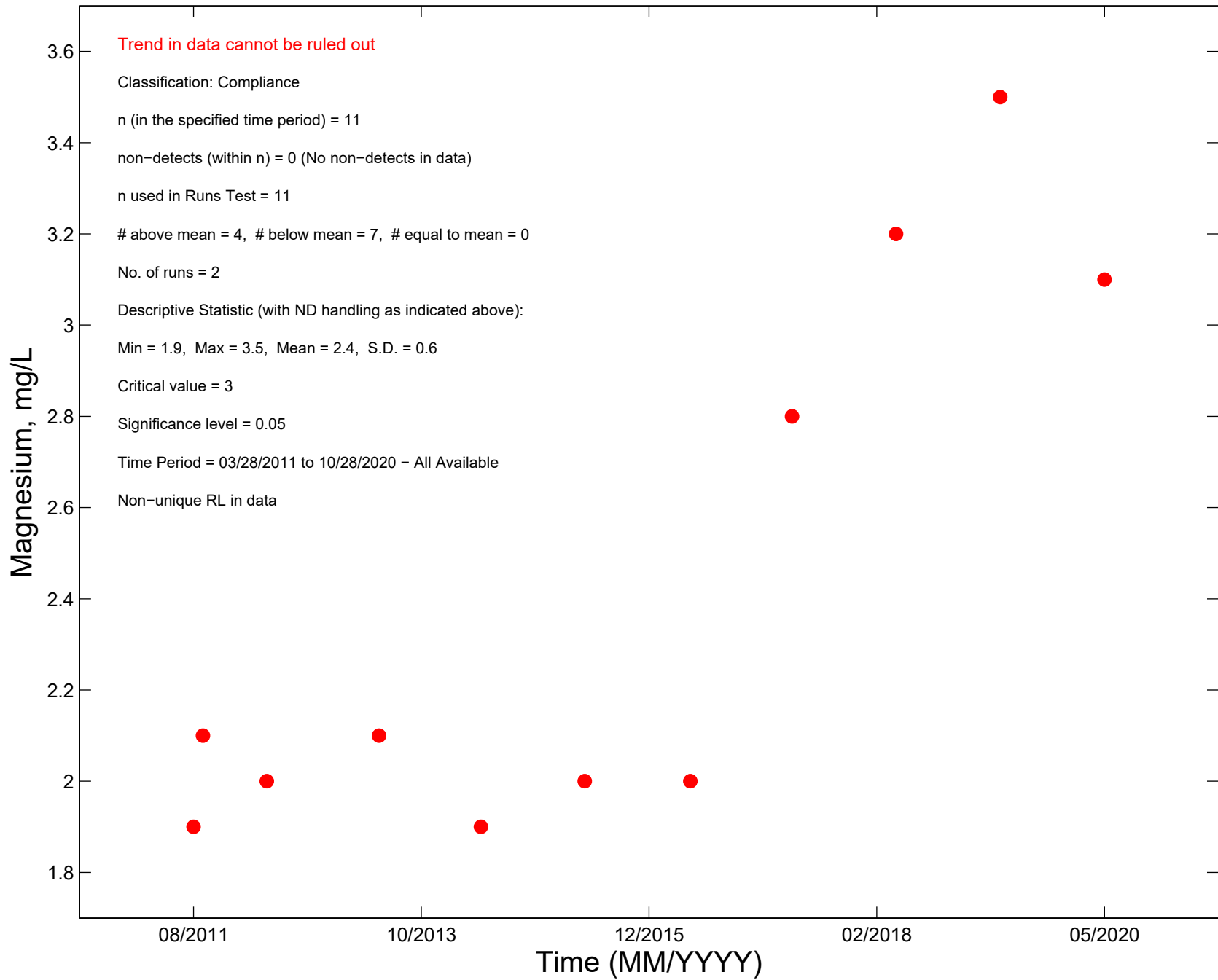
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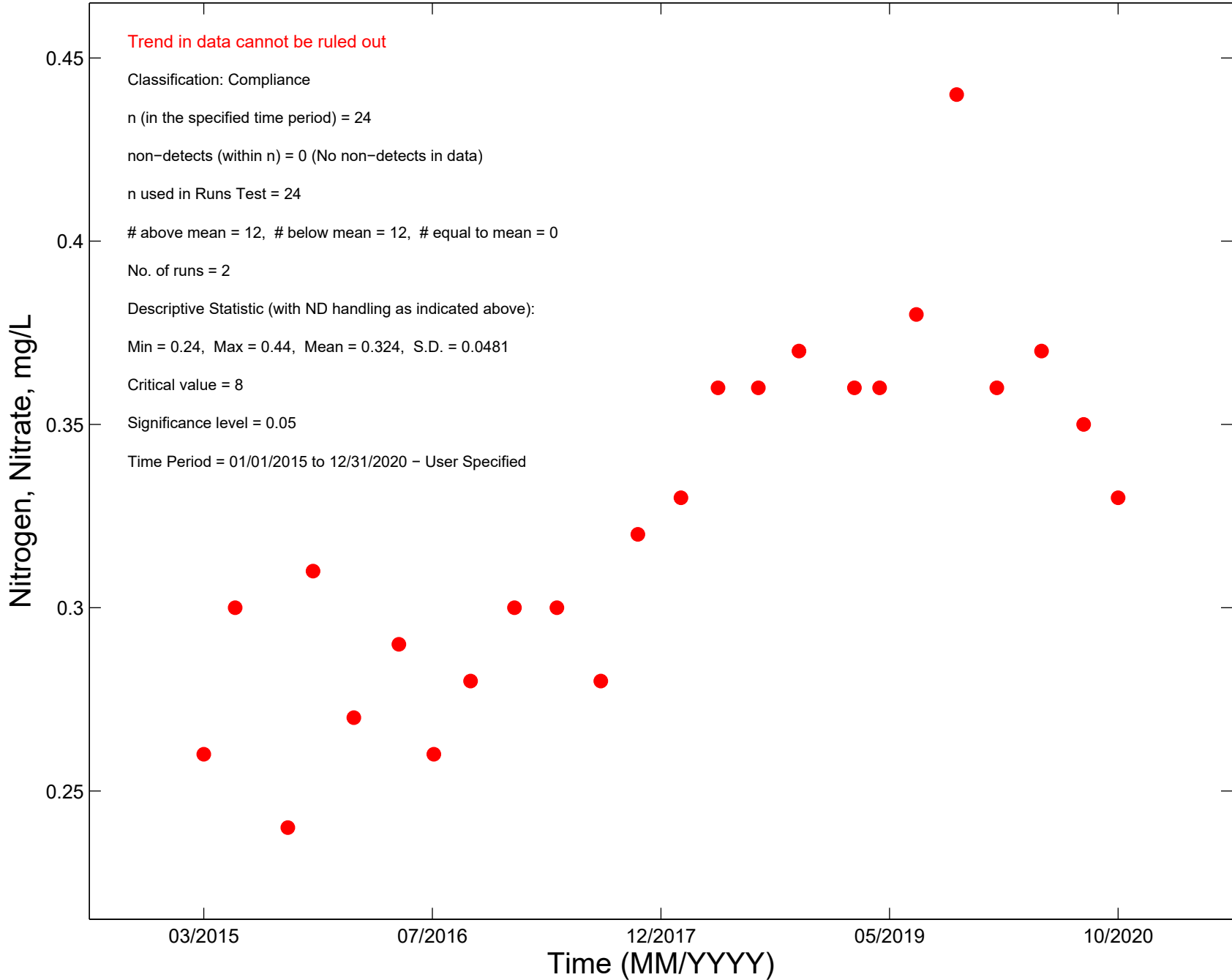
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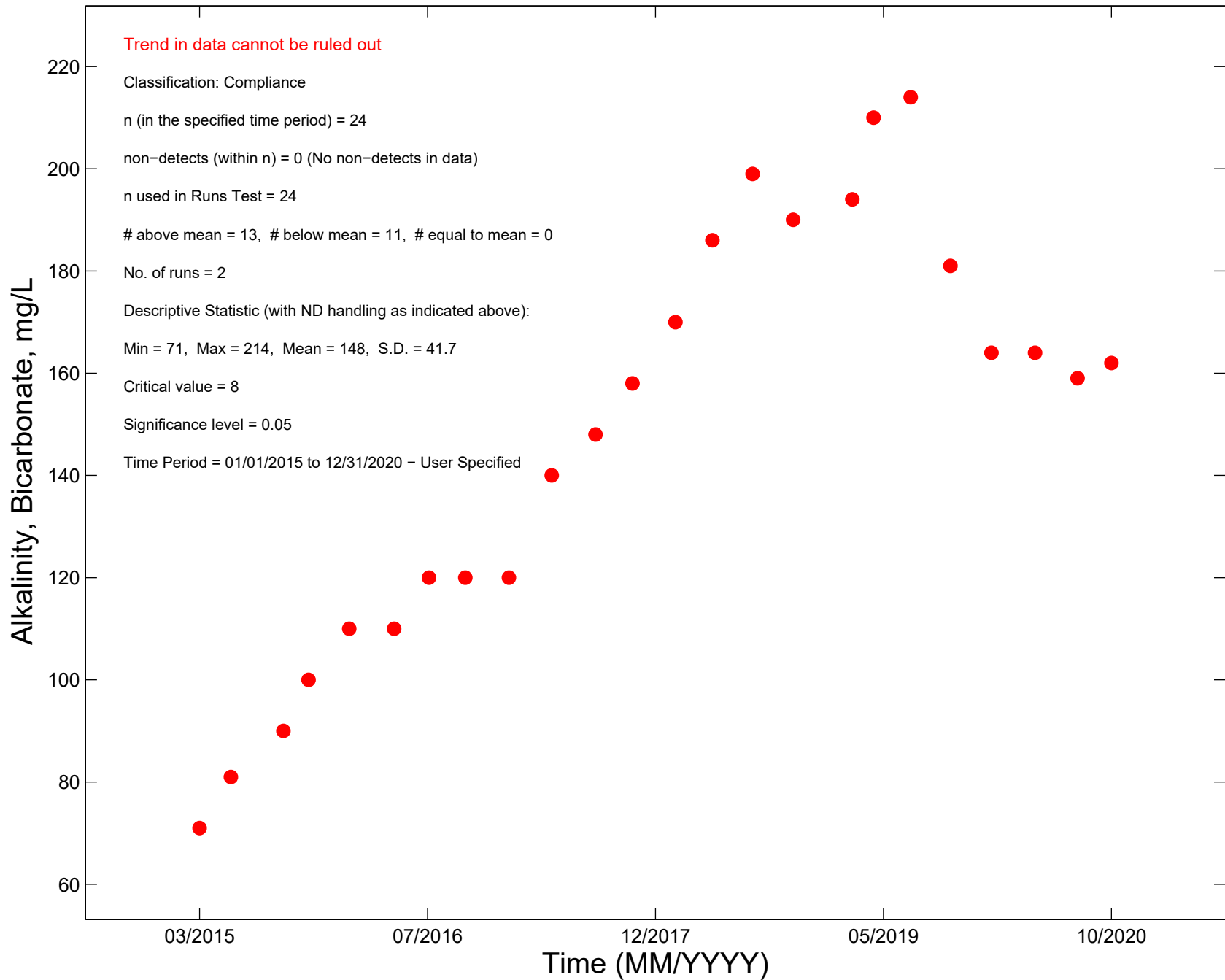
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# QAL061A

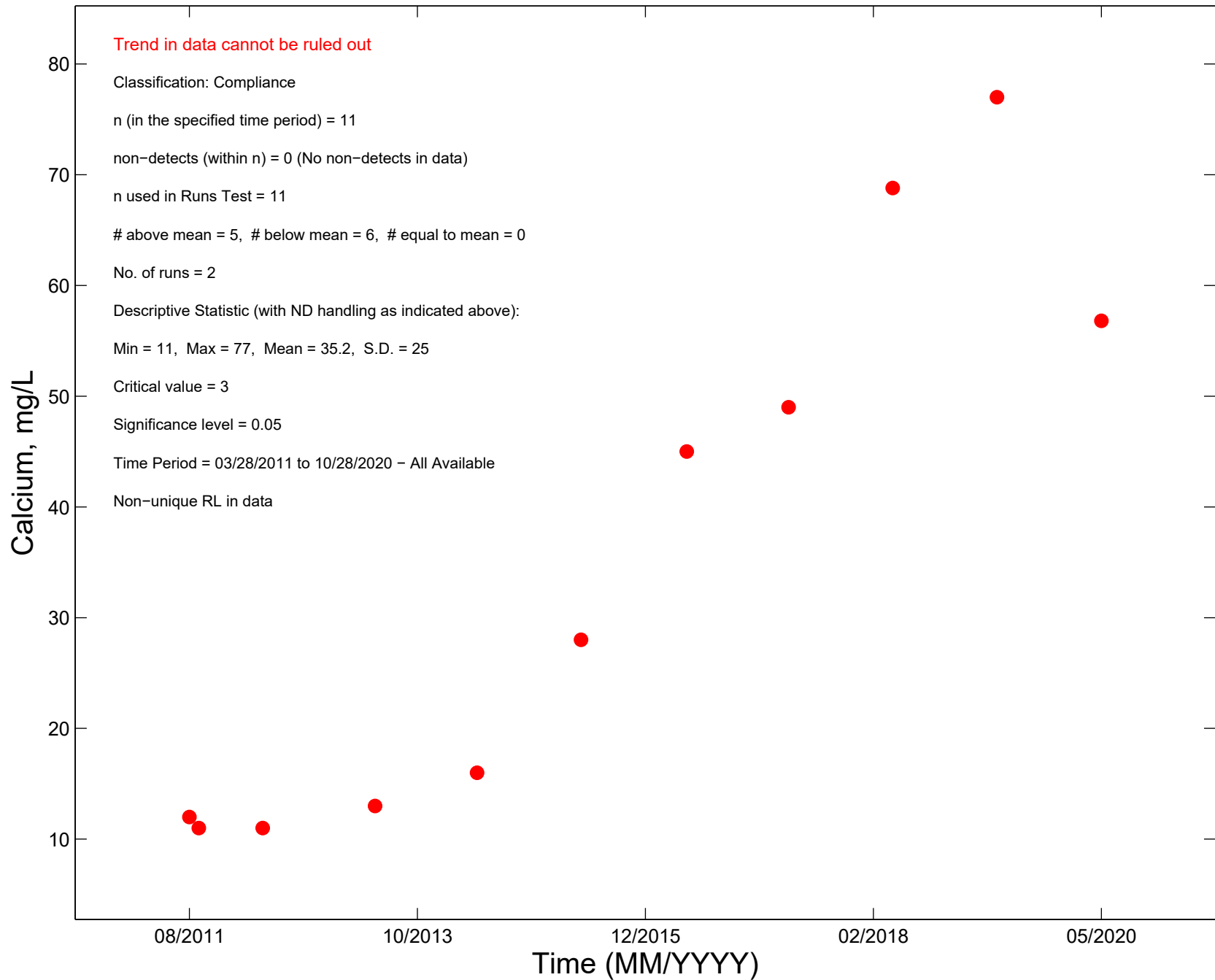


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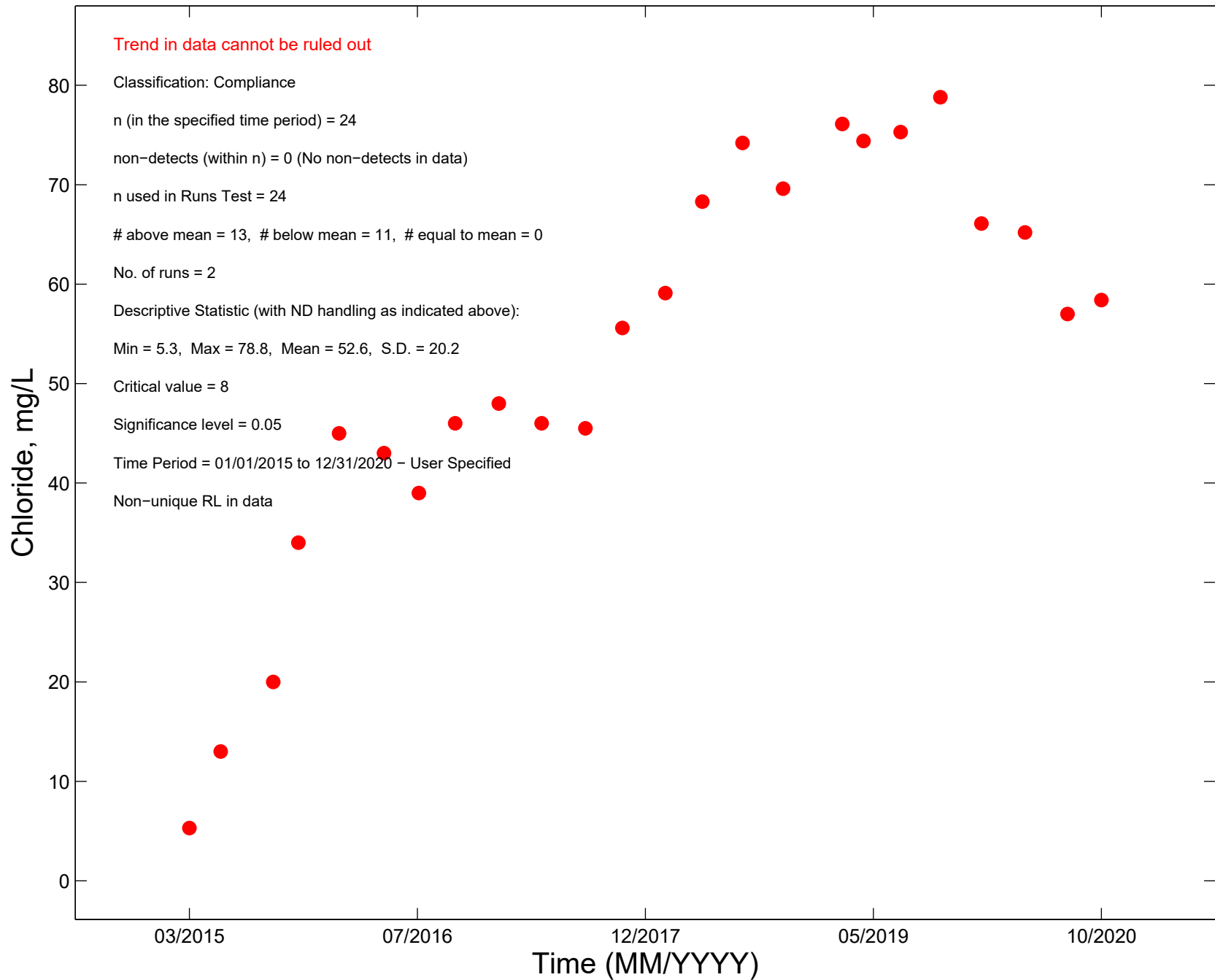




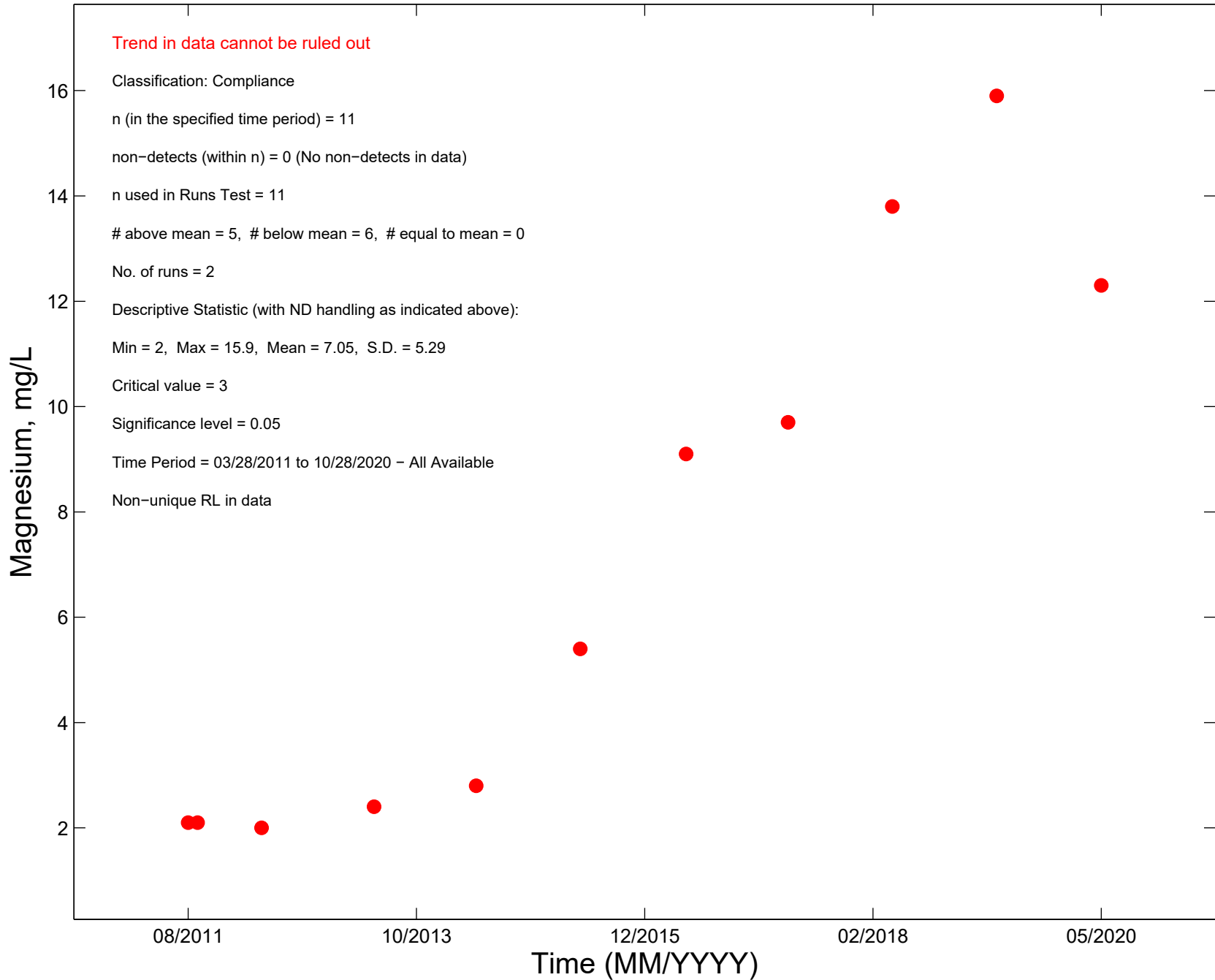
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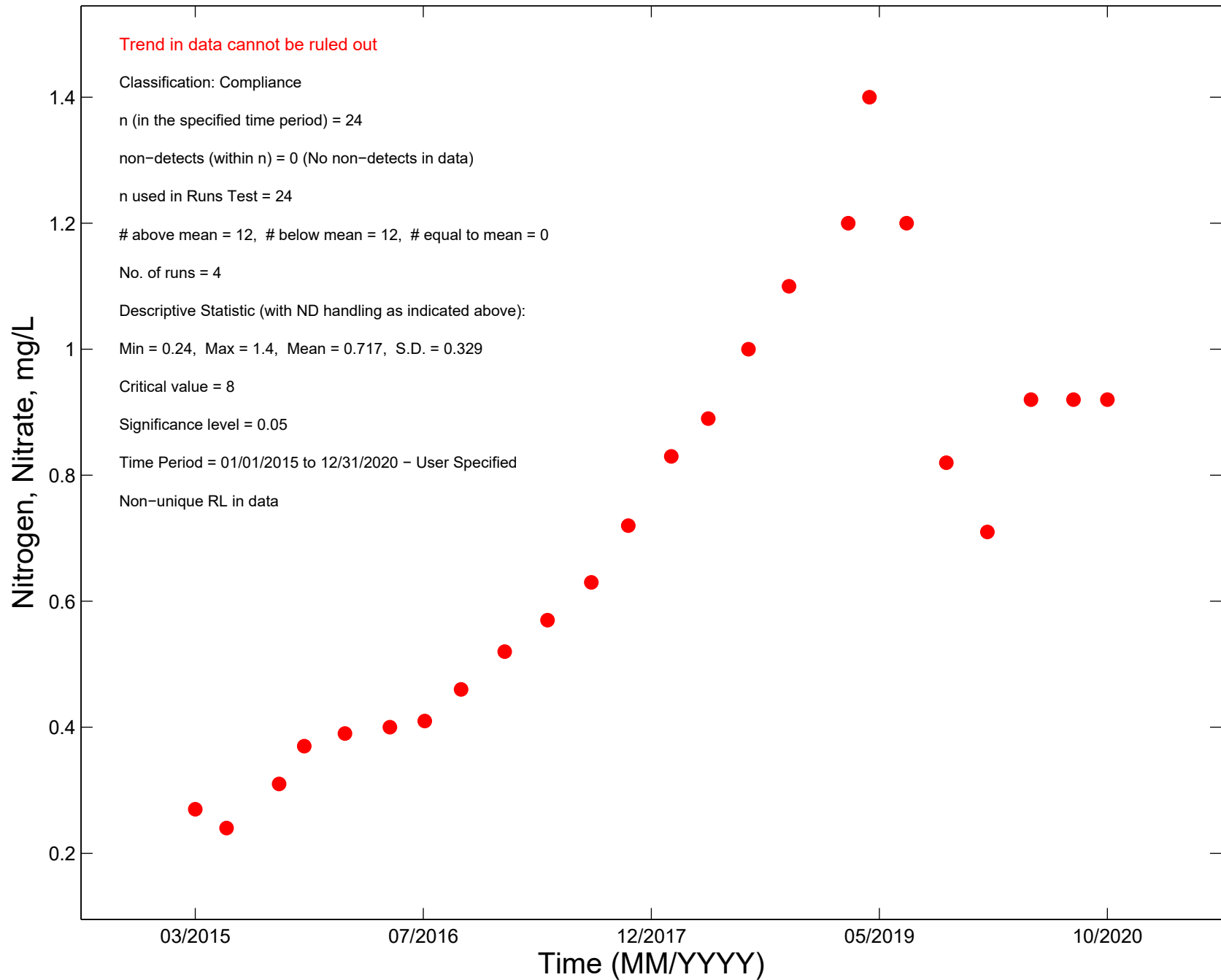
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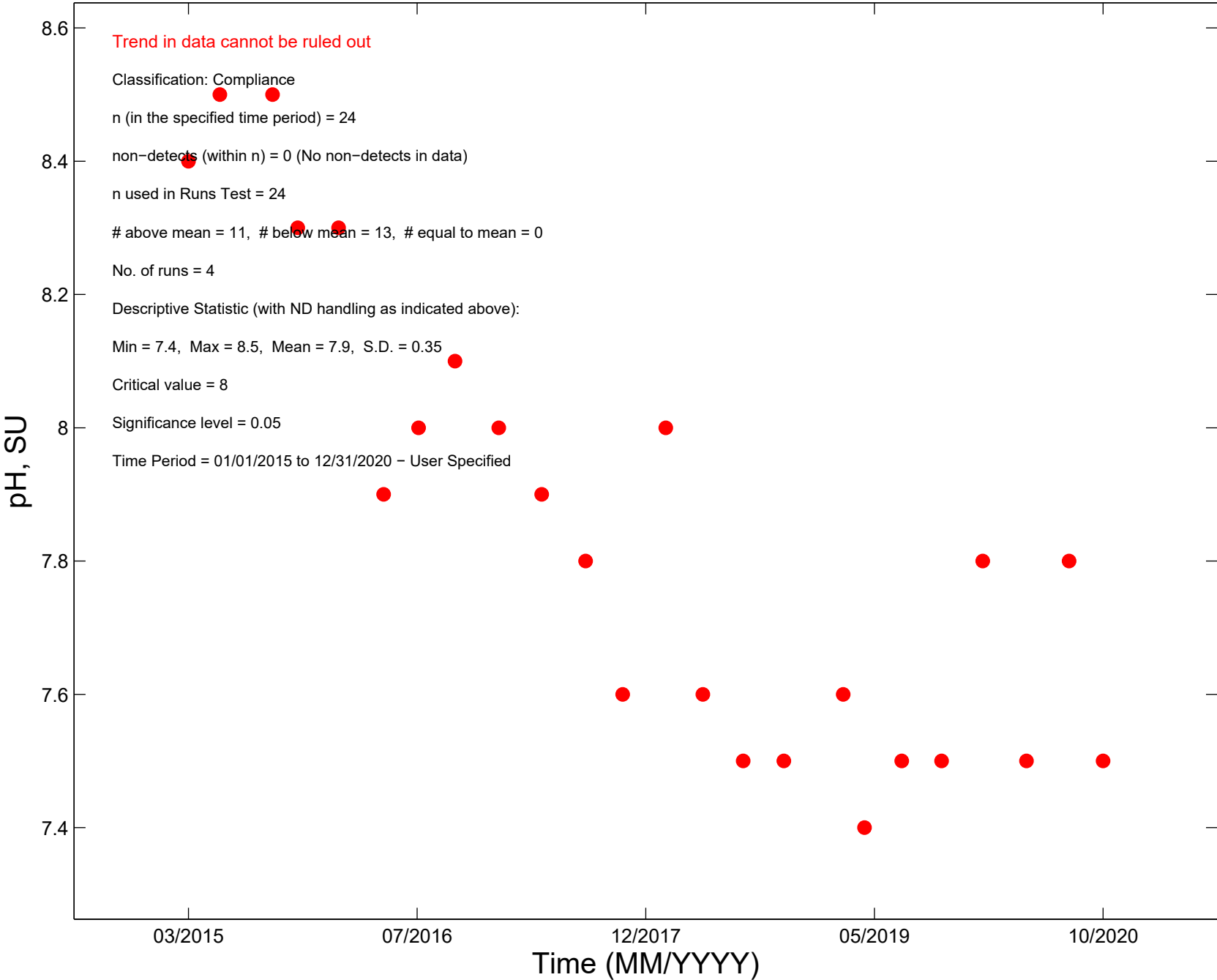
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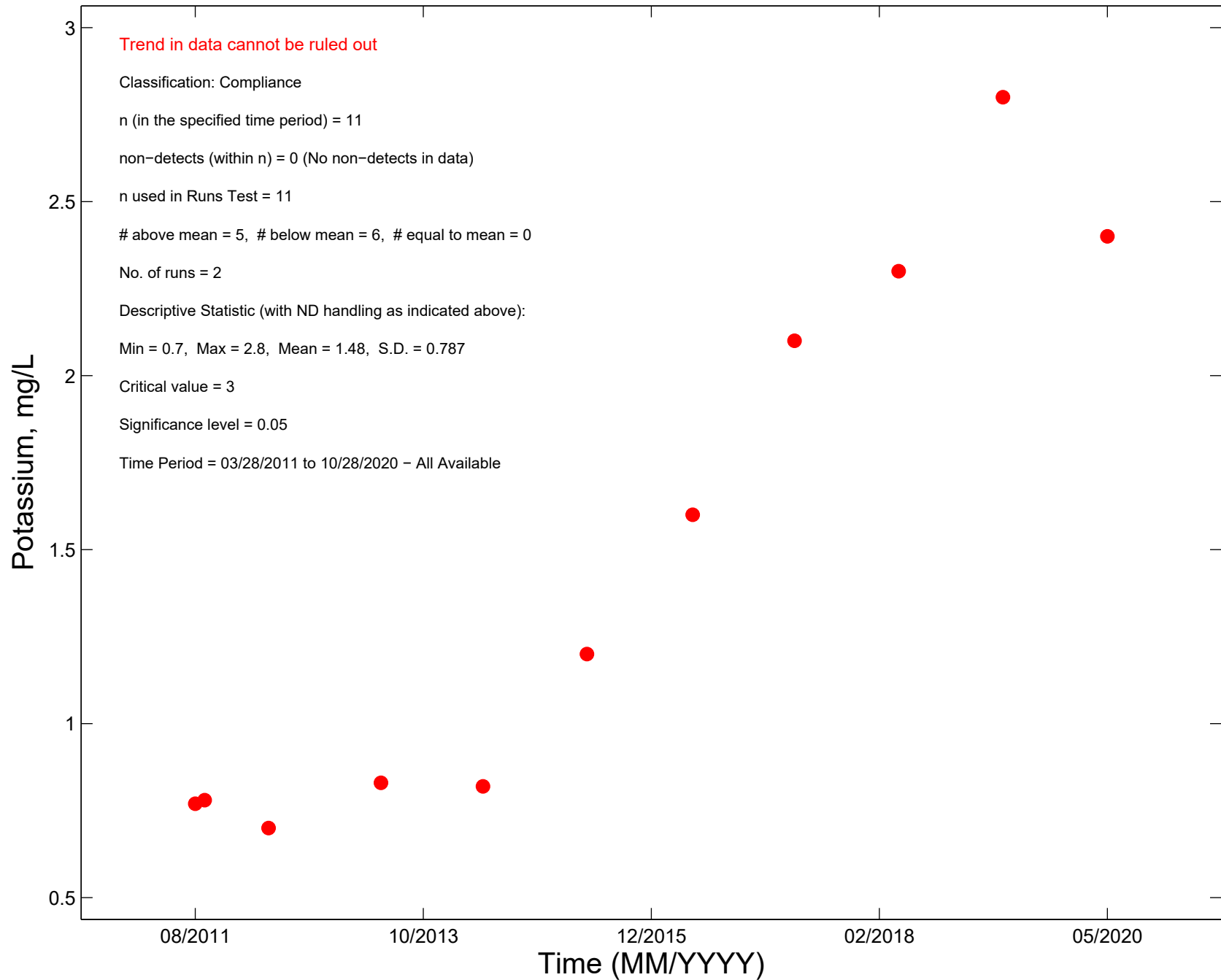
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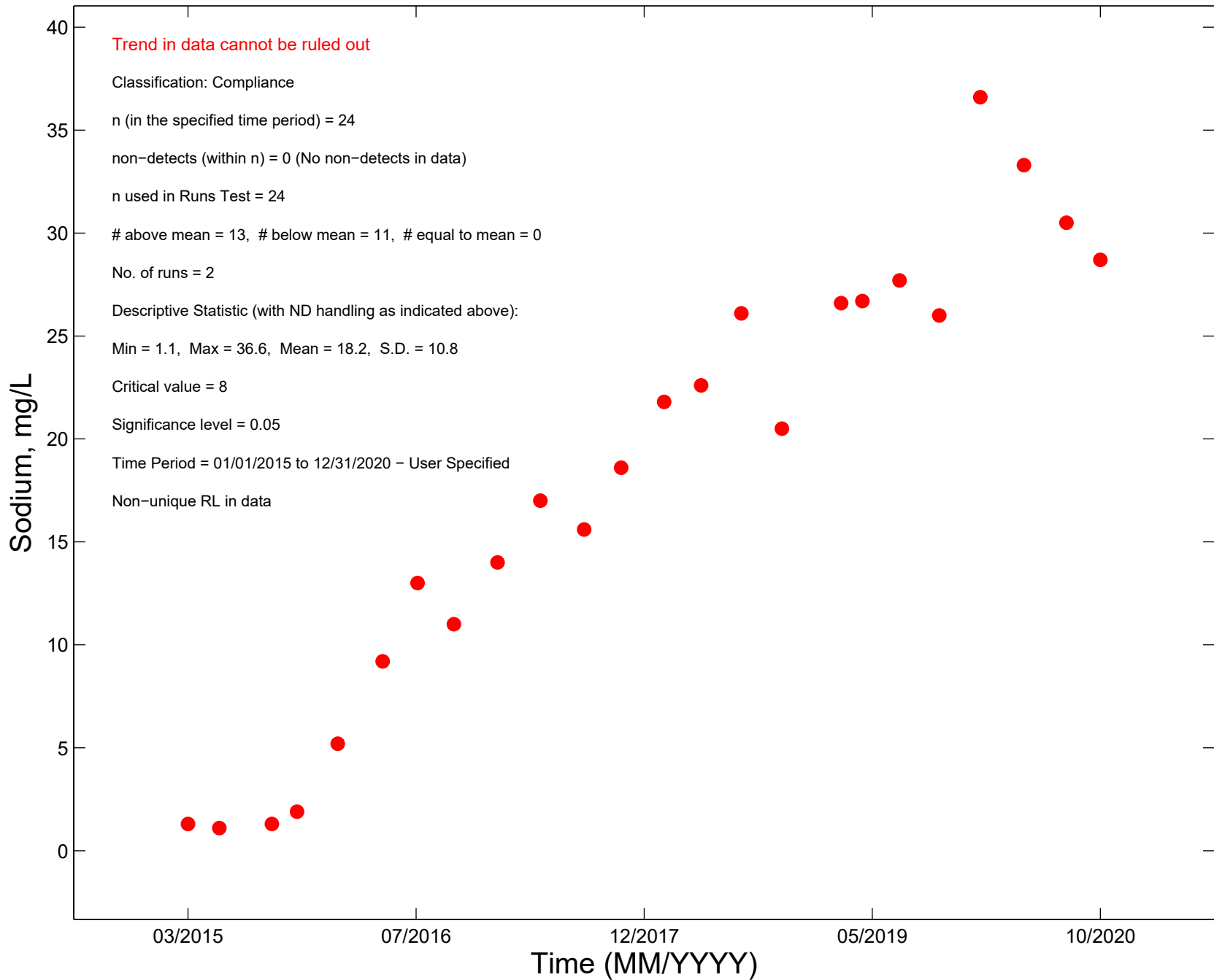
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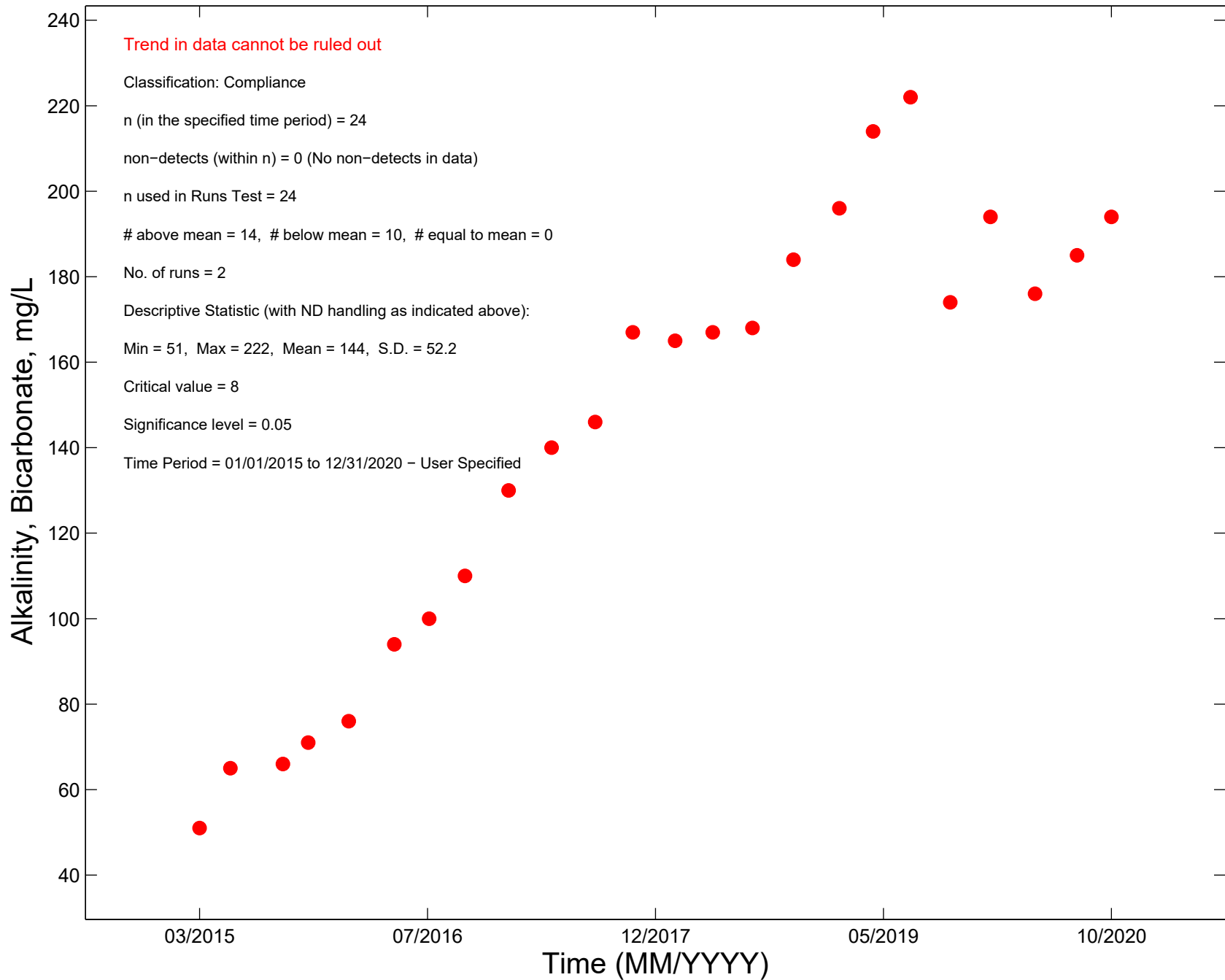
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# QAL062A

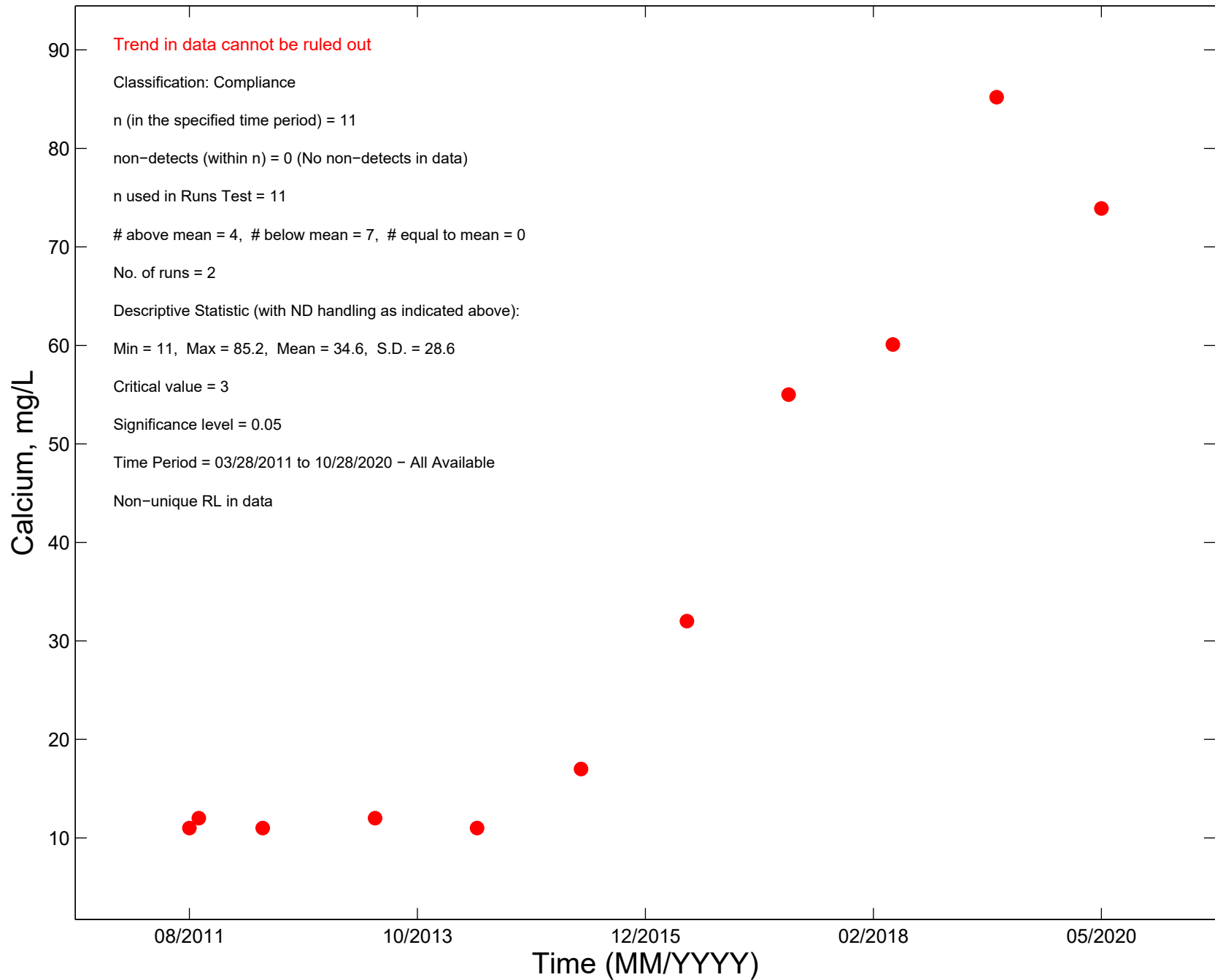


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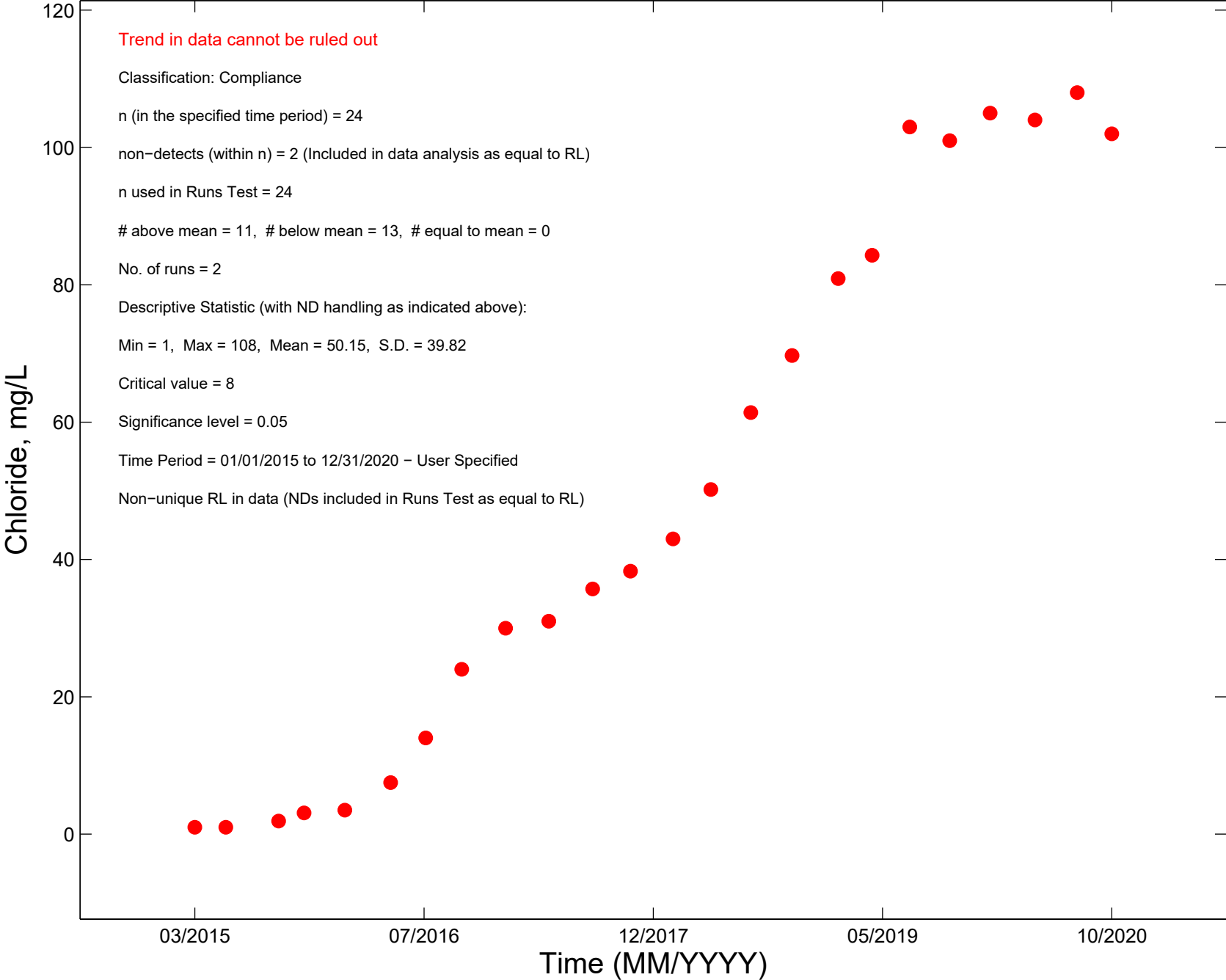




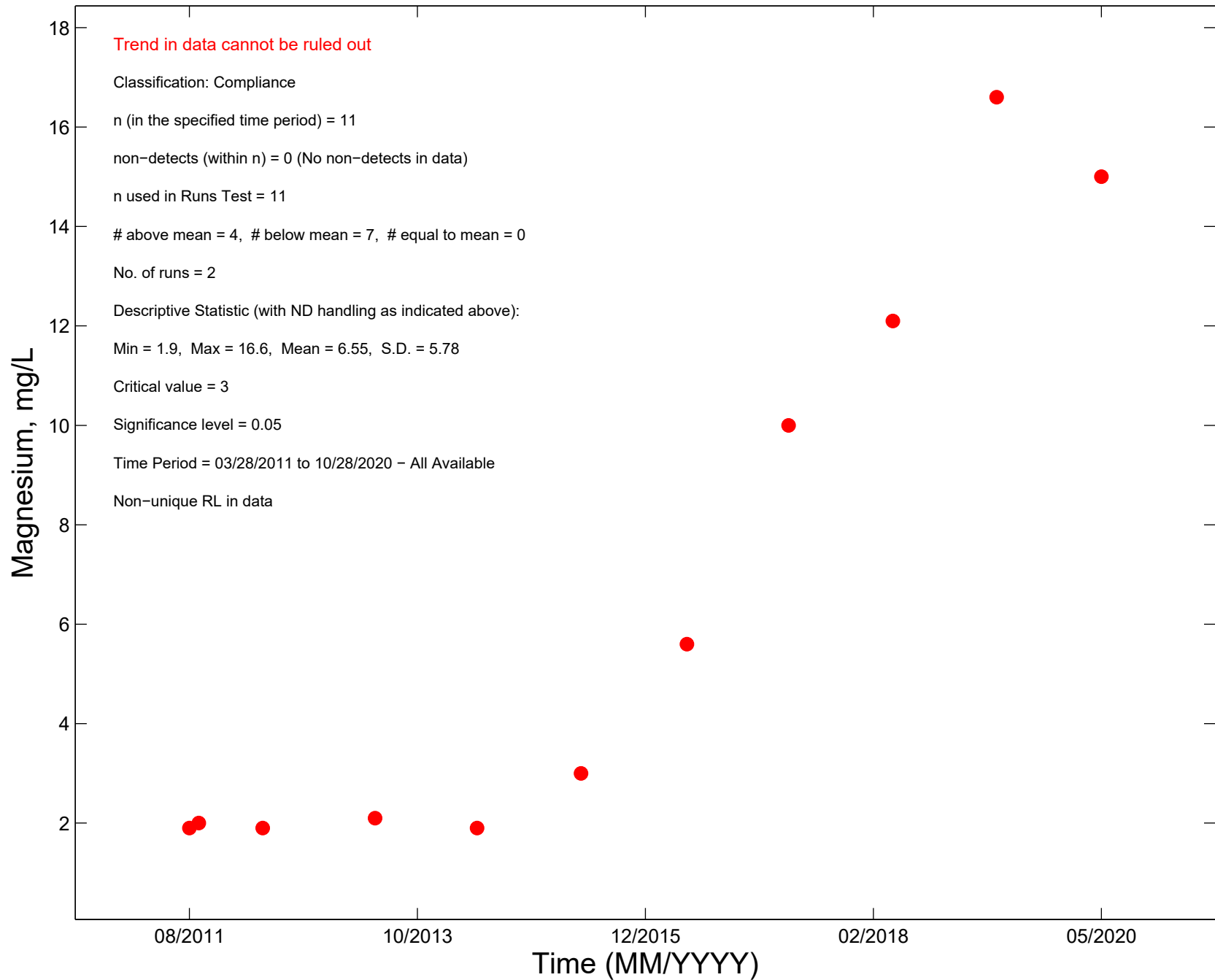
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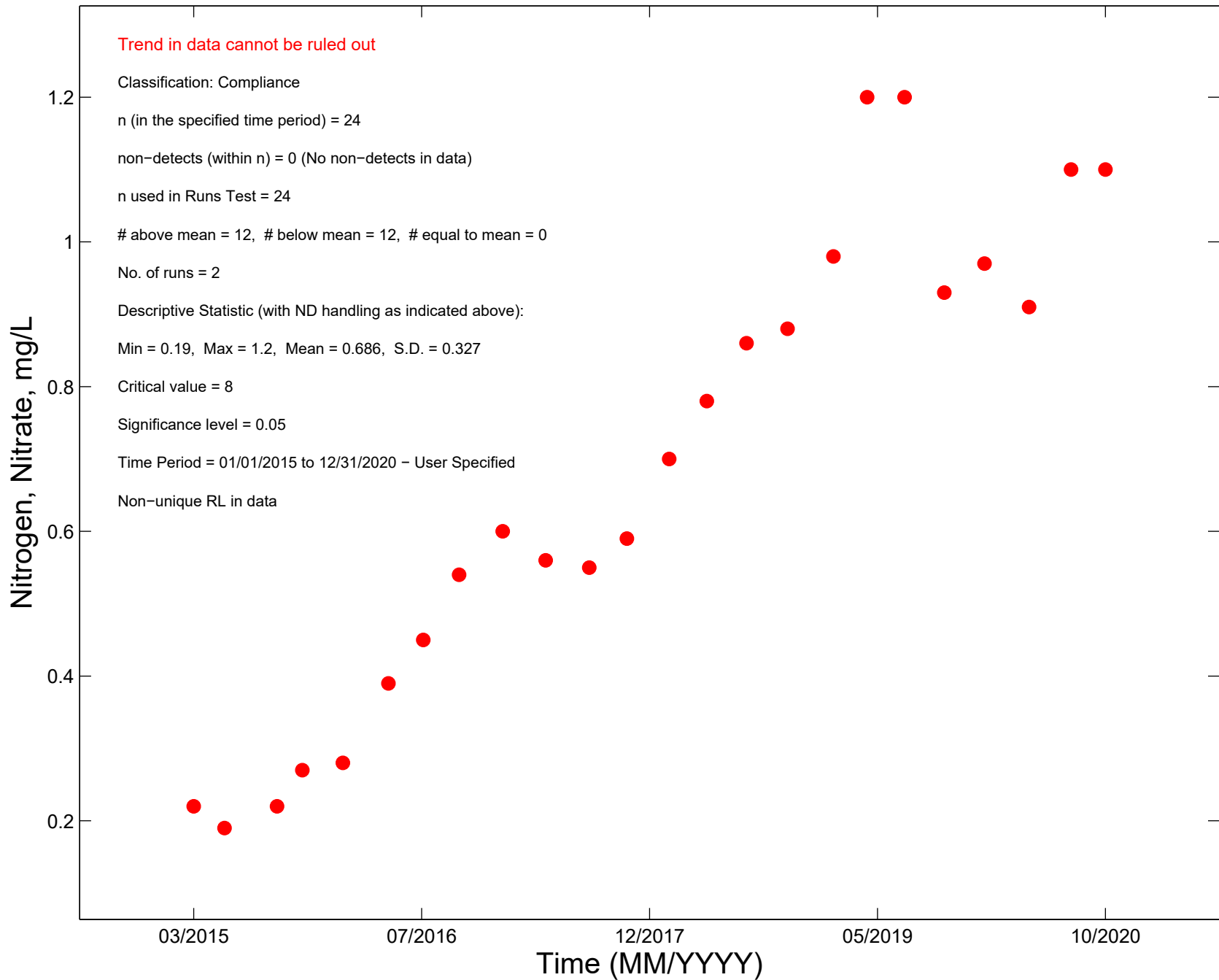
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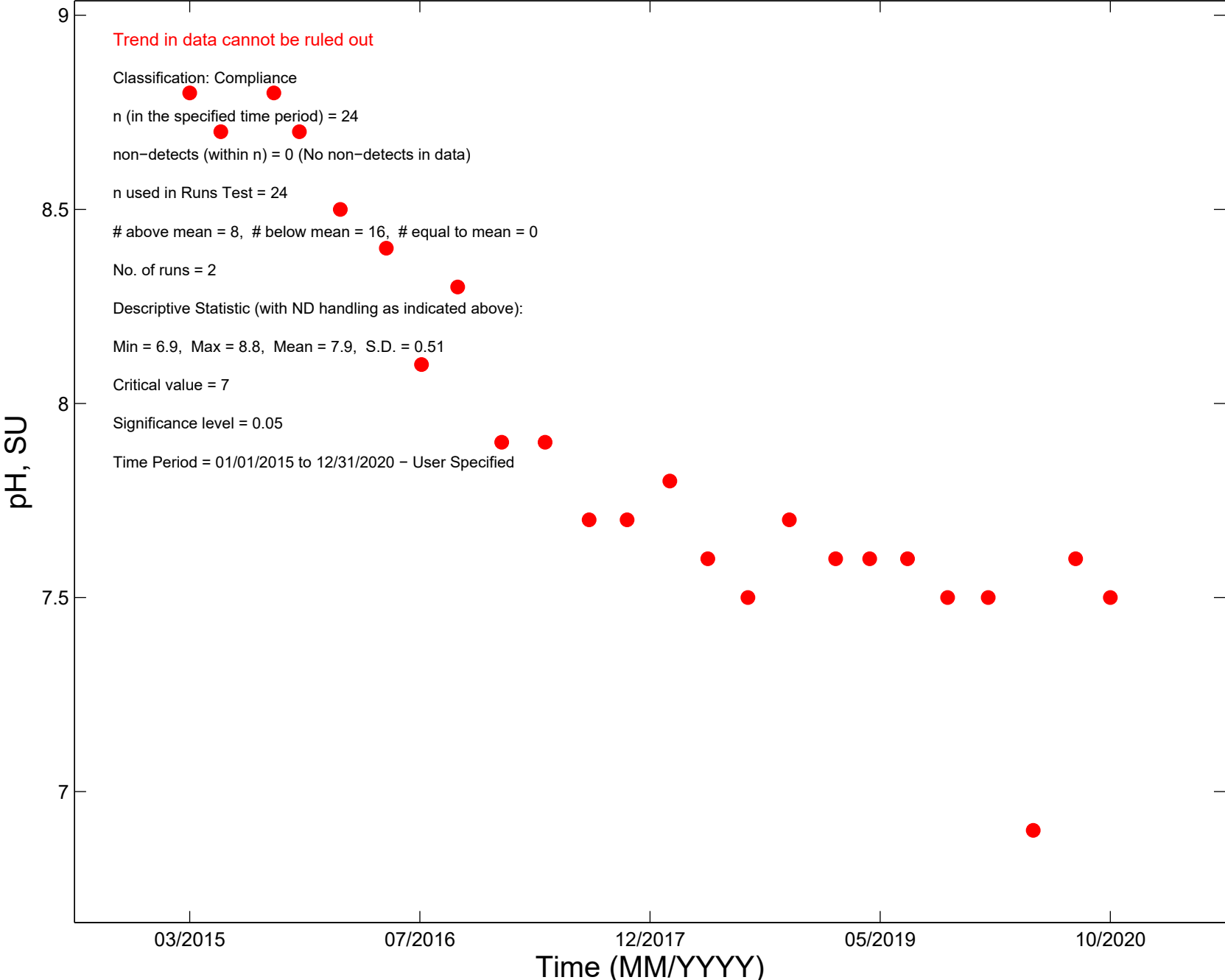
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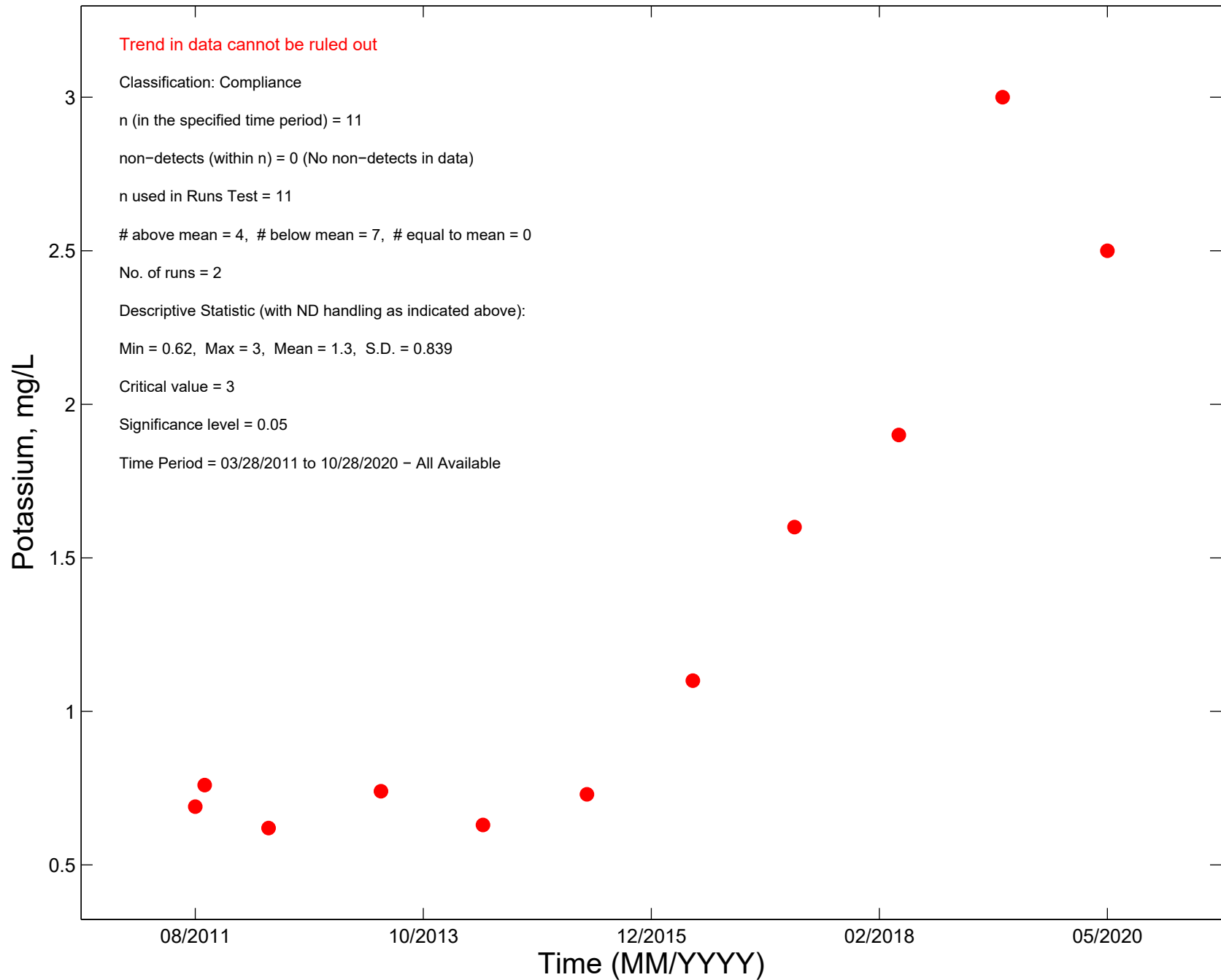
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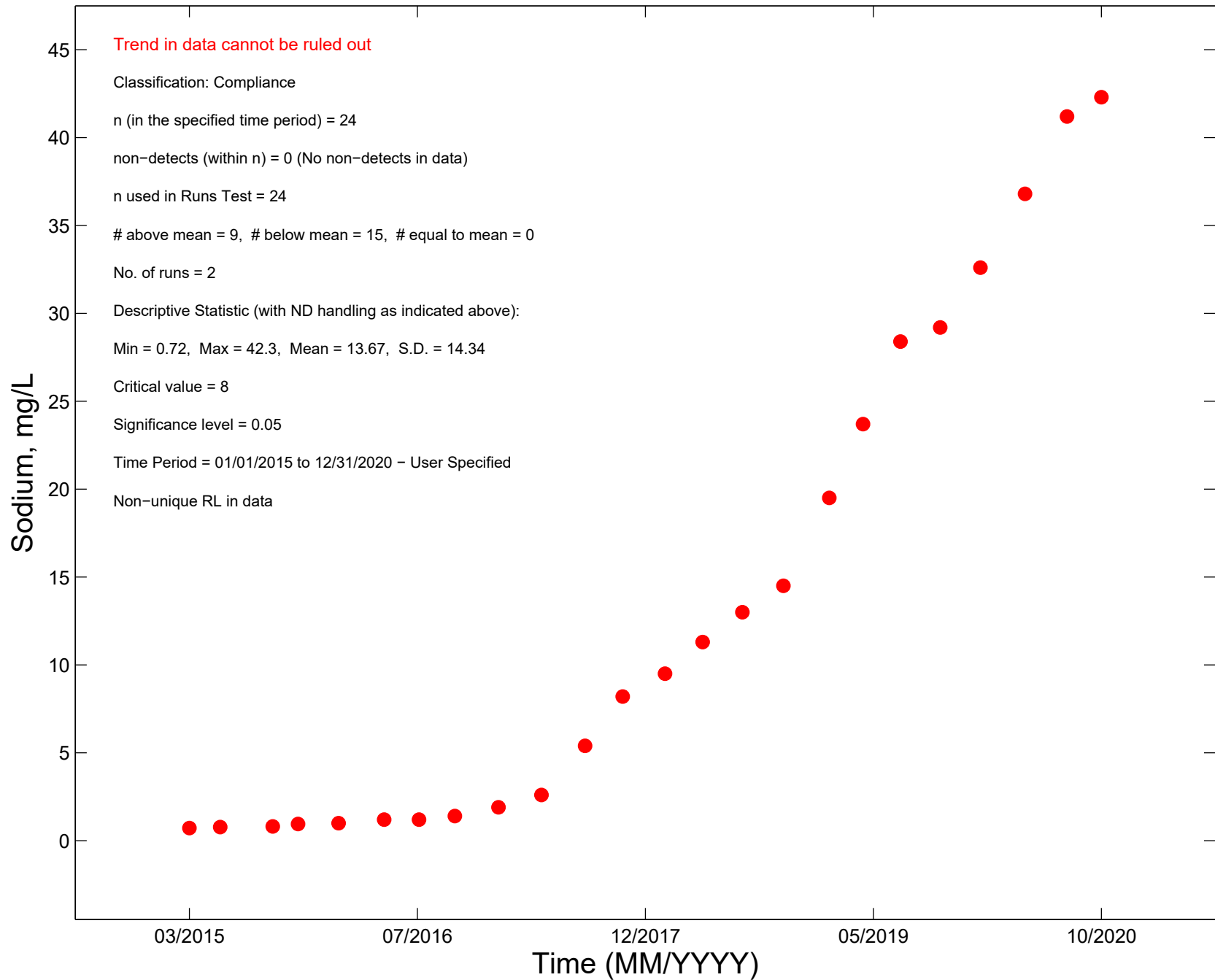
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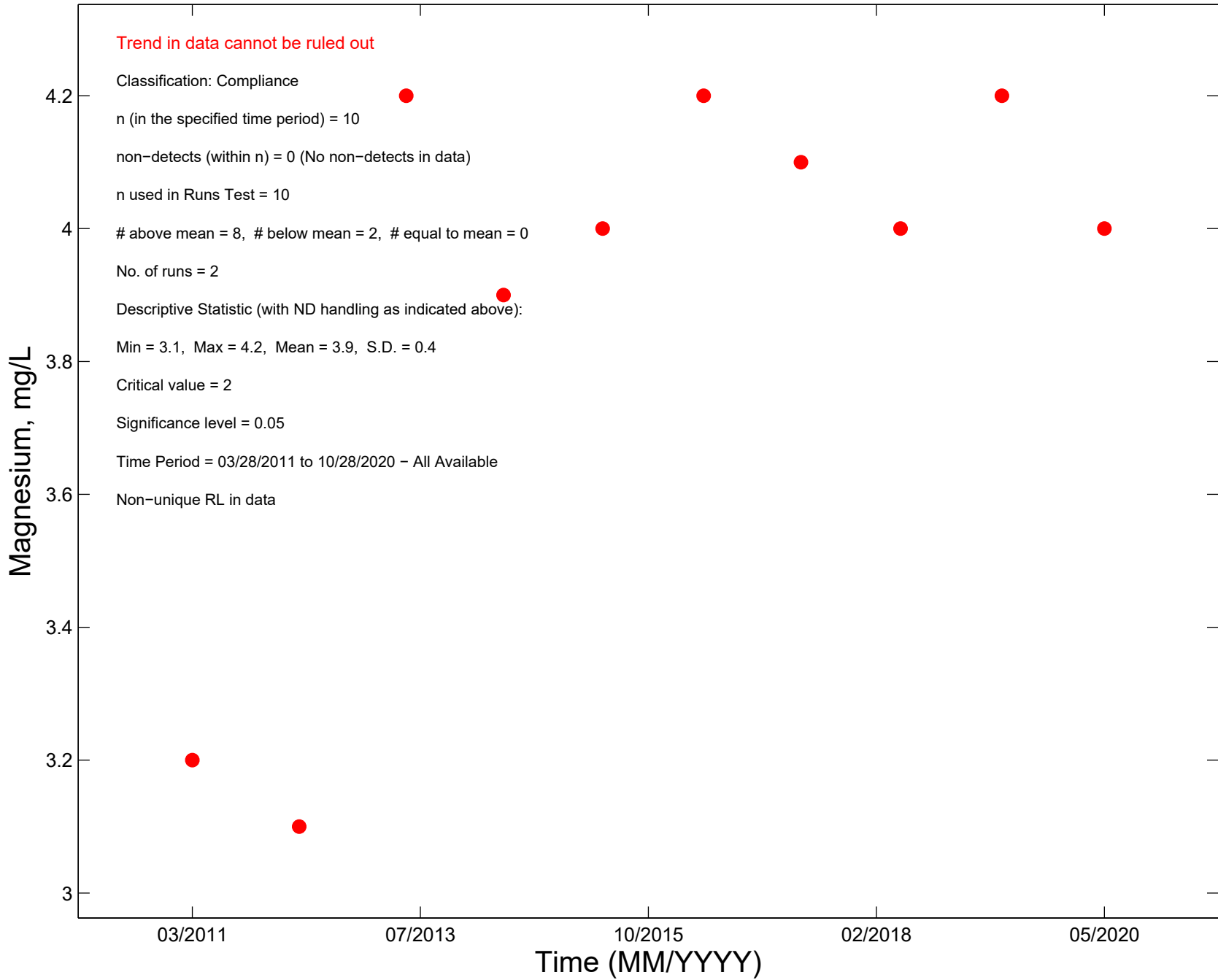
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# QAL063A

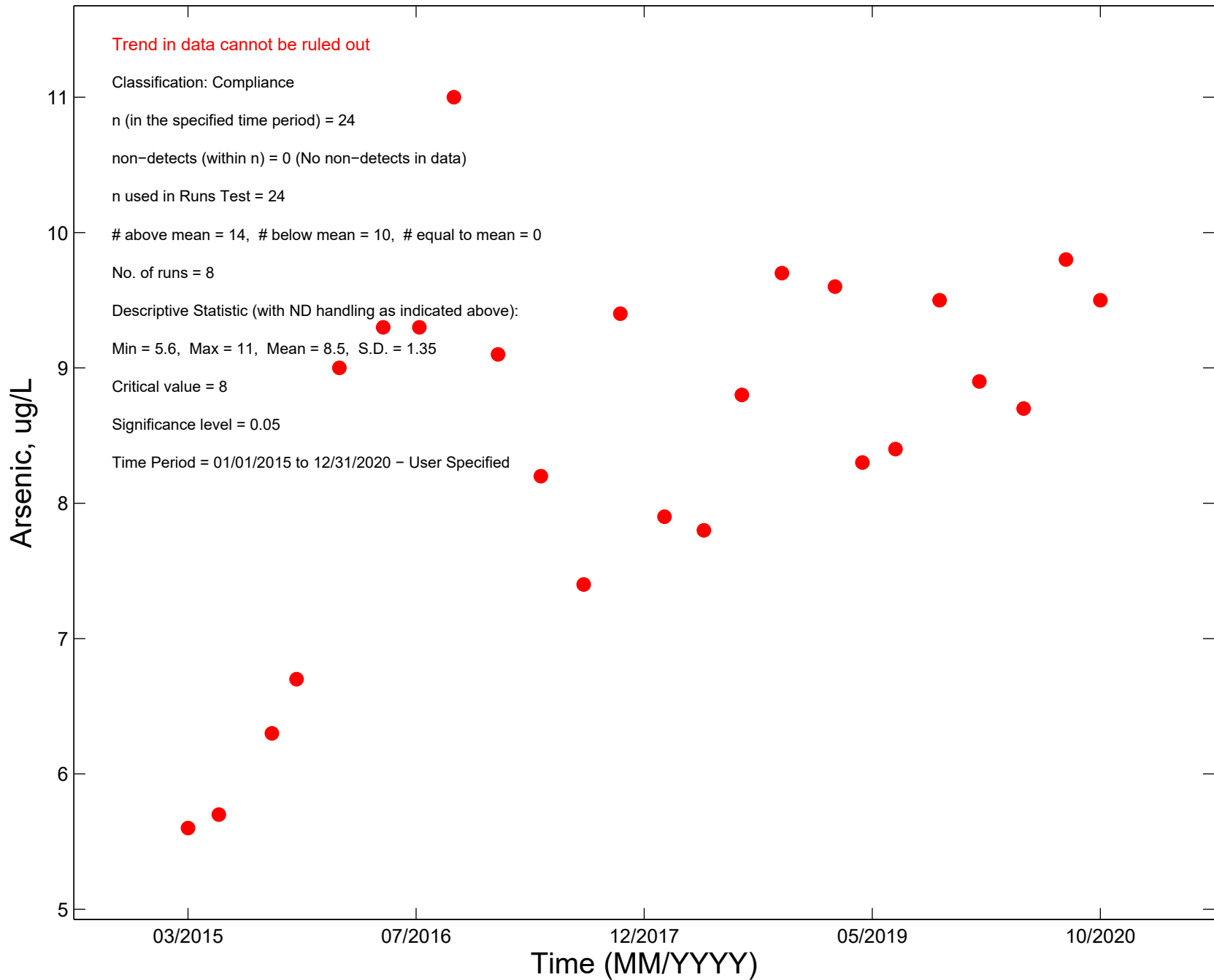


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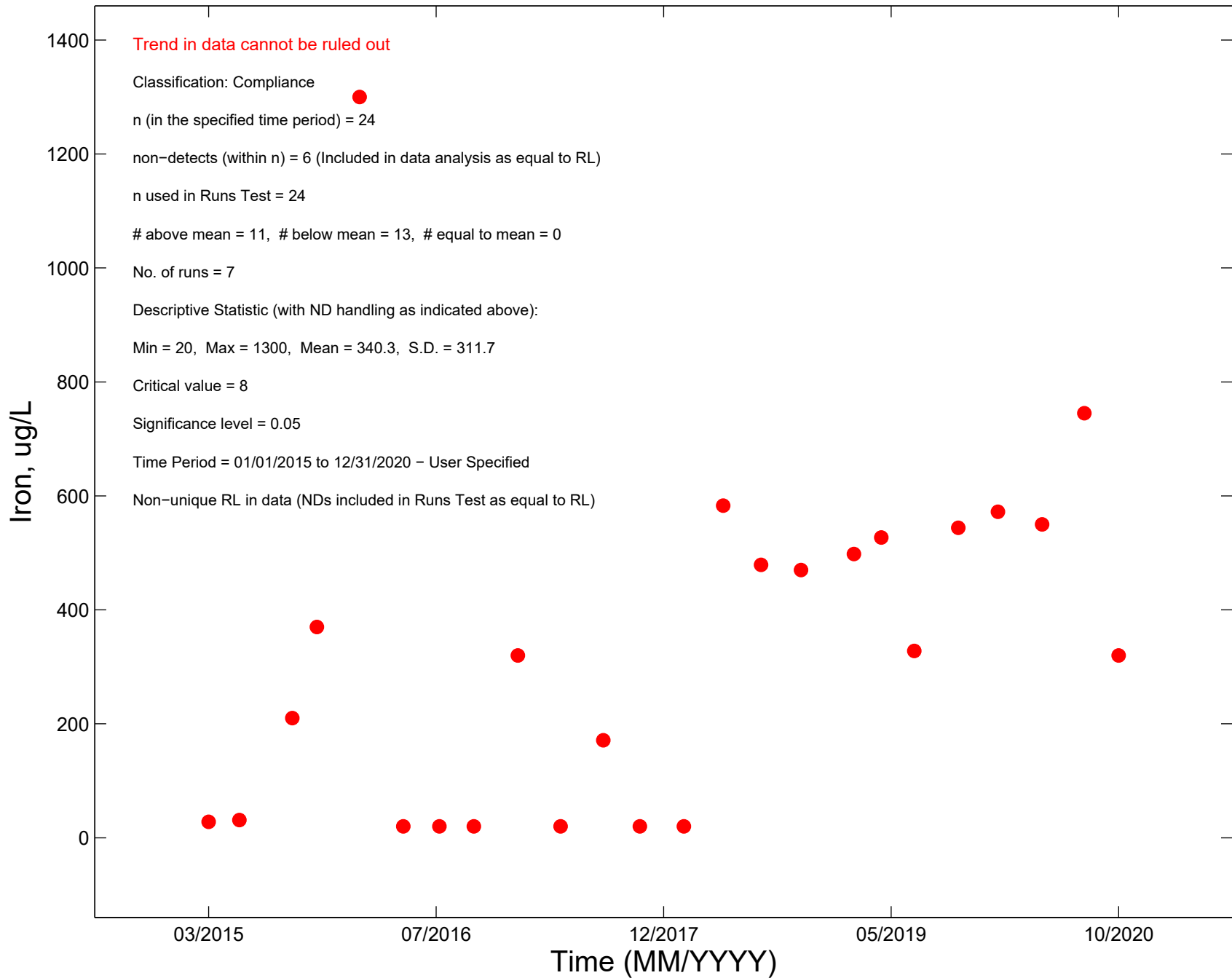




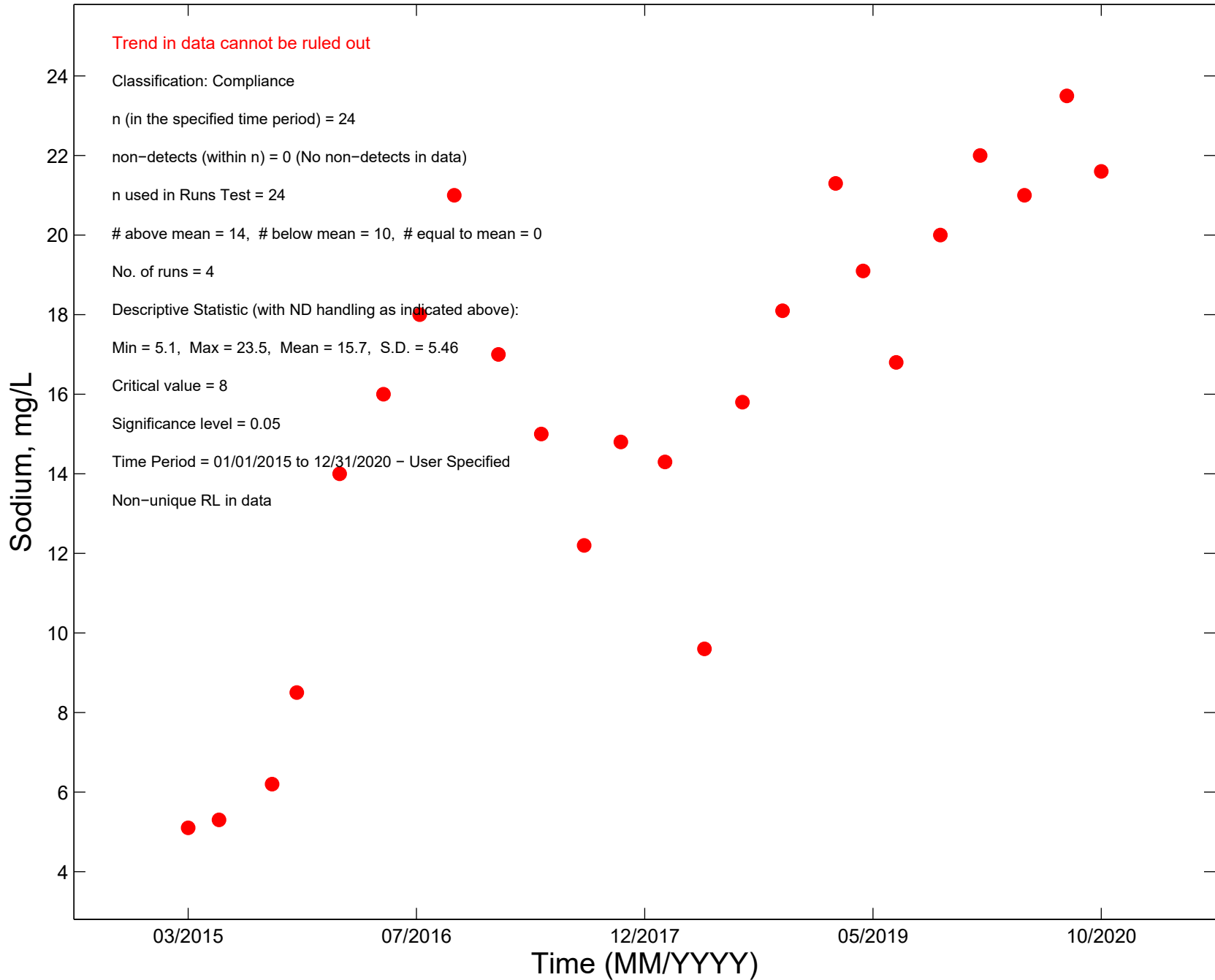
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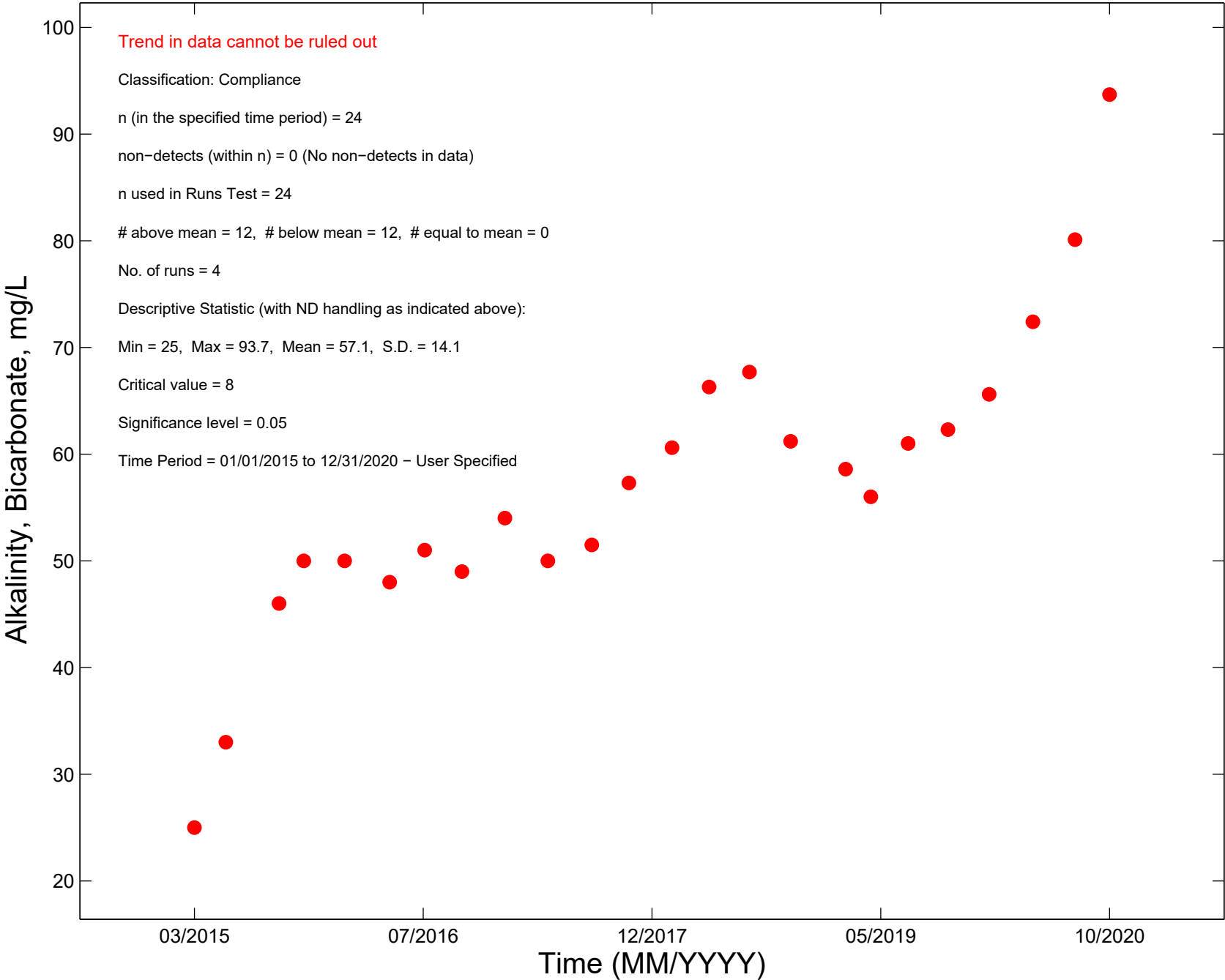
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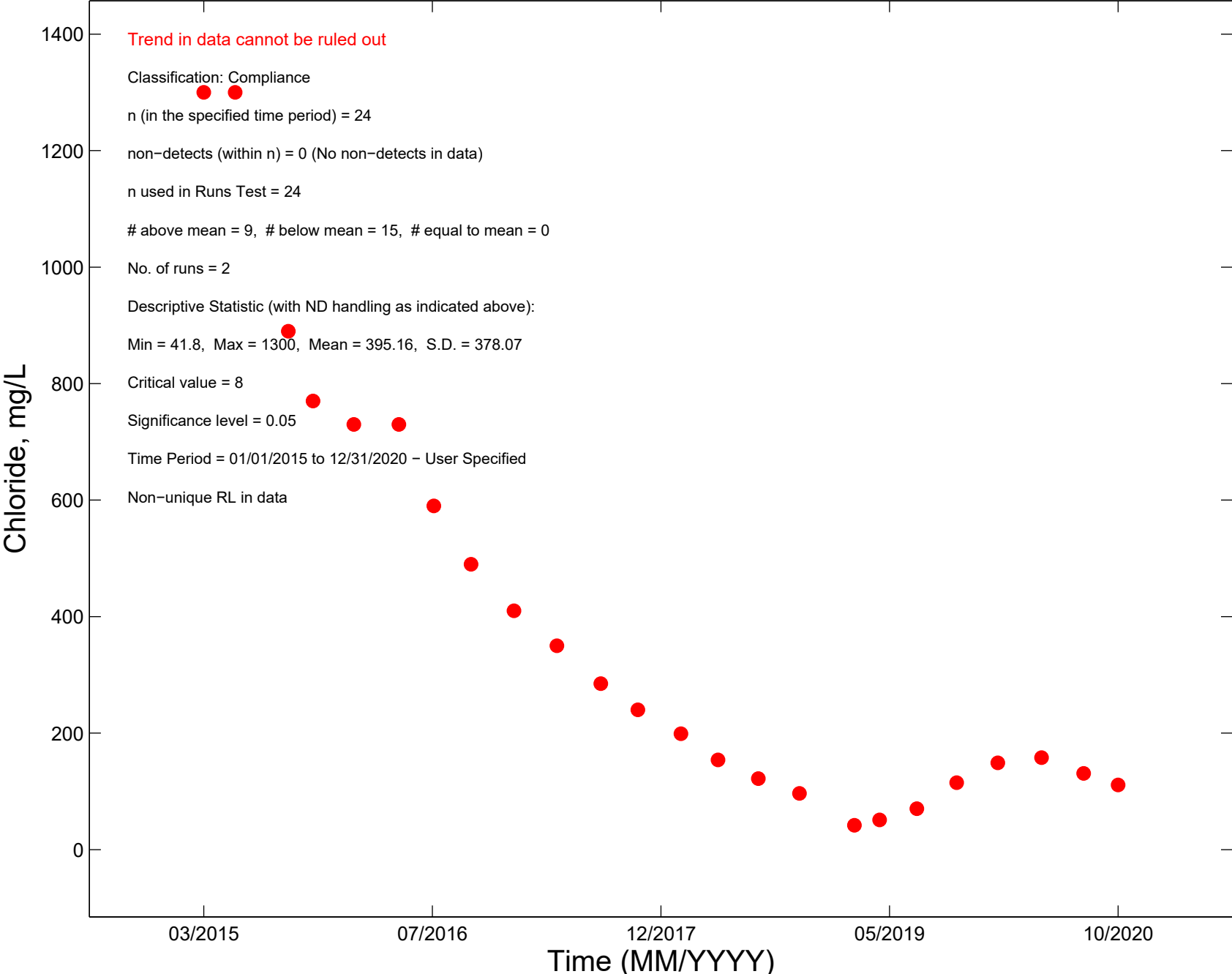
# QAL066D



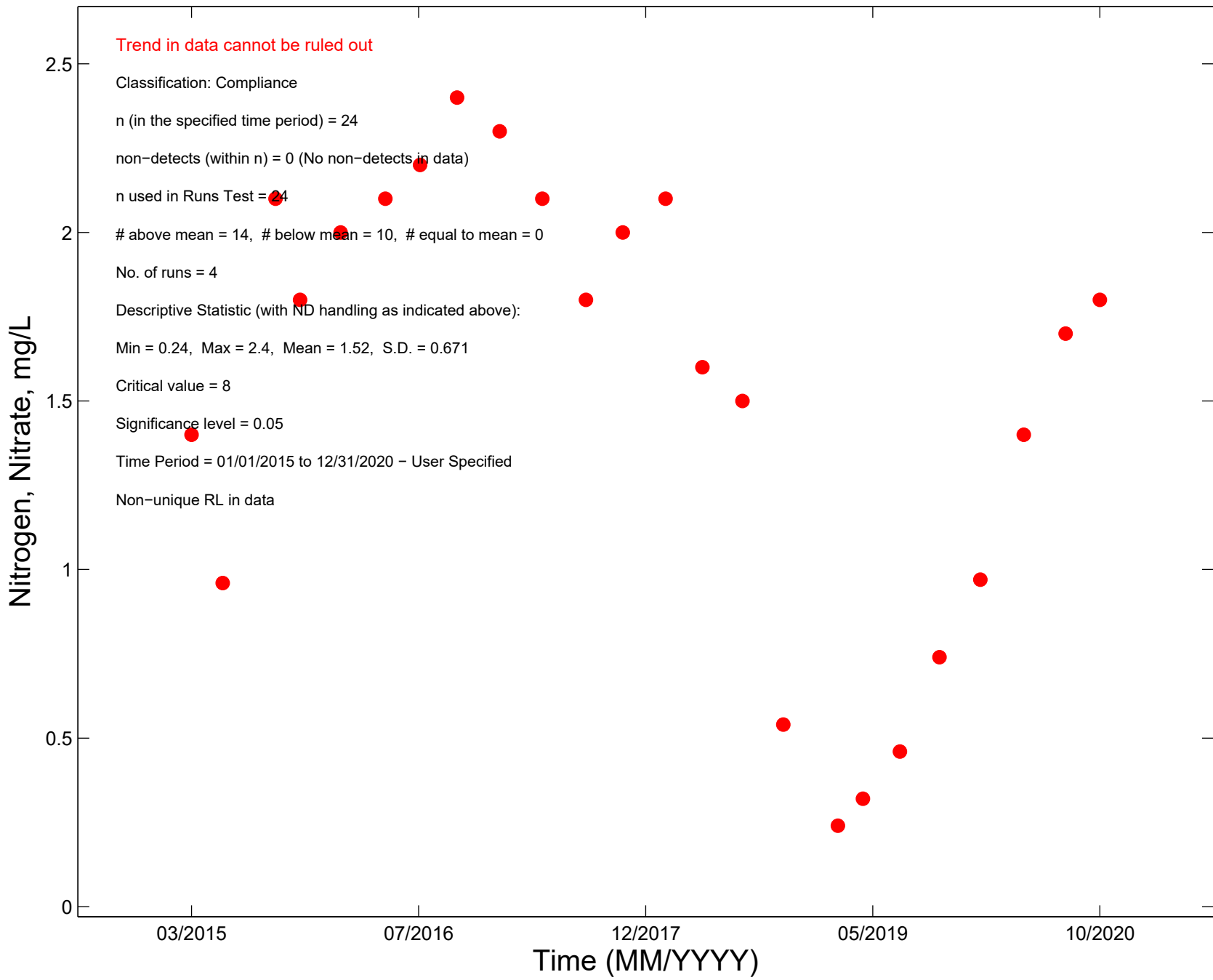
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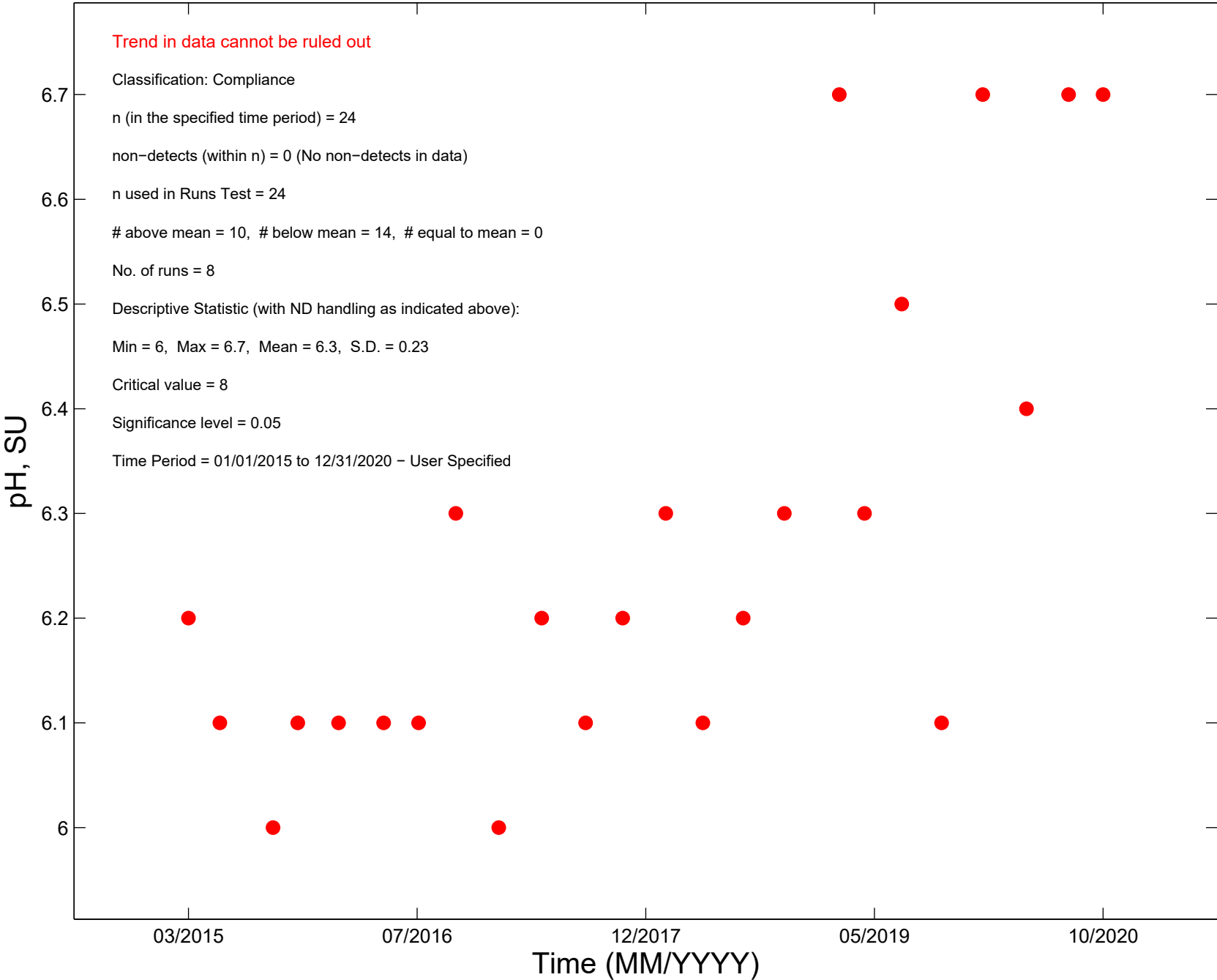
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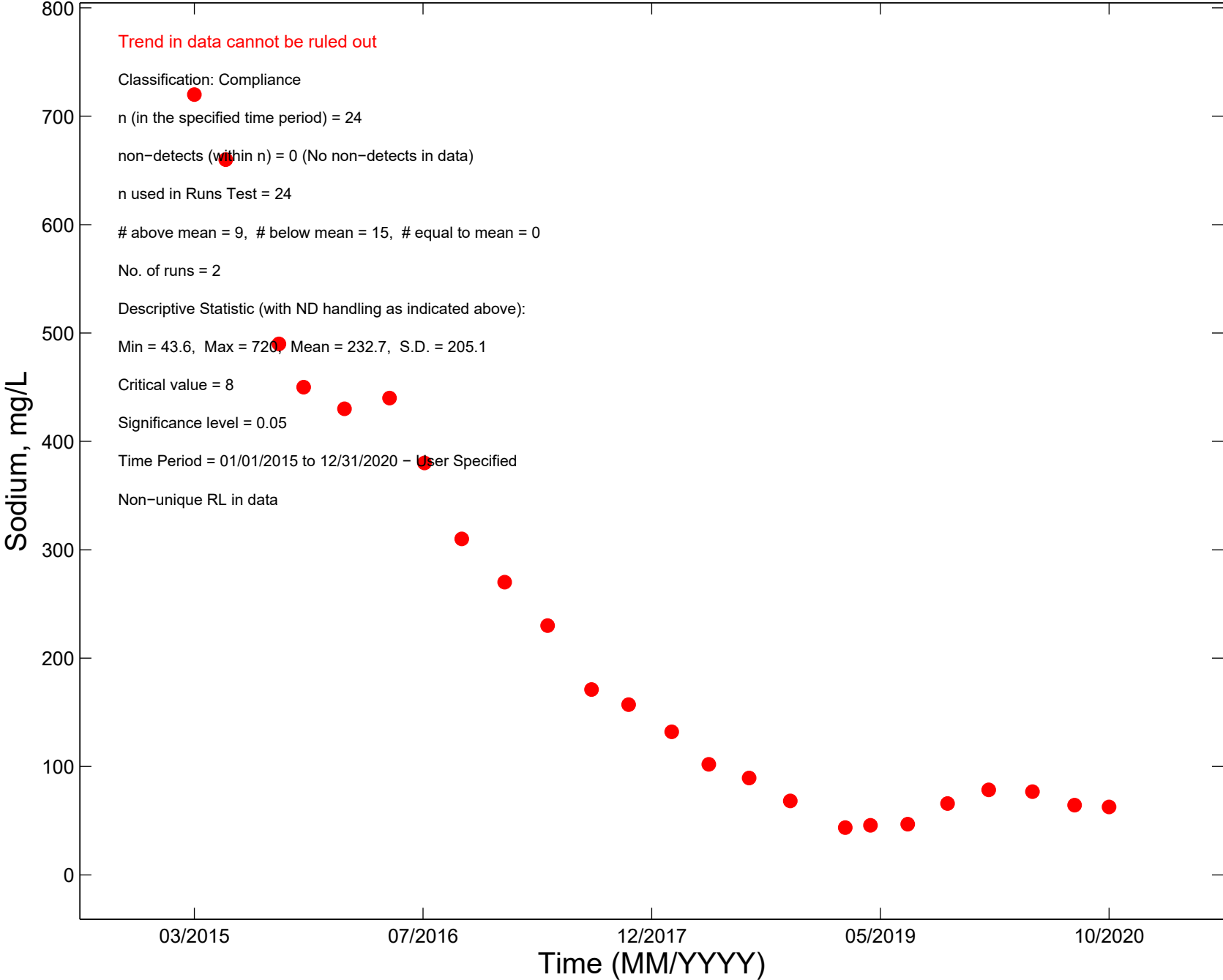
# QAL067A



# QAL067A

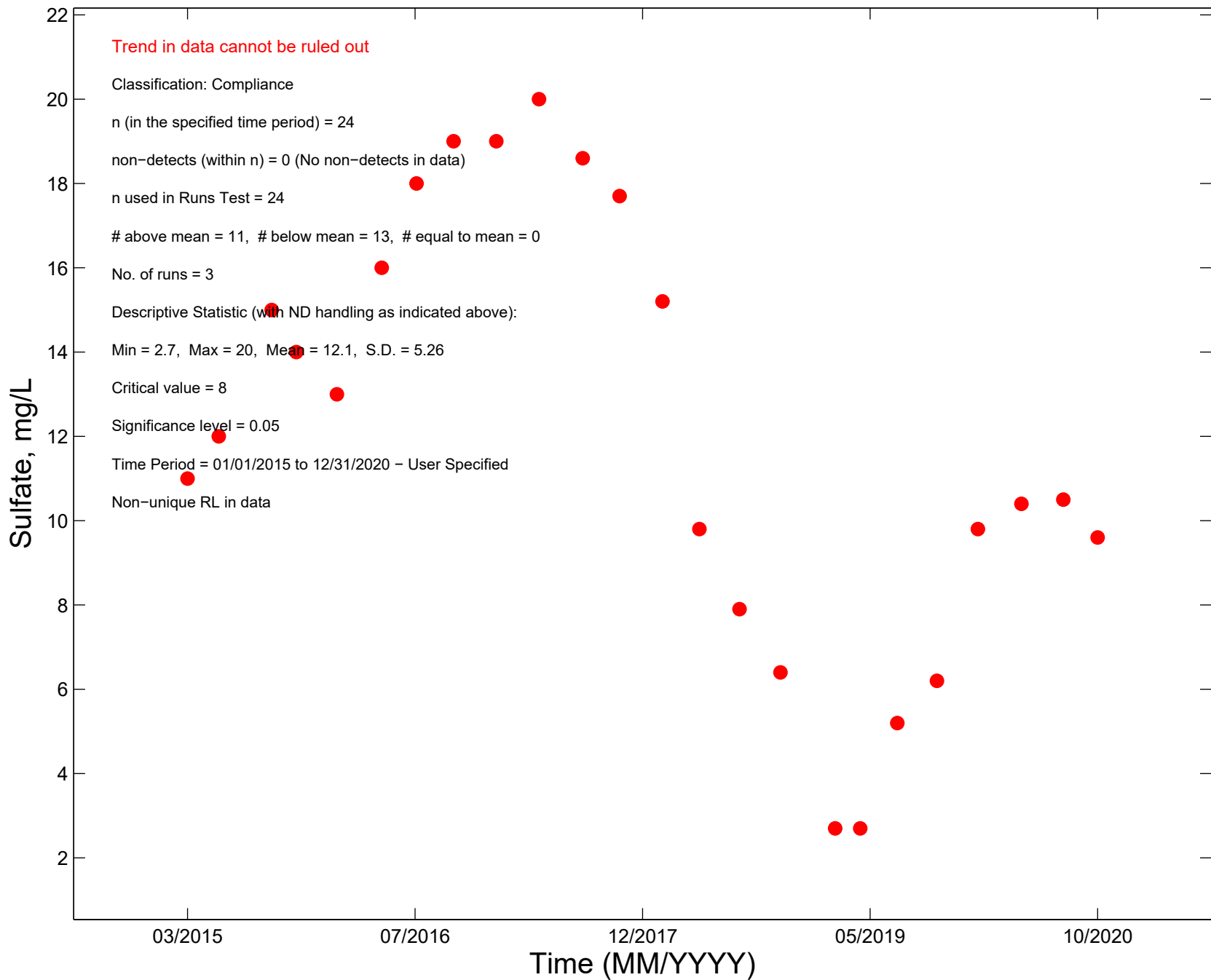


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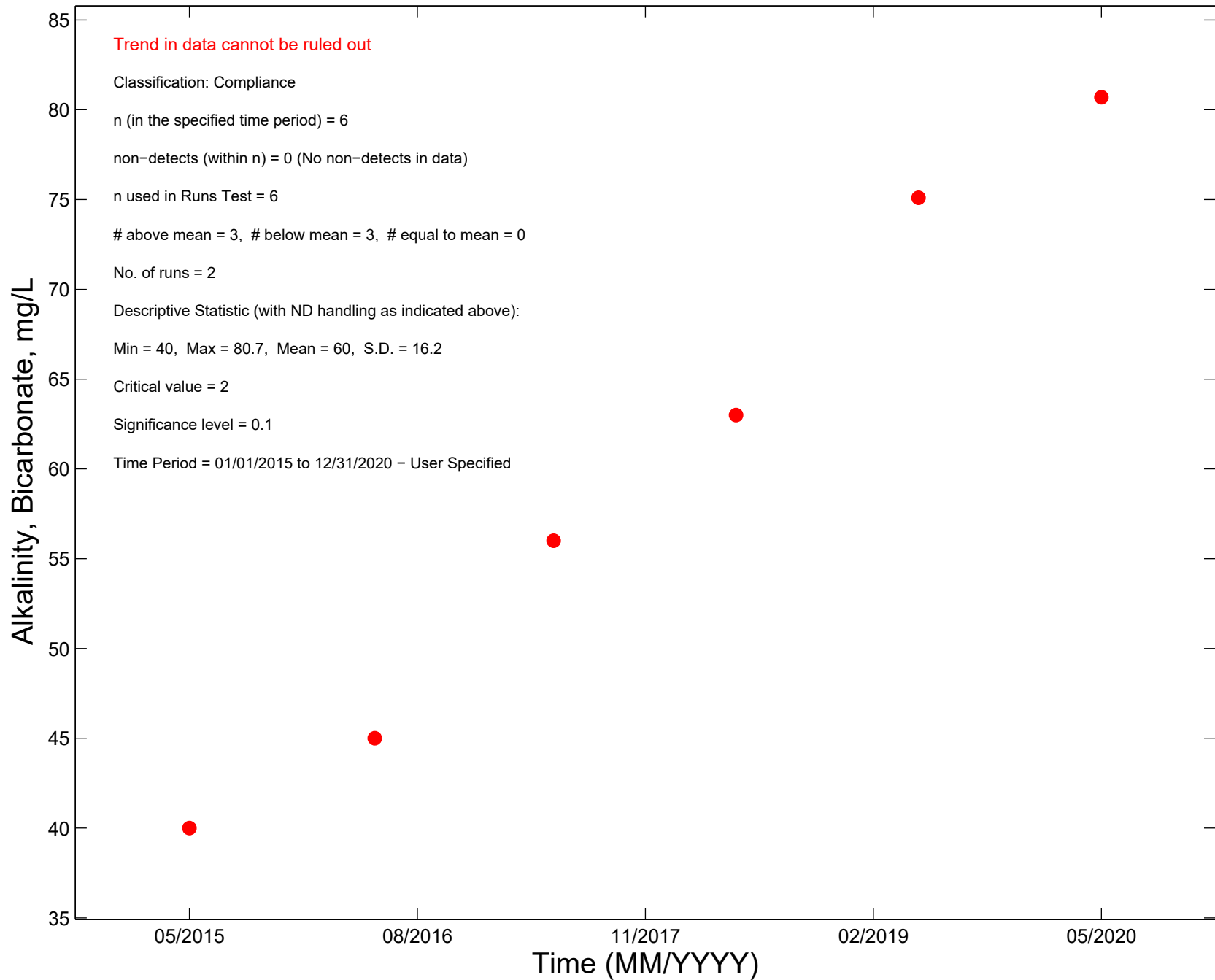




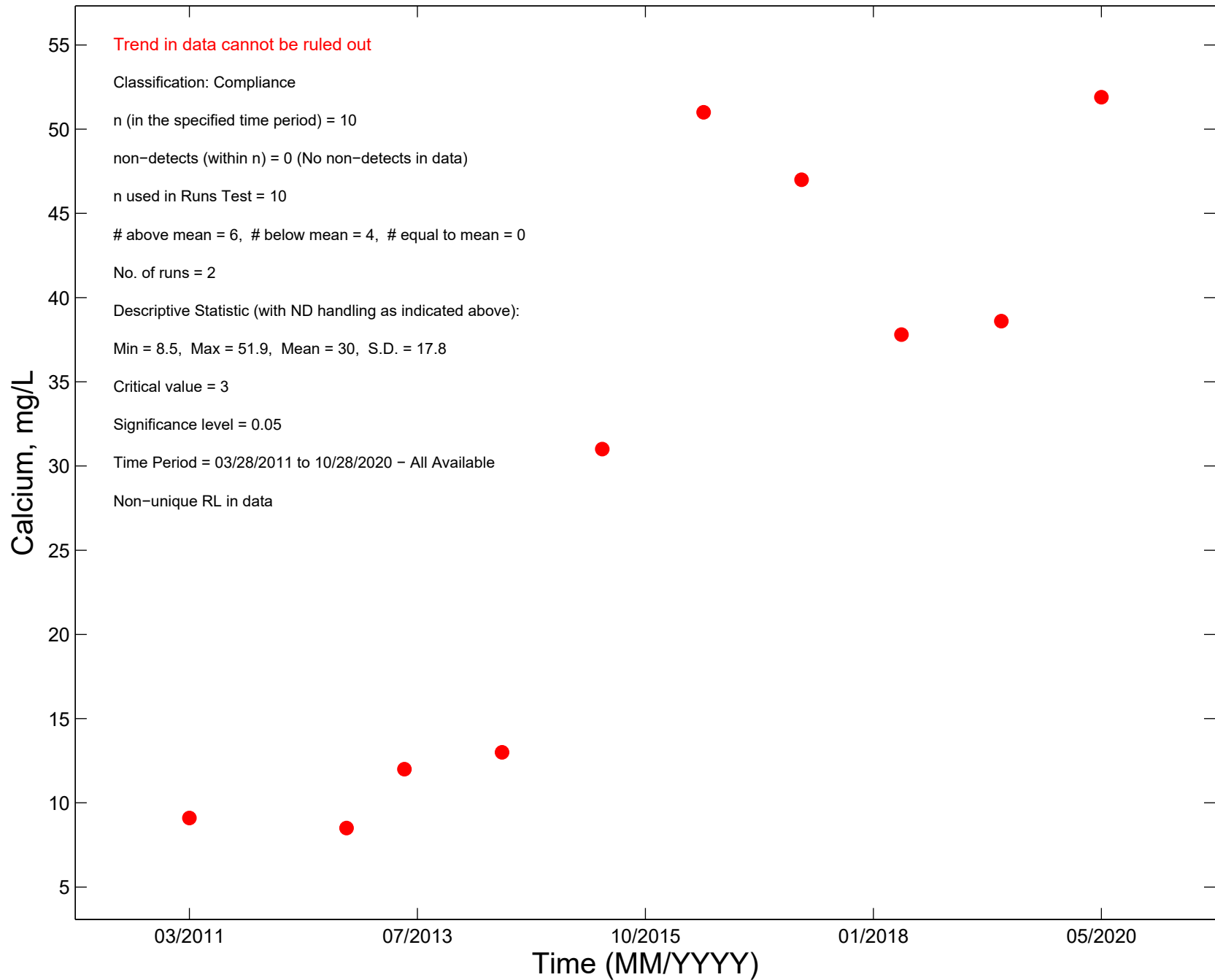
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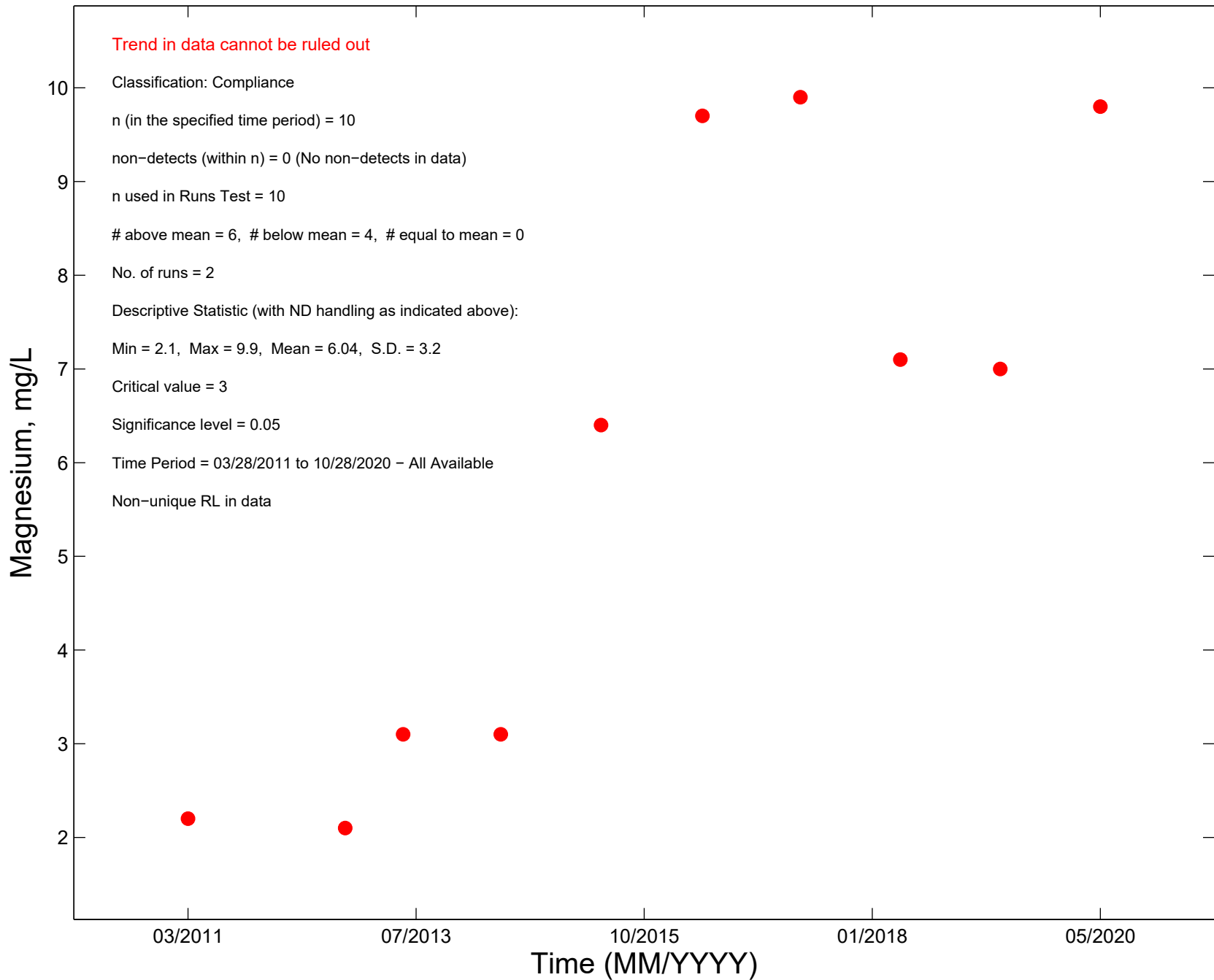
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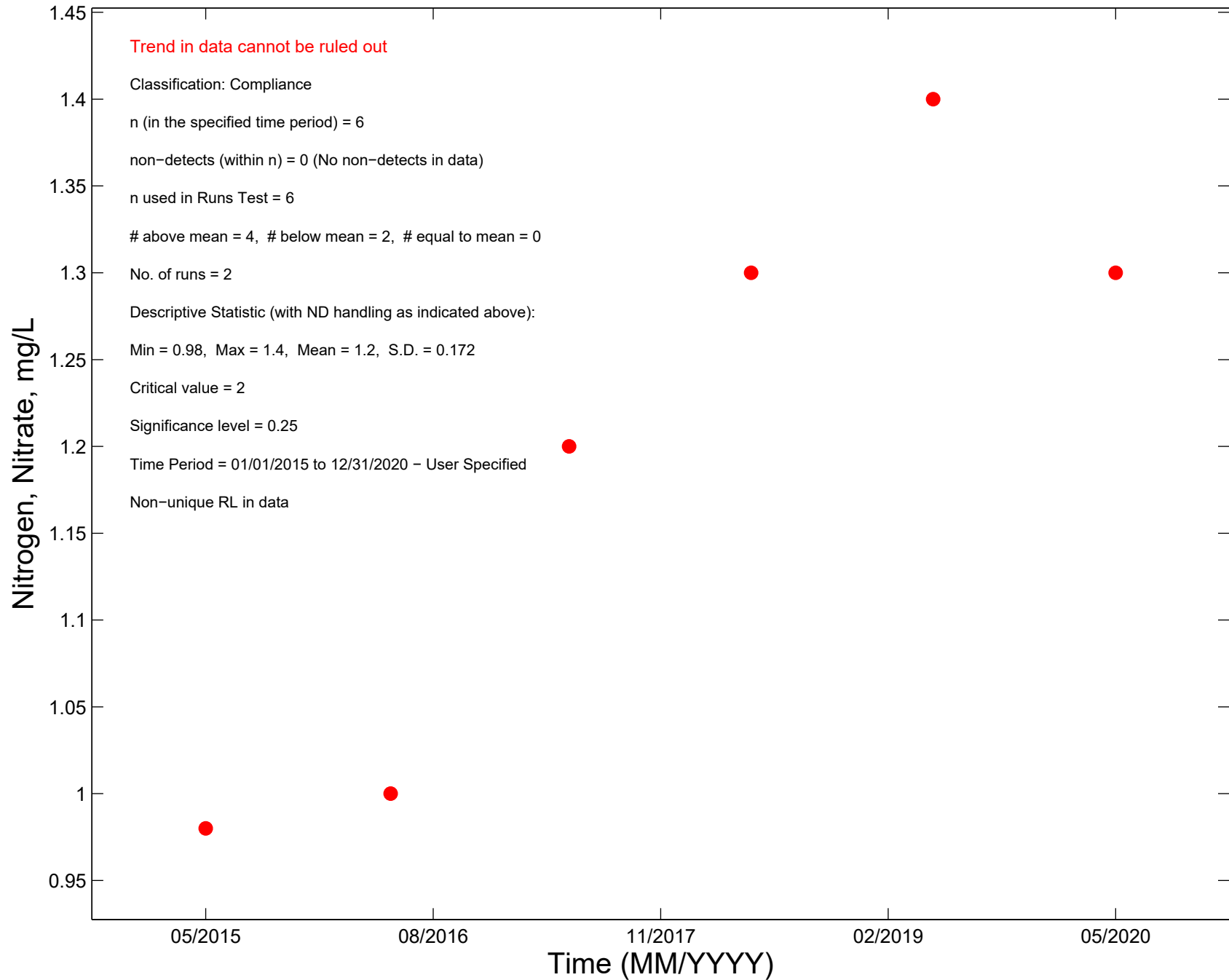
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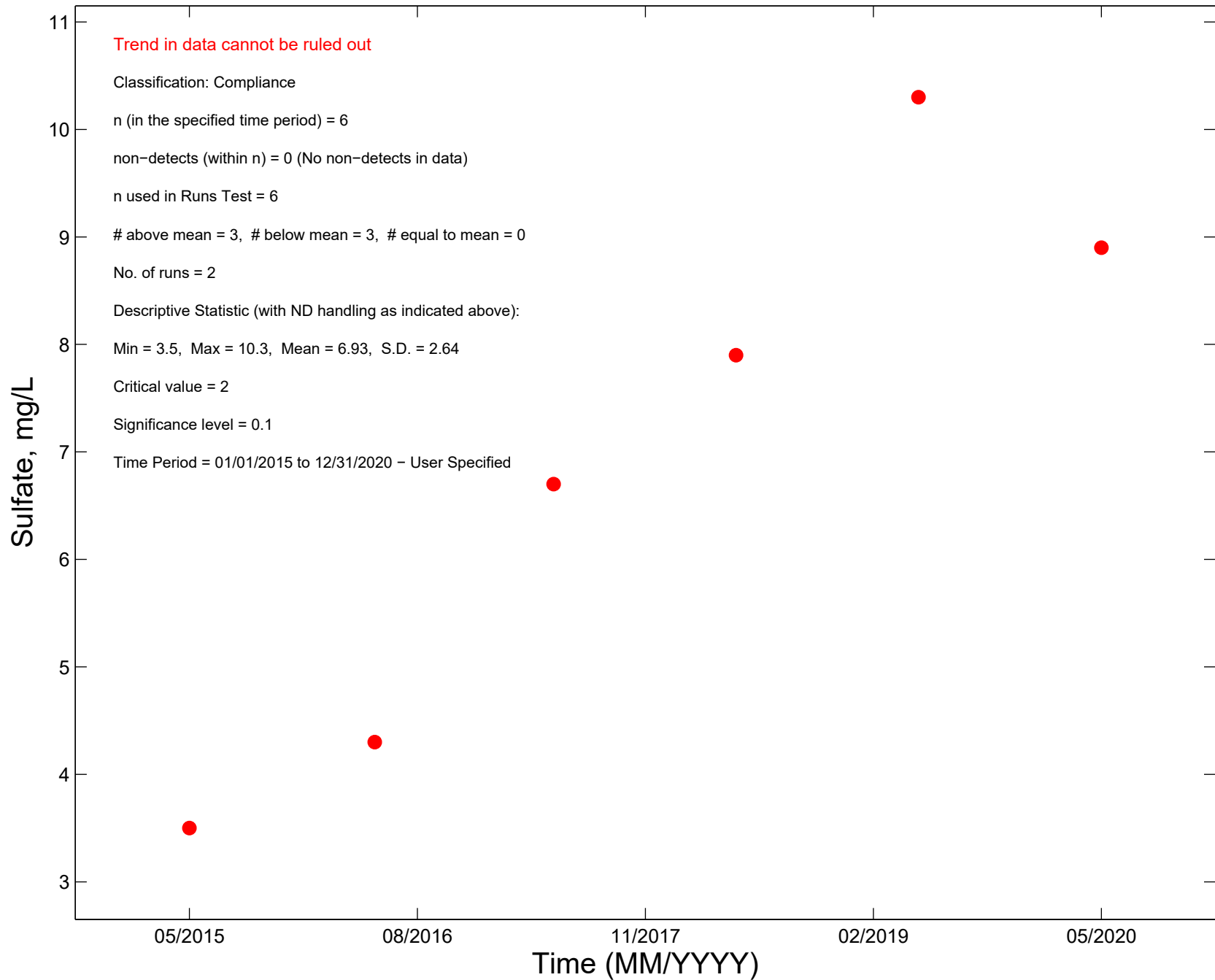
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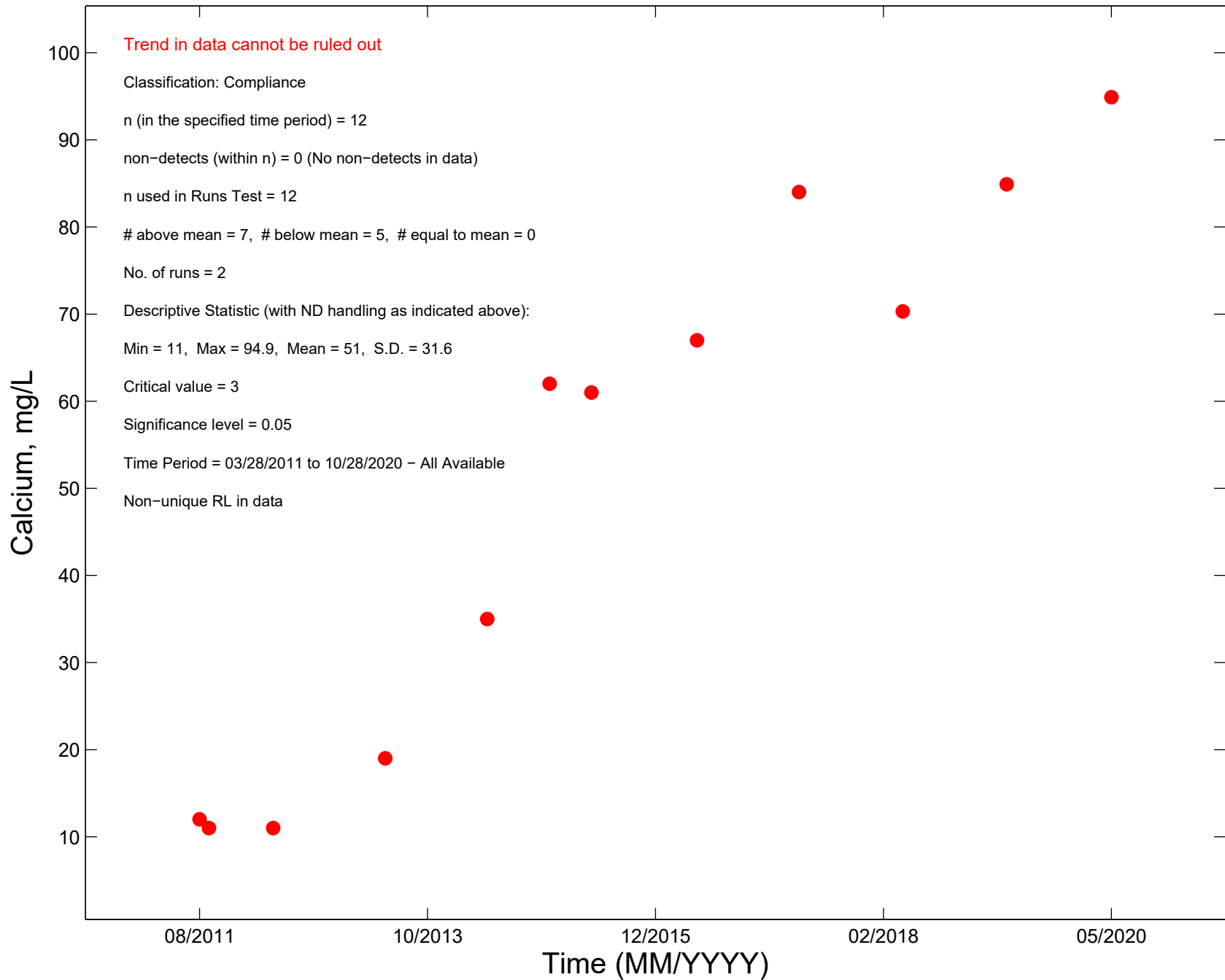
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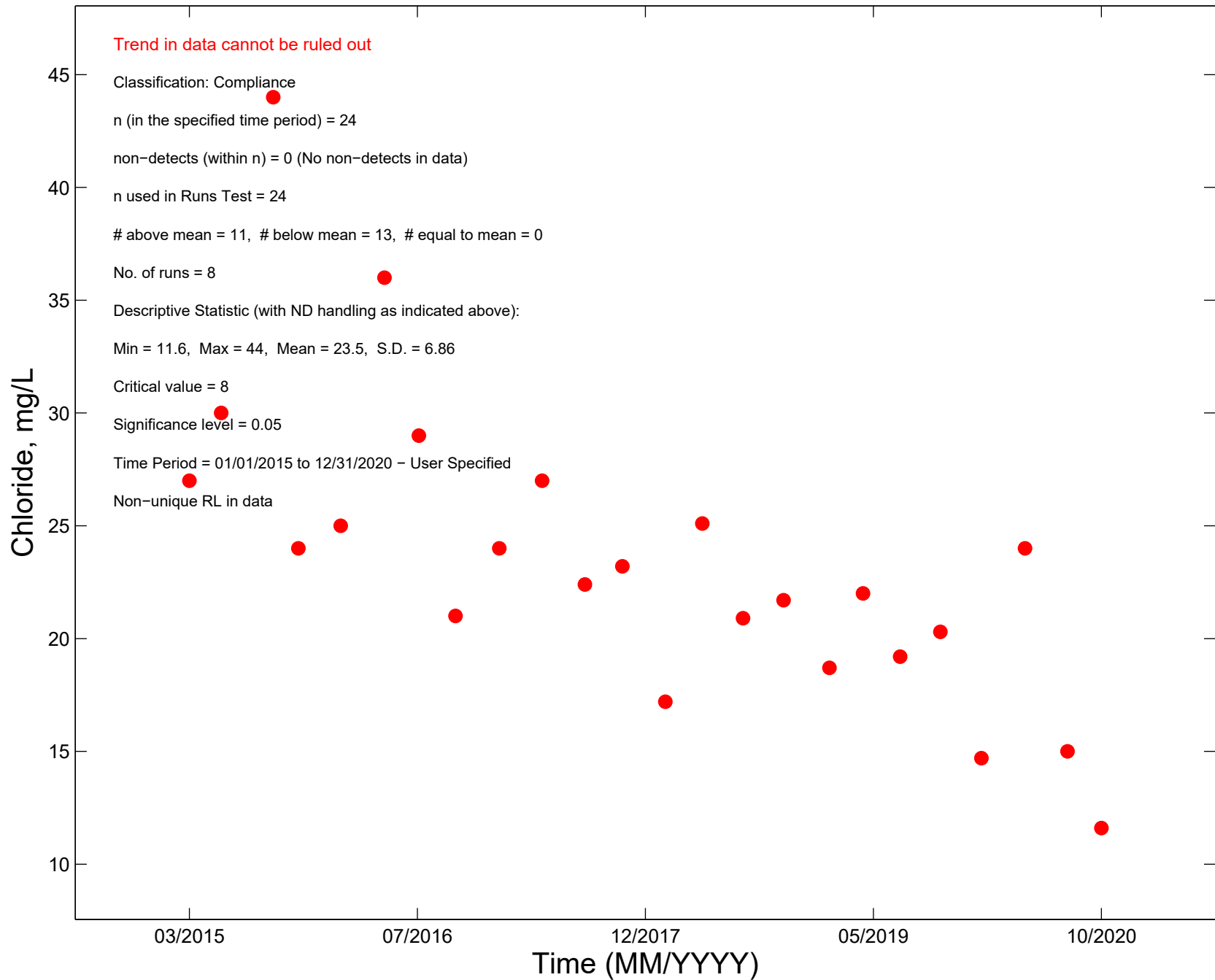
# QAL070A



# QAL071A

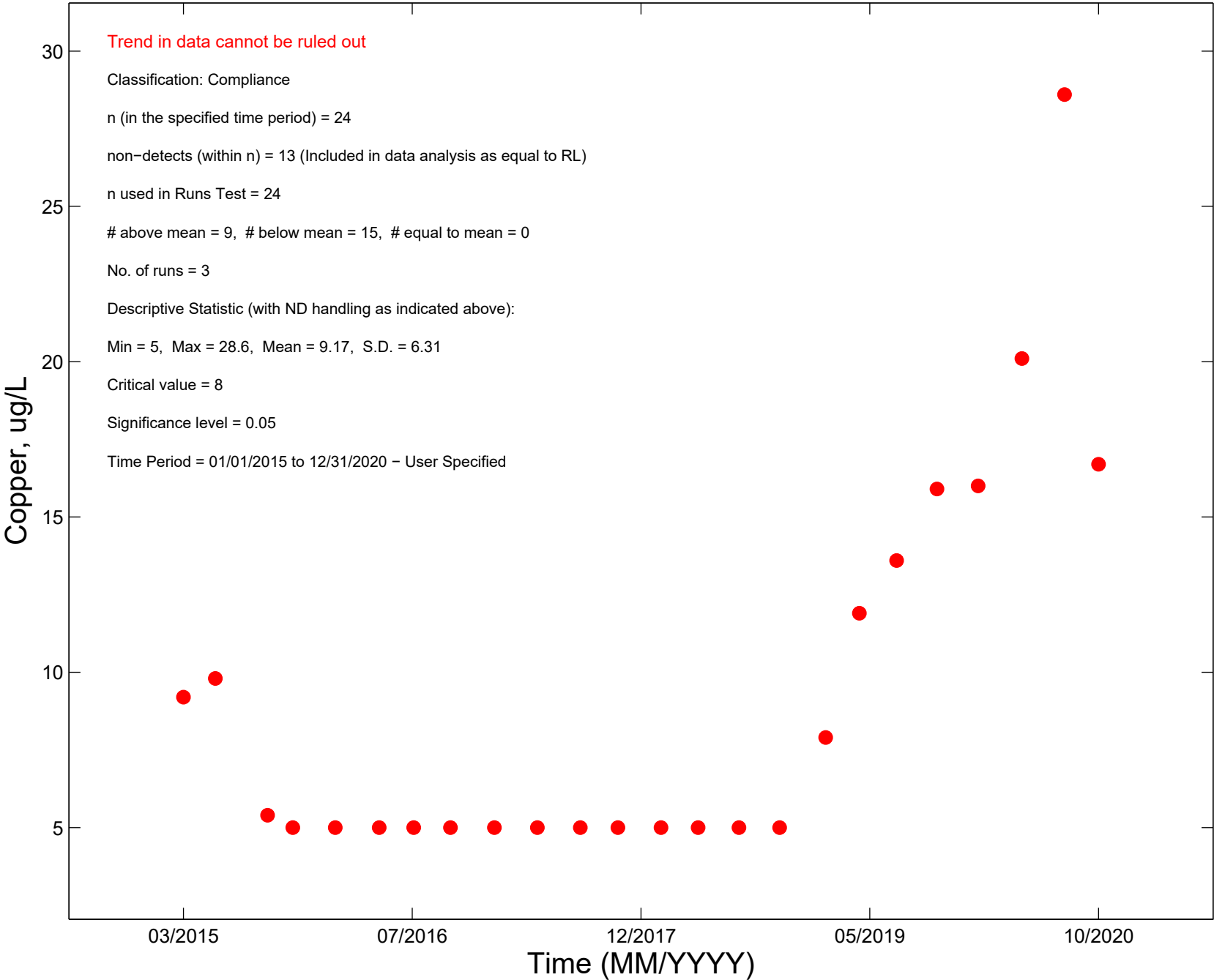


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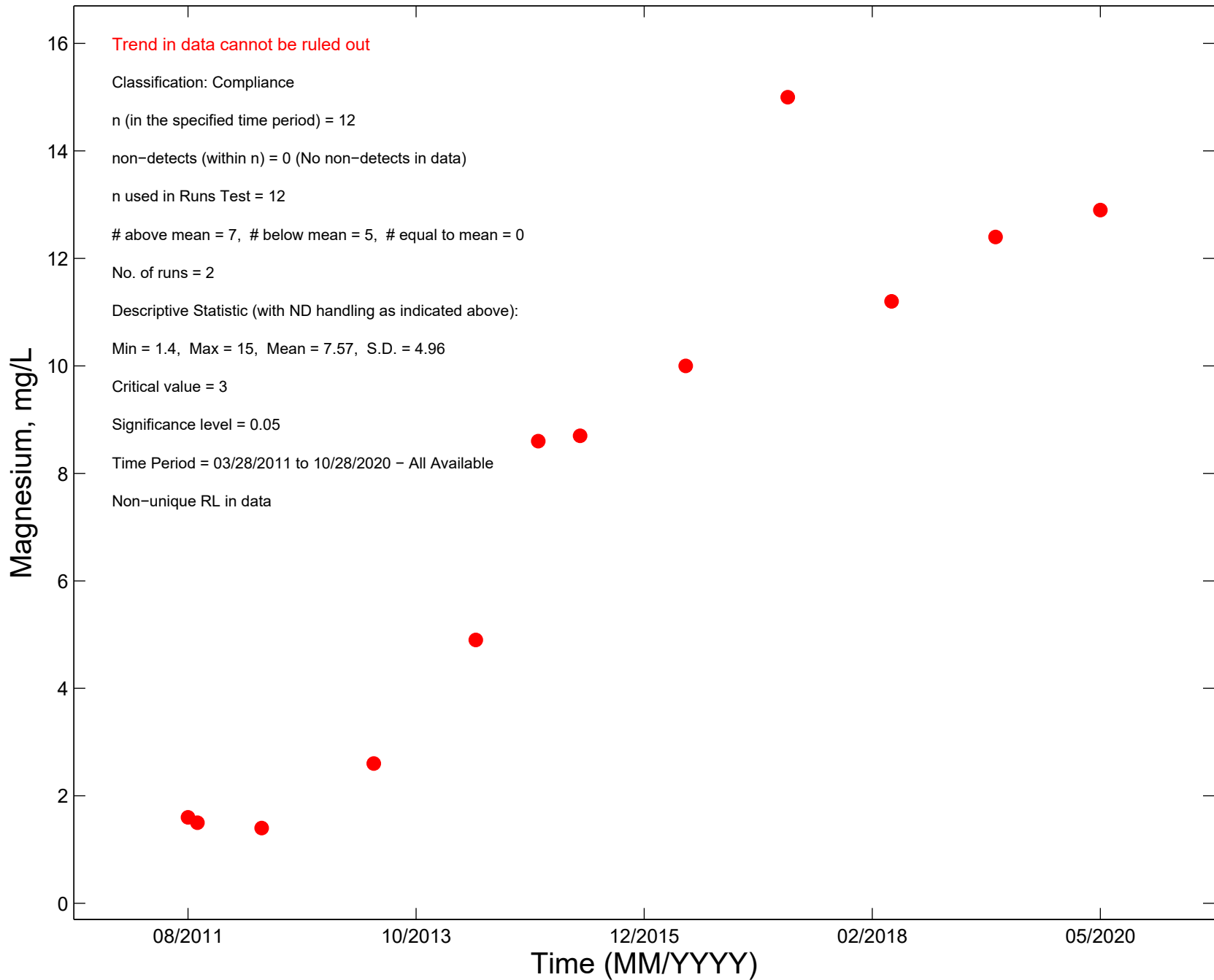




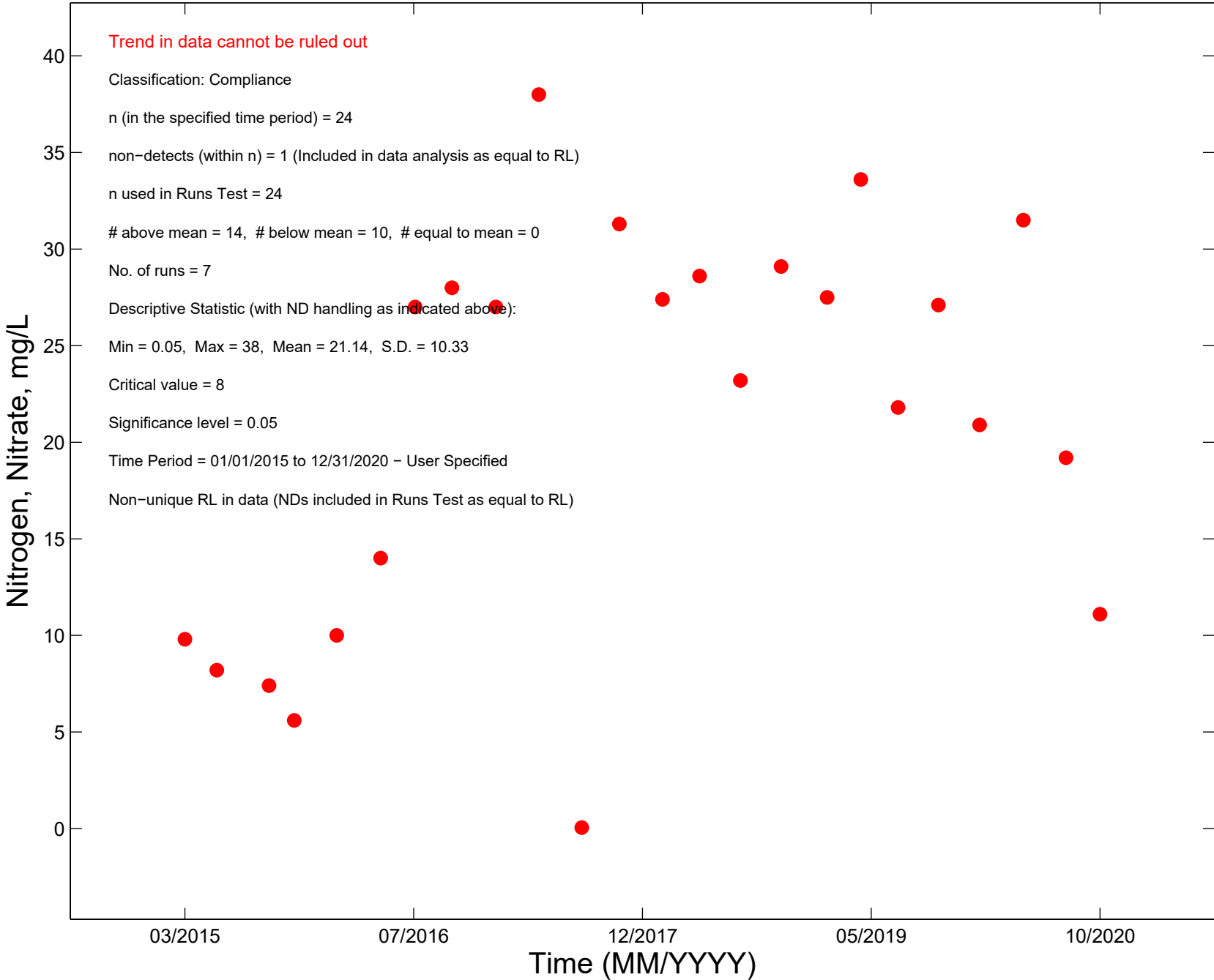
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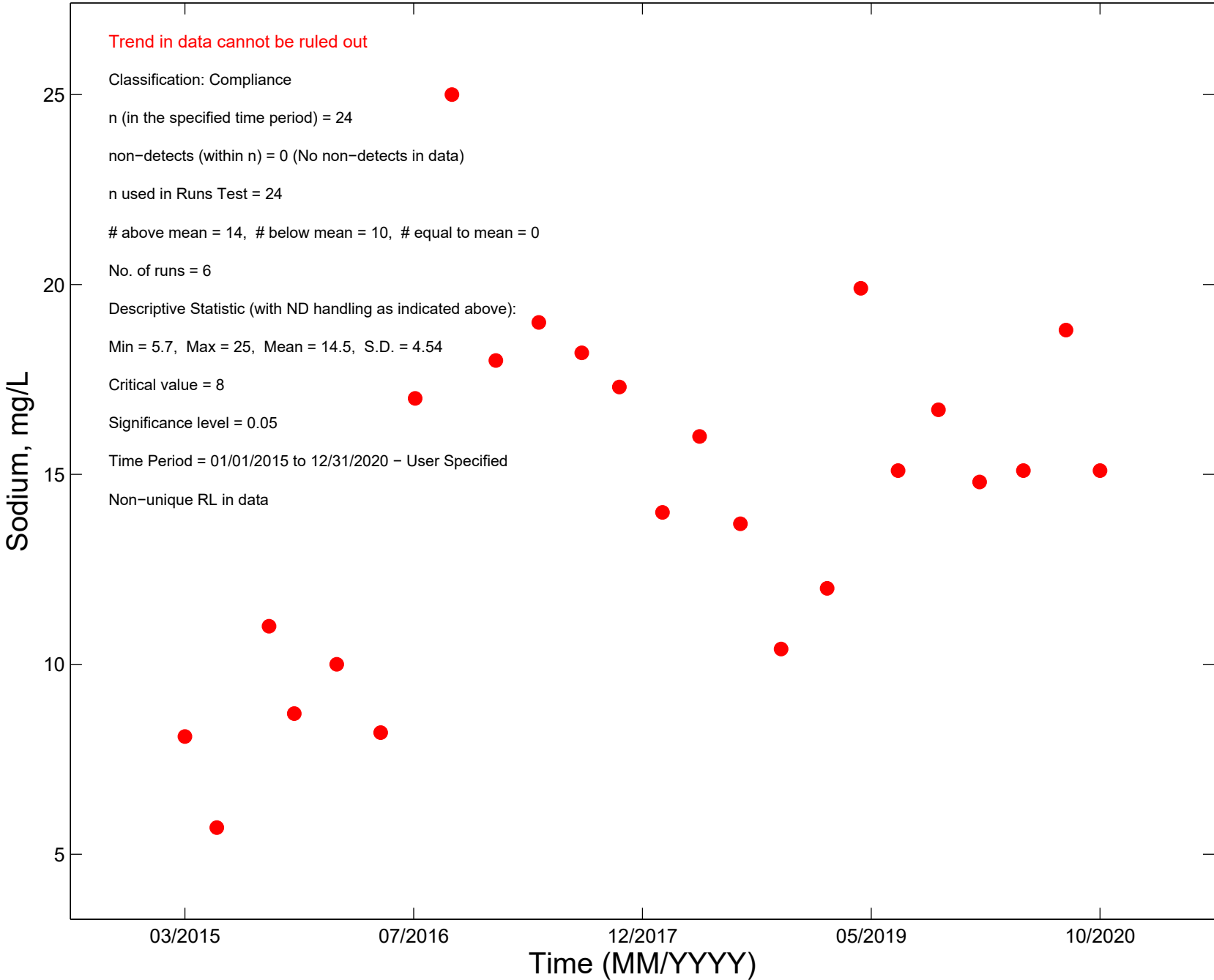
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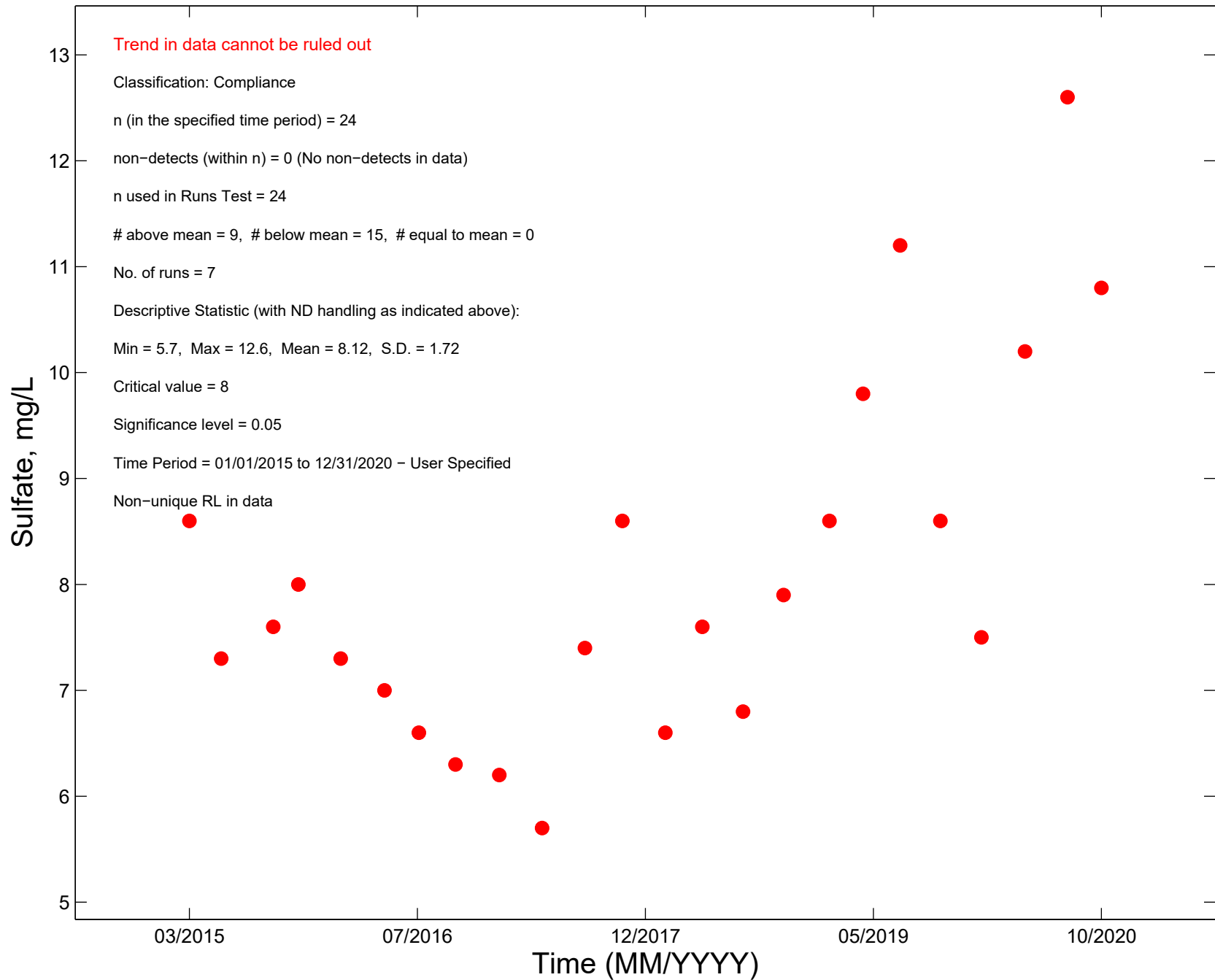
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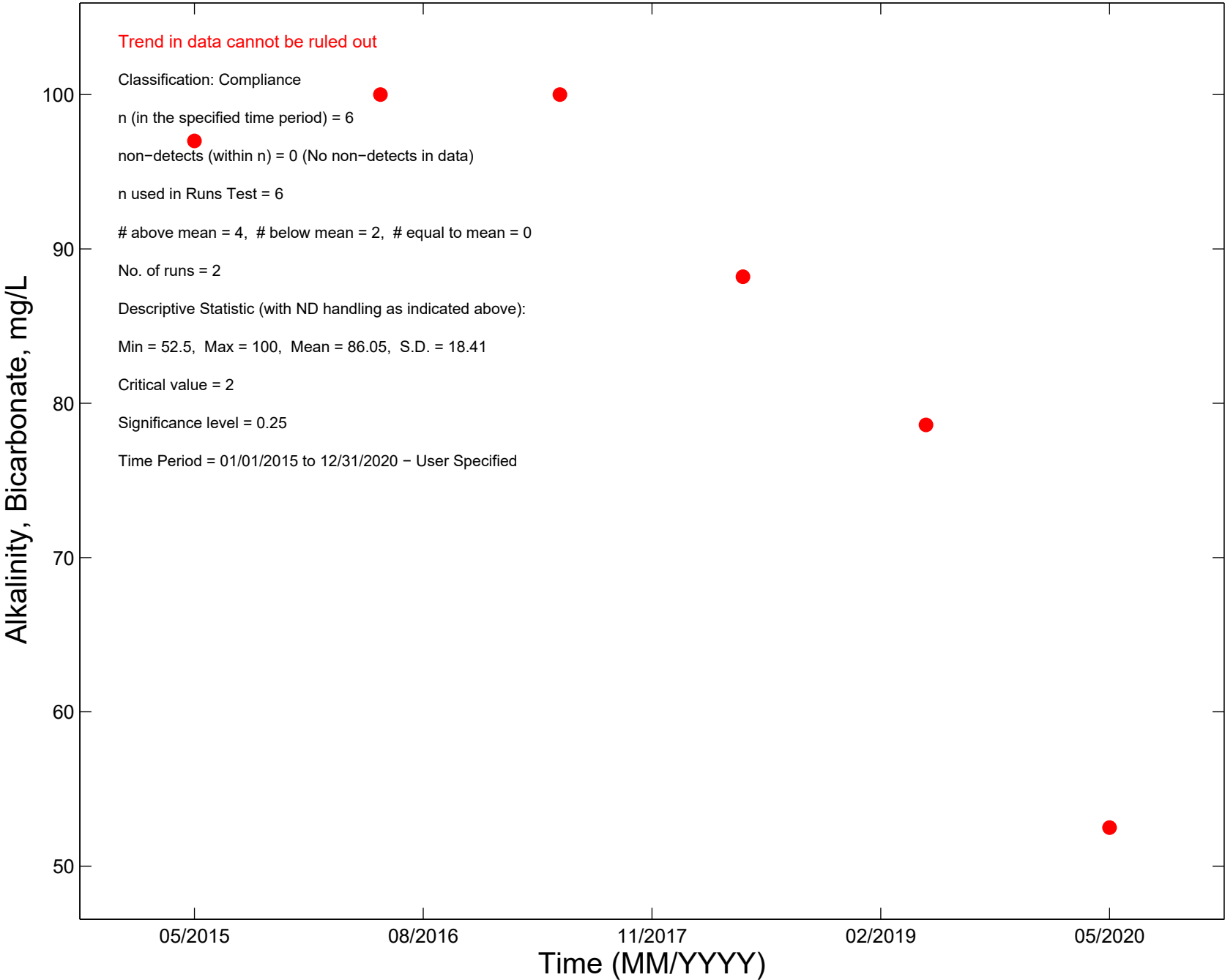
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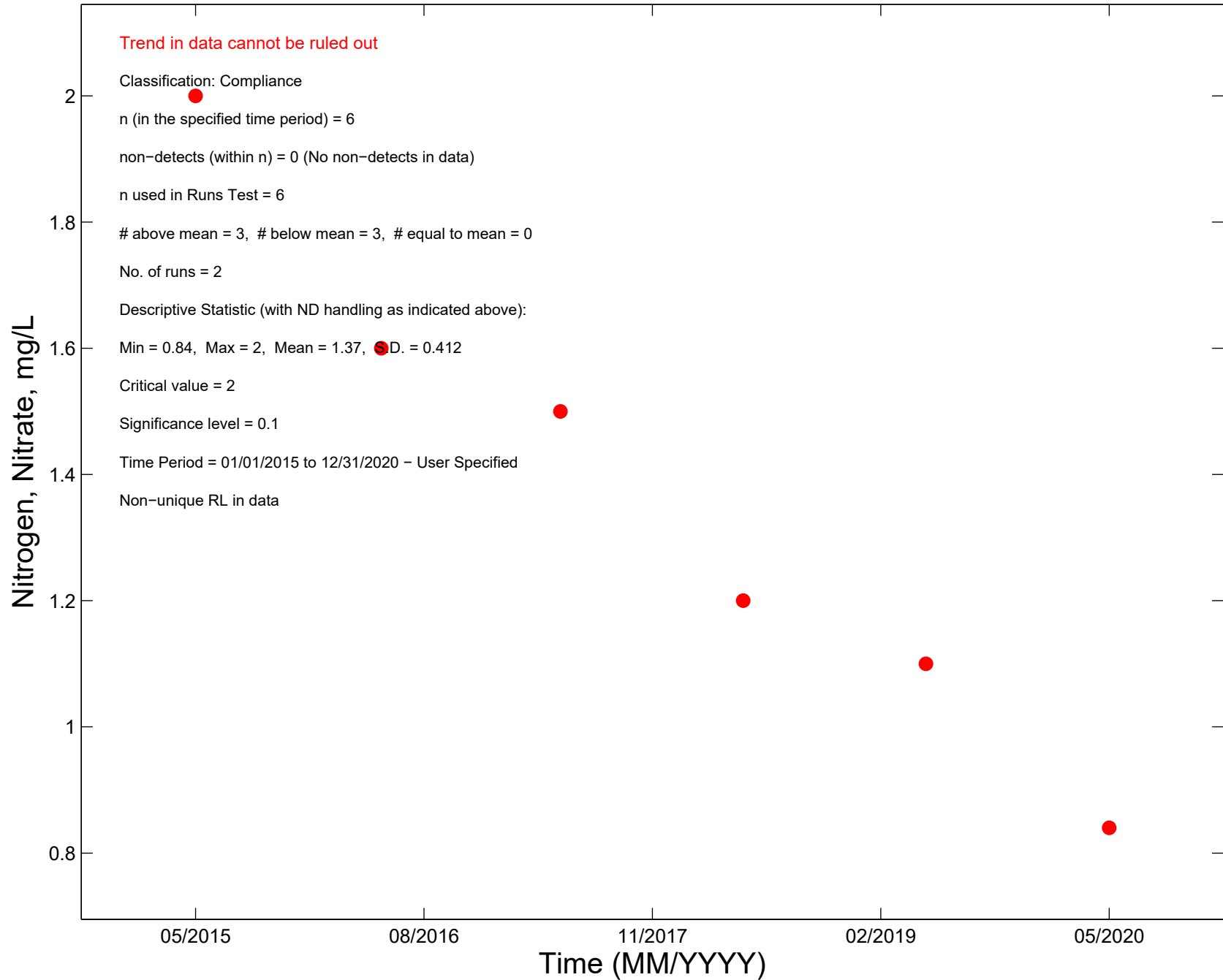
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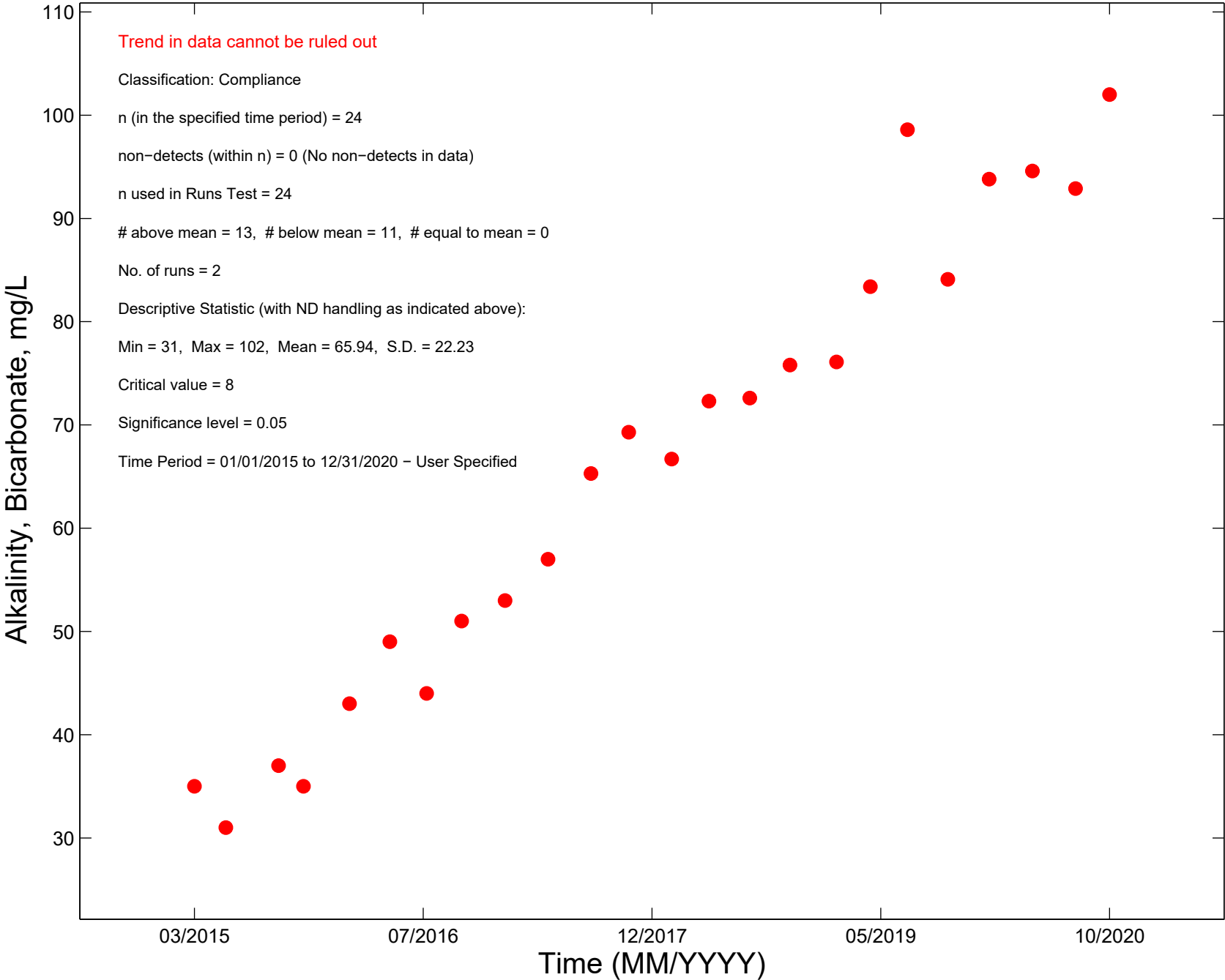
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# QAL073A

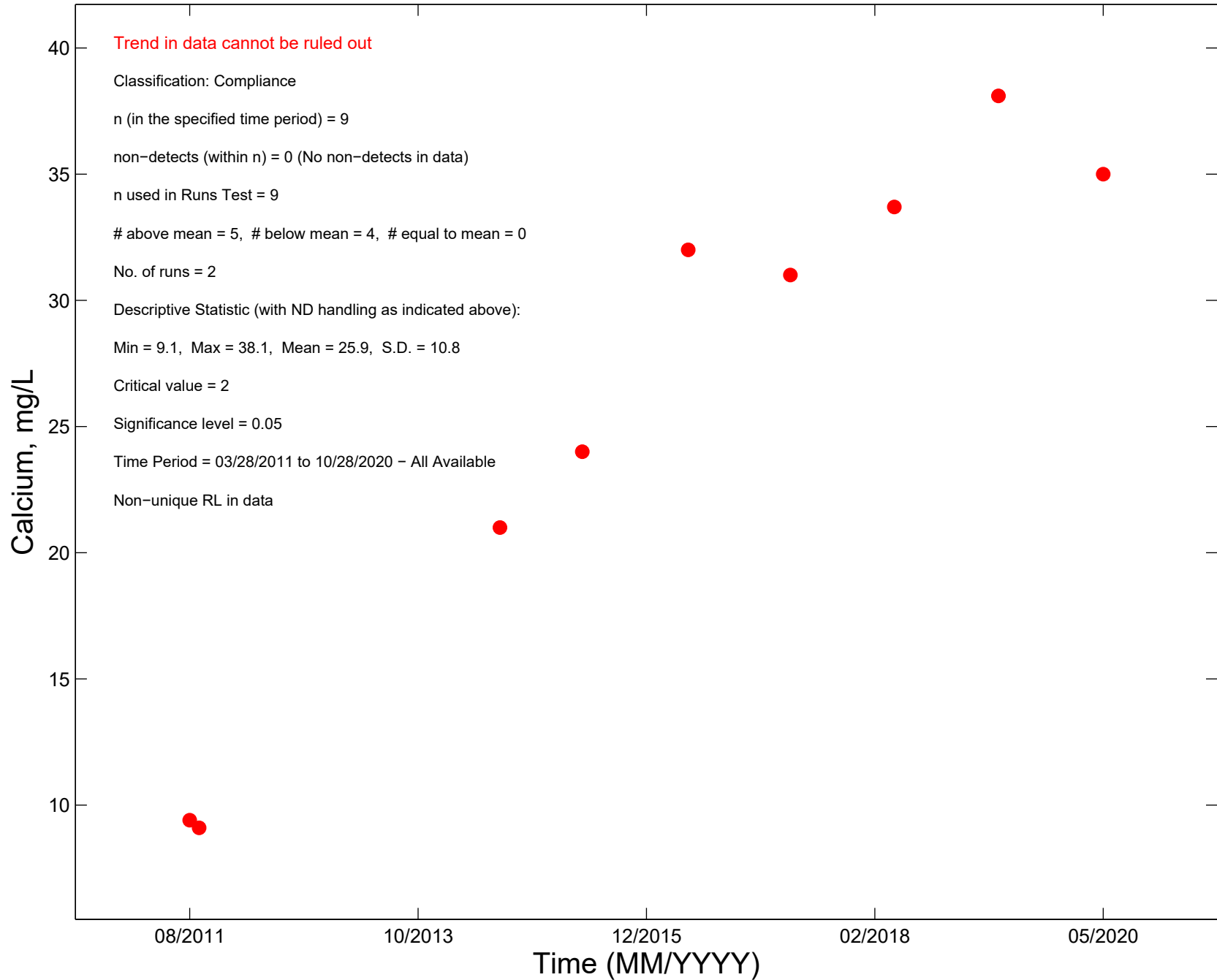


# QAL074A

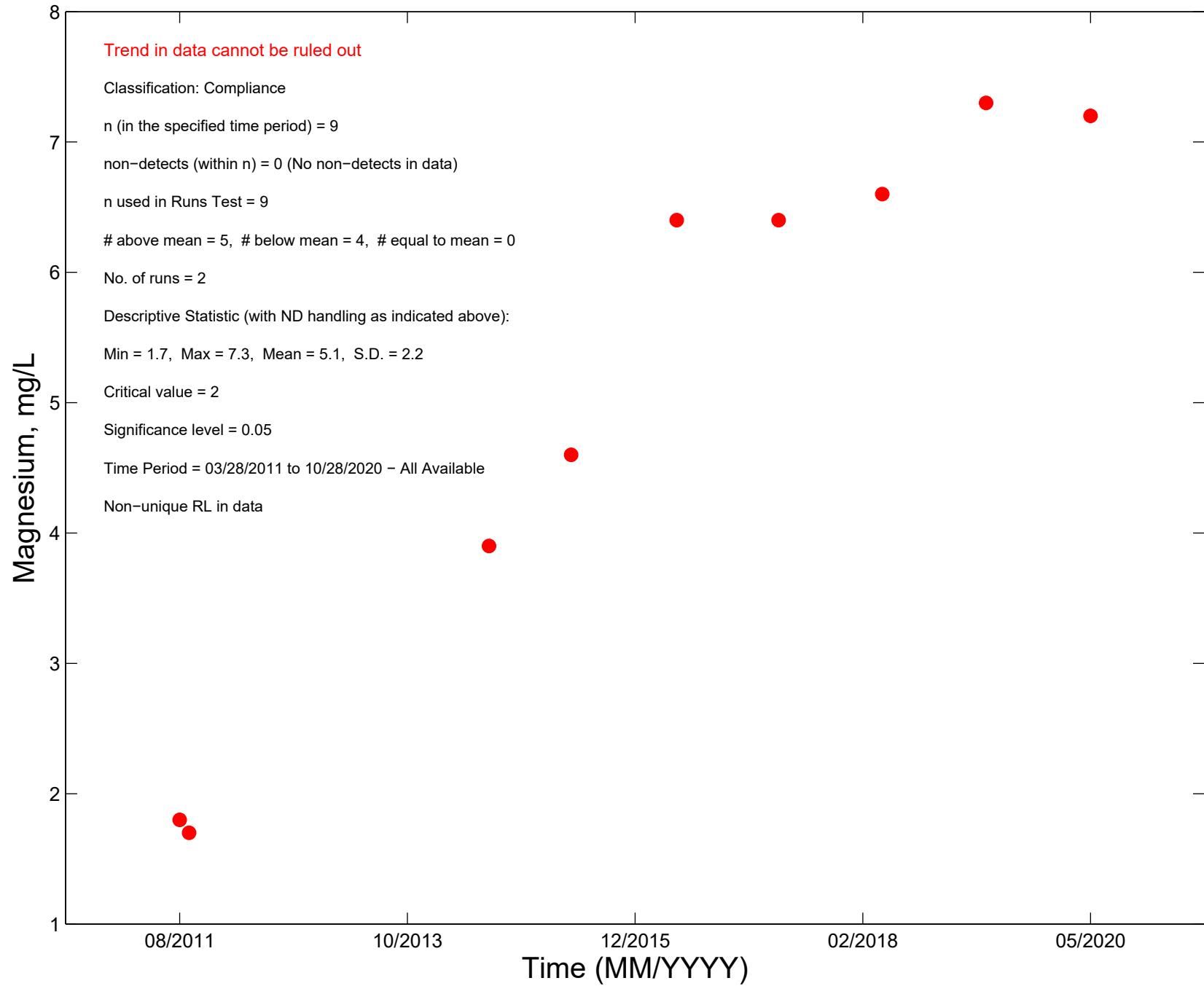




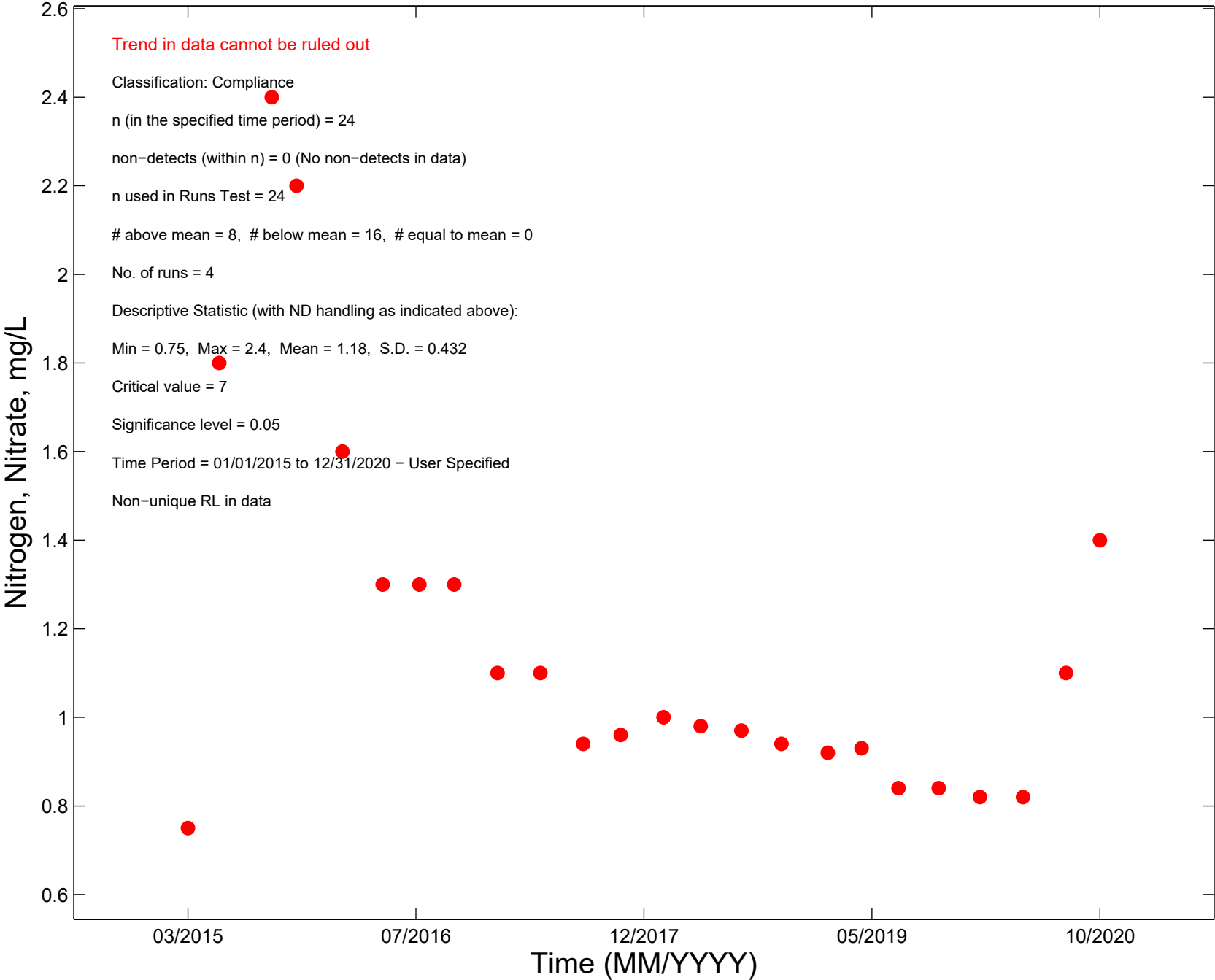
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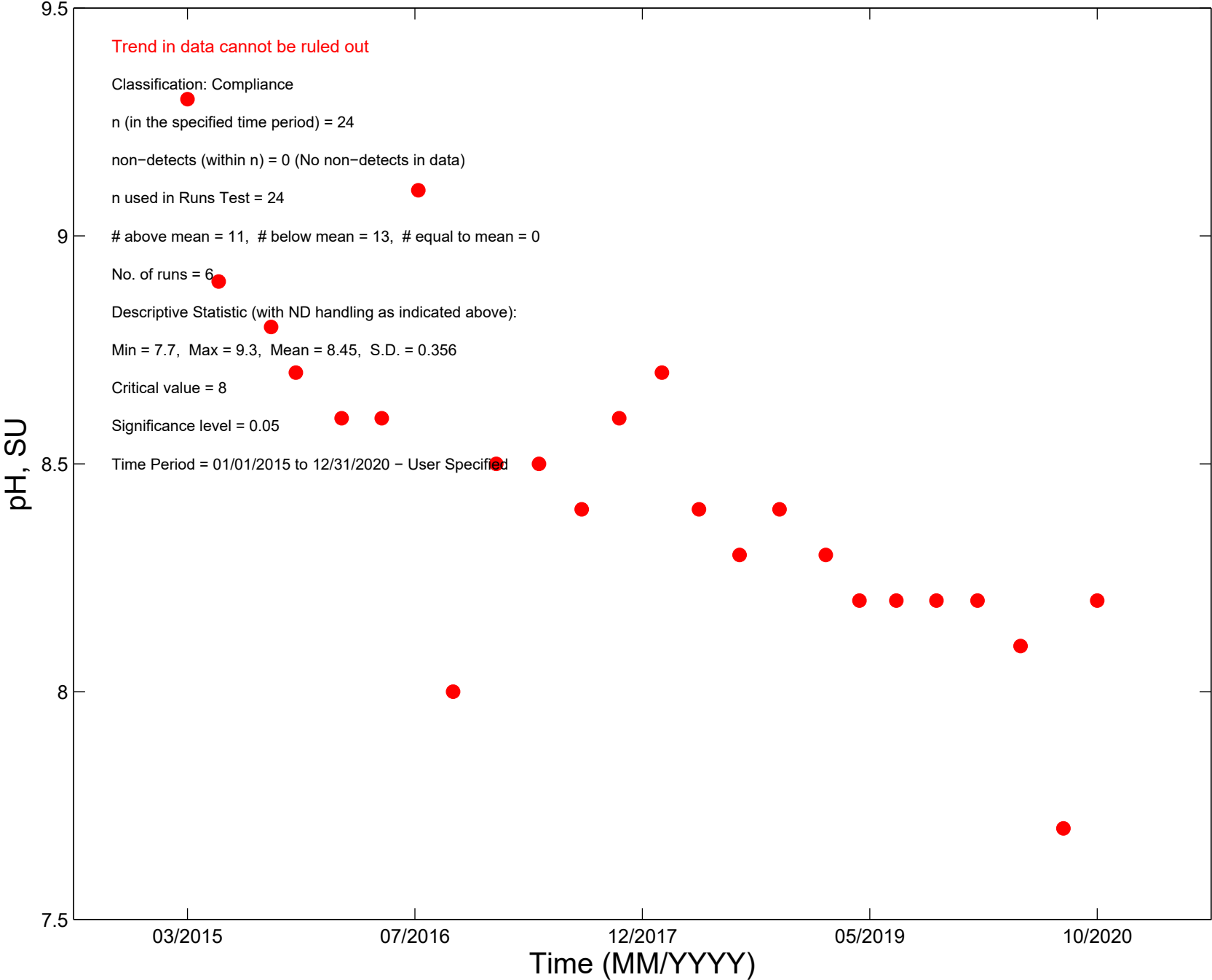
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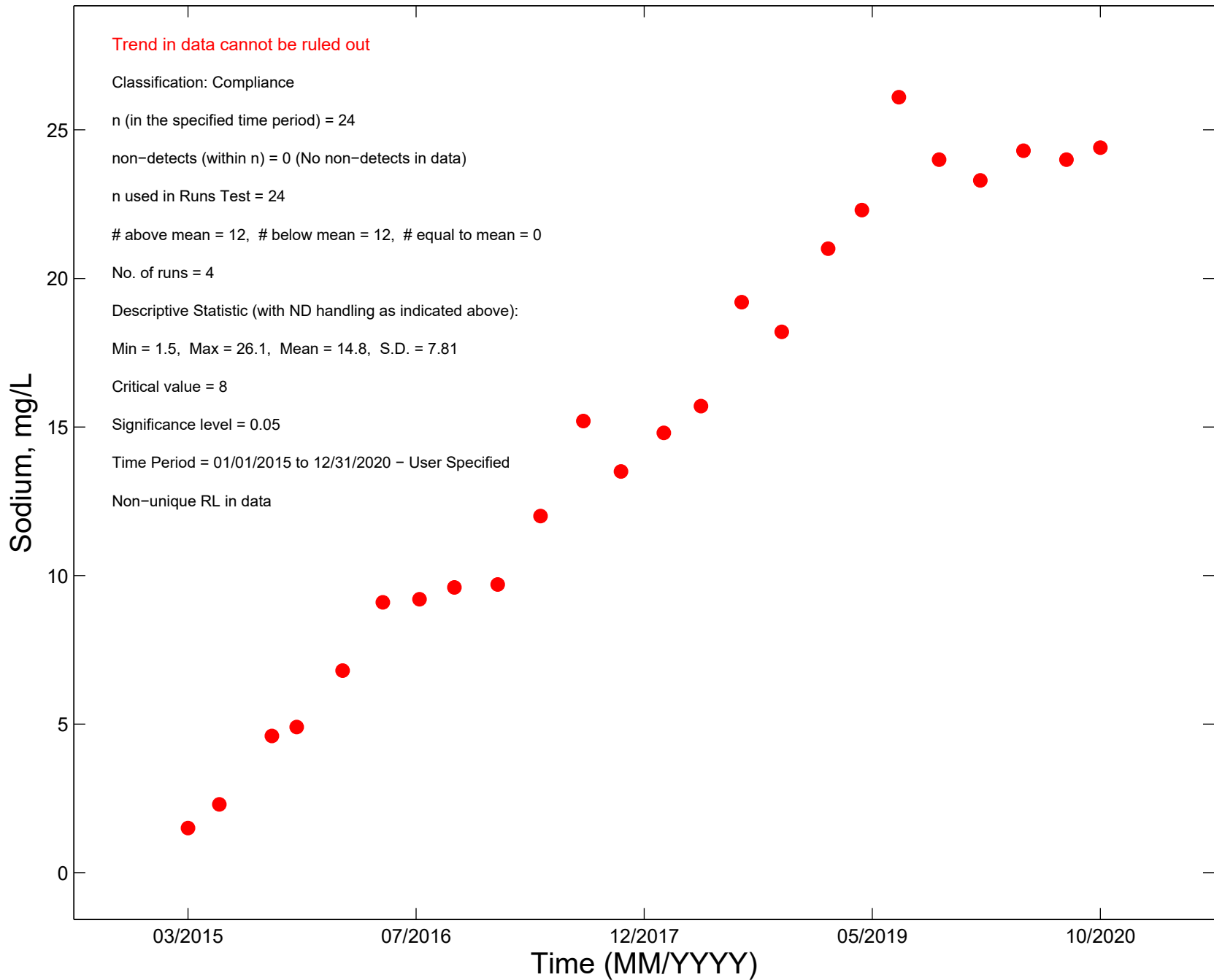
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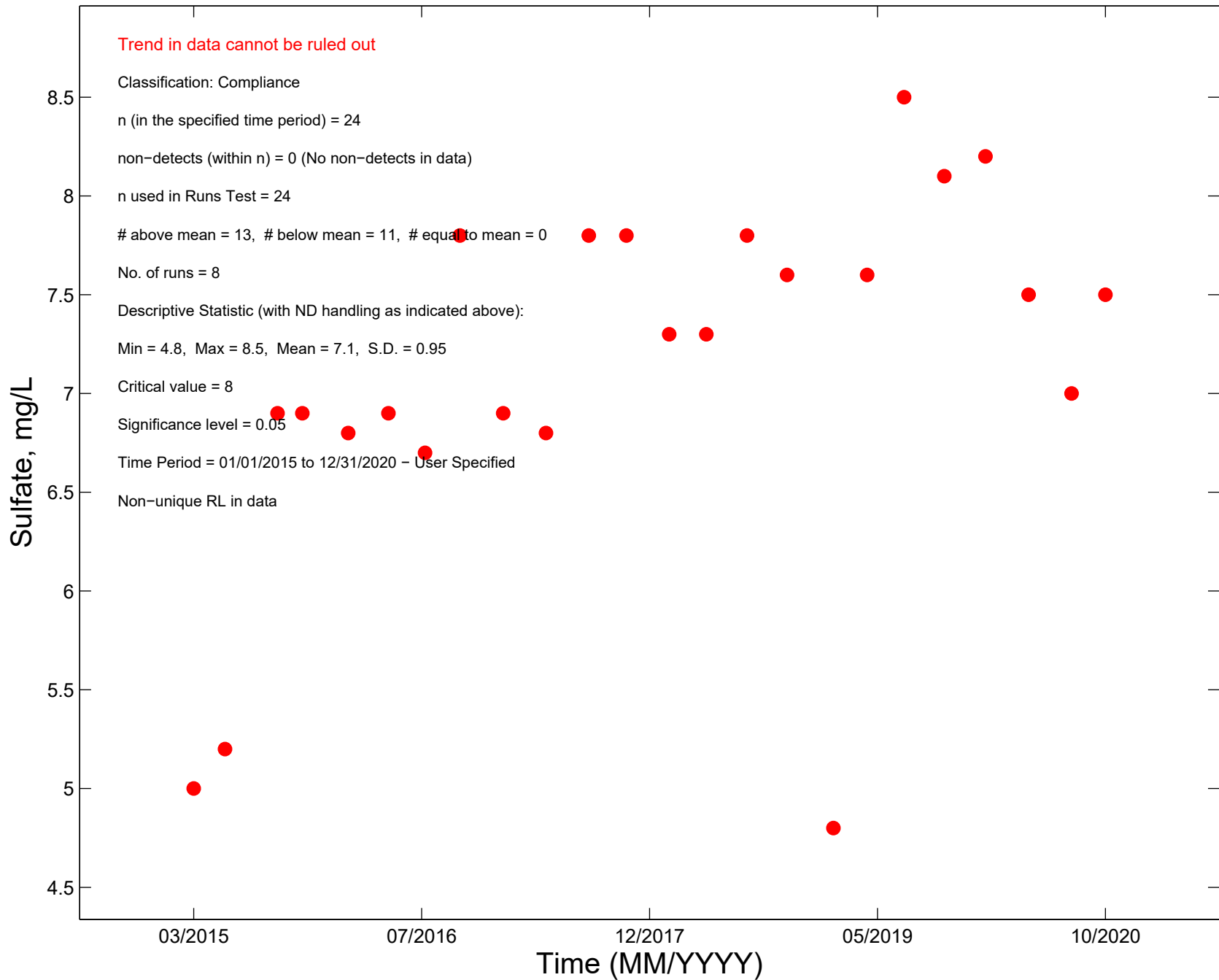
# QAL074A



# QAL074A



# QAL074A



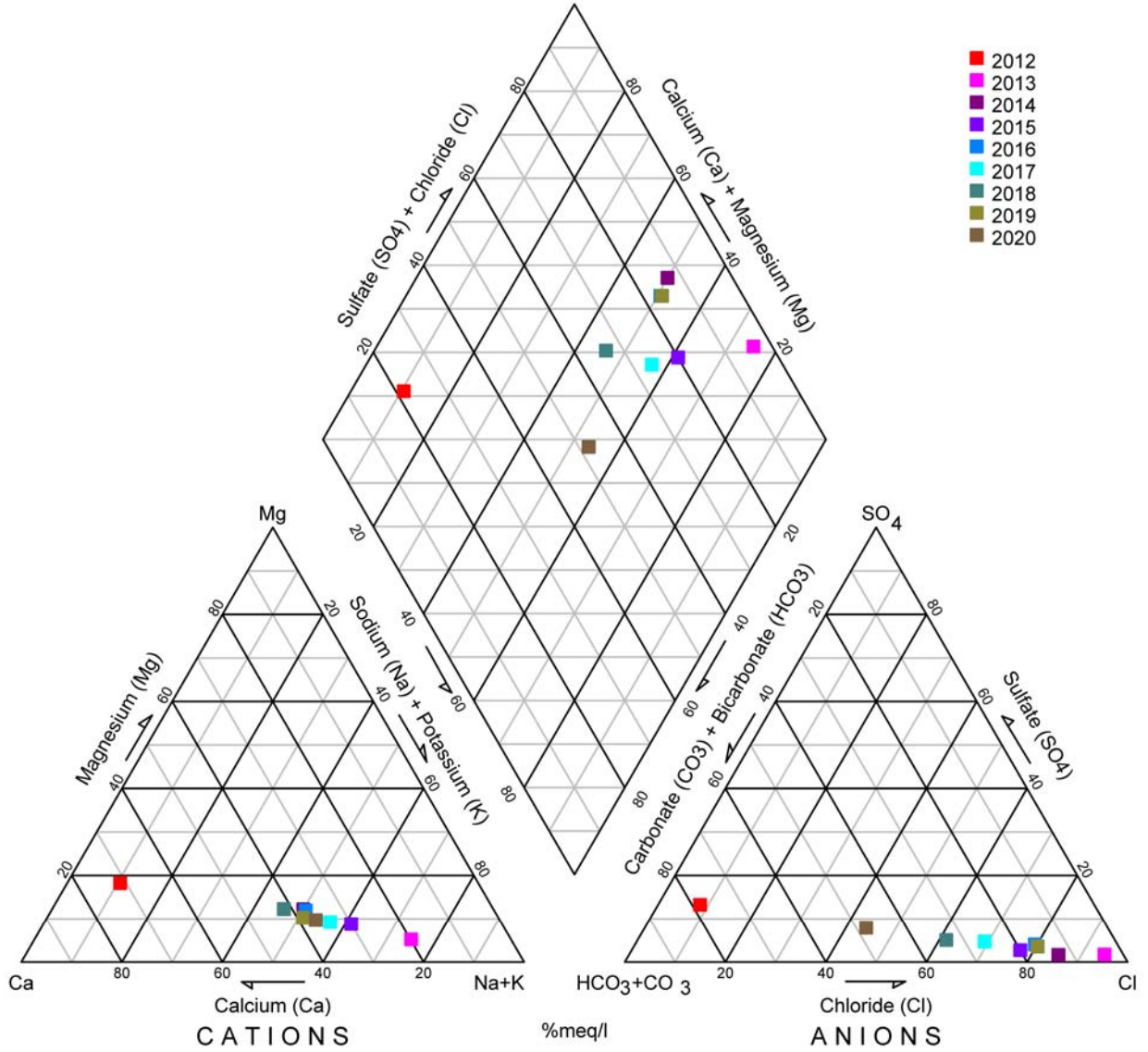
## **Appendix H**

### **Eagle Mine**

### **Groundwater Piper Diagrams**

# Well QAL024A

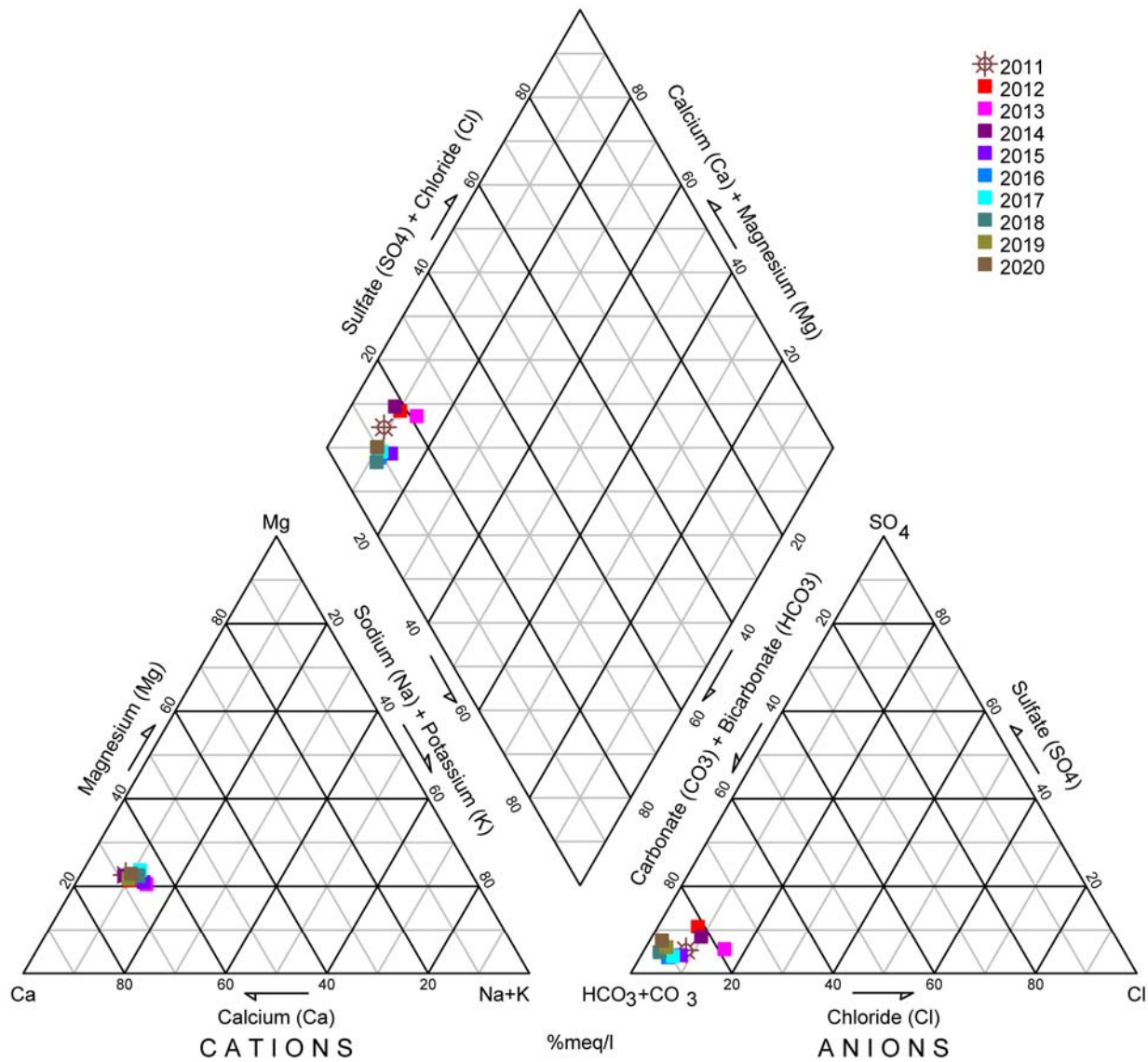
## 2020 Piper Diagram





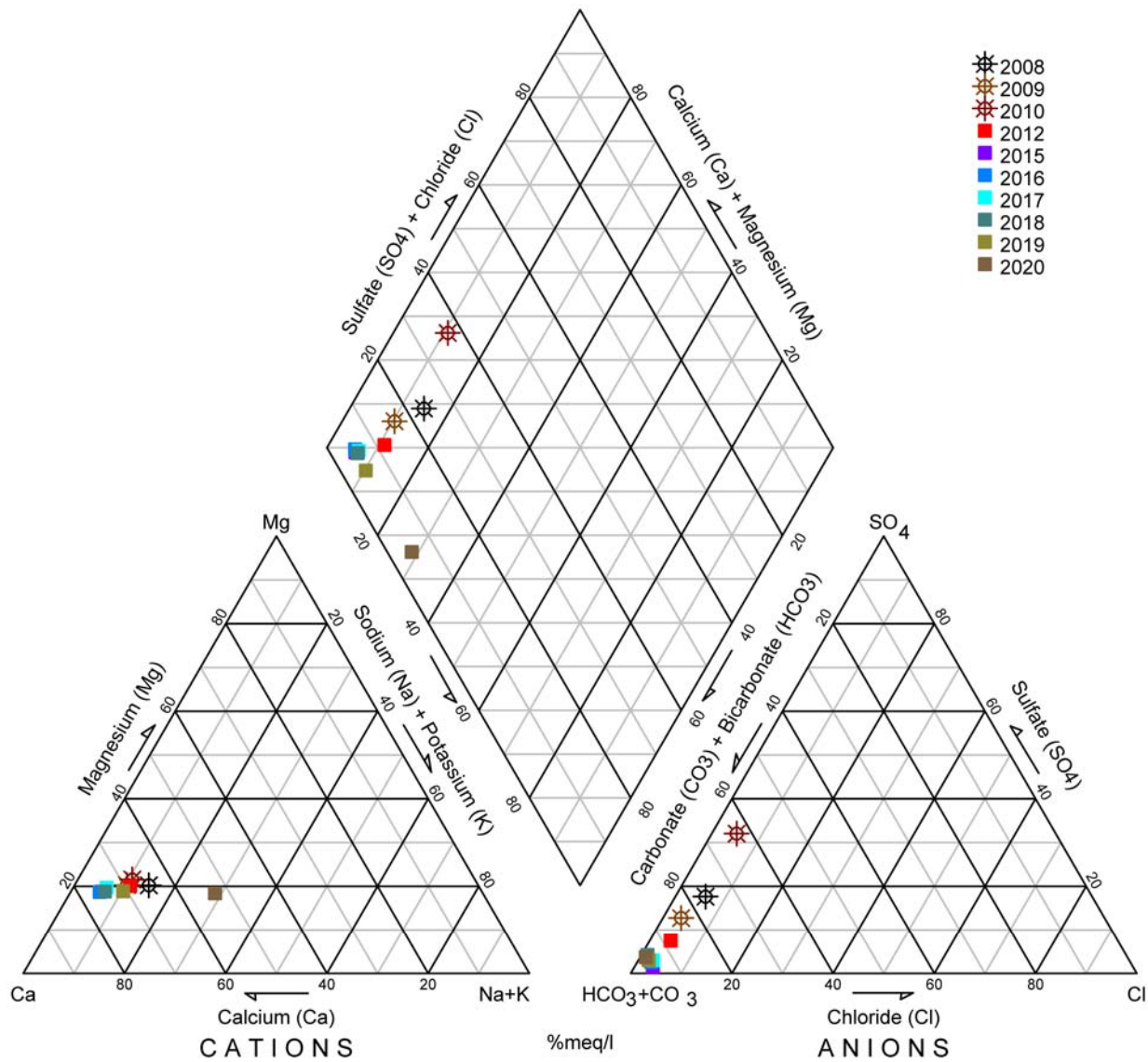
# Well QAL025A

## 2020 Piper Diagram



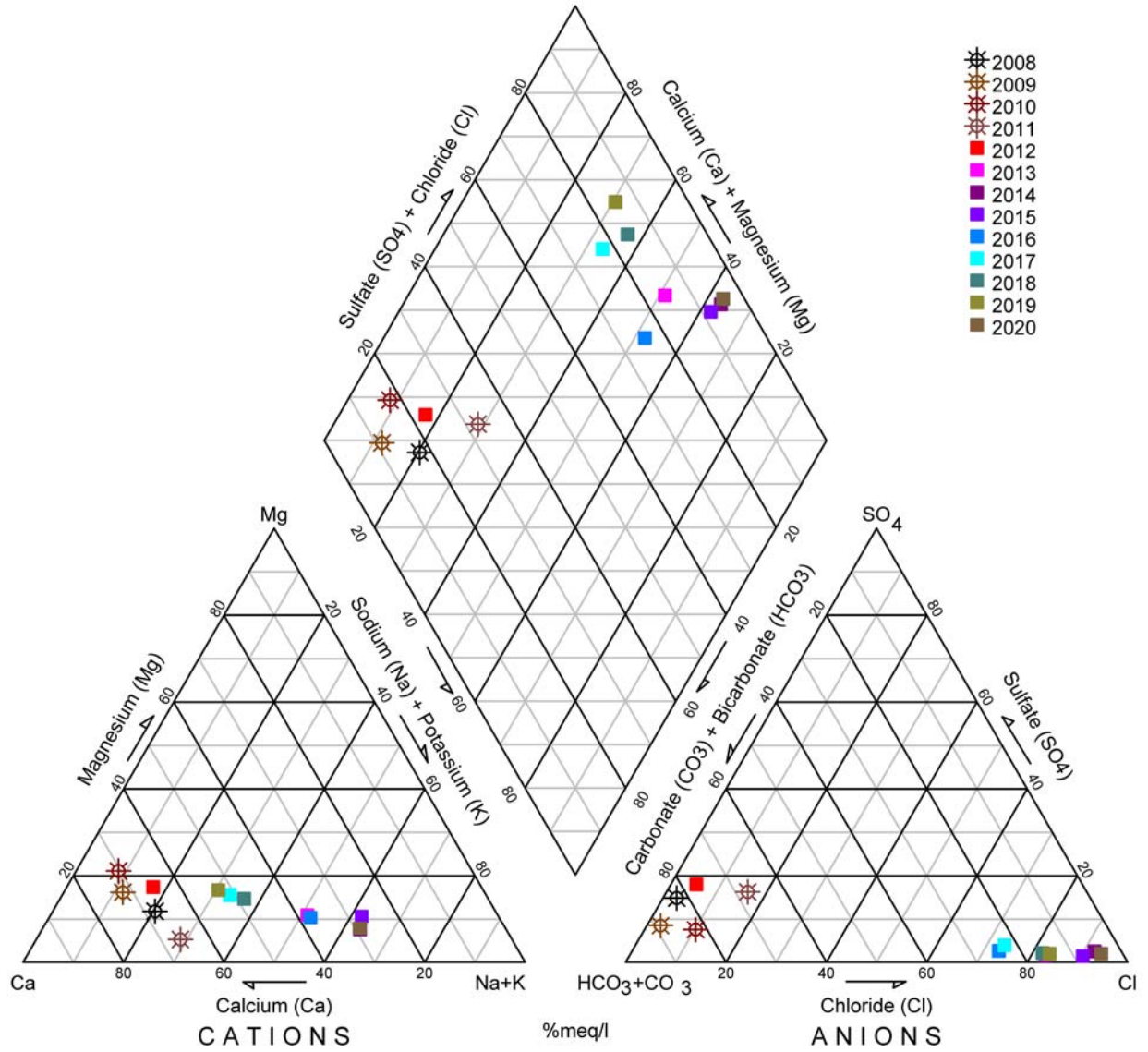
# Well QAL026A

## 2020 Piper Diagram



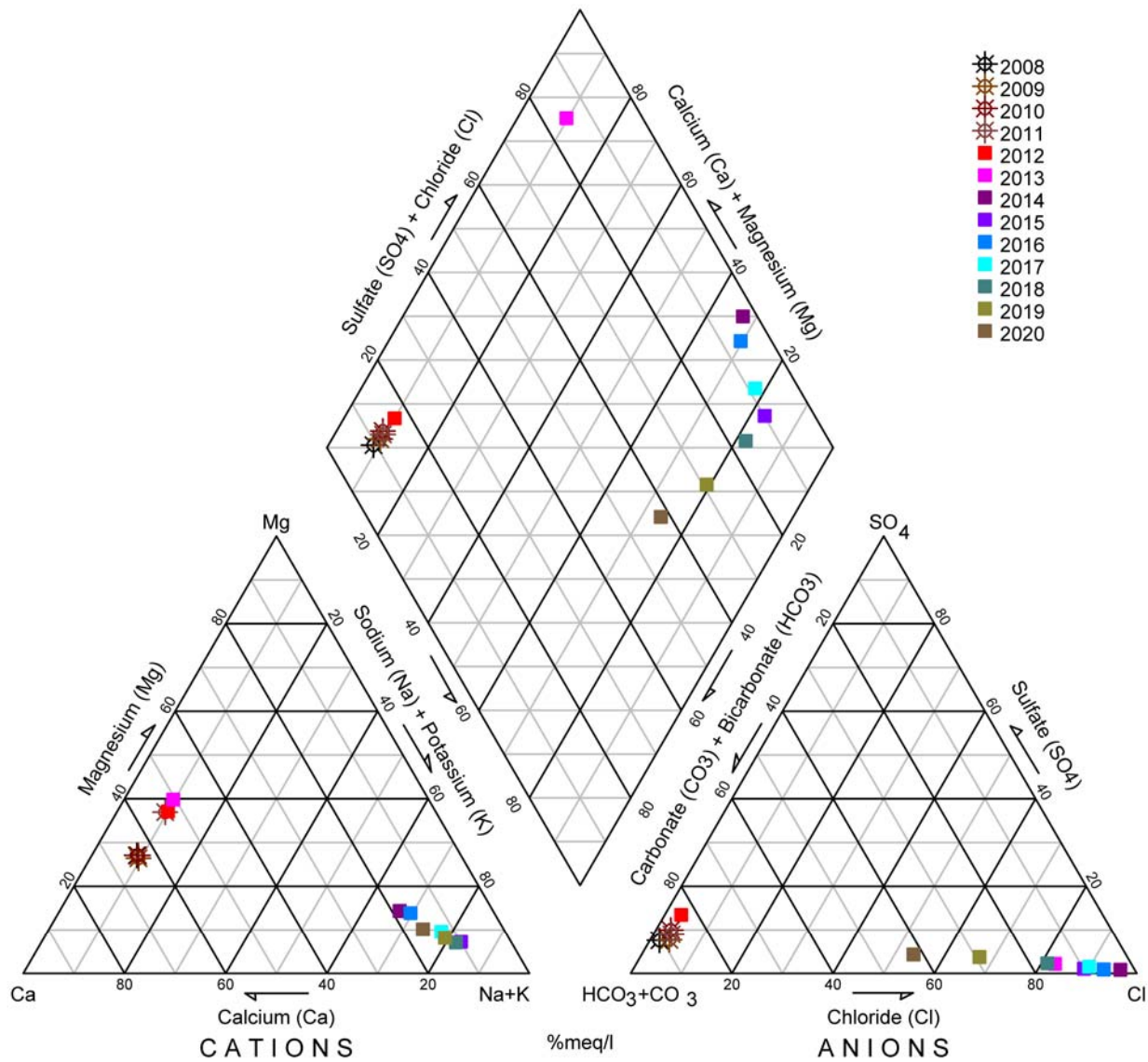
# Well QAL029A

## 2020 Piper Diagram



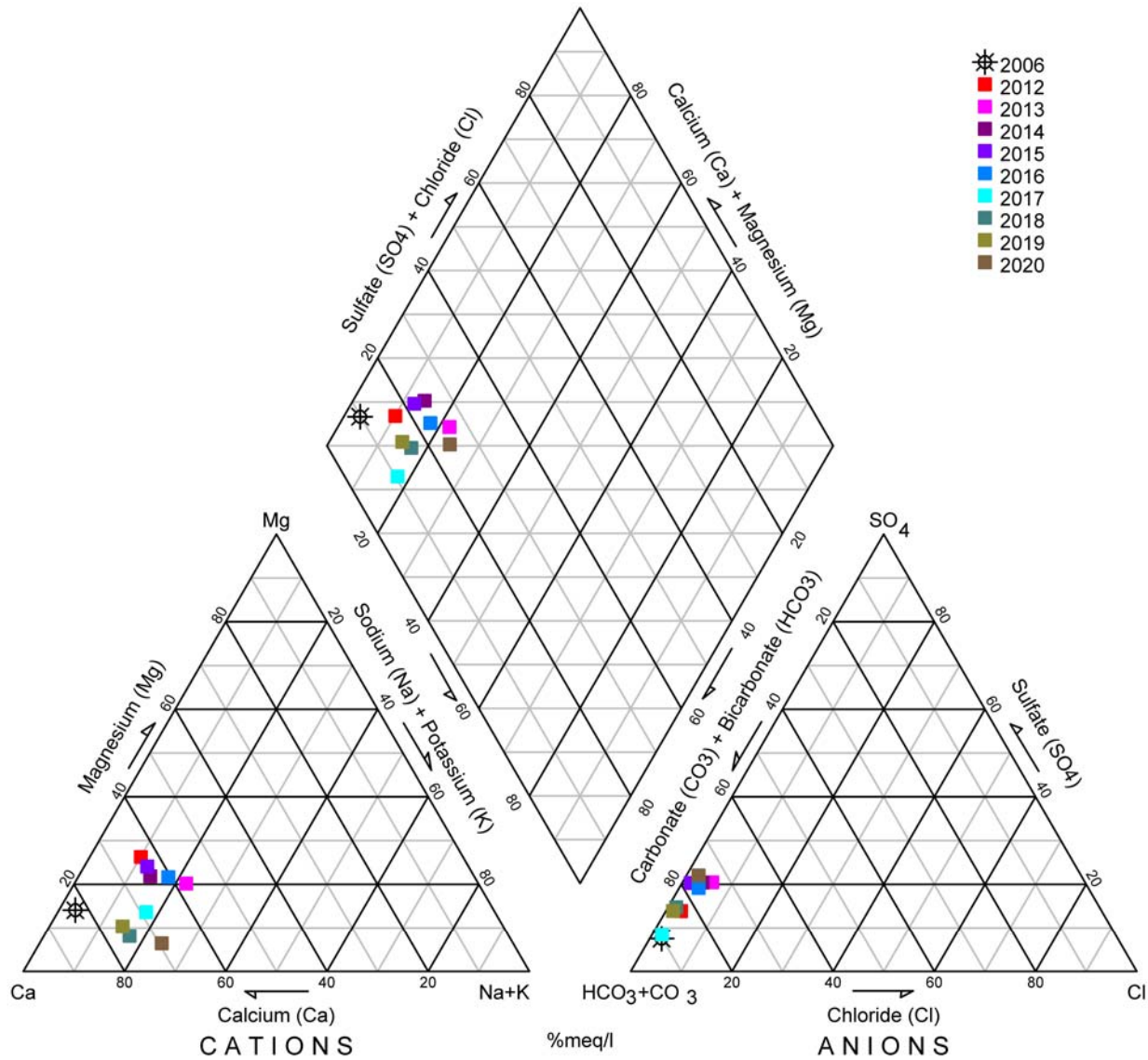
# Well QAL029D

## 2020 Piper Diagram



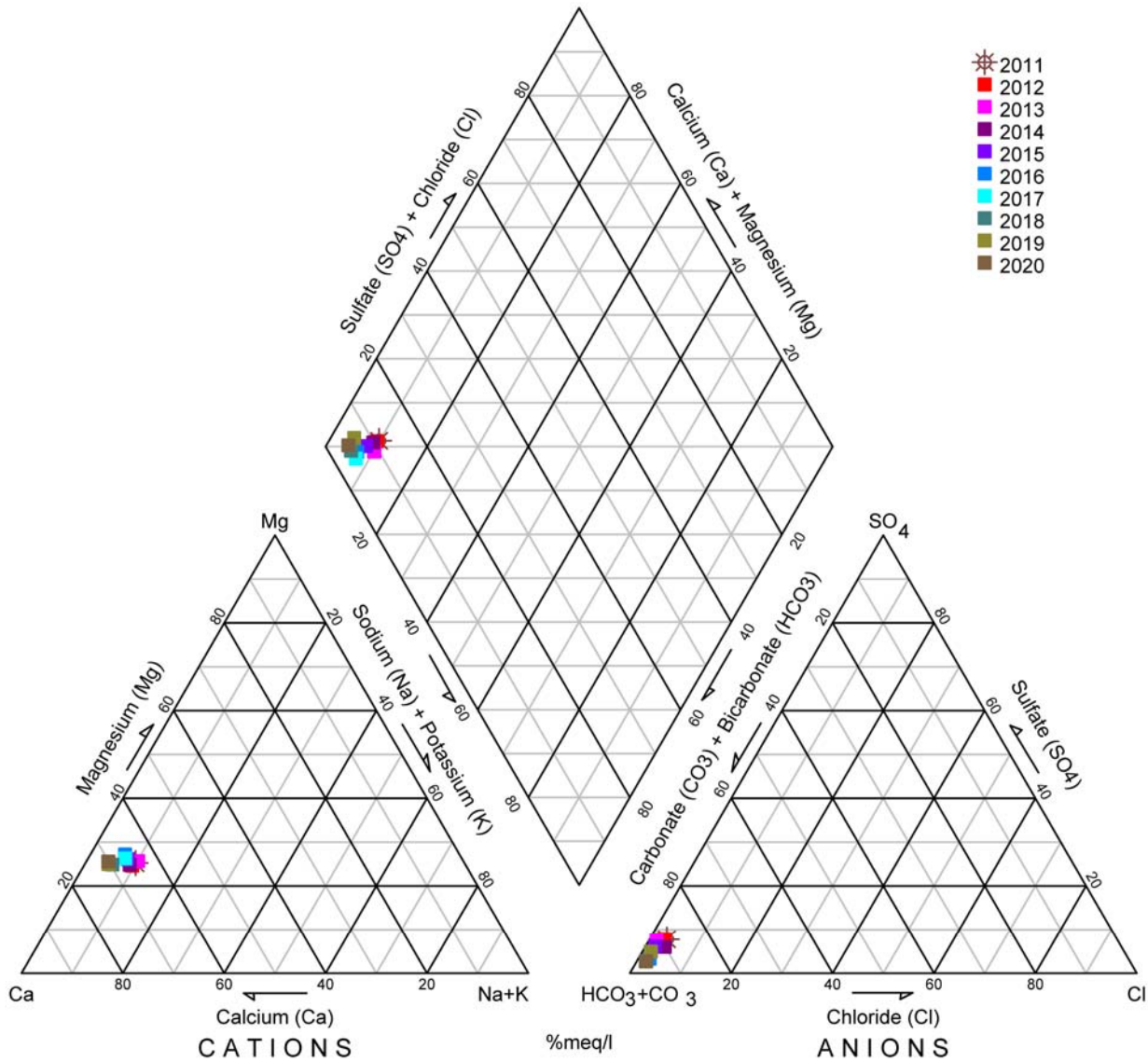
# Well QAL044B

## 2020 Piper Diagram



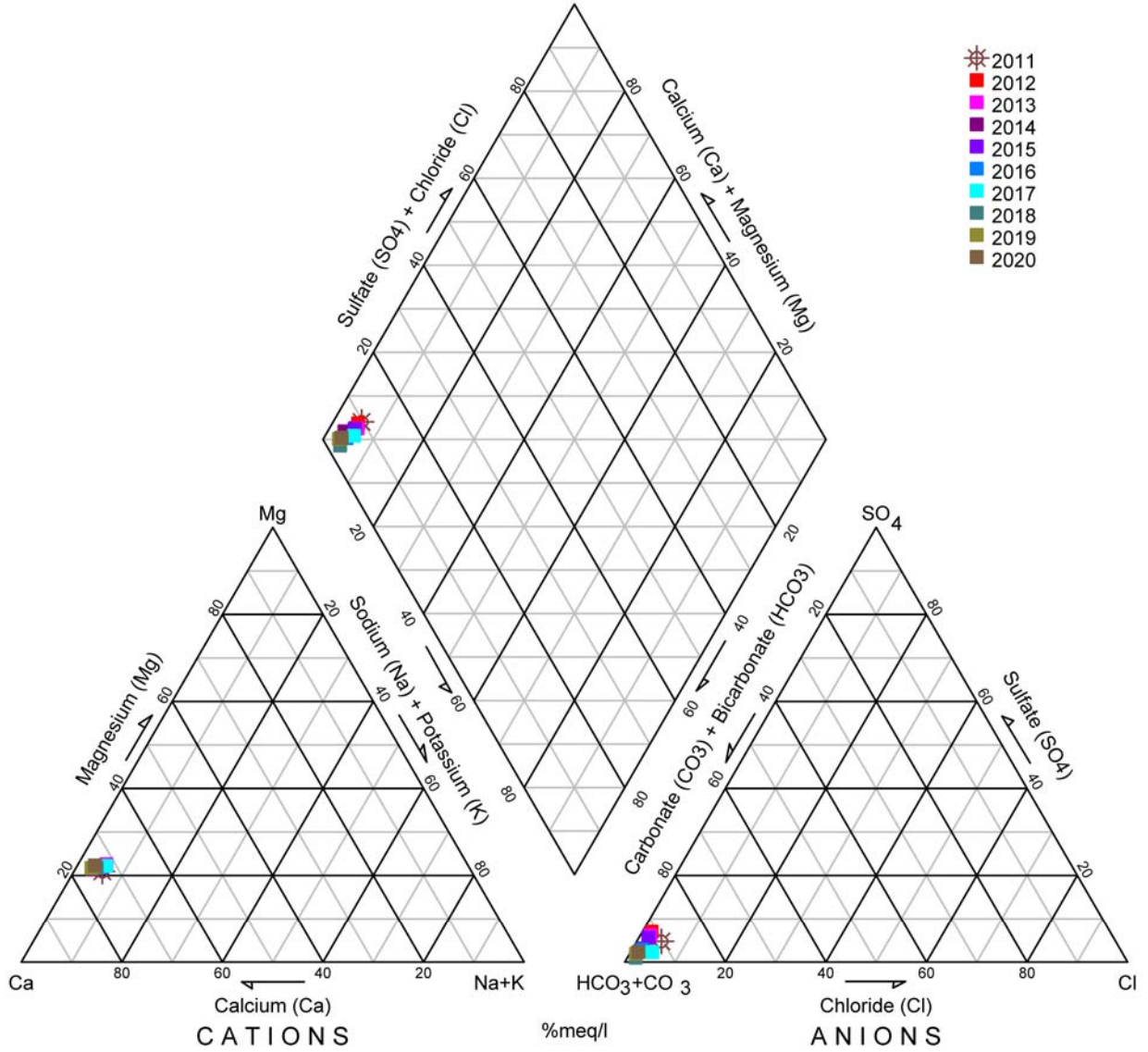
# Well QAL060A

## 2020 Piper Diagram



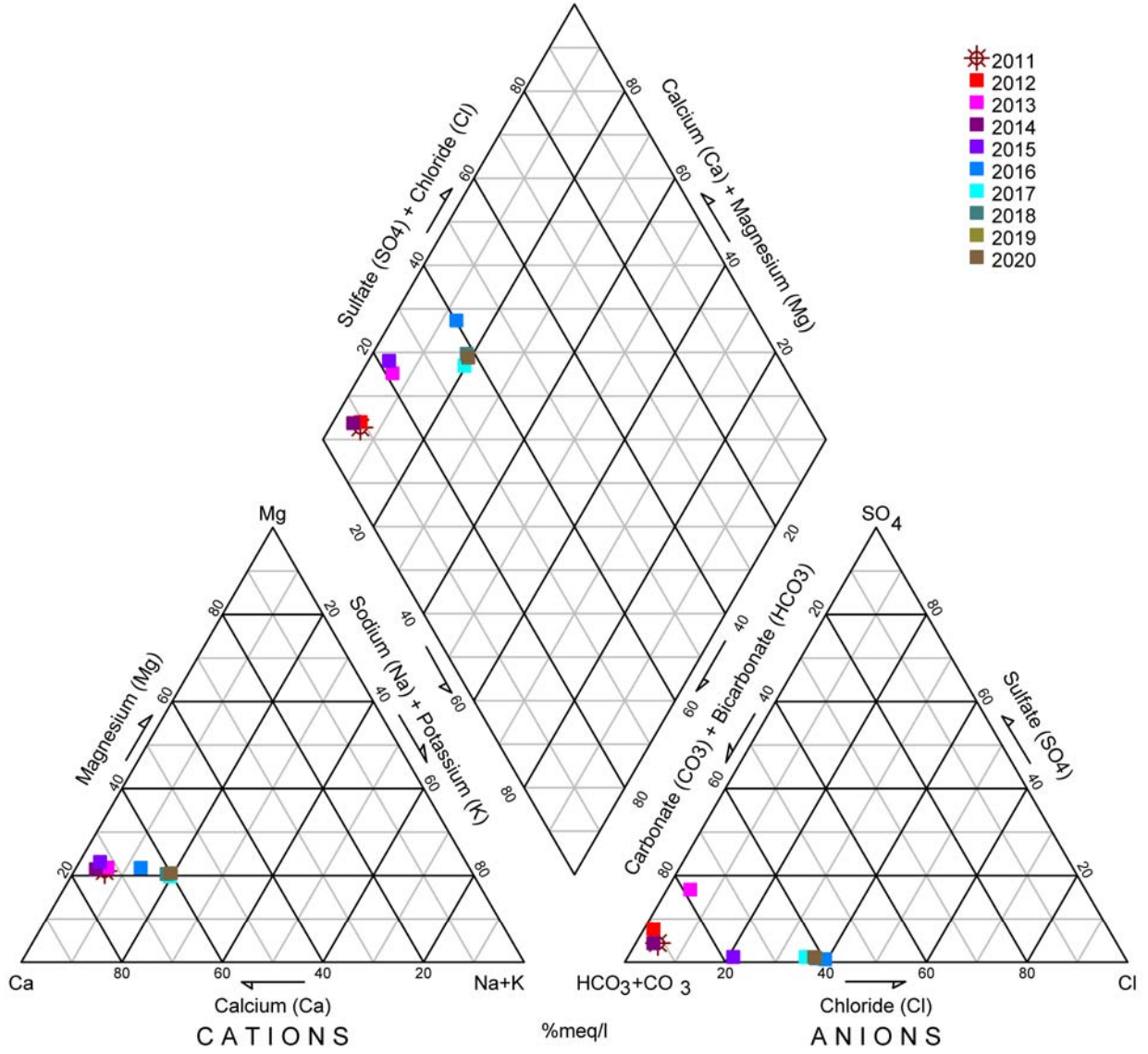
# Well QAL061A

## 2020 Piper Diagram



# Well QAL062A

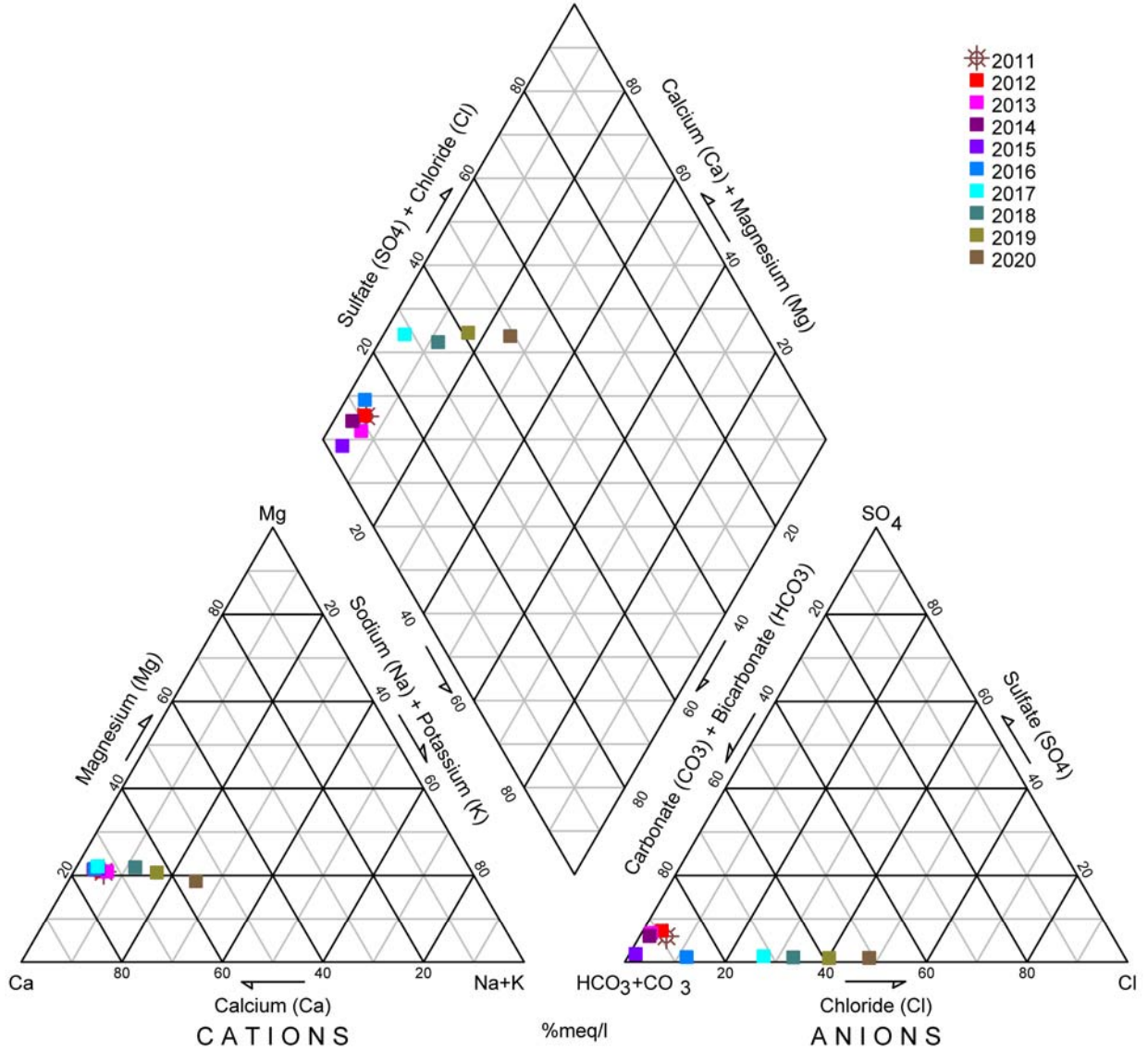
## 2020 Piper Diagram





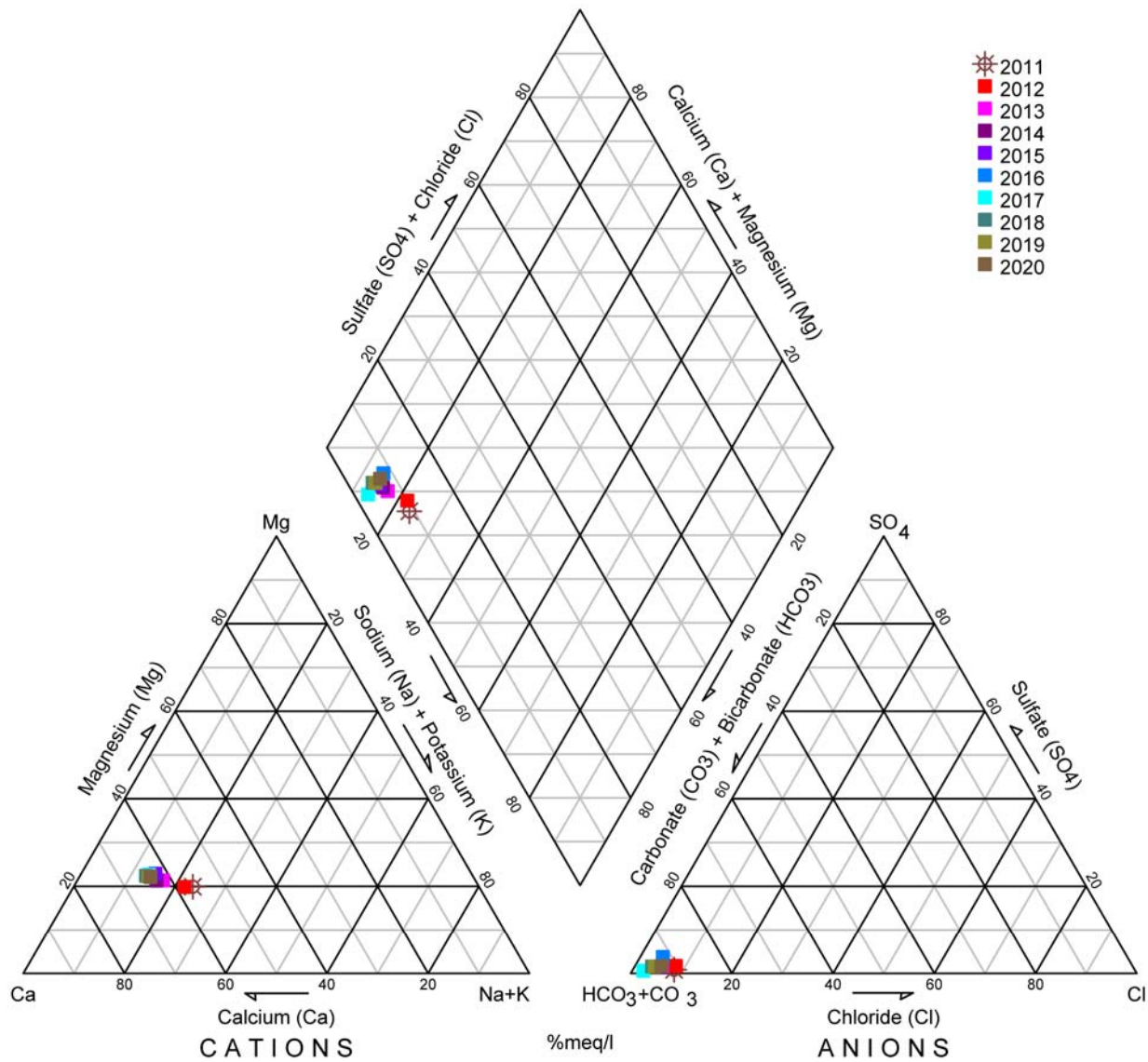
# Well QAL063A

## 2020 Piper Diagram



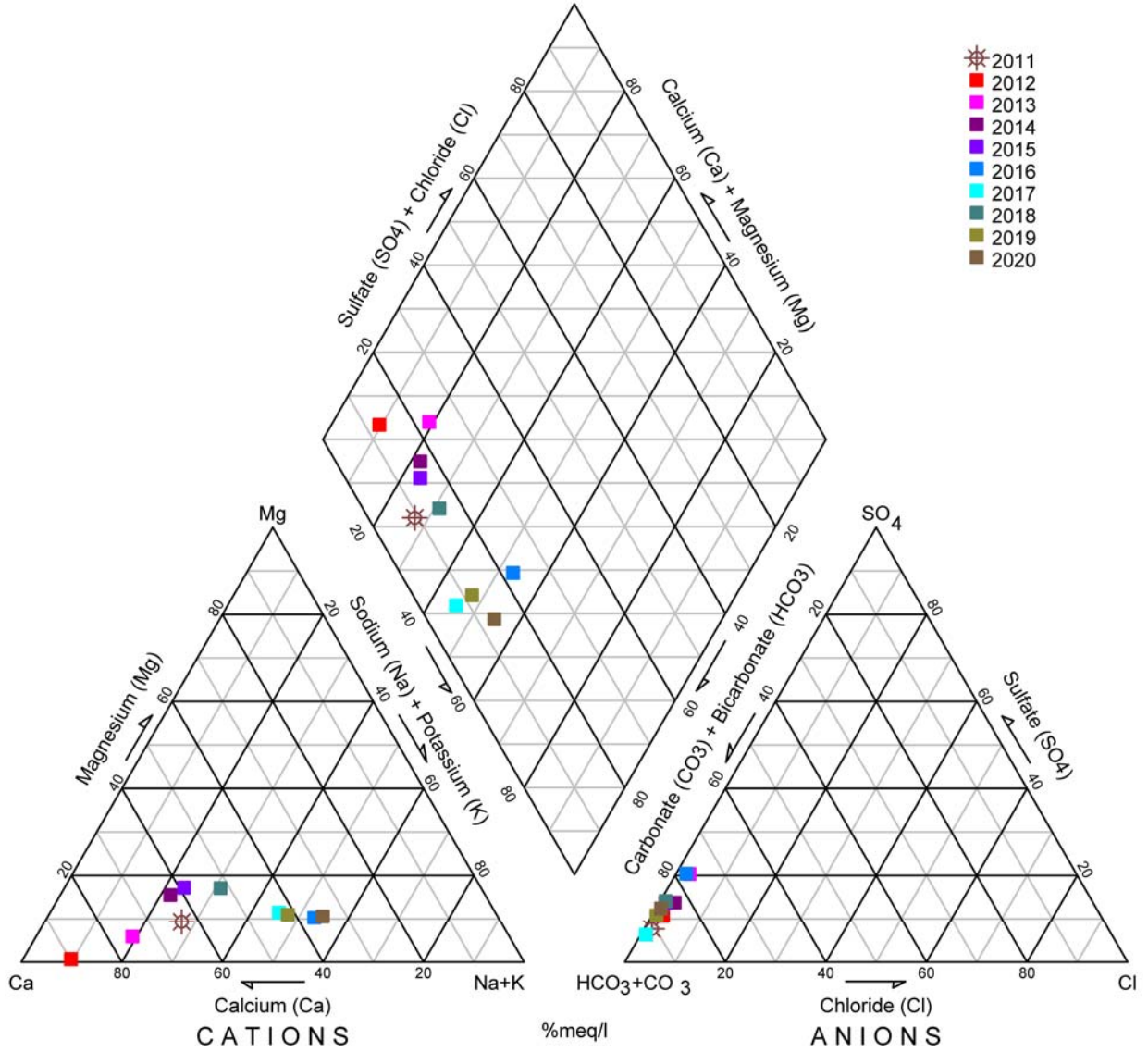
# Well QAL064D

## 2020 Piper Diagram



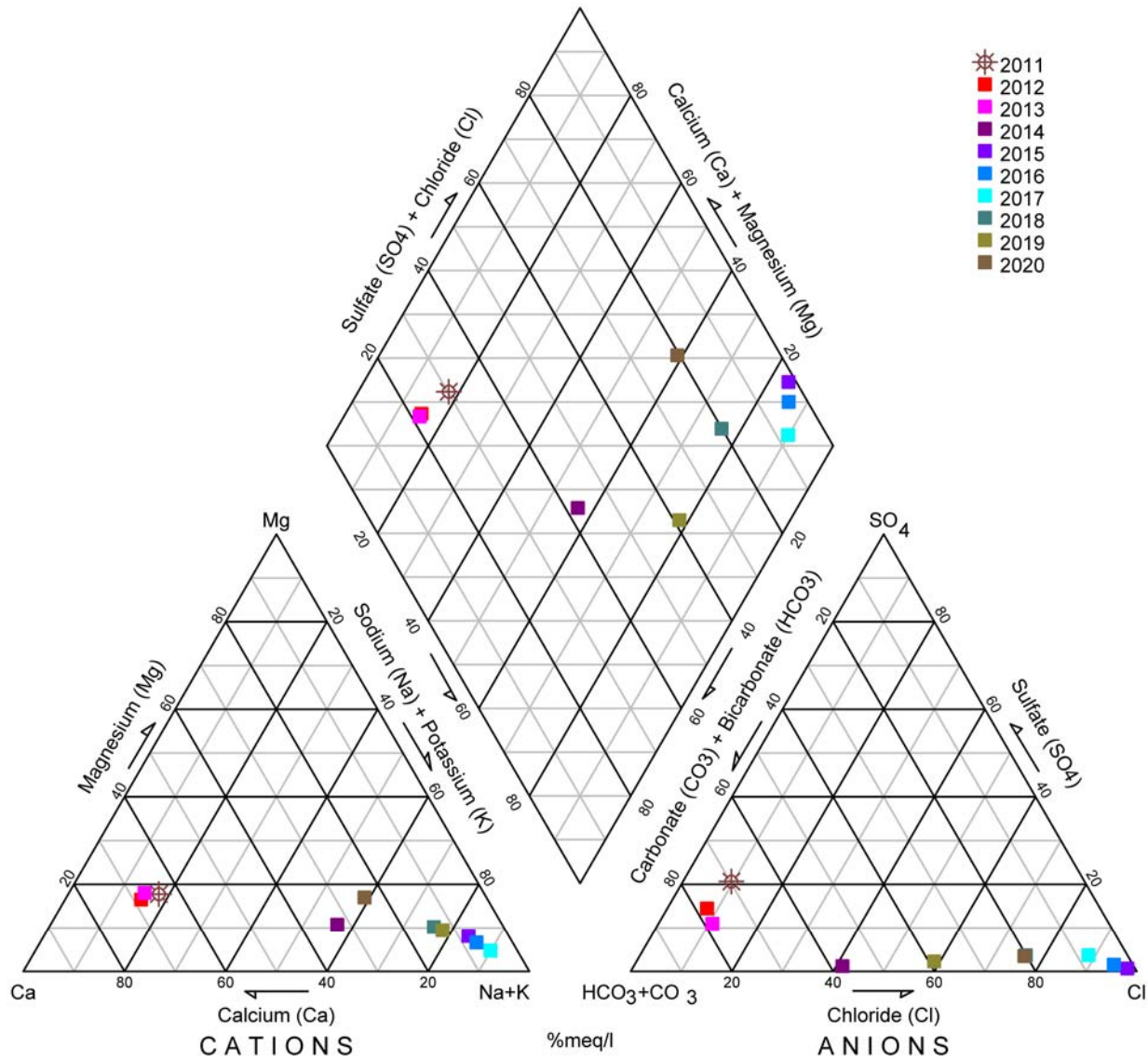
# Well QAL066D

## 2020 Piper Diagram



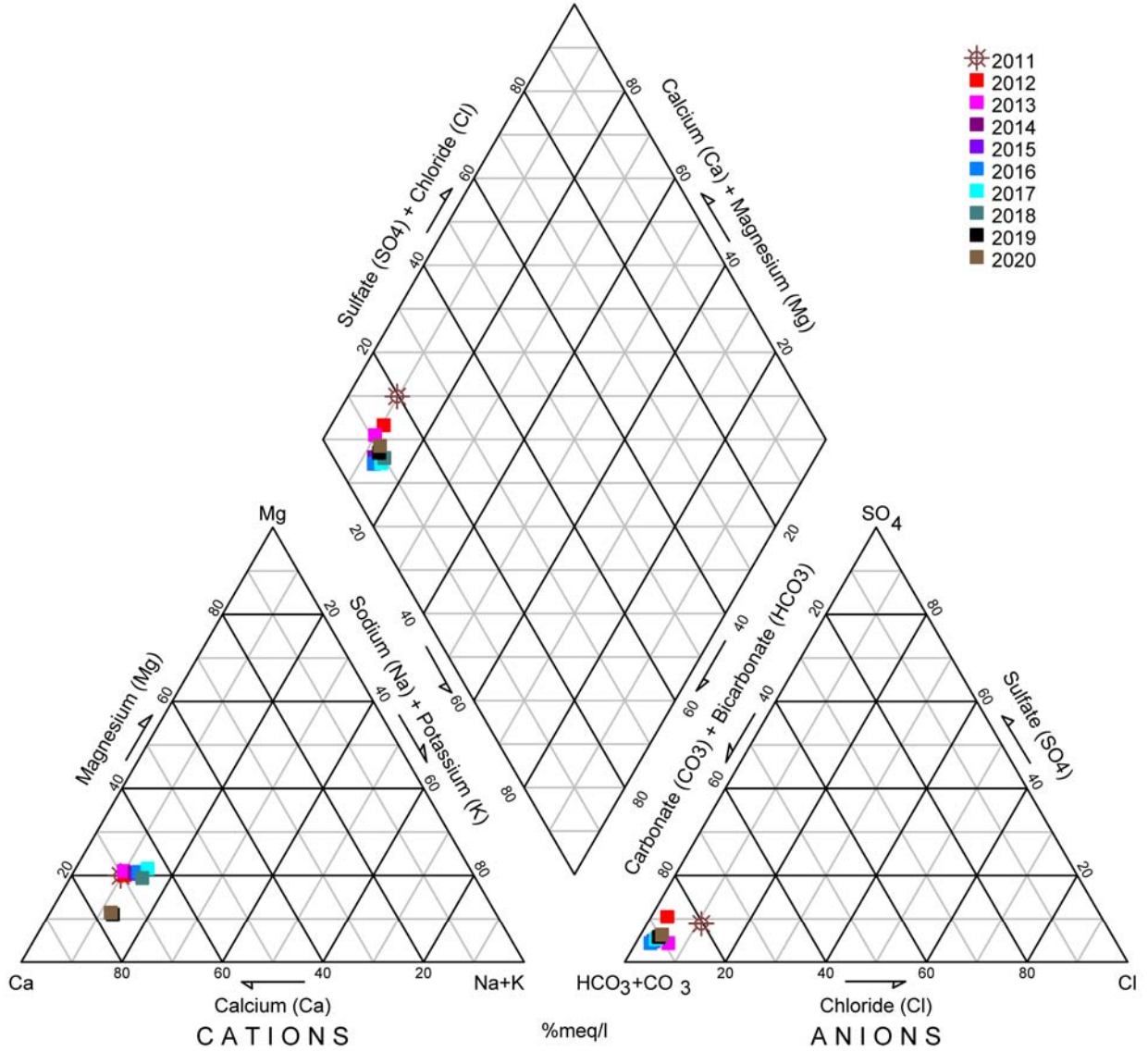
# Well QAL067A

## 2020 Piper Diagram



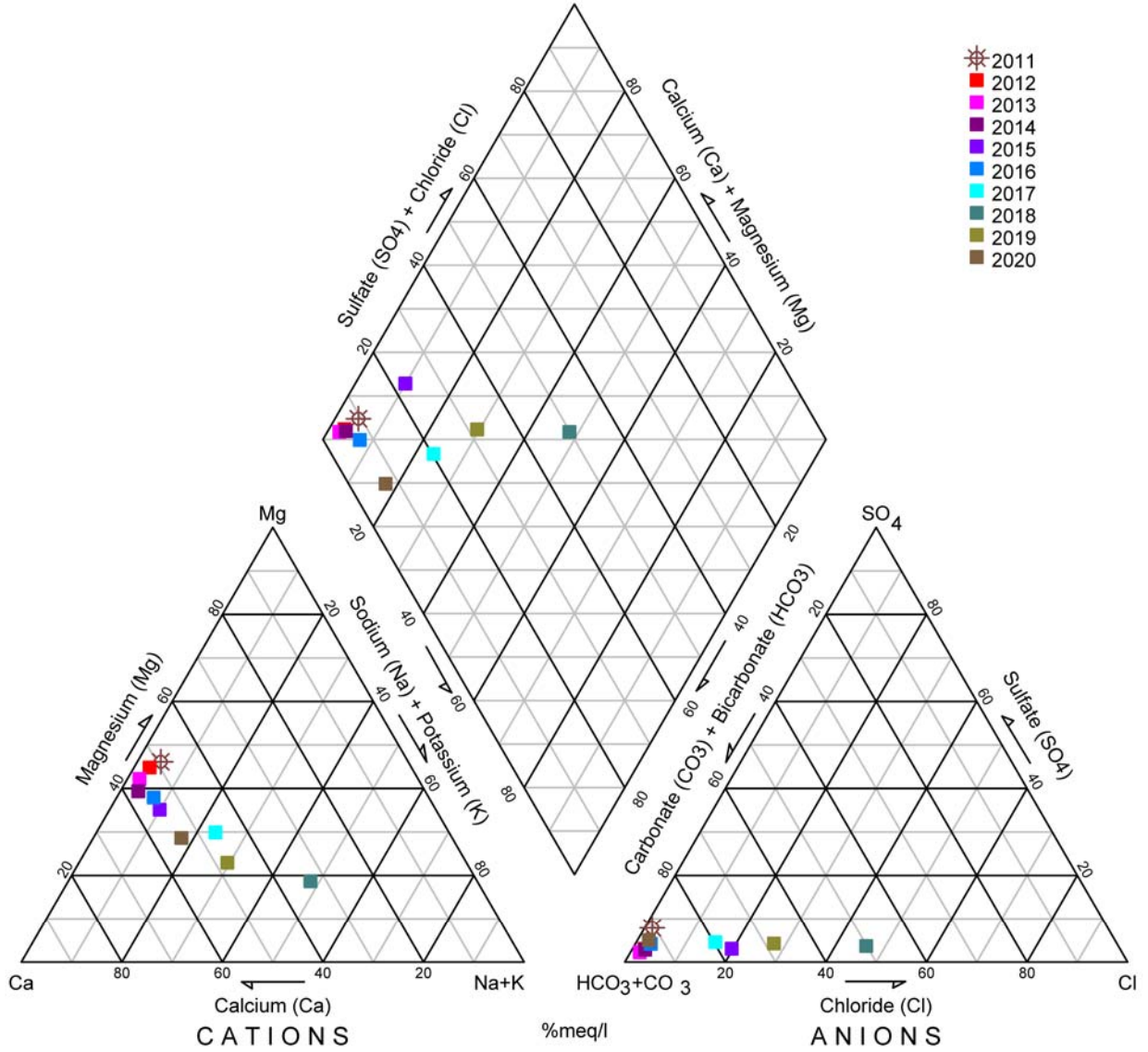
# Well QAL068A

## 2020 Piper Diagram



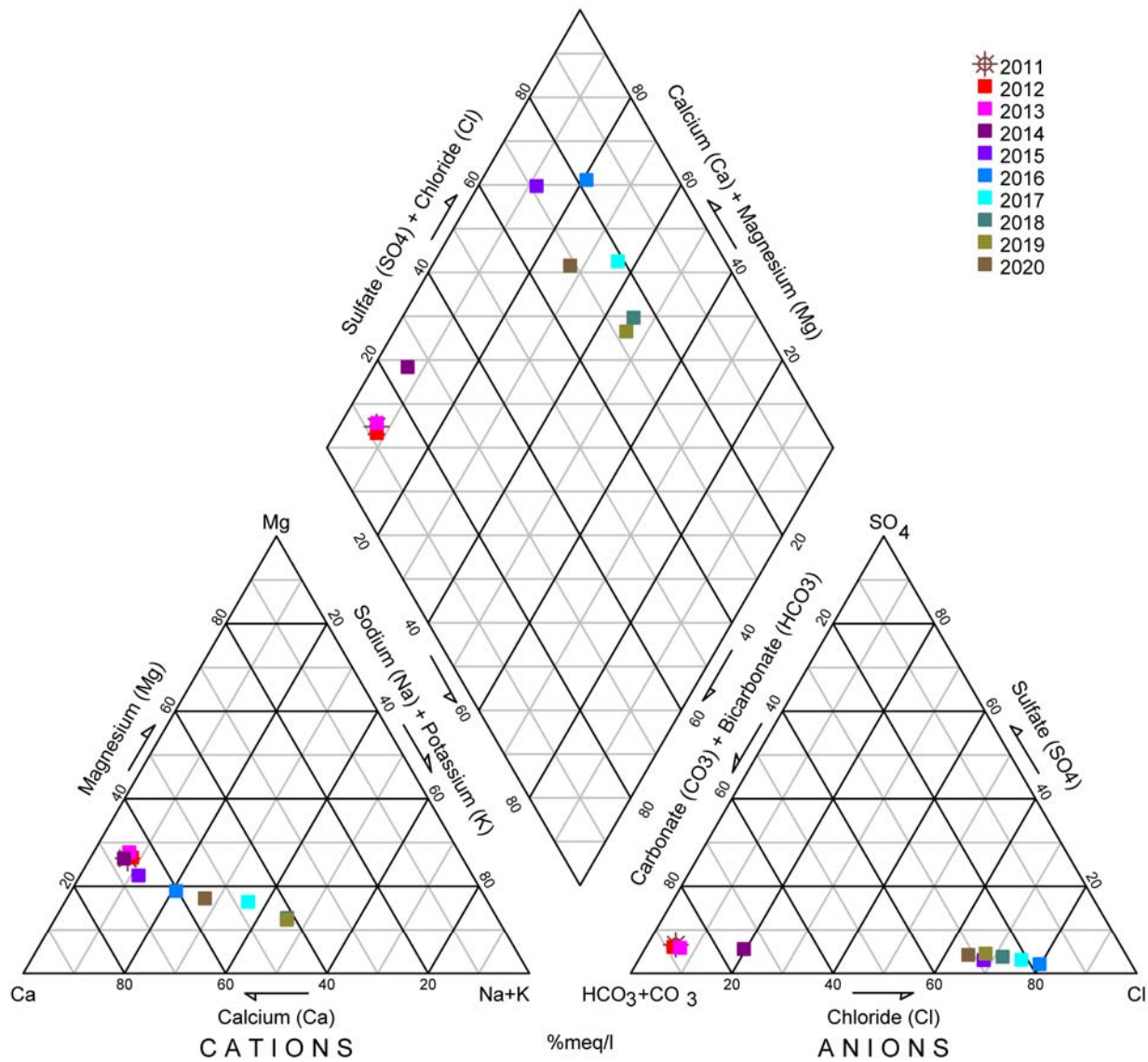
# Well QAL069A

## 2020 Piper Diagram



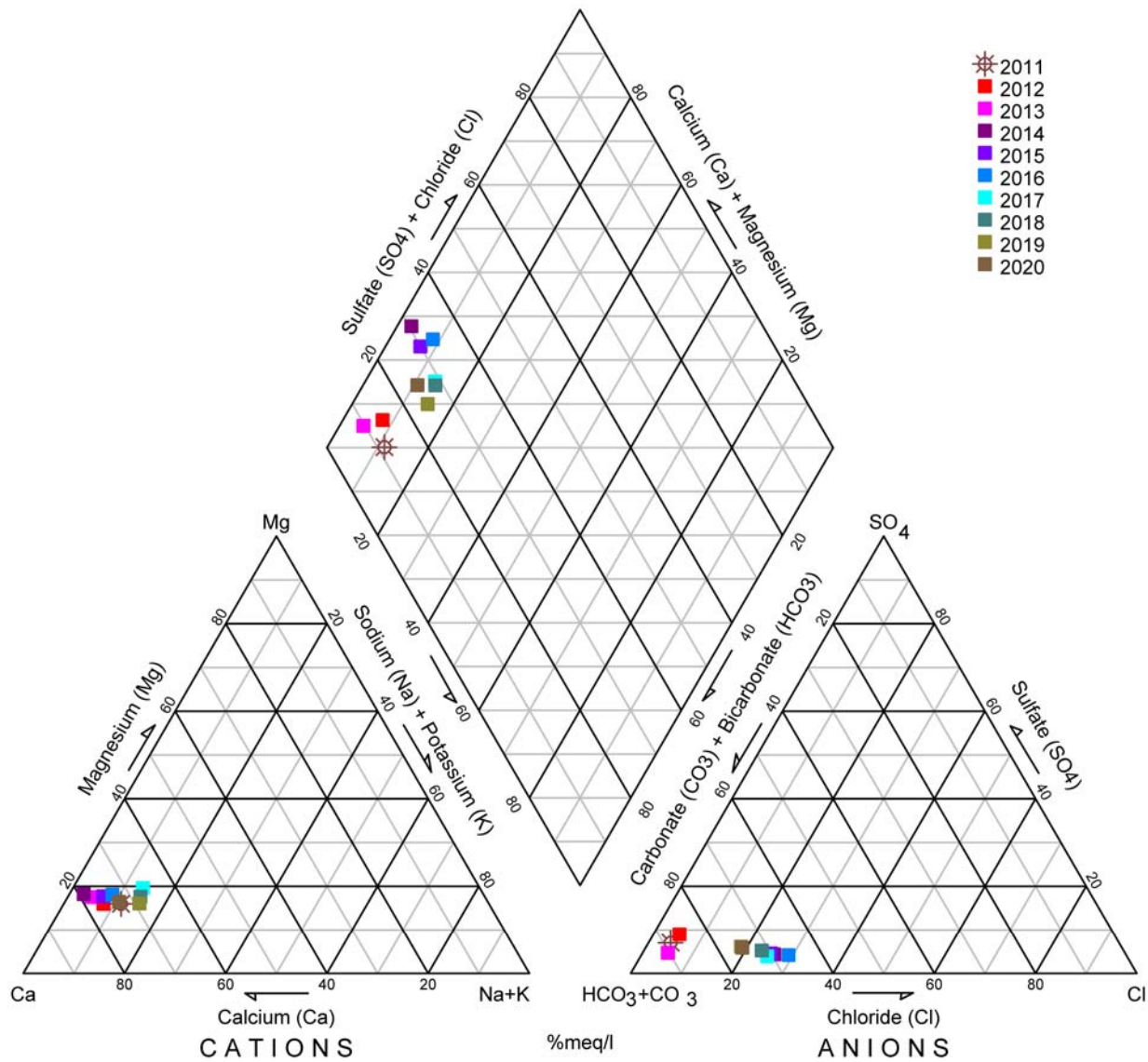
# Well QAL070A

## 2020 Piper Diagram



# Well QAL071A

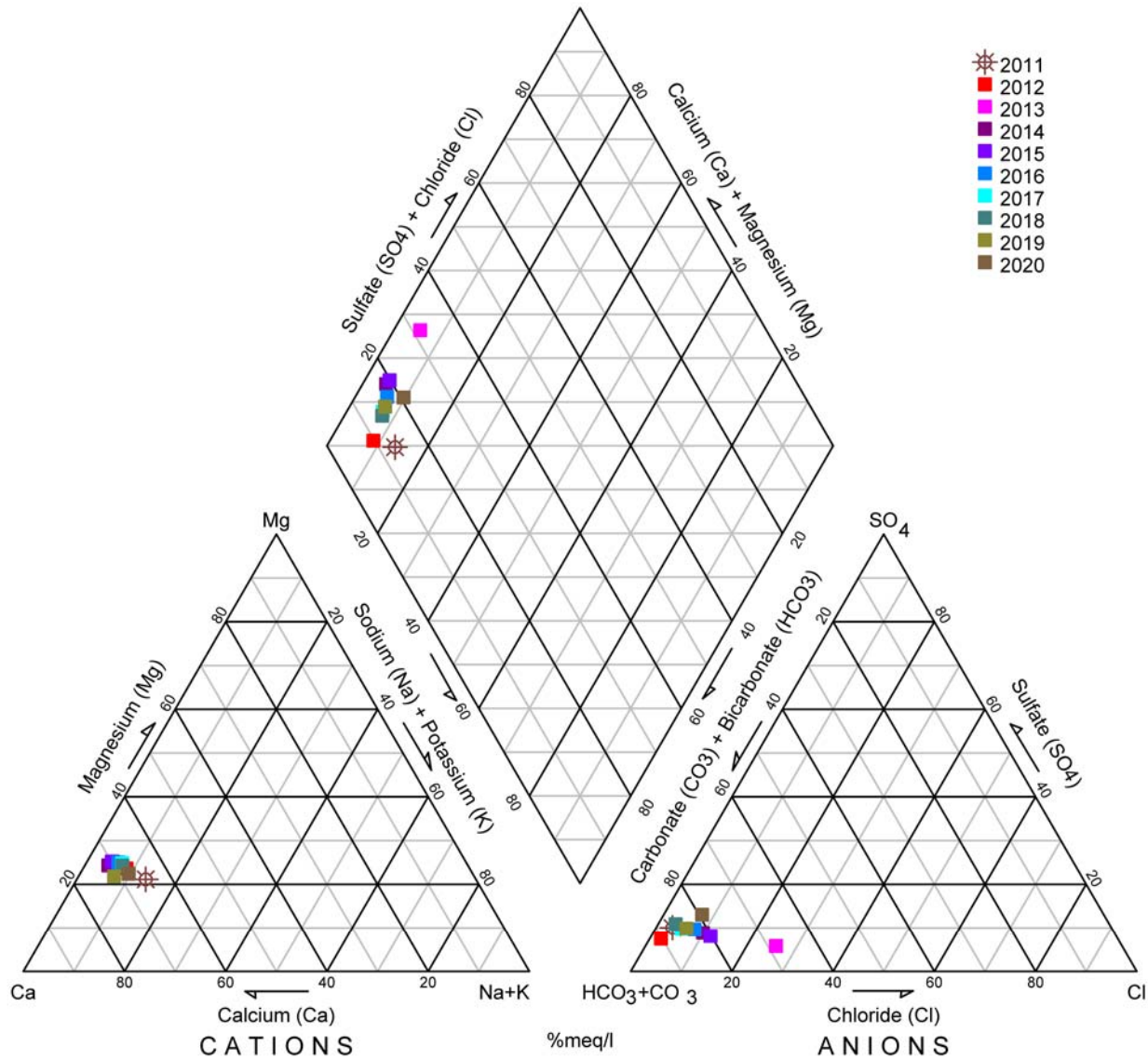
## 2020 Piper Diagram





# Well QAL073A

## 2020 Piper Diagram



# **Appendix I**

## **Eagle Mine**

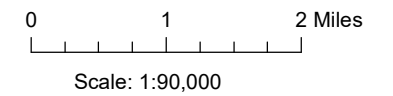
### **Surface Water Location Map**



## 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



**Eagle Mine**  
 a subsidiary of **huntington**

**North Jackson Company**  
 ENVIRONMENTAL SCIENCE & ENGINEERING

# **Appendix J**

## **Eagle Mine**

### **Surface Water Results**

**and**

### **Benchmark Summary Table**

**2020**  
**Mine Permit Surface Water Quality Monitoring Data**  
**Benchmark Summary Table**

Location	Location Classification	Q1	Q2	Q3	Q4
STRM001	Background			Copper, Mercury	
STRM002	Compliance			pH	pH
STRM004	Compliance				
STRM005	Compliance			<b>pH</b>	<b>Iron</b>
STRE001	Compliance			<b>Iron</b>	
STRE002	Compliance		pH		
STRE005	Compliance		pH, Calcium, Magnesium, Hardness	Manganese	
STRE009	Compliance	Iron			
STRE010	Compliance		Calcium, Magnesium, Hardness		
YDRM002	Compliance				
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 2013 and Q1 2014) sampling events. If the location is classified as background or reference, Department notification is not required for an exceedance.

2020  
 Mine Permit Surface Water Quality Monitoring Data  
 STRM001 (Background)  
 Eagle Mine

Parameter	Unit	Permit RL	STRM001 Seasonal Benchmark				STRM001 Data (Q1-Q4 2020)			
			Q1	Q2	Q3	Q4	Q1 2020	Q2 2020	Q3 2020	Q4 2020
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow 2/18/20	Spring Snowmelt & Runoff 5/13/20	Summer Baseflow 8/18/20	Fall Rain 10/20/20
<b>Field</b>										
D.O.	ppm	--	--	--	--	--	4.4	6.5	1.3	7.8
Flow	cfs	--	--	--	--	--	0.60	0.40	0.10	<0.10
pH	SU	--	6.2-7.2	6.2-7.2	6.2-7.2	6.0-7.0	6.6	6.2	6.4	6.8
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	36	32	58	38
Temperature	°C	--	--	--	--	--	0.0	10	15	3.7
<b>Metals</b>										
Aluminum	ug/L	50	--	200	--	--	--	<50	e	--
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
Barium	ug/L	10.0	--	40	--	--	--	<10.0	e	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Boron	ug/L	50	200	200	200	200	<50.0	e	<50.0	e
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Cobalt	ug/L	10.0	40	40	40	40	<10.0	<10	e	<10.0
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0		10
Iron	ug/L	20	875	1,616	6,195	675	414	211	e	3,160
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Lithium	ug/L	10.0	--	40	--	--	--	<10.0		--
Manganese	ug/L	10.0	44	179	392	40	29	<10.0	e	190
Mercury	ng/L	0.50	2.0	3.6	2.9	2.0	0.72	0.82		3.7
Molybdenum	ug/L	10	--	40	--	--	--	<10	e	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<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
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Zinc	ug/L	10.0	40	40	40	40	<10.0	<10.0		10
<b>Major Anions</b>										
Alkalinity, Bicarbonate	mg/L	2.0	--	40	--	--	--	10.8		--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0		--
Chloride	mg/L	1.0	--	7.3	--	--	--	<1.0	e	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10		--
Nitrogen, Nitrate	mg/L	0.05	--	0.20	--	--	--	<0.05	e	--
Sulfate	mg/L	1.0	4.0	10.0	4.0	4.0	1.3	e	1.3	<1.0
<b>Major Cations</b>										
Calcium	mg/L	0.50	--	11	--	--	--	3.9	e	--
Magnesium	mg/L	0.50	--	2.4	--	--	--	<1.0	e	--
Potassium	mg/L	0.50	--	2.0	--	--	--	<0.50	e	--
Sodium	mg/L	0.50	--	2.0	--	--	--	<1.0	e	--
<b>General</b>										
Hardness	mg/L	3.0	--	36	--	--	--	<3.0		--
TDS	mg/L	50	200	200	200	200	<50.0	<50.0		<50.0

2020  
 Mine Permit Surface Water Quality Monitoring Data  
 STRM002 (Compliance)  
 Eagle Mine

Parameter	Unit	Permit RL	STRM002 Seasonal Benchmark				STRM002 Data (Q1-Q4 2020)			
			Q1	Q2	Q3	Q4	Q1 2020	Q2 2020	Q3 2020	Q4 2020
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
					2/18/20	5/12/20	8/18/20	10/20/20		
<b>Field</b>										
D.O.	ppm	--	--	--	--	--	12	12	8.4	12
Flow	cfs	--	--	--	--	--	1.7	3.6	1.4	2.2
pH	SU	--	6.8-7.8	6.5-7.5	6.3-7.3	6.5-7.5	6.9	6.8	7.6	7.7
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	65	36	64	48
Temperature	°C	--	--	--	--	--	0.30	6.8	13	4.2
<b>Metals</b>										
Aluminum	ug/L	50	--	200	--	--	--	62	e	--
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
Barium	ug/L	10.0	--	40	--	--	--	<10	e	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Boron	ug/L	50	200	200	200	200	<50.0	e	<50.0	e
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Cobalt	ug/L	10.0	40	40	40	40	<10.0	<10.0	e	<10.0
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0		<1.0
Iron	ug/L	20	304	651	703	504	217	179	e	306
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Lithium	ug/L	10.0	--	40	--	--	--	<10.0		--
Manganese	ug/L	10.0	40	58	40	40	<10.0	<10.0	e	<10.0
Mercury	ng/L	0.50	2.0	5.8	2.4	2.8	0.83	2.8		1.1
Molybdenum	ug/L	10.0	--	40	--	--	--	<10.0	e	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<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
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Zinc	ug/L	10.0	250	40	40	40	<10.0	<10.0		<10.0
<b>Major Anions</b>										
Alkalinity, Bicarbonate	mg/L	2.0	--	34	--	--	--	15		--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0		--
Chloride	mg/L	1.0	--	4.0	--	--	--	<1.0	e	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10		--
Nitrogen, Nitrate	mg/L	0.05	--	0.20	--	--	--	<0.05	e	--
Sulfate	mg/L	1.0	4.0	6.2	4.0	4.0	2.0	e	1.6	1.4
<b>Major Cations</b>										
Calcium	mg/L	0.50	--	10	--	--	--	5.6	e	--
Magnesium	mg/L	0.50	--	2.0	--	--	--	1.2	e	--
Potassium	mg/L	0.50	--	2.0	--	--	--	0.60	e	--
Sodium	mg/L	0.50	--	2.0	--	--	--	<1.0	e	--
<b>General</b>										
Hardness	mg/L	3.0	--	32	--	--	--	19		--
TDS	mg/L	50	200	200	200	200	<50.0	<50.0		<50.0

2020  
 Mine Permit Surface Water Quality Monitoring Data  
 STRM005 (Compliance)  
 Eagle Mine

Parameter	Unit	Permit RL	STRM005 Seasonal Benchmark				STRM005 Data (Q1-Q4 2020)			
			Q1	Q2	Q3	Q4	Q1 2020	Q2 2020	Q3 2020	Q4 2020
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
			2/17/20	5/13/20	8/18/20	10/20/20				
<b>Field</b>										
D.O.	ppm	--	--	--	--	--	14	13	11	13
Flow	cfs	--	--	--	--	--	42	67	317	44
pH	SU	--	7.1-8.1	6.6-7.6	6.6-7.6	7.2-8.2	7.5	7.1	8.4	7.9
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	133	104	138	118
Temperature	°C	--	--	--	--	--	0.0	4.6	15	3.1
<b>Metals</b>										
Aluminum	ug/L	50	--	568	--	--	--	82	e	--
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
Barium	ug/L	10.0	--	40	--	--	--	11	e	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Boron	ug/L	50	200	200	200	200	<50.0	e	<50.0	e
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Cobalt	ug/L	10.0	40	40	40	40	<10.0	<10.0	e	<10.0
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0		<1.0
Iron	ug/L	20	166	470	201	309	144	171	e	189
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Lithium	ug/L	10.0	--	40	--	--	--	<10.0		--
Manganese	ug/L	10.0	40	40	40	40	12	17	e	12
Mercury	ng/L	0.50	2.0	11	2.0	2.5	0.79	1.6		0.78
Molybdenum	ug/L	10.0	--	40	--	--	--	<10.0	e	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<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
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Zinc	ug/L	10.0	40	89	40	40	<10.0	<10.0		<10.0
<b>Major Anions</b>										
Alkalinity, Bicarbonate	mg/L	2.0	--	66	--	--	--	43.7		--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0		--
Chloride	mg/L	1.0	--	4.0	--	--	--	<1.0	e	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10		--
Nitrogen, Nitrate	mg/L	0.05	--	0.20	--	--	--	<0.05	e	--
Sulfate	mg/L	1.0	6.6	4.0	4.0	4.0	3.3	e	2.6	2.9
<b>Major Cations</b>										
Calcium	mg/L	0.50	--	19	--	--	--	15	e	--
Magnesium	mg/L	0.50	--	3.9	--	--	--	2.9	e	--
Potassium	mg/L	0.50	--	2.0	--	--	--	0.54	e	--
Sodium	mg/L	0.50	--	2.0	--	--	--	<1.0	e	--
<b>General</b>										
Hardness	mg/L	3.0	--	65	--	--	--	49		--
TDS	mg/L	50	200	200	200	200	75	51		71



2020  
 Mine Permit Surface Water Quality Monitoring Data  
 STRM004 (Compliance)  
 Eagle Mine

Parameter	Unit	Permit RL	STRM004 Seasonal Benchmark				STRM004 Data (Q1-Q4 2020)			
			Q1	Q2	Q3	Q4	Q1 2020	Q2 2020	Q3 2020	Q4 2020
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
					2/12/20	5/18/20	8/17/20	10/19/20		
<b>Field</b>										
D.O.	ppm	--	--	--	--	--	14	11	10	13
Flow	cfs	--	--	--	--	--	3.7	2.9	5.3	7.0
pH	SU	--	7.0-8.0	7.3-8.3	7.2-8.2	7.2-8.2	7.6	6.8	8.2	7.3
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	102	75	98	87
Temperature	°C	--	--	--	--	--	0.0	9.5	13	3.2
<b>Metals</b>										
Aluminum	ug/L	50	--	993	--	--	--	155	e	--
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		1.5
Barium	ug/L	10.0	--	40	--	--	--	<10	e	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Boron	ug/L	50	200	200	200	200	<50.0	e	<50	e
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Cobalt	ug/L	10.0	40	40	40	40	<10.0	<10	e	<10.0
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	8.3		<1.0
Iron	ug/L	20	312	984	500	406	159	265	e	265
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Lithium	ug/L	10.0	--	40	--	--	--	<10		--
Manganese	ug/L	10.0	40	61	40	40	12	17	e	21
Mercury	ng/L	0.50	2.5	14	3.5	2.9	0.89	3.1		1.5
Molybdenum	ug/L	10.0	--	40	--	--	--	<10	e	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<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
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Zinc	ug/L	10	40	40	40	40	<10.0	<10		<10.0
<b>Major Anions</b>										
Alkalinity, Bicarbonate	mg/L	2.0	--	52	--	--	--	32		--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0		--
Chloride	mg/L	1.0	--	4.0	--	--	--	<1.0	e	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10		--
Nitrogen, Nitrate	mg/L	0.05	--	0.20	--	--	--	<0.05	e	--
Sulfate	mg/L	1.0	4.5	4.0	4.0	4.0	2.6	e	1.9	1.9
<b>Major Cations</b>										
Calcium	mg/L	0.50	--	16	--	--	--	11	e	--
Magnesium	mg/L	0.50	--	3.0	--	--	--	2.2	e	--
Potassium	mg/L	0.50	--	2.0	--	--	--	0.58	e	--
Sodium	mg/L	0.50	--	2.0	--	--	--	<1.0	e	--
<b>General</b>										
Hardness	mg/L	3.0	--	54	--	--	--	37		--
TDS	mg/L	50	200	200	200	200	53	<50.0		<50.0

2020  
 Mine Permit Surface Water Quality Monitoring Data  
 STRE001 (Compliance)  
 Eagle Mine

Parameter	Unit	Permit RL	STRE001 Seasonal Benchmark				STRE001 Data (Q1-Q4 2020)				
			Q1	Q2	Q3	Q4	Q1 2020	Q2 2020	Q3 2020	Q4 2020	
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	
			2/12/20	5/13/20	8/17/20	10/19/20					
<b>Field</b>											
D.O.	ppm	--	--	--	--	--	13	13	10	13	
Flow	cfs	--	--	--	--	--	14	21	12	17	
pH	SU	--	7.3-8.3	7.0-8.0	7.1-8.1	7.2-8.2	7.8	7.1	8.0	7.8	
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	135	123	133	120	
Temperature	°C	--	--	--	--	--	1.4	5.2	15	4.2	
<b>Metals</b>											
Aluminum	ug/L	50	--	339	--	--	--	60	e	--	
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		1.3	
Barium	ug/L	10.0	--	40	--	--	--	<10	e	--	
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0		--	
Boron	ug/L	50	200	200	200	200	<50.0	e	<50.0	e	
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20		--	
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0		--	
Cobalt	ug/L	10.0	40	40	40	40	<10.0	<10	e	<10.0	
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0		<1.0	
Iron	ug/L	20	96	327	109	160	69	116	e	133	
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0		--	
Lithium	ug/L	10.0	--	40	--	--	--	<10		--	
Manganese	ug/L	10.0	40	40	40	94	<10.0	13	e	16	
Mercury	ng/L	0.50	2.0	8.6	2.0	2.2	0.54	1.1		0.85	
Molybdenum	ug/L	10.0	--	40	--	--	--	<10	e	--	
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<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	
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20		--	
Zinc	ug/L	10.0	40	40	40	40	<10.0	<10.0		<10.0	
<b>Major Anions</b>											
Alkalinity, Bicarbonate	mg/L	2.0	--	81	--	--	--	52		--	
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0		--	
Chloride	mg/L	1.0	--	4.0	--	--	--	<1.0	e	--	
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10		--	
Nitrogen, Nitrate	mg/L	0.05	--	0.20	--	--	--	<0.05	e	--	
Sulfate	mg/L	1.0	6.1	4.0	4.0	4.0	3.6	e	3.0	3.0	
<b>Major Cations</b>											
Calcium	mg/L	0.50	--	24	--	--	--	18	e	--	
Magnesium	mg/L	0.50	--	4.6	--	--	--	3.5	e	--	
Potassium	mg/L	0.50	--	2.0	--	--	--	0.57	e	--	
Sodium	mg/L	0.50	--	2.0	--	--	--	1.1	e	--	
<b>General</b>											
Hardness	mg/L	3.0	--	78	--	--	--	58		--	
TDS	mg/L	50	200	200	200	200	70	50		64	
										e	<50.0

2020  
 Mine Permit Surface Water Quality Monitoring Data  
 STRE002 (Compliance)  
 Eagle Mine

Parameter	Unit	Permit RL	STRE002 Seasonal Benchmark				STRE002 Data (Q1-Q4 2020)			
			Q1	Q2	Q3	Q4	Q1 2020	Q2 2020	Q3 2020	Q4 2020
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
					2/11/20	5/18/20	8/17/20	10/19/20		
<b>Field</b>										
D.O.	ppm	--	--	--	--	--	14	12	9.2	13
Flow	cfs	--	--	--	--	--	19	22	13	20
pH	SU	--	7.3-8.3	7.6-8.6	7.4-8.4	7.2-8.2	7.8	7.3	8.1	7.4
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	135	113	138	120
Temperature	°C	--	--	--	--	--	1.4	7.3	13	3.6
<b>Metals</b>										
Aluminum	ug/L	50	--	200	--	--	--	68	e	--
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		1.5
Barium	ug/L	10.0	--	40	--	--	--	<10	e	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Boron	ug/L	50	200	200	200	200	<50.0	e	<50.0	e
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Cobalt	ug/L	10.0	40	40	40	40	<10.0	<10.0	e	<10.0
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0		<1.0
Iron	ug/L	20	165	194	191	182	76	105	e	189
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Lithium	ug/L	10.0	--	40	--	--	--	<10.0		--
Manganese	ug/L	10.0	40	40	40	40	<10.0	12	e	21
Mercury	ng/L	0.50	2.0	4.8	2.0	2.0	0.60	1.9		0.68
Molybdenum	ug/L	10.0	--	40	--	--	--	<10.0	e	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<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
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Zinc	ug/L	10.0	40	40	40	40	<10.0	<10.0		<10.0
<b>Major Anions</b>										
Alkalinity, Bicarbonate	mg/L	2.0	--	81	--	--	--	50		--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0		--
Chloride	mg/L	1.0	--	4.0	--	--	--	<1.0	e	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10		--
Nitrogen, Nitrate	mg/L	0.05	--	0.20	--	--	--	<0.05	e	--
Sulfate	mg/L	1.0	5.7	4.0	4.0	4.0	3.6	e	2.8	3.1
<b>Major Cations</b>										
Calcium	mg/L	0.50	--	24	--	--	--	17	e	--
Magnesium	mg/L	0.50	--	4.7	--	--	--	3.4	e	--
Potassium	mg/L	0.50	--	2.0	--	--	--	0.58	e	--
Sodium	mg/L	0.50	--	2.0	--	--	--	1.1	e	--
<b>General</b>										
Hardness	mg/L	3.0	--	80	--	--	--	55		--
TDS	mg/L	50	200	200	200	200	59	<50.0		57

2020  
 Mine Permit Surface Water Quality Monitoring Data  
 STRE005 (Compliance)  
 Eagle Mine

Parameter	Unit	Permit RL	STRE005 Seasonal Benchmark				STRE005 Data (Q1-Q4 2020)			
			Q1	Q2	Q3	Q4	Q1 2020	Q2 2020	Q3 2020	Q4 2020
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
					2/12/20	5/18/20	8/17/20	10/19/20		
<b>Field</b>										
D.O.	ppm	--	--	--	--	--	14	12	9.2	12
Flow	cfs	--	--	--	--	--	0.70	1.0	0.10	0.8
pH	SU	--	7.1-8.1	6.8-7.8	7.3-8.3	7.0-8.0	7.6	6.7	8.0	7.7
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	124	113	157	115
Temperature	°C	--	--	--	--	--	0.10	7.4	16	4.0
<b>Metals</b>										
Aluminum	ug/L	50	--	1,722	--	--	--	<50.0	e	--
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
Barium	ug/L	10.0	--	40	--	--	--	<10	e	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Boron	ug/L	50	200	200	200	200	<50.0	e	<50.0	e
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Cobalt	ug/L	10.0	40	40	40	40	<10.0	<10.0	e	<10.0
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0		<1.0
Iron	ug/L	20	489	1,218	501	259	158	138	e	294
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Lithium	ug/L	10.0	--	40	--	--	--	<10.0		--
Manganese	ug/L	10.0	66	93	40	40	30	21	e	51
Mercury	ng/L	0.50	2.0	17	2.0	2.0	0.83	1.3		0.92
Molybdenum	ug/L	10.0	--	40	--	--	--	<10	e	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<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
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Zinc	ug/L	10.0	40	40	40	40	<10.0	<10.0		<10.0
<b>Major Anions</b>										
Alkalinity, Bicarbonate	mg/L	2.0	--	60	--	--	--	53		--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0		--
Chloride	mg/L	1.0	--	4.0	--	--	--	<1.0	e	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10		--
Nitrogen, Nitrate	mg/L	0.05	--	0.20	--	--	--	<0.05	e	--
Sulfate	mg/L	1.0	6.1	4.0	4.0	6.4	2.8	e	2.0	1.1
<b>Major Cations</b>										
Calcium	mg/L	0.50	--	17	--	--	--	17	e	--
Magnesium	mg/L	0.50	--	3.0	--	--	--	3.2	e	--
Potassium	mg/L	0.50	--	2.0	--	--	--	0.64	e	--
Sodium	mg/L	0.50	--	2.0	--	--	--	<1.0	e	--
<b>General</b>										
Hardness	mg/L	3.0	--	55	--	--	--	57		--
TDS	mg/L	50	200	200	200	200	76	<50.0		78

2020  
 Mine Permit Surface Water Quality Monitoring Data  
 STRE009 (Compliance)  
 Eagle Mine

Parameter	Unit	Permit RL	STRE009 Seasonal Benchmark				STRE009 Data (Q1-Q4 2020)			
			Q1	Q2	Q3	Q4	Q1 2020	Q2 2020	Q3 2020	Q4 2020
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
					2/17/20	5/12/20	8/17/20	10/20/20		
<b>Field</b>										
D.O.	ppm	--	--	--	--	--	14	13	11	13
Flow	cfs	--	--	--	--	--	4.8	5.7	3.6	5.2
pH	SU	--	7.3-8.3	6.9-7.9	7.2-8.2	6.8-7.8	7.5	6.9	8.1	7.4
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	124	114	115	111
Temperature	°C	--	--	--	--	--	0.10	3.7	15	4.0
<b>Metals</b>										
Aluminum	ug/L	50	--	405	--	--	--	<50	e	--
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
Barium	ug/L	10.0	--	40	--	--	--	<10	e	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Boron	ug/L	50	200	200	200	200	<50.0	e	<50.0	e
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Cobalt	ug/L	10.0	40	40	40	40	<10.0	<10.0	e	<10.0
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0		<1.0
Iron	ug/L	20	165	400	224	114	92	<50.0	e	102
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Lithium	ug/L	10.0	--	40	--	--	--	<10.0		--
Manganese	ug/L	10.0	40	40	36	40	<10.0	<10.0	e	14
Mercury	ng/L	0.50	2.0	6.6	2.9	2.0	0.51	0.94		0.52
Molybdenum	ug/L	10.0	--	40	--	--	--	<10.0	e	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<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
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Zinc	ug/L	10.0	40	40	40	40	<10.0	<10.0		<10.0
<b>Major Anions</b>										
Alkalinity, Bicarbonate	mg/L	2.0	--	57	--	--	--	49		--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0		--
Chloride	mg/L	1.0	--	4.0	--	--	--	<1.0	e	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10		--
Nitrogen, Nitrate	mg/L	0.05	--	0.20	--	--	--	<0.05	e	--
Sulfate	mg/L	1.0	5.7	4.0	4.0	10	3.3	e	2.8	2.7
<b>Major Cations</b>										
Calcium	mg/L	0.50	--	17	--	--	--	16	e	--
Magnesium	mg/L	0.50	--	3.3	--	--	--	3.2	e	--
Potassium	mg/L	0.50	--	2.0	--	--	--	0.56	e	--
Sodium	mg/L	0.50	--	2.0	--	--	--	1.0	e	--
<b>General</b>										
Hardness	mg/L	3.0	--	56	--	--	--	54		--
TDS	mg/L	50	200	200	200	200	57	60		<50.0

2020  
 Mine Permit Surface Water Quality Monitoring Data  
 STRE010 (Compliance)  
 Eagle Mine

Parameter	Unit	Permit RL	STRE010 Seasonal Benchmark				STRE010 Data (Q1-Q4 2020)			
			Q1	Q2	Q3	Q4	Q1 2020	Q2 2020	Q3 2020	Q4 2020
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
					2/12/20	5/12/20	8/17/20	10/20/20		
<b>Field</b>										
D.O.	ppm	--	--	--	--	--	13	13	10	12
Flow	cfs	--	--	--	--	--	3.3	3.4	2.6	3.6
pH	SU	--	7.3-8.3	6.9-7.9	7.2-8.2	7.0-8.0	7.9	7.0	8.1	7.4
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	123	112	122	112
Temperature	°C	--	--	--	--	--	2.2	3.3	12	4.5
<b>Metals</b>										
Aluminum	ug/L	50	--	431	--	--	--	60	e	--
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
Barium	ug/L	10.0	--	40	--	--	--	<10	e	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Boron	ug/L	50	200	200	200	200	<50.0	e	<50.0	e
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Cobalt	ug/L	10.0	40	40	40	40	<10.0	<10.0	e	<10.0
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0		<1.0
Iron	ug/L	20	165	514	135	97	103	106	e	86
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Lithium	ug/L	10.0	--	40	--	--	--	<10.0		--
Manganese	ug/L	10.0	40	43	40	40	12	13	e	14
Mercury	ng/L	0.50	2.0	9.7	2.0	2.0	0.94	1.4		0.62
Molybdenum	ug/L	10	--	40	--	--	--	<10.0	e	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<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
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Zinc	ug/L	10.0	40	40	40	40	<10.0	<10.0		<10.0
<b>Major Anions</b>										
Alkalinity, Bicarbonate	mg/L	2.0	--	55	--	--	--	48		--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0		--
Chloride	mg/L	1.0	--	4.0	--	--	--	<1.0	e	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10		--
Nitrogen, Nitrate	mg/L	0.05	--	0.20	--	--	--	0.10	e	--
Sulfate	mg/L	1.0	5.7	4.0	4.0	4.0	2.9	e	2.6	2.4
<b>Major Cations</b>										
Calcium	mg/L	0.50	--	16	--	--	--	17	e	--
Magnesium	mg/L	0.50	--	3.0	--	--	--	3.1	e	--
Potassium	mg/L	0.50	--	2.0	--	--	--	0.61	e	--
Sodium	mg/L	0.50	--	2.0	--	--	--	1.0	e	--
<b>General</b>										
Hardness	mg/L	3.0	--	52	--	--	--	55		--
TDS	mg/L	50	200	200	200	200	67	<50.0		66

2020  
 Mine Permit Surface Water Quality Monitoring Data  
 YDRM002 (Compliance)  
 Eagle Mine

Parameter	Unit	Permit RL	YDRM002 Seasonal Benchmark				YDRM002 Data (Q1-Q4 2020)			
			Q1	Q2	Q3	Q4	Q1 2020	Q2 2020	Q3 2020	Q4 2020
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
					2/18/20	5/19/20	8/18/20	10/20/20		
<b>Field</b>										
D.O.	ppm	--	--	--	--	--	11	10	8.4	12
Flow	cfs	--	--	--	--	--	18	54	10	30
pH	SU	--	7.3-8.3	6.1-7.1	6.6-7.6	6.6-7.6	6.7	6.7	7.3	6.7
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	63	28	74	37
Temperature	°C	--	--	--	--	--	0.0	12	16	2.9
<b>Metals</b>										
Aluminum	ug/L	50	--	200	--	--	--	115	e	--
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
Barium	ug/L	10.0	--	40	--	--	--	<10	e	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Boron	ug/L	50	200	200	200	200	<50.0	e	<50.0	e
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Cobalt	ug/L	10.0	40	40	40	40	<10.0	<10.0	e	<10.0
Copper	ug/L	1.0	4.0	6.8	4.0	4.0	<1.0	<1.0		<1.0
Iron	ug/L	20	165	1,192	1,270	1,207	624	356	e	1,130
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Lithium	ug/L	10.0	--	40	--	--	--	<10.0		--
Manganese	ug/L	10.0	40	50	40	40	28	17	e	35
Mercury	ng/L	0.50	2.0	8.1	3.1	6.0	1.5	3.3		1.7
Molybdenum	ug/L	10.0	--	40	--	--	--	<10.0	e	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<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
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Zinc	ug/L	10.0	40	40	40	40	<10.0	<10.0		<10.0
<b>Major Anions</b>										
Alkalinity, Bicarbonate	mg/L	2.0	--	30	--	--	--	<2.0		--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0		--
Chloride	mg/L	1.0	--	4.0	--	--	--	<1.0	e	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10		--
Nitrogen, Nitrate	mg/L	0.05	--	0.20	--	--	--	<0.05	e	--
Sulfate	mg/L	1.0	5.7	10	4.0	24	3.0	e	1.6	2.7
<b>Major Cations</b>										
Calcium	mg/L	0.50	--	10	--	--	--	3.9	e	--
Magnesium	mg/L	0.50	--	2.1	--	--	--	<1.0	e	--
Potassium	mg/L	0.50	--	2.0	--	--	--	<0.50	e	--
Sodium	mg/L	0.50	--	2.0	--	--	--	<1.0	e	--
<b>General</b>										
Hardness	mg/L	3.0	--	32	--	--	--	<3.0		--
TDS	mg/L	50	200	200	200	200	<50.0	<50.0		<50.0

2020  
 Mine Permit Surface Water Quality Monitoring Data  
 CDRM004 (Compliance)  
 Eagle Mine

Parameter	Unit	Permit RL	CDRM004 Seasonal Benchmark				CDRM004 Data (Q1-Q4 2020)			
			Q1	Q2	Q3	Q4	Q1 2020	Q2 2020	Q3 2020	Q4 2020
			Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain	Winter Baseflow	Spring Snowmelt & Runoff	Summer Baseflow	Fall Rain
					2/11/20	5/19/20	8/19/20	10/19/20		
<b>Field</b>										
D.O.	ppm	--	--	--	--	--	14	12	10	13
Flow	cfs	--	--	--	--	--	15	17	9.5	17
pH	SU	--	7.3-8.3	7.2-8.2	7.2-8.2	7.2-8.2	7.8	7.3	8.3	8.1
Specific Conductance	µS/cm @ 25°C	--	--	--	--	--	132	116	148	122
Temperature	°C	--	--	--	--	--	0.80	7.8	13	3.5
<b>Metals</b>										
Aluminum	ug/L	50	--	258	--	--	--	<50.0	e	--
Antimony	ug/L	2.0	--	8.0	--	--	--	<2.0		--
Arsenic	ug/L	1.0	4.0	4.0	4.0	4.0	1.3	1.2		2.4
Barium	ug/L	10.0	--	40	--	--	--	11	e	--
Beryllium	ug/L	1.0	--	4.0	--	--	--	<1.0	e	--
Boron	ug/L	50	200	200	200	200	<50.0	e	<50.0	e
Cadmium	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Chromium	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Cobalt	ug/L	10.0	40	40	40	40	<10.0	<10.0	e	<10.0
Copper	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0		<1.0
Iron	ug/L	20	165	358	309	195	79	99	e	201
Lead	ug/L	1.0	--	4.0	--	--	--	<1.0		--
Lithium	ug/L	10.0	--	40	--	--	--	<10.0		--
Manganese	ug/L	10.0	40	57	44	96	17	13	e	25
Mercury	ng/L	0.50	2.0	8.1	2.0	2.0	0.60	1.3		1.0
Molybdenum	ug/L	10.0	--	40	--	--	--	<10.0	e	--
Nickel	ug/L	1.0	4.0	4.0	4.0	4.0	<1.0	<1.0	e	<1.0
Selenium	ug/L	2.0	8.0	8.0	8.0	8.0	<2.0	<2.0		<2.0
Silver	ug/L	0.20	--	0.80	--	--	--	<0.20		--
Zinc	ug/L	10.0	40	40	40	40	<10.0	<10.0		<10.0
<b>Major Anions</b>										
Alkalinity, Bicarbonate	mg/L	2.0	--	85	--	--	--	52		--
Alkalinity, Carbonate	mg/L	2.0	--	8.0	--	--	--	<2.0		--
Chloride	mg/L	1.0	--	4.0	--	--	--	<1.0	e	--
Fluoride	mg/L	0.10	--	0.40	--	--	--	<0.10		--
Nitrogen, Nitrate	mg/L	0.05	--	0.20	--	--	--	<0.05	e	--
Sulfate	mg/L	1.0	5.7	4.0	4.0	4.0	2.6	e	2.0	1.6
<b>Major Cations</b>										
Calcium	mg/L	0.50	--	25	--	--	--	18	e	--
Magnesium	mg/L	0.50	--	4.0	--	--	--	3.0	e	--
Potassium	mg/L	0.50	--	2.0	--	--	--	0.57	e	--
Sodium	mg/L	0.50	--	2.0	--	--	--	<1.0	e	--
<b>General</b>										
Hardness	mg/L	3.0	--	80	--	--	--	57		--
TDS	mg/L	50	200	200	200	200	81	<50.0		66



**2020**  
**Mine Permit Surface Water Quality Monitoring Data**  
**Abbreviations & Data Qualifiers**  
**Eagle Mine**

Abbreviation or Data Qualifier	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.
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.
	Value is equal to or above site-specific benchmark at a compliance monitoring.

## **Appendix K**

### **Eagle Mine**

#### **Surface Water Monitoring**

#### **Trend Analysis Summary & Trending Charts**

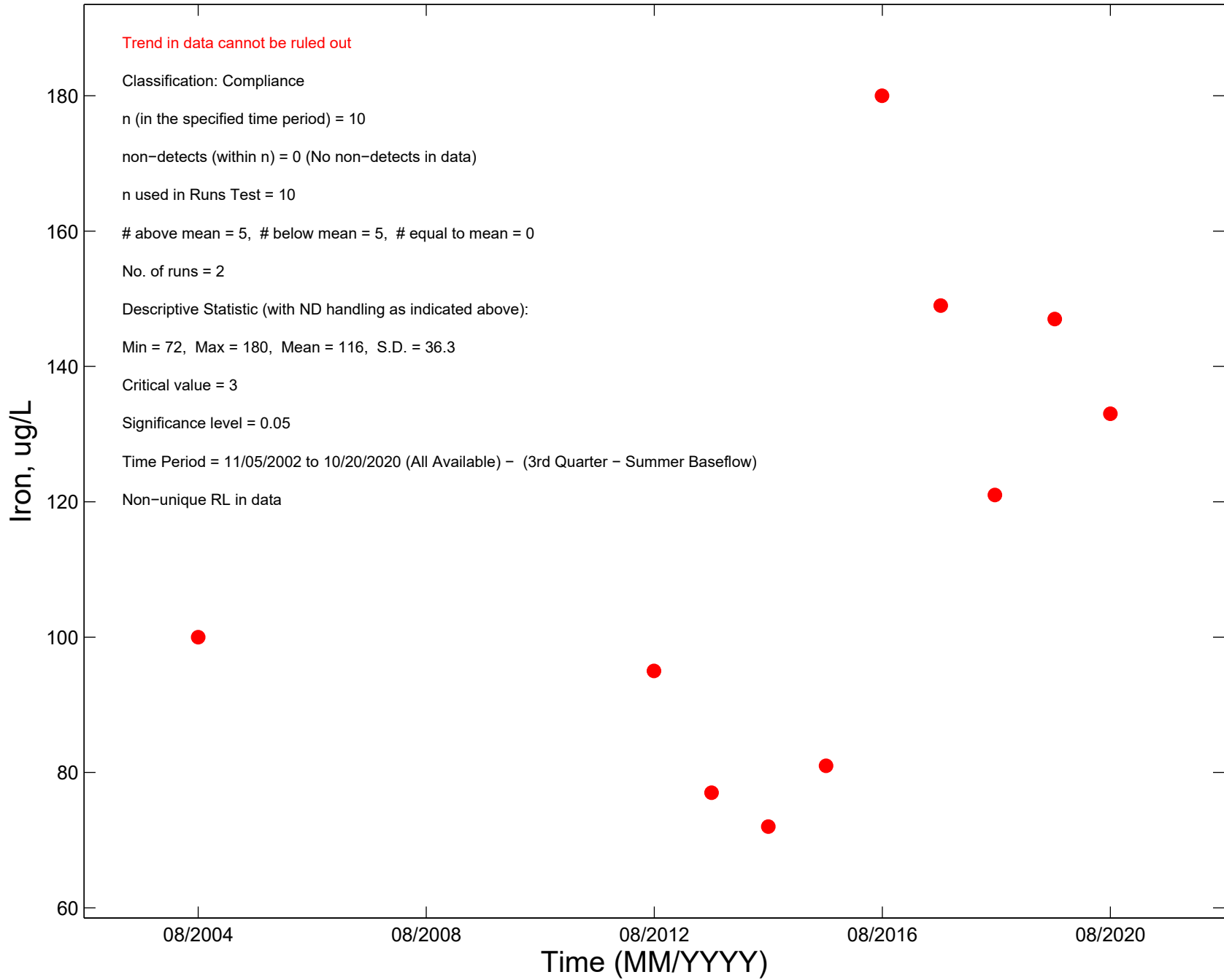
**2020 Mine Permit Surface Water  
Trend Analysis Summary  
Eagle Mine**

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	Critical value	Sig Level	Trend Present	Remarks
STRE005	1	Compliance	Sulfate	mg/L	9	2	Included as RL	9	1.0	5.5	2.9	1.60	4	5	0	2	2	0.05	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRE009	1	Compliance	Sulfate	mg/L	9	0	No NDs	9	3.2	4.6	3.9	0.51	6	3	0	2	2	0.05	Y	
STRM005	1	Compliance	pH	SU	10	0	No NDs	10	7.1	7.8	7.5	0.19	3	2	5	2	2	0.25	Y	
CDRM004	2	Reference	Barium	ug/L	13	5	Included as RL	13	10.0	14	11	1.29	6	7	0	4	4	0.05	Y	
STRE001	2	Compliance	Sodium	mg/L	13	0	No NDs	13	0.58	1.4	0.94	0.23	7	6	0	4	4	0.05	Y	Non-unique RL in data
STRE005	2	Compliance	Potassium	mg/L	9	1	Included as RL	9	0.50	0.74	0.61	0.09	4	5	0	2	2	0.05	Y	
STRE005	2	Compliance	Sodium	mg/L	9	3	Included as RL	9	0.50	1.2	0.83	0.21	5	4	0	2	2	0.05	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRE005	2	Compliance	Sulfate	mg/L	9	7	Included as RL	9	1.0	2.0	1.2	0.38	2	7	0	2	2	0.10	Y	
STRE009	2	Compliance	Sulfate	mg/L	9	7	Included as RL	9	1.0	2.8	1.4	0.79	2	7	0	2	2	0.10	Y	
STRE010	2	Compliance	Sodium	mg/L	9	1	Included as RL	9	0.72	1.1	0.86	0.14	3	6	0	2	2	0.05	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRE010	2	Compliance	Sulfate	mg/L	9	7	Included as RL	9	1.0	2.6	1.3	0.66	2	7	0	2	2	0.10	Y	
STRM002	2	Compliance	Mercury	ng/L	15	0	No NDs	15	1.64	5.54	3.48	1.14	8	7	0	3	4	0.05	Y	Non-unique RL in data
STRM002	2	Compliance	Sulfate	mg/L	15	11	Included as RL	15	1.0	5.7	2.5	2.00	5	10	0	4	4	0.05	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRM004	2	Compliance	TDS	mg/L	12	4	Included as RL	12	48	124	66	24.20	4	8	0	3	3	0.05	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRM005	2	Compliance	Sulfate	mg/L	11	9	Included as RL	11	1.0	2.6	1.3	0.59	2	9	0	2	2	0.05	Y	
YDRM002	2	Compliance	Sulfate	mg/L	15	11	Included as RL	15	1.0	8.3	2.7	2.40	5	10	0	4	4	0.05	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
CDRM004	3	Reference	Arsenic	ug/L	11	0	No NDs	11	1.9	3.3	2.6	0.52	5	5	1	3	3	0.05	Y	
CDRM004	3	Reference	Sulfate	mg/L	11	9	Included as RL	11	1.0	5.0	1.9	1.60	2	9	0	2	2	0.05	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRE001	3	Compliance	Iron	ug/L	10	0	No NDs	10	72	180	116	36.30	5	5	0	2	3	0.05	Y*	Non-unique RL in data
STRE001	3	Compliance	Manganese	ug/L	10	2	Included as RL	10	10	23.1	15.3	4.34	5	5	0	2	3	0.05	Y	
STRE001	3	Compliance	Sulfate	mg/L	10	3	Included as RL	10	1.0	5.0	2.7	1.30	6	4	0	3	3	0.05	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRE010	3	Compliance	Sulfate	mg/L	9	6	Included as RL	9	1.0	2.8	1.4	0.71	3	6	0	2	2	0.05	Y	
STRM001	3	Background	Copper	ug/L	11	8	Included as RL	11	1.0	10.4	2.5	3.31	2	9	0	2	2	0.05	Y	
STRM001	3	Background	Iron	ug/L	11	0	No NDs	11	651	5860	2088	1597.00	5	6	0	3	3	0.05	Y	Non-unique RL in data
STRM002	3	Compliance	Manganese	ug/L	11	5	Included as RL	11	10	23	12	4.79	2	9	0	2	2	0.05	Y	
STRM002	3	Compliance	Sulfate	mg/L	11	9	Included as RL	11	1.0	5.0	1.8	1.60	2	9	0	2	2	0.05	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
CDRM004	4	Reference	Sulfate	mg/L	15	13	Included as RL	15	1.0	5.0	2.3	1.80	4	11	0	2	3	0.05	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
CDRM004	4	Reference	TDS	mg/L	15	2	Included as RL	15	50	100	80	16.80	9	6	0	4	4	0.05	Y	Non-unique RL in data (NDs included in Runs Test as equal to RL)
STRE005	4	Compliance	TDS	mg/L	10	1	Included as RL	10	50	98	72	13.00	4	6	0	3	3	0.05	Y	
STRE010	4	Compliance	pH	SU	10	0	No NDs	10	7.1	7.8	7.4	0.25	6	4	0	3	3	0.05	Y	
YDRM002	4	Compliance	pH	SU	16	0	No NDs	16	5.2	7.6	6.9	0.58	7	9	0	5	5	0.05	Y	

**Mine Permit Groundwater Trend Analysis**  
**Notes and Abbreviations Used in Statistical Summary Tables**  
**Eagle Mine**

<b>Abbreviation</b>	<b>Explanation</b>
Y	Null Hypothesis that the sequence was produced in a random manner cannot be accepted at the indicated significance level (i.e., a trend in data cannot be ruled out).
Y*	In addition to a trend being identified, the parameter exceeded the limit at least two times in a row.
ND	Non detect (reported concentration was below the analytical reporting limit).
RL	Reporting limit.

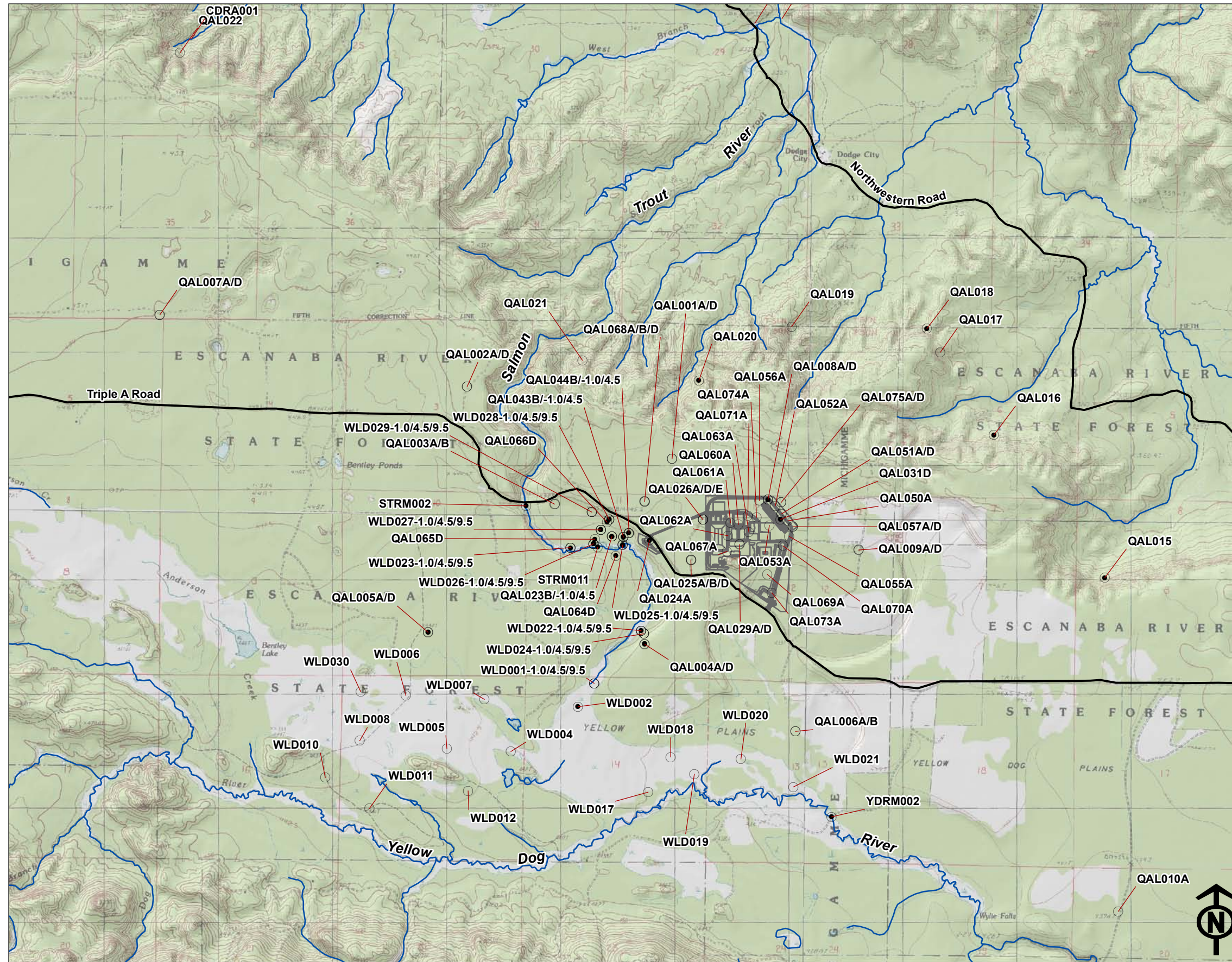
# STRE001



## **Appendix L**

### **Eagle Mine**

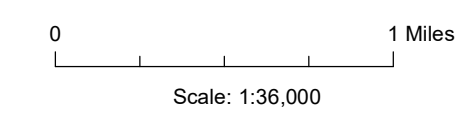
#### **Water Level Monitoring Location Map**



## 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



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## **Appendix M**

### **Eagle Mine**

### **Groundwater Contour Maps**



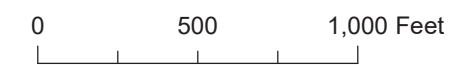
**A-ZONE GROUNDWATER ELEVATION CONTOURS  
WINTER BASEFLOW, JANUARY-MARCH 2020  
HS VIEW**

**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

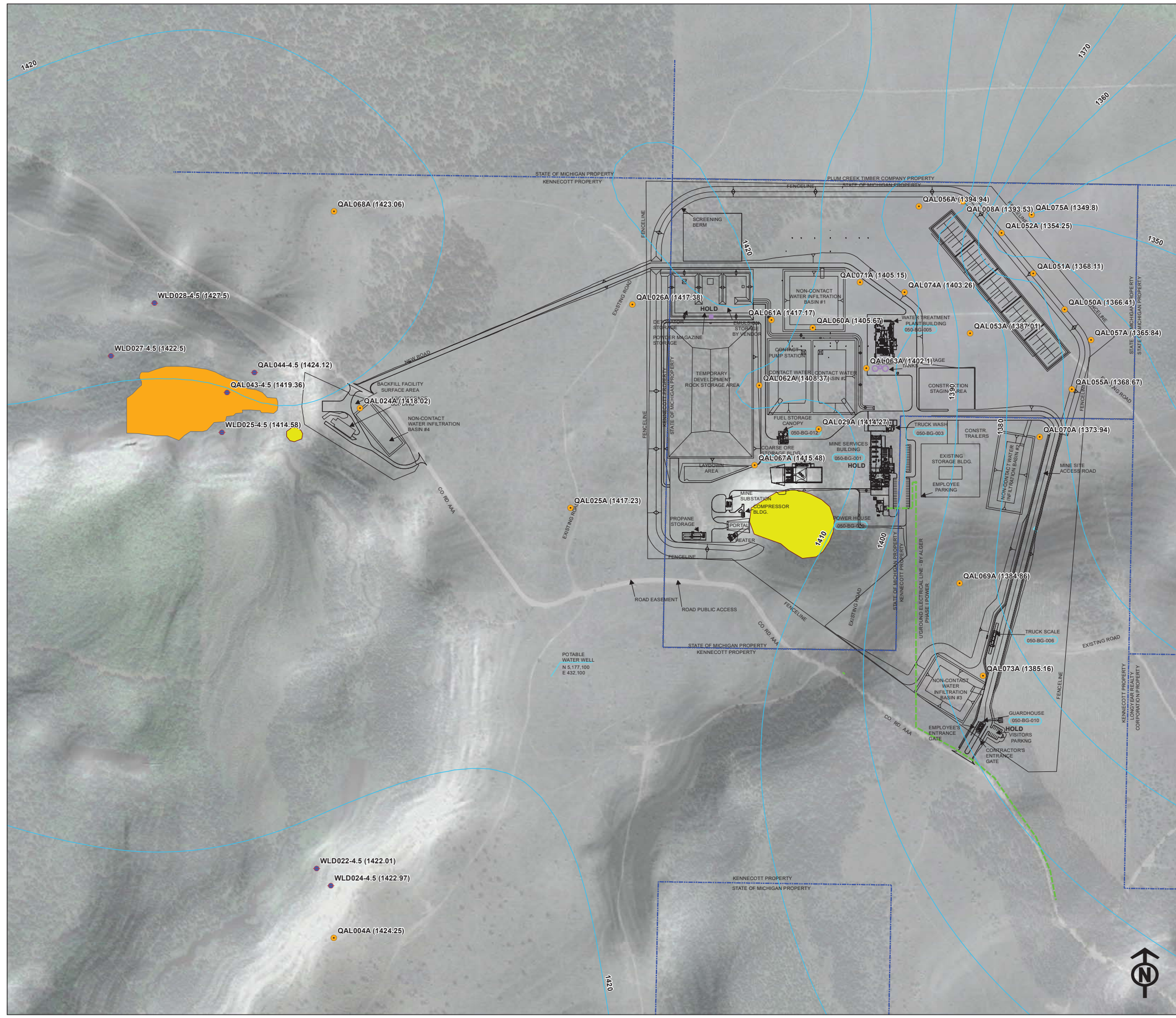


1:3,600












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**Figure: 1**



**A-ZONE GROUNDWATER ELEVATION  
CONTOURS  
SPRING RUNOFF, MAY 2020**

**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

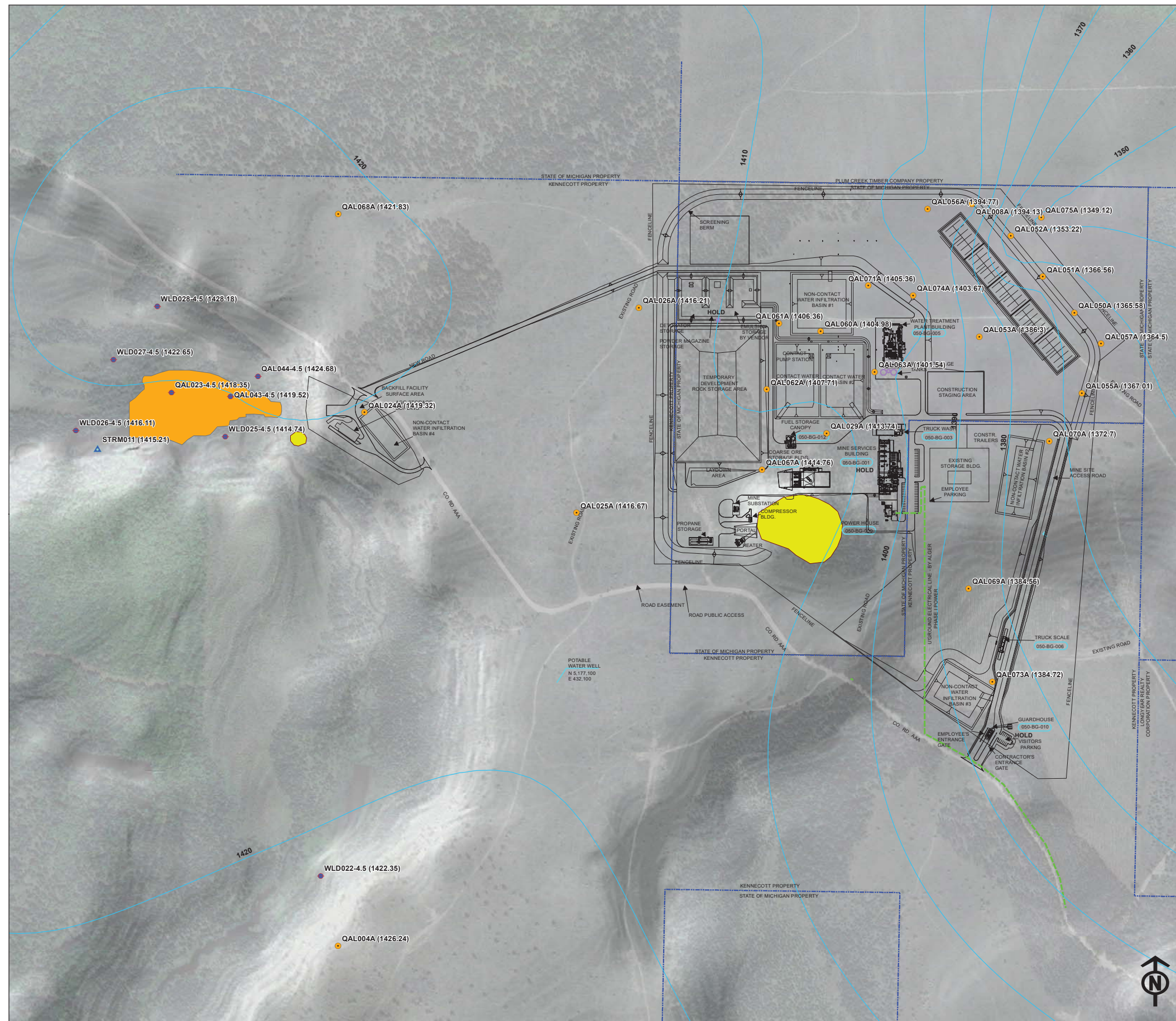


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**Figure: 1**





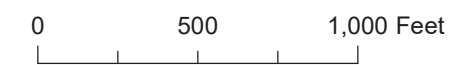
**A-ZONE GROUNDWATER ELEVATION  
CONTOURS  
SUMMER LOWFLOW, JUL-SEPT 2020**

**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

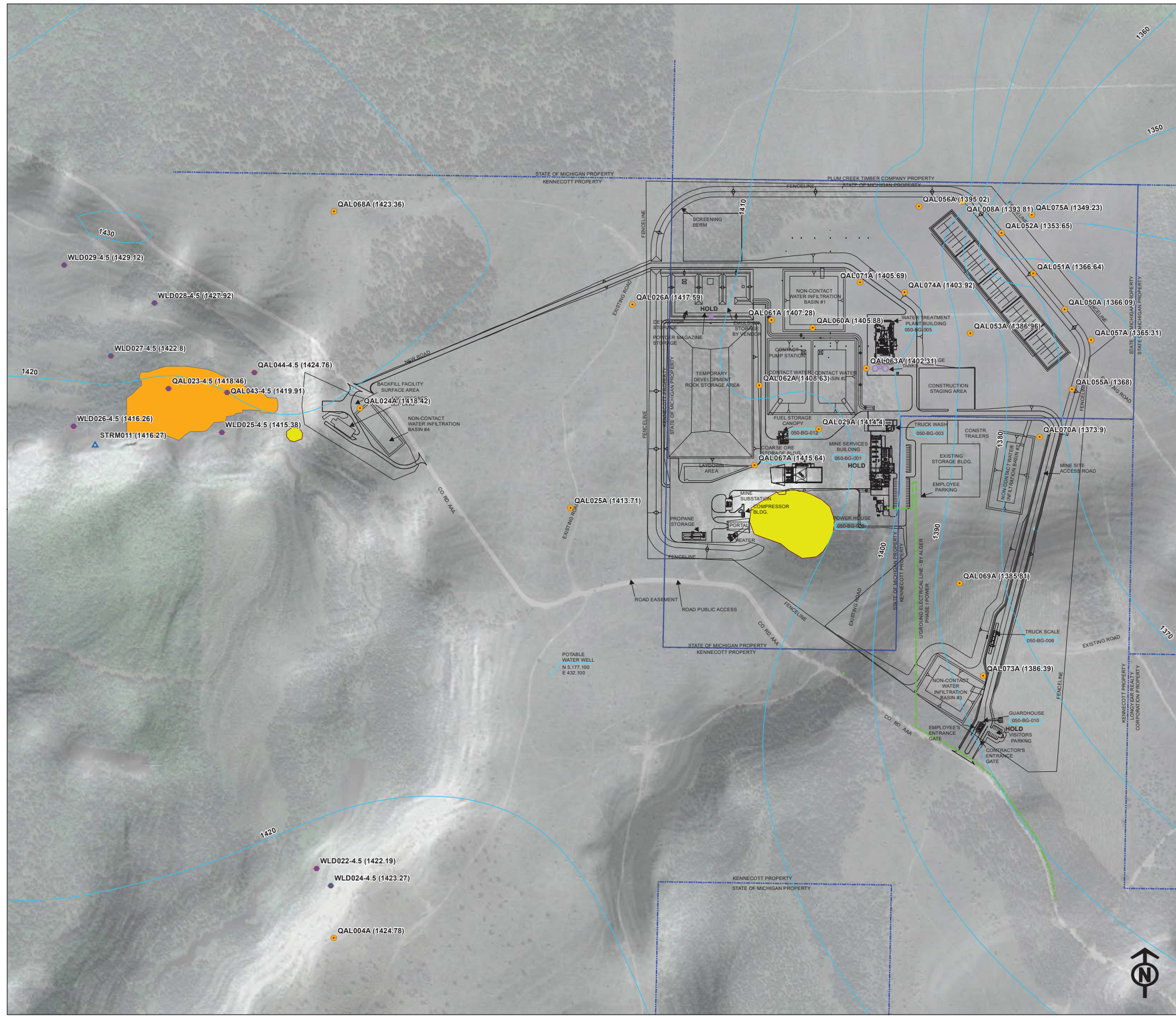


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**Figure: 1**



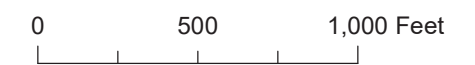
**A-ZONE GROUNDWATER ELEVATION  
CONTOURS  
FALL RAIN RUNOFF, OCT-NOV 2020**

**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



1:3,600



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**Figure: 1**

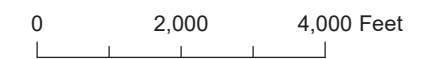
**A-ZONE GROUNDWATER ELEVATION CONTOURS  
WINTER BASEFLOW, JANUARY-MARCH 2020**

**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

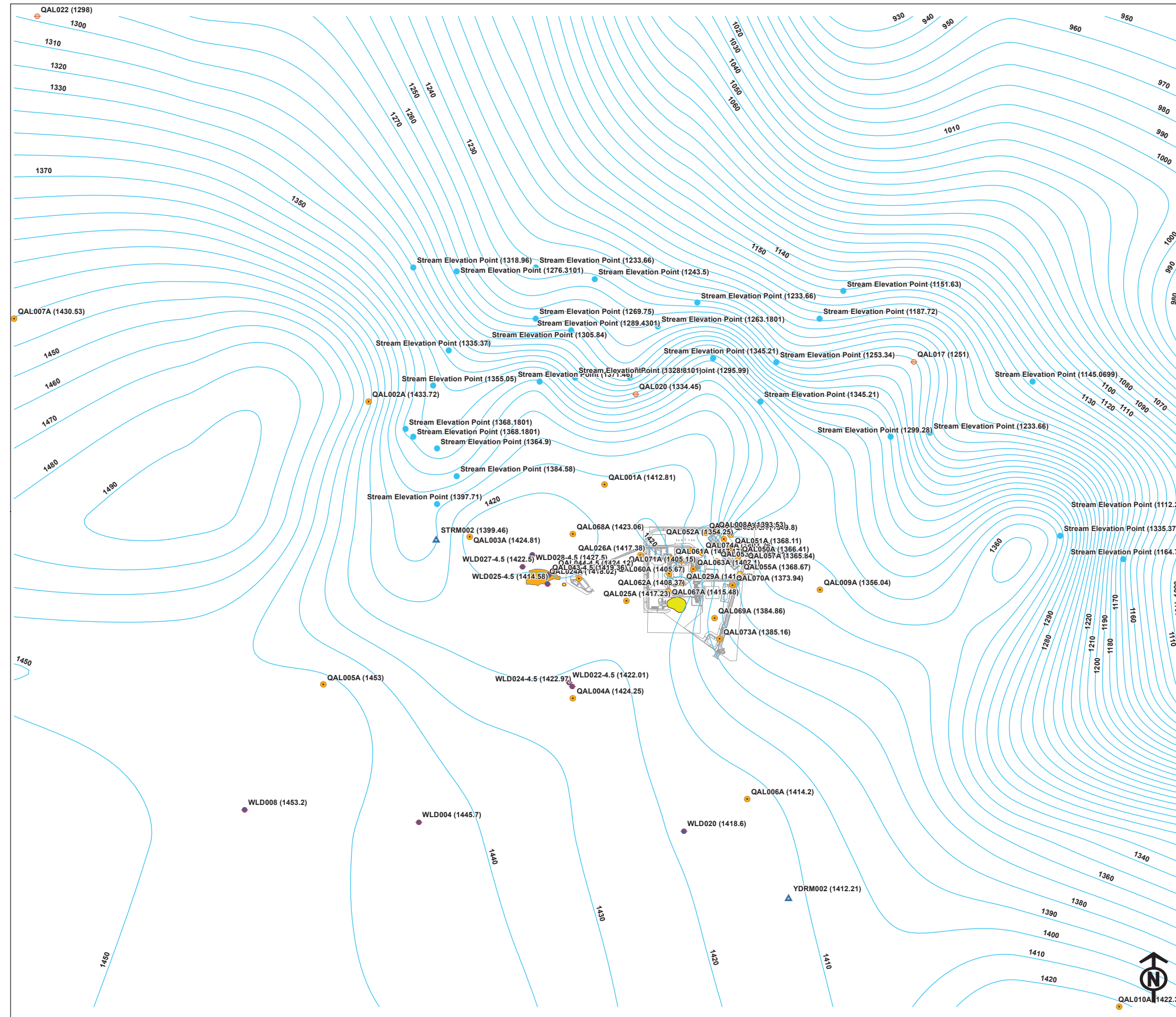


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**Figure: 1**



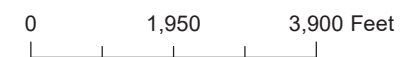
**A-ZONE GROUNDWATER ELEVATION  
CONTOURS  
SPRING RUNOFF, MAY 2020  
HS VIEW**

**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

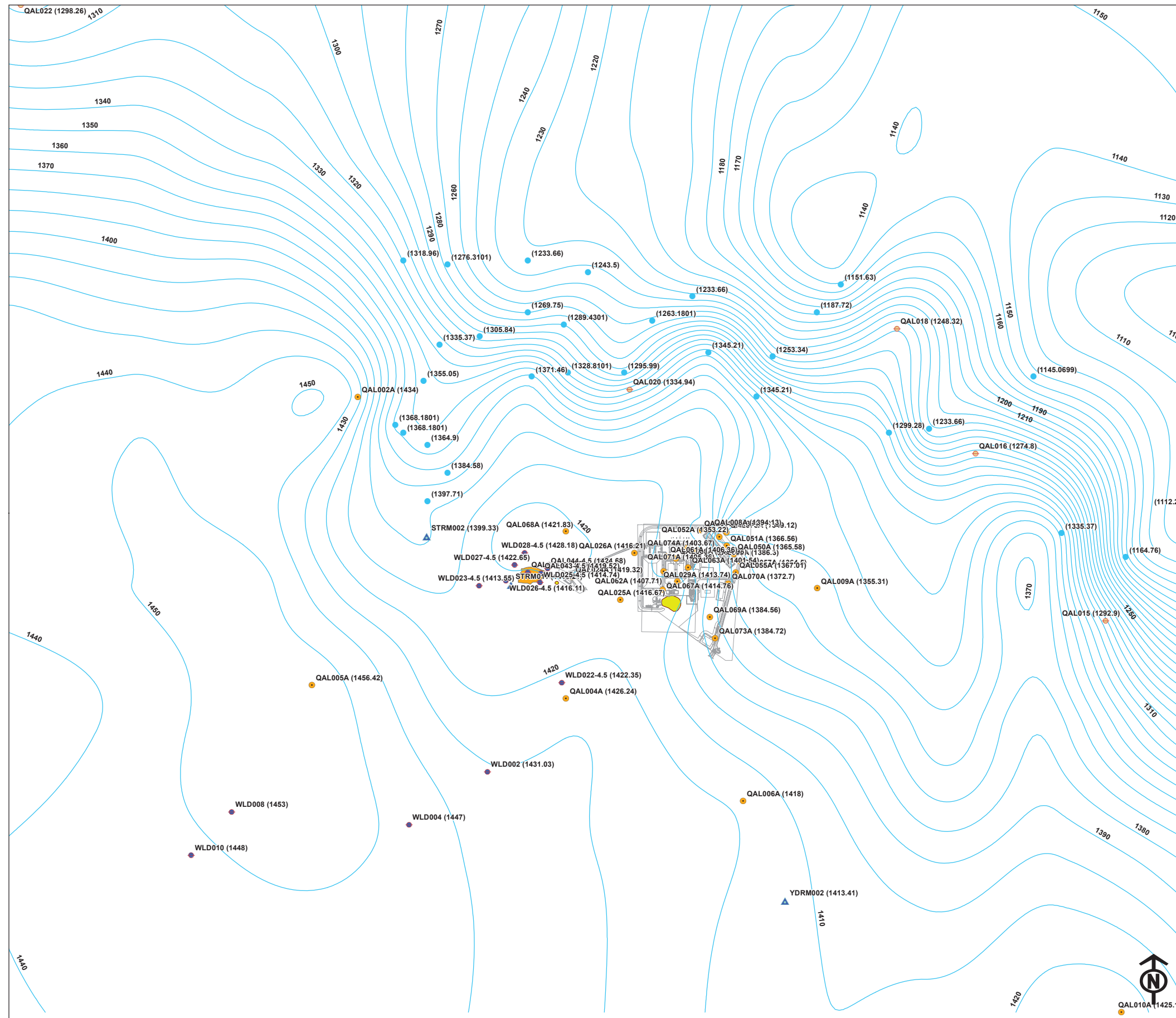


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**Figure: 1**



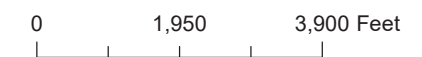
**A-ZONE GROUNDWATER ELEVATION  
CONTOURS  
SUMMER LOW FLOW, JUL-SEPT 2020  
HS VIEW**

**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

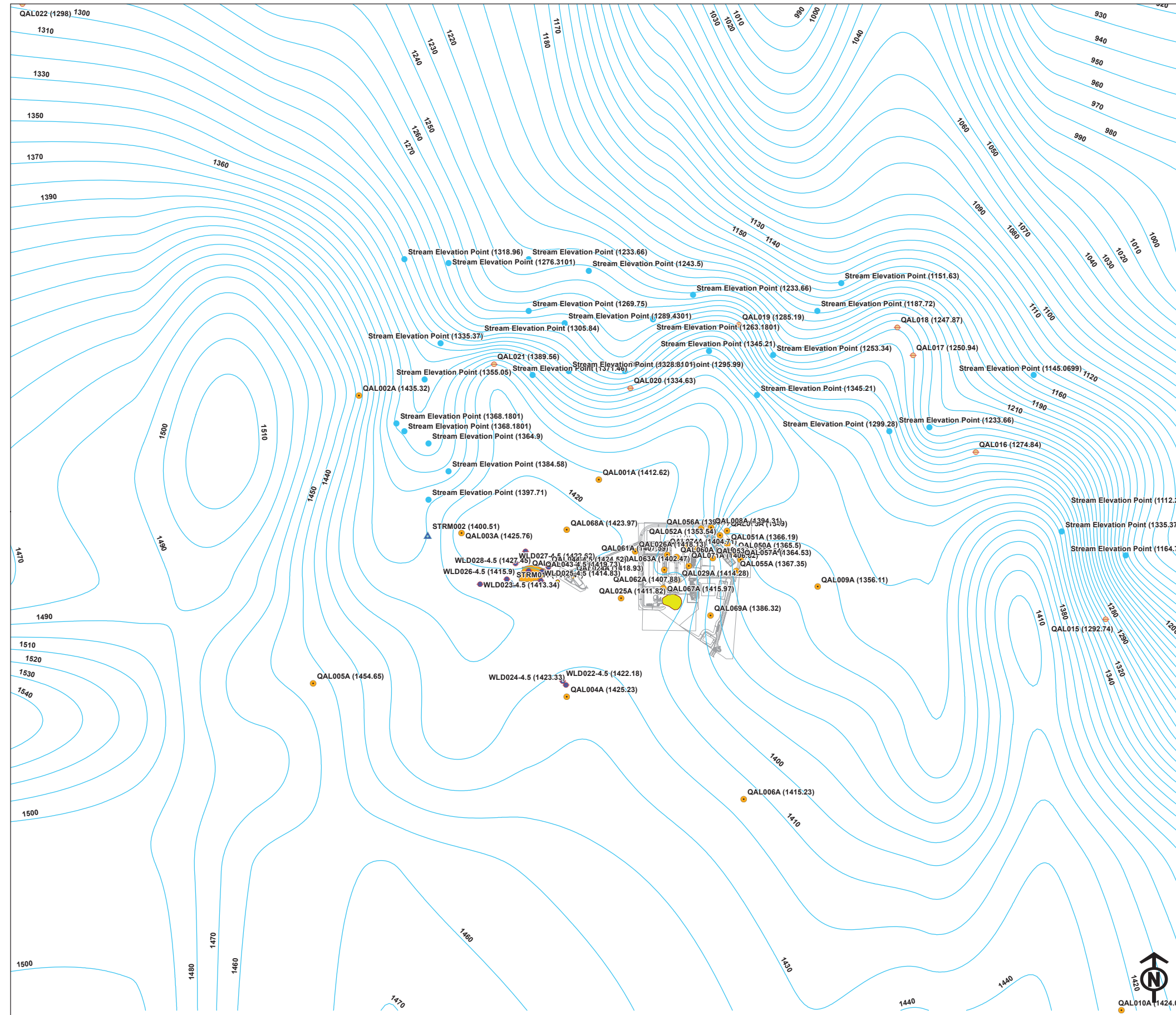


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**Figure: 1**



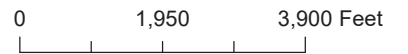
**A-ZONE GROUNDWATER ELEVATION CONTOURS**  
**FALL RAIN RUNOFF, OCTOBER-NOVEMBER 2020**  
**HS VIEW**

**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

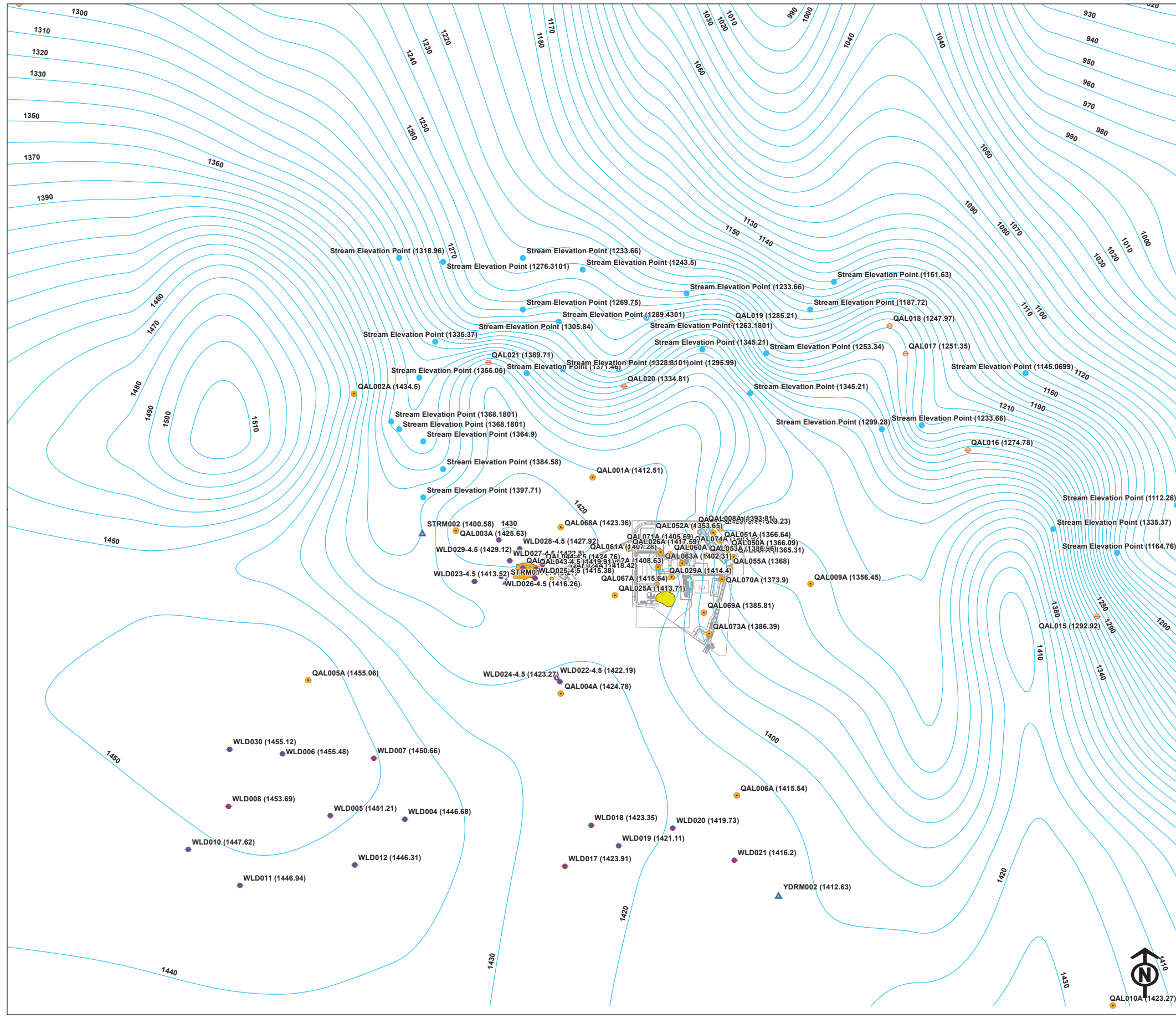


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**Figure: 1**





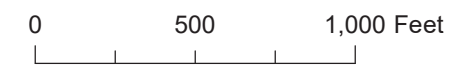
**D-ZONE GROUNDWATER ELEVATION CONTOURS  
WINTER BASEFLOW, JANUARY-MARCH 2020  
HS VIEW**

**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

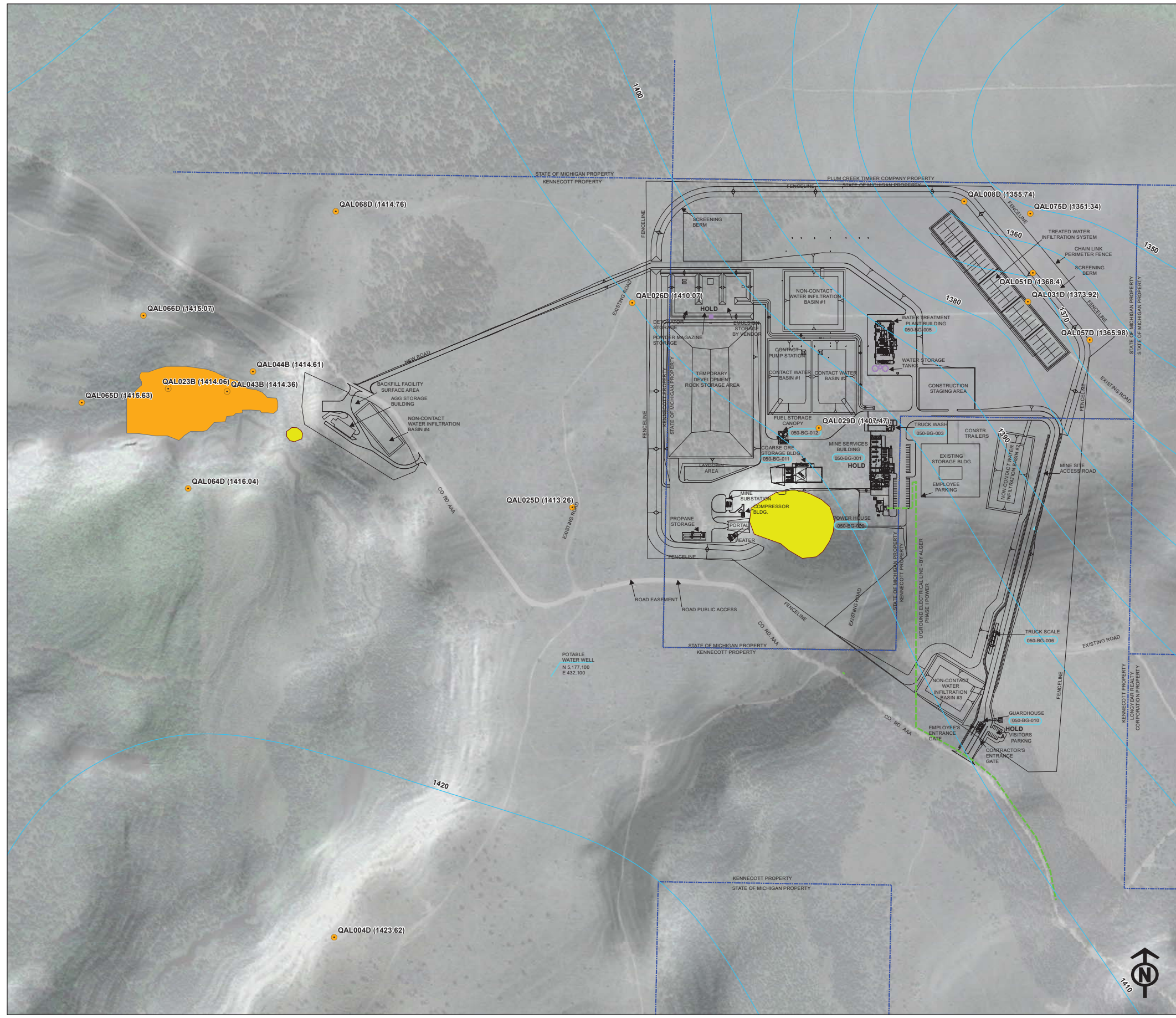


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**Figure: 1**



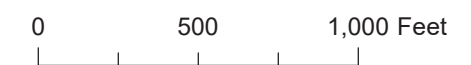
**D-ZONE GROUNDWATER ELEVATION CONTOURS**  
**SPRING RUNOFF, MAY 2020**

**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



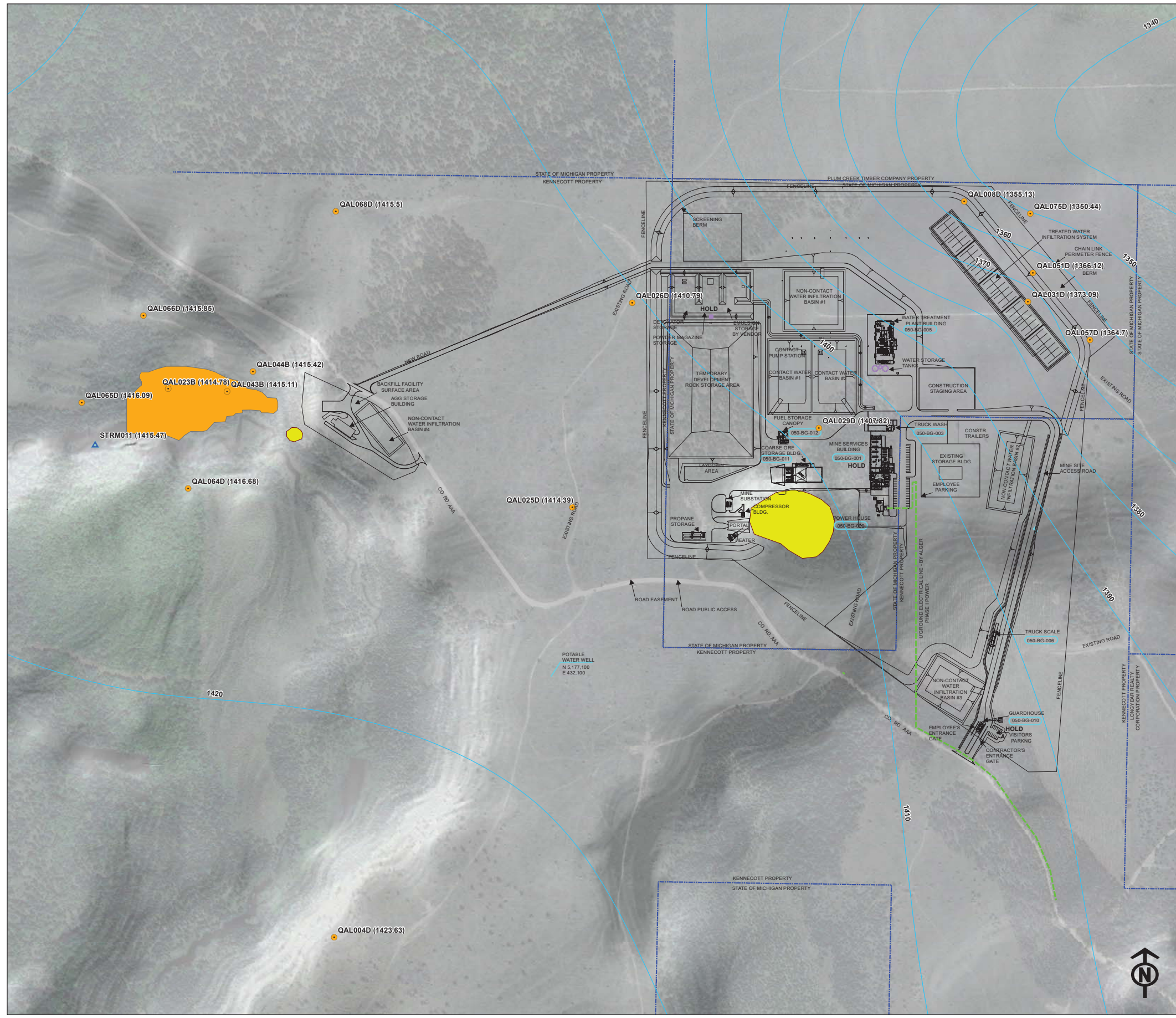
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**Figure: 1**





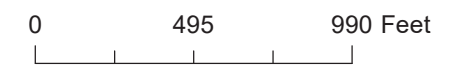
**D-ZONE GROUNDWATER ELEVATION CONTOURS  
SUMMER BASEFLOW, JUL-SEP 2020**

**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

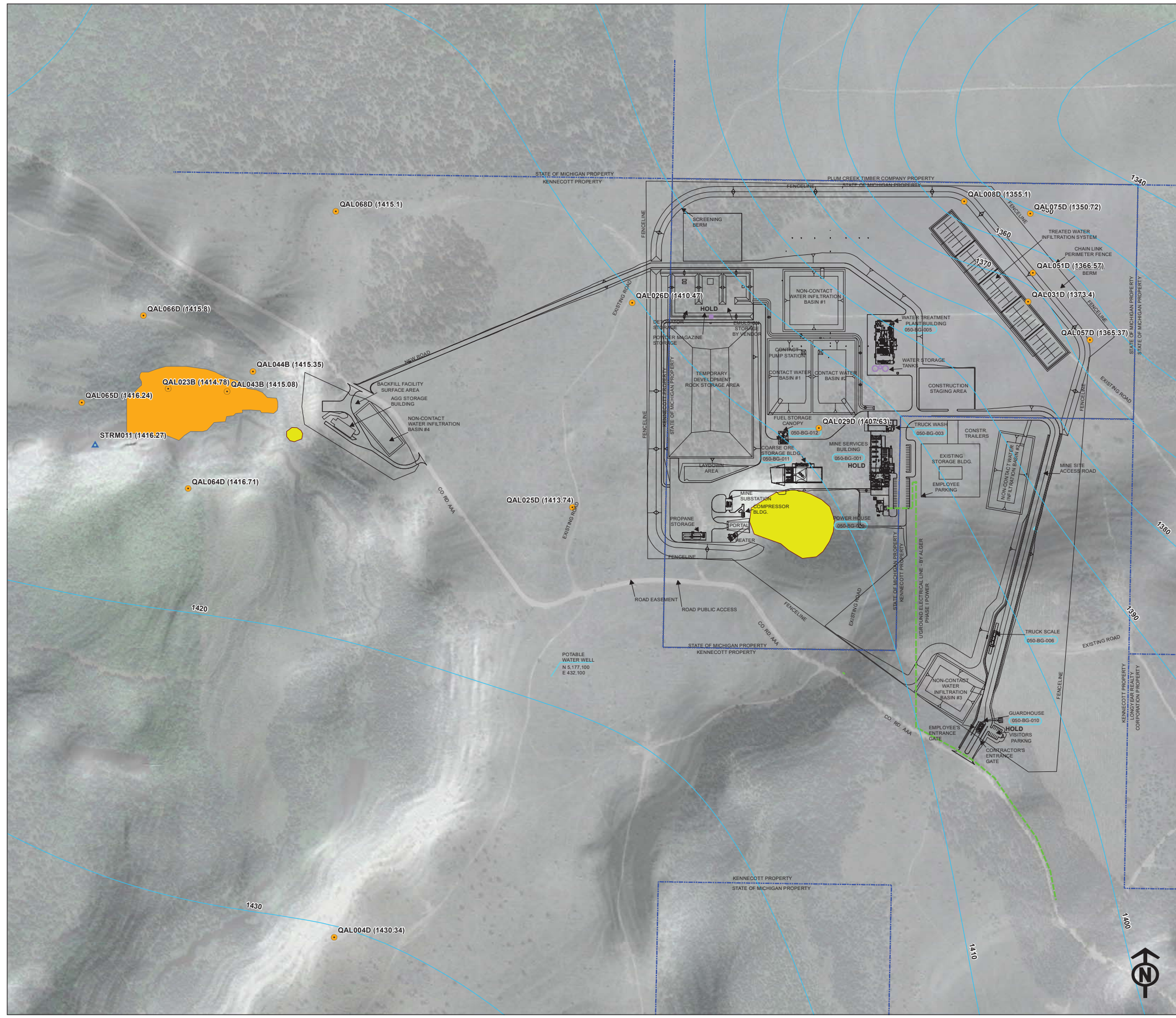


1:3,600



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**Figure: 1**



**D-ZONE GROUNDWATER ELEVATION CONTOURS**  
**FALL RAIN RUNOFF OCT-NOV 2020**

**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      500      1,000 Feet

1:3,600

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**Figure: 1**

**D-ZONE GROUNDWATER ELEVATION CONTOURS  
WINTER BASEFLOW, JANUARY-MARCH 2020**

**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

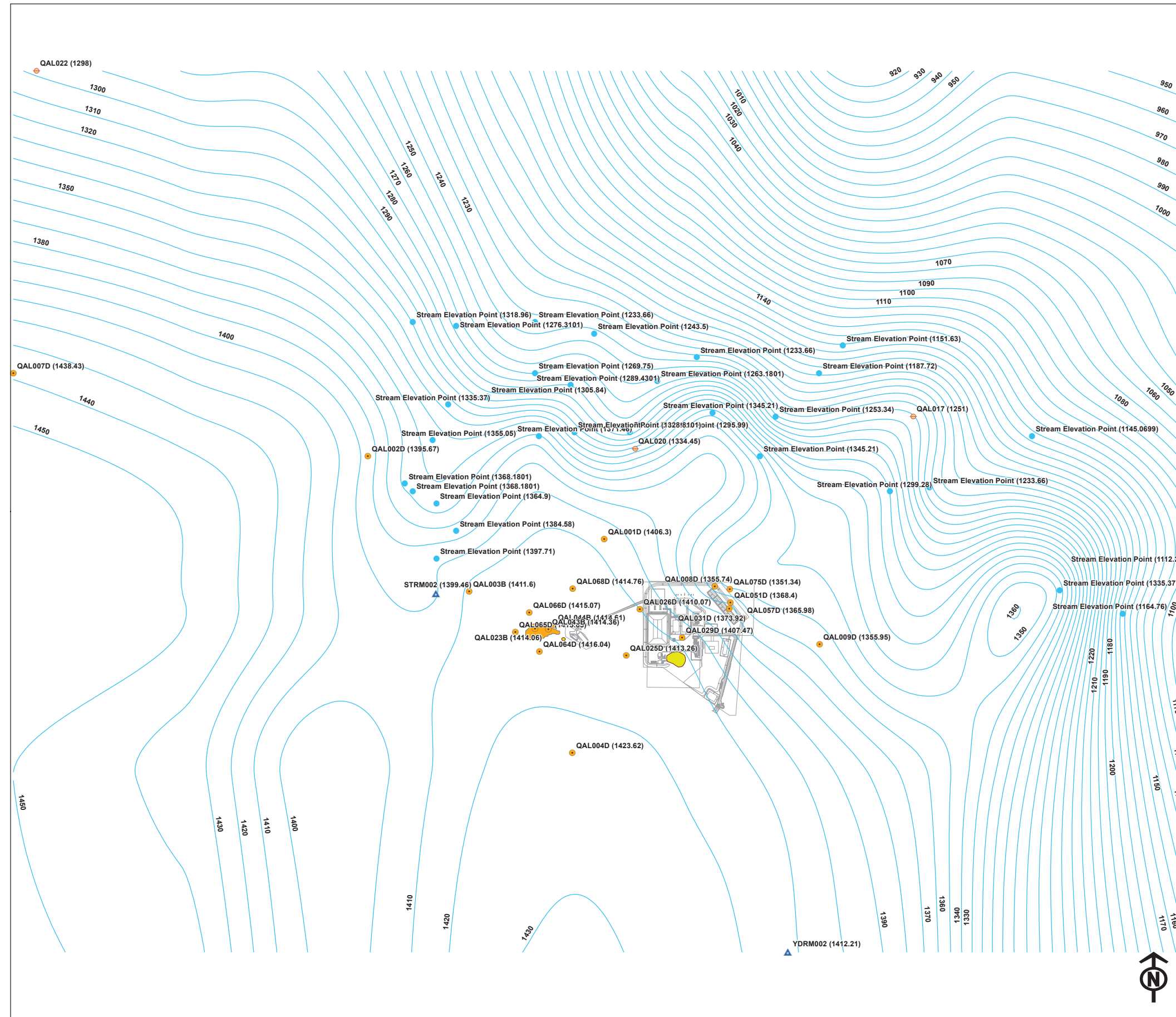


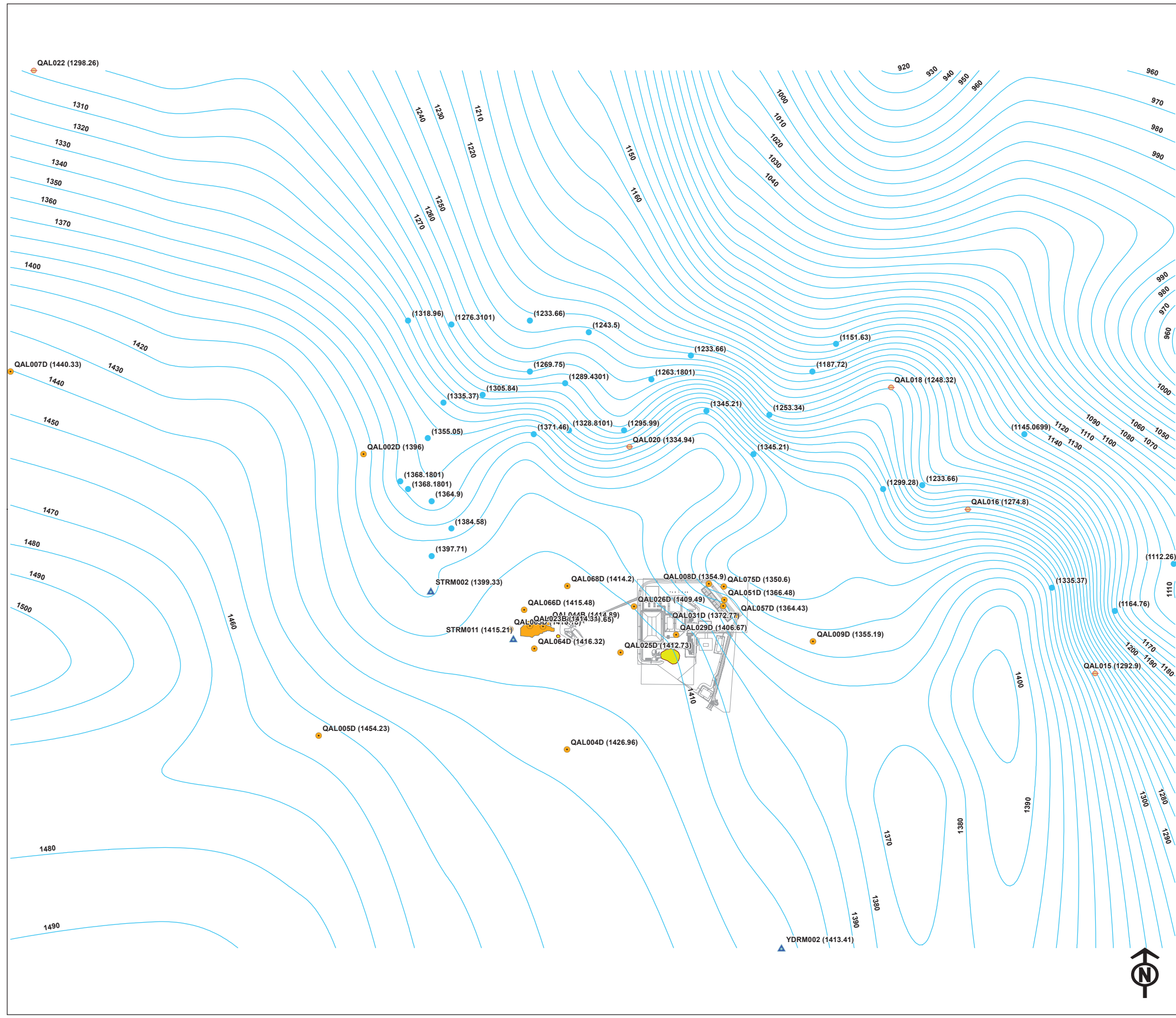
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**Figure: 1**





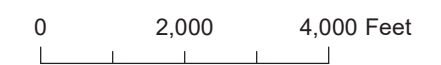
**D-ZONE GROUNDWATER ELEVATION  
CONTOURS  
SPRING RUNOFF, MAY 2020  
HS VIEW**

**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



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**Figure: 1**

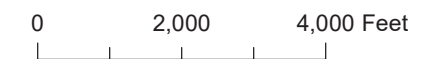
**D-ZONE GROUNDWATER ELEVATION  
CONTOURS  
SUMMER BASEFLOW, JUL-SEP 2020  
HS VIEW**

**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

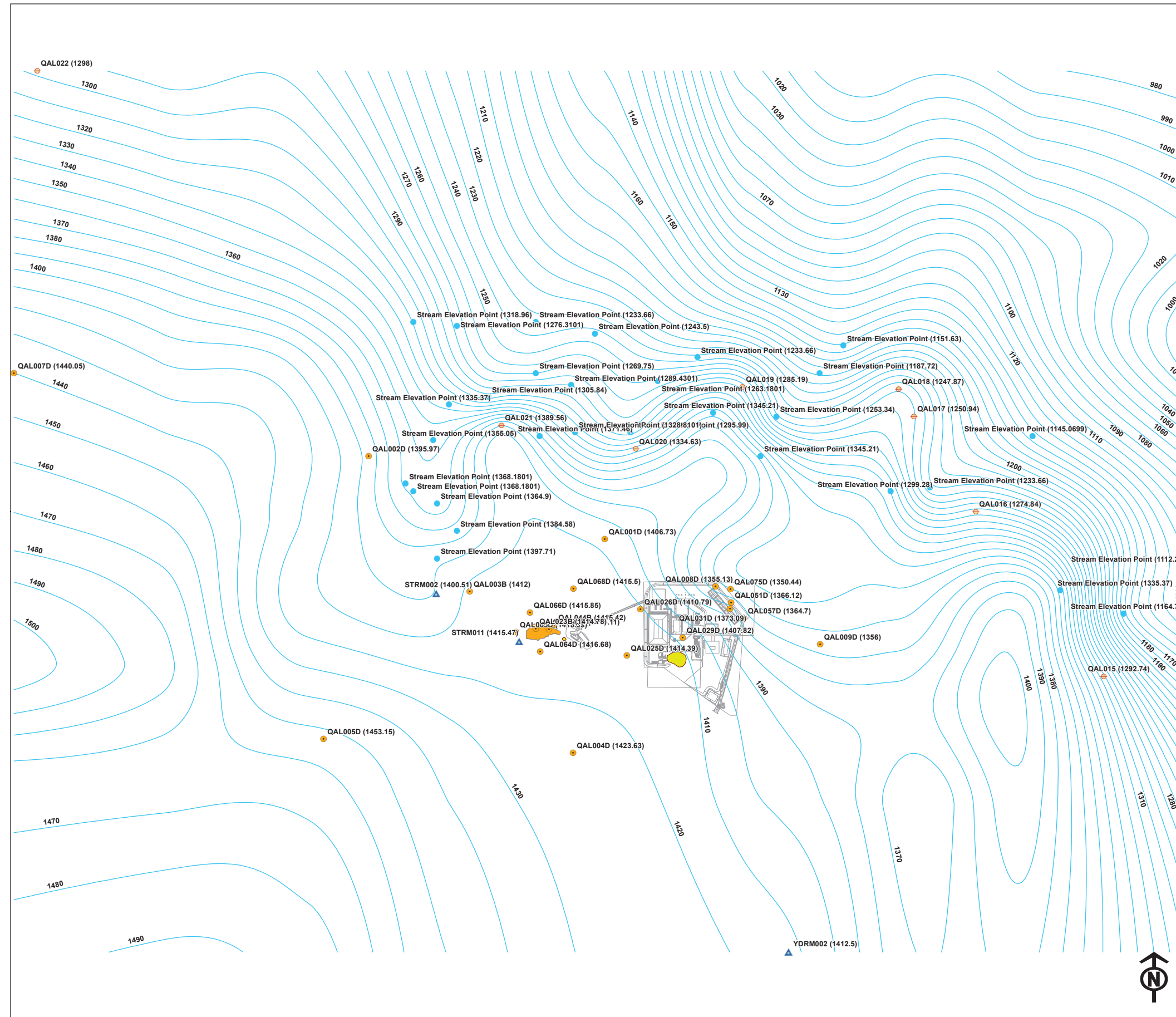


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**Figure: 1**



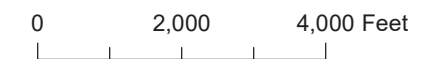
**D-ZONE GROUNDWATER ELEVATION  
CONTOURS  
FALL RAIN RUNOFF, OCT-NOV 2020  
HS VIEW**

**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

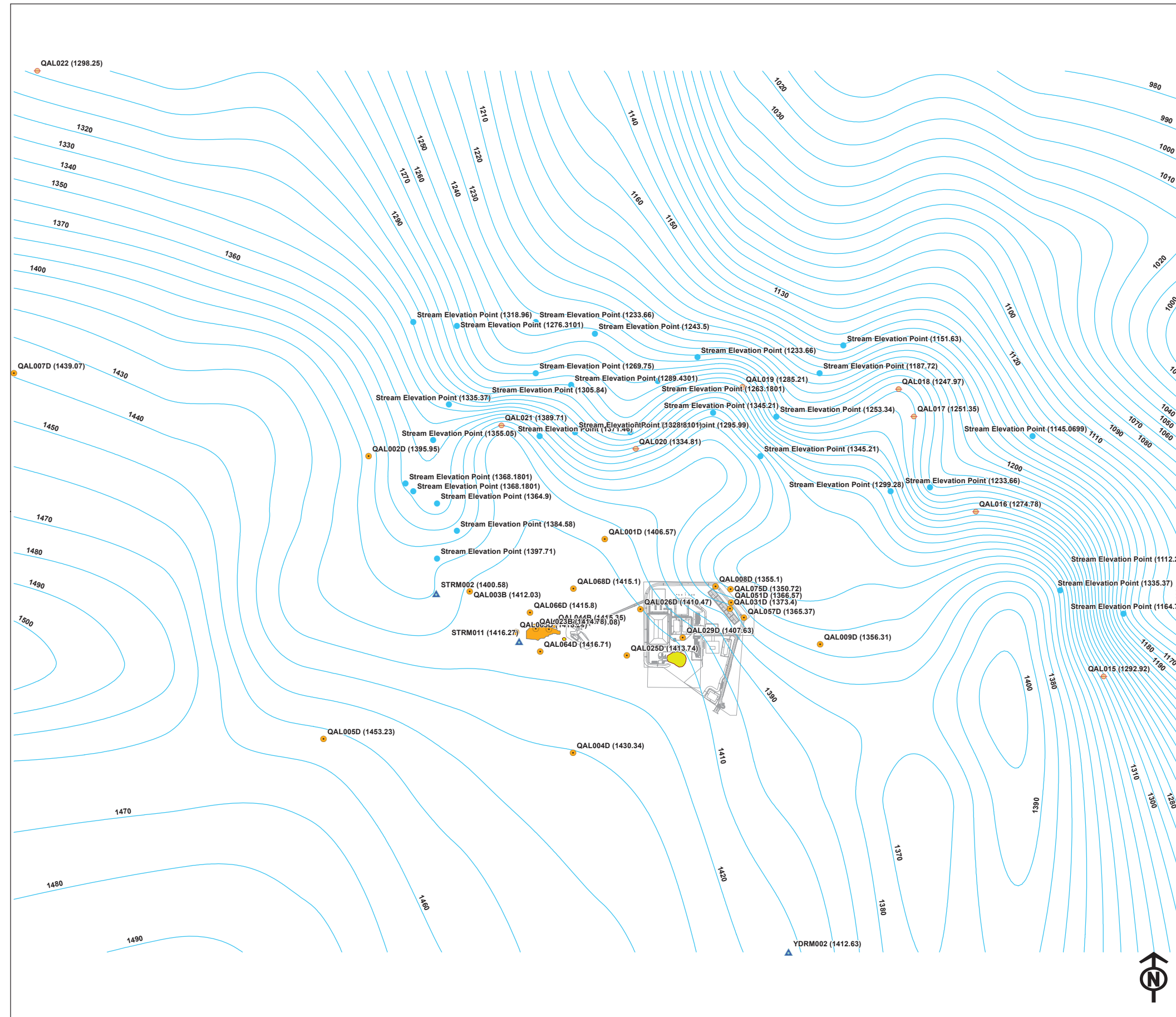


1:16,000



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**Figure: 1**





## **Appendix N**

### **Eagle Mine**

#### **Continuous Groundwater Level Results**

**2020 Water Year  
Continuous Monitoring Results  
Monitoring Well Locations  
Eagle Mine**

	QAL023B	QAL024A	QAL044B	QAL064D	QAL065D	QAL066D
<b>Background</b>						
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
<b>Oct-19</b>						
Mean	1414.7	1418.8	1415.6	1416.4	1416.0	1416.0
Minimum	1414.6	1418.7	1415.5	1416.2	1415.9	1415.9
Maximum	1414.9	1419.0	1415.8	1416.7	1416.2	1416.2
<b>Nov-19</b>						
Mean	1414.5	1418.6	1415.3	1416.3	1415.7	1415.7
Minimum	1414.4	1418.5	1415.2	1416.1	1415.7	1415.6
Maximum	1414.6	1418.7	1415.5	1416.7	1416.0	1415.9
<b>Dec-19</b>						
Mean	1414.4	1418.3	1415.2	1416.4	1415.8	1415.5
Minimum	1414.4	1418.2	1415.1	1416.3	1415.8	1415.5
Maximum	1414.6	1418.5	1415.4	1416.7	1416.1	1415.8
<b>Jan-20</b>						
Mean	1414.3	1418.0	1414.9	1416.2	1415.7	1415.4
Minimum	1414.1	1418.0	1414.8	1415.9	1415.6	1415.2
Maximum	1414.6	1418.2	1415.2	1416.6	1416.0	1415.6
<b>Feb-20</b>						
Mean	1414.1	1417.8	1414.7	1415.9	1415.6	1415.1
Minimum	1414.1	1417.7	1414.6	1415.9	1415.6	1415.1
Maximum	1414.3	1417.8	1414.9	1416.1	1415.7	1415.3
<b>Mar-20</b>						
Mean	1414.0	1417.5	1414.5	1415.9	1415.6	1415.0
Minimum	1414.0	1417.5	1414.5	1415.8	1415.6	1415.0
Maximum	1414.2	1417.7	1414.6	1416.2	1415.9	1415.2
<b>Apr-20</b>						
Mean	1414.2	1417.6	1414.6	1416.2	1415.9	1415.2
Minimum	1414.1	1417.5	1414.5	1416.0	1415.8	1415.1
Maximum	1414.2	1417.8	1414.7	1416.4	1416.2	1415.4
<b>May-20</b>						
Mean	1414.4	1418.5	1414.8	1416.3	1416.2	1415.5
Minimum	1414.3	1417.8	1414.6	1416.1	1416.1	1415.4
Maximum	1414.6	1419.2	1415.1	1416.6	1416.4	1415.6
<b>Jun-20</b>						
Mean	1414.4	1419.2	1415.0	1416.3	1416.0	1415.6
Minimum	1414.4	1419.2	1415.0	1416.0	1415.9	1415.5
Maximum	1414.6	1419.3	1415.2	1416.6	1416.3	1415.7

**2020 Water Year  
Continuous Monitoring Results  
Monitoring Well Locations  
Eagle Mine**

	QAL023B	QAL024A	QAL044B	QAL064D	QAL065D	QAL066D
<b>Jul-20</b>						
Mean	1414.5	1419.0	1415.2	1416.3	1415.9	1415.6
Minimum	1414.3	1419.0	1415.0	1416.0	1415.7	1415.6
Maximum	1414.8	1419.2	1415.5	1416.6	1416.2	1415.9
<b>Aug-20</b>						
Mean	1414.5	1418.8	1415.2	1416.2	1415.8	1415.6
Minimum	1414.4	1418.7	1415.1	1416.0	1415.7	1415.6
Maximum	1414.8	1419.0	1415.4	1416.7	1416.1	1415.8
<b>Sep-20</b>						
Mean	1414.7	1418.5	1415.3	1416.6	1415.9	1415.7
Minimum	1414.6	1418.5	1415.3	1416.4	1415.8	1415.7
Maximum	1414.9	1418.7	1415.5	1416.8	1416.1	1415.9

Source: North Jackson Company, REACH System

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

Results in red indicate values outside of the background range.

**2020 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
<b>Background</b>										
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
<b>Oct-19</b>										
Mean	1422.1	1413.2	1415.0	1415.3	1416.2	1416.1	1422.6	1422.5	1427.6	1427.5
Minimum	1422.1	1413.1	1414.9	1415.2	1416.1	1415.9	1422.4	1422.4	1427.5	1427.4
Maximum	1422.3	1413.5	1415.3	1415.4	1416.5	1416.4	1422.8	1422.8	1427.9	1427.7
<b>Nov-19</b>										
Mean	1422.1	1413.3	1414.8	1415.0	1416.2	1415.9	1422.5	1422.5	NM	1427.4
Minimum	1422.1	1413.2	1414.7	1415.0	1416.2	1415.9	1422.5	1422.4	NM	1427.3
Maximum	1422.2	1413.4	1415.1	1415.3	1416.4	1416.1	1422.7	1422.6	NM	1427.5
<b>Dec-19</b>										
Mean	NM	1413.3	1414.8	1415.1	1416.3	NM	1422.6	1422.5	NM	1427.3
Minimum	NM	1413.3	1414.8	1415.1	1416.3	NM	1422.6	1422.5	NM	1427.3
Maximum	NM	1413.5	1415.1	1415.3	1416.6	NM	1422.9	1422.8	NM	1427.5
<b>Jan-20</b>										
Mean	NM	1413.4	1414.8	1415.0	1416.3	NM	1422.6	1422.5	NM	NM
Minimum	NM	1413.4	1414.8	1415.0	1416.3	NM	1422.6	1422.5	NM	NM
Maximum	NM	1413.4	1415.0	1415.2	1416.5	NM	1422.8	1422.7	NM	NM
<b>Feb-20</b>										
Mean	1422.0	1413.4	1414.8	1414.9	1416.3	1416.0	1422.5	1422.4	NM	NM
Minimum	1422.0	1413.4	1414.8	1414.9	1416.3	1416.0	1422.5	1422.4	NM	NM
Maximum	1422.0	1413.5	1414.9	1415.0	1416.4	1416.1	1422.6	1422.5	NM	NM
<b>Mar-20</b>										
Mean	1422.0	1413.4	1414.8	1414.9	1416.4	1416.1	1422.6	1422.6	1427.9	1427.3
Minimum	1422.0	1413.4	1414.7	1414.9	1416.2	1416.0	1422.4	1422.4	1427.8	1427.2
Maximum	1422.2	1413.6	1415.1	1415.2	1416.6	1416.5	1422.9	1422.9	1428.4	1427.8
<b>Apr-20</b>										
Mean	1422.1	1413.5	1415.0	1415.1	1416.6	1416.5	1422.8	1422.8	1428.4	1427.7
Minimum	1422.1	1413.6	1414.9	1415.0	1416.5	1416.4	1422.7	1422.7	1428.3	1427.6
Maximum	1422.4	1413.7	1415.3	1415.3	1416.8	1416.9	1423.1	1423.0	1428.5	1428.1
<b>May-20</b>										
Mean	1422.2	1413.5	1415.0	1415.2	1416.6	1416.6	1422.8	1422.7	1428.2	1427.7
Minimum	1422.2	1413.5	1414.9	1415.0	1416.5	1416.4	1422.6	1422.6	1428.0	1427.6
Maximum	1422.4	1413.7	1415.4	1415.4	1416.8	1417.0	1423.1	1423.1	1428.6	1428.1
<b>Jun-20</b>										
Mean	1422.2	1413.4	1414.8	1415.0	1416.3	1416.1	1422.4	1422.4	1427.7	1427.4
Minimum	1422.2	1413.2	1414.7	1414.9	1416.2	1416.0	1422.2	1422.2	1427.5	1427.2
Maximum	1422.4	1413.5	1415.0	1415.2	1416.5	1416.4	1422.7	1422.7	1428.0	1427.7
<b>Jul-20</b>										
Mean	1422.2	1413.2	1414.7	1415.0	1416.1	1415.9	1422.2	1422.2	1427.4	1427.2
Minimum	1422.2	1413.0	1414.6	1414.8	1415.9	1415.7	1421.7	1421.7	1427.1	1426.7
Maximum	1422.4	1413.5	1415.1	1415.3	1416.5	1416.3	1422.8	1422.8	1427.8	1427.6
<b>Aug-20</b>										
Mean	1422.1	1413.2	1414.8	1415.0	1416.0	1415.8	1422.0	1422.0	1427.1	1427.0
Minimum	1422.1	1413.0	1414.7	1414.8	1415.8	1415.6	1421.4	1421.5	1426.6	1426.7
Maximum	1422.4	1413.5	1415.4	1415.5	1416.4	1416.3	1422.7	1422.7	1427.6	1427.4

**2020 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
<b>Background</b>										
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
<b>Sep-20</b>										
Mean	1422.1	1413.2	1414.9	1415.1	1416.1	1415.9	1422.3	1422.3	1427.2	1427.0
Minimum	1422.1	1413.2	1414.8	1415.0	1416.0	1415.8	1422.0	1422.0	1426.9	1426.9
Maximum	1422.3	1413.5	1415.2	1415.4	1416.3	1416.2	1422.6	1422.6	1427.5	1427.3

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.

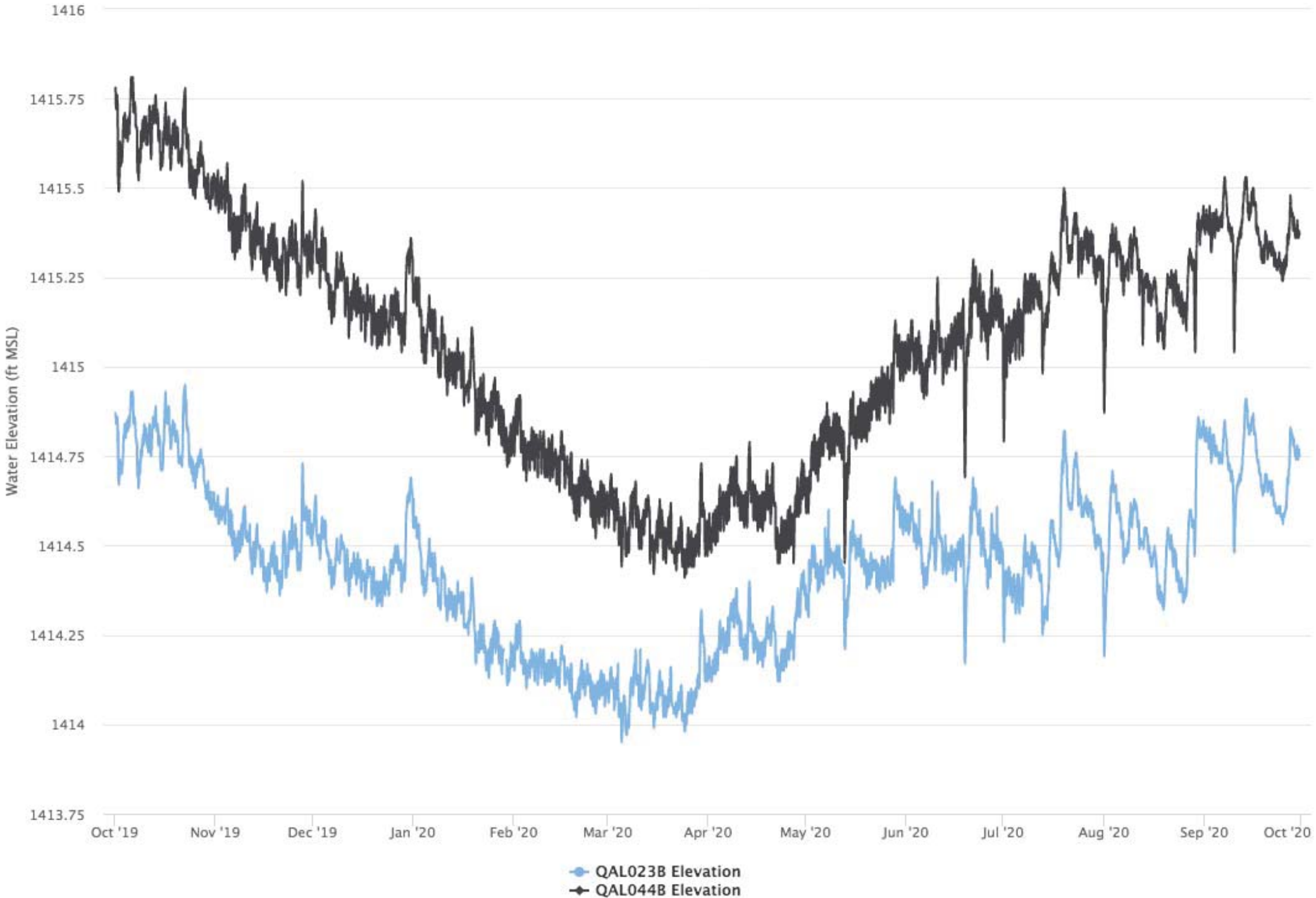
Results in red indicate values outside of the background range.

## **Appendix O**

### **Eagle Mine Groundwater and Wetland Hydrographs**

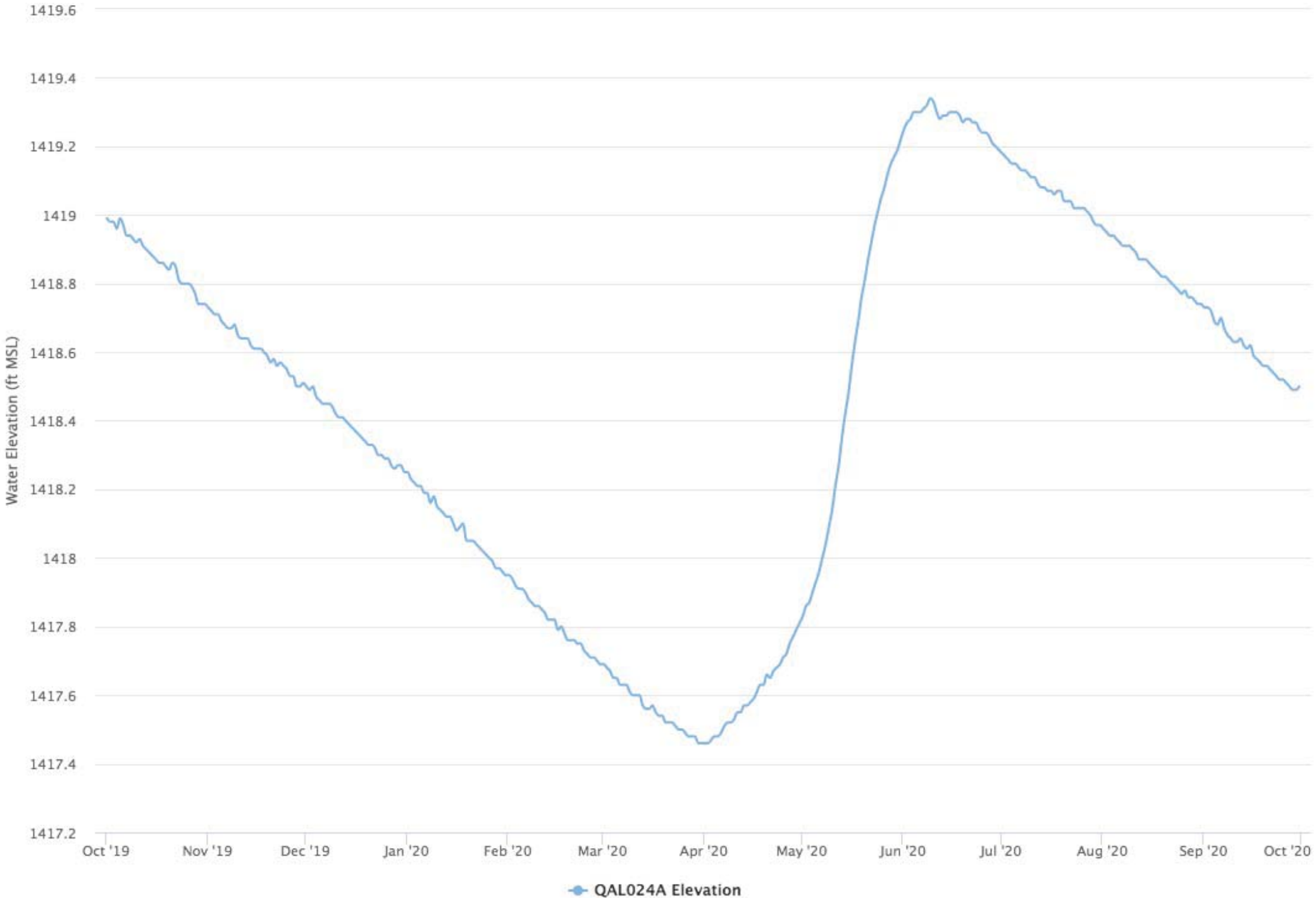
# Mine Permit Groundwater Hydrograph

Water Year 2020



# Mine Permit Groundwater Hydrograph

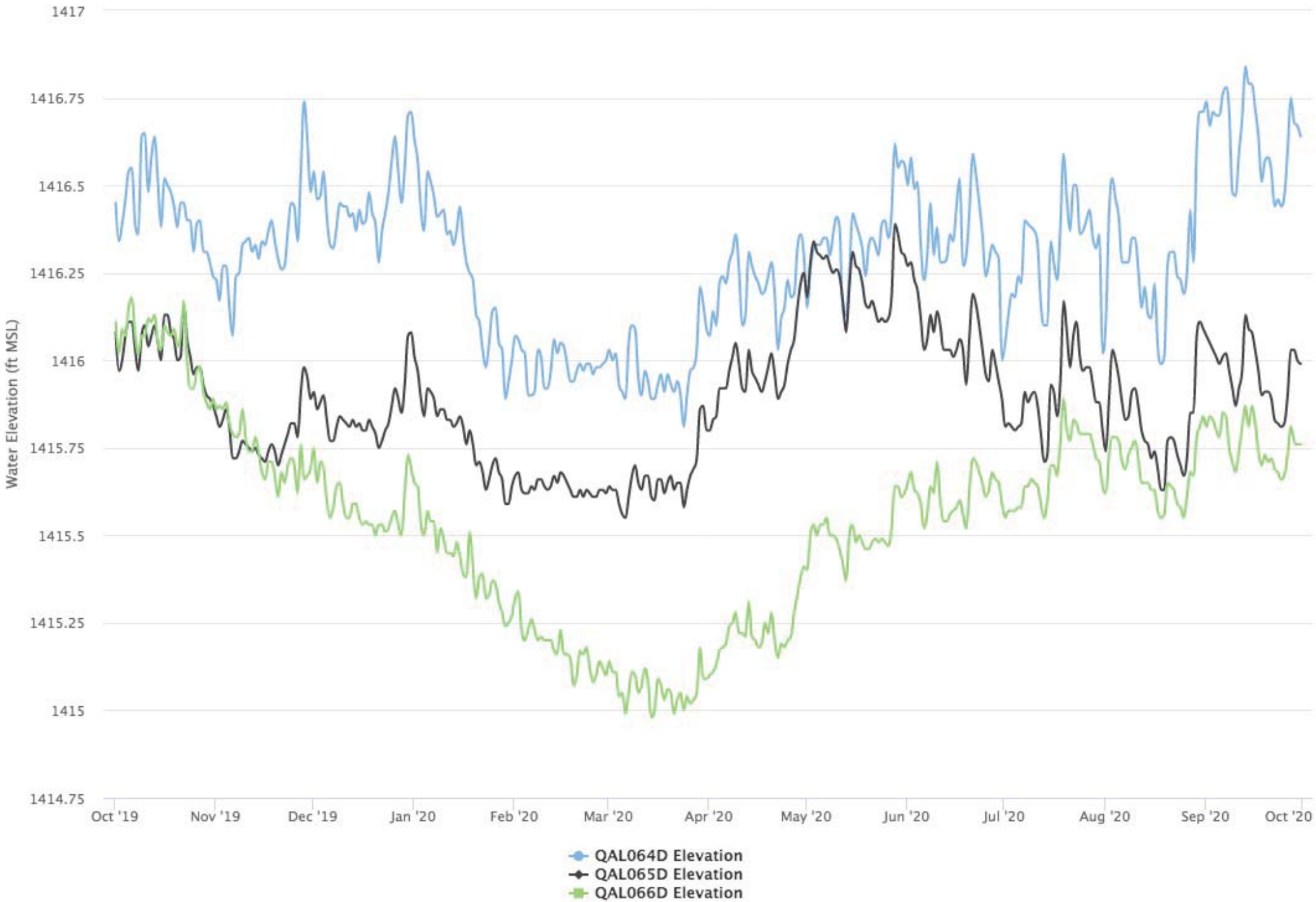
Water Year 2020





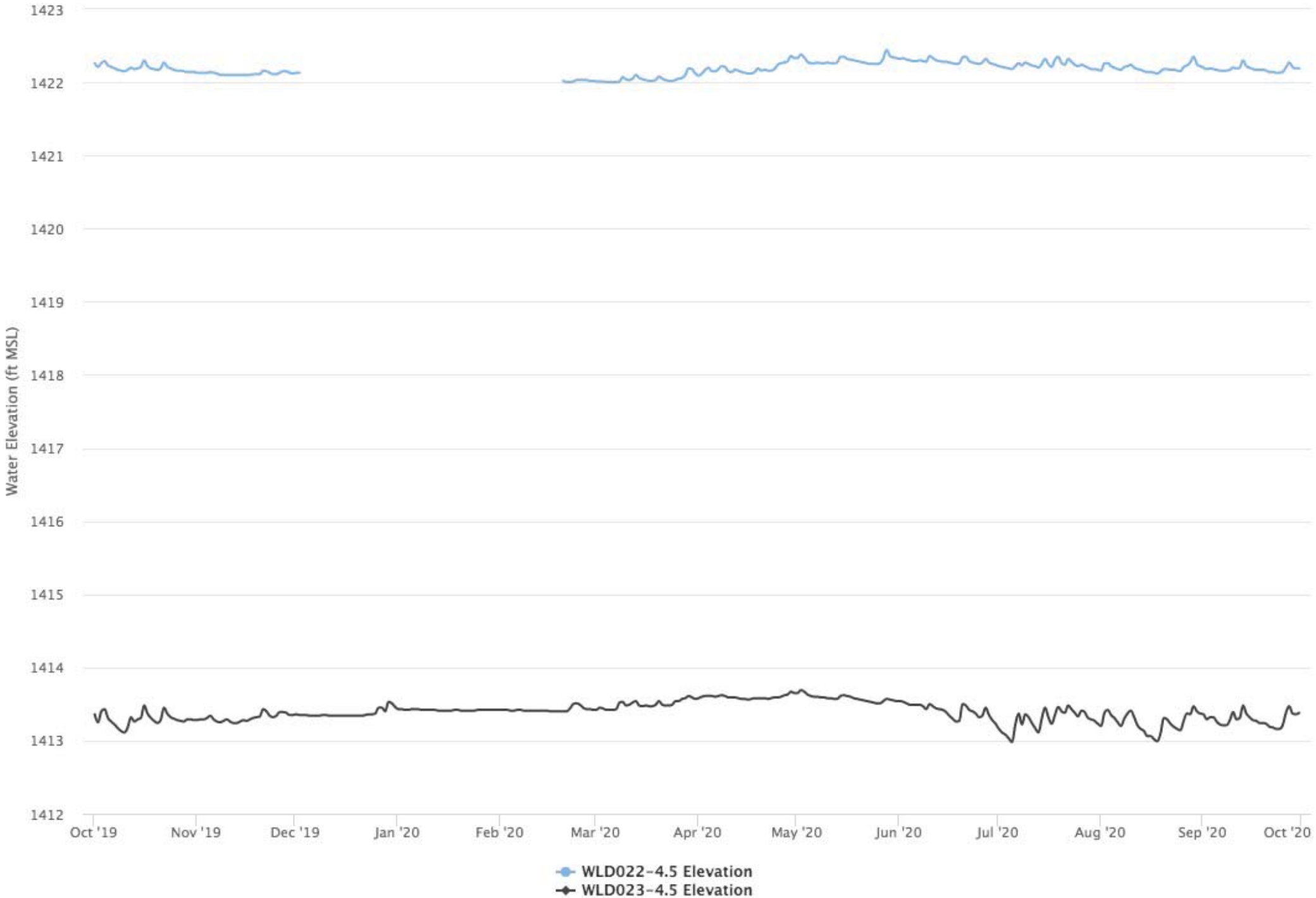
# Mine Permit Groundwater Hydrograph

Water Year 2020



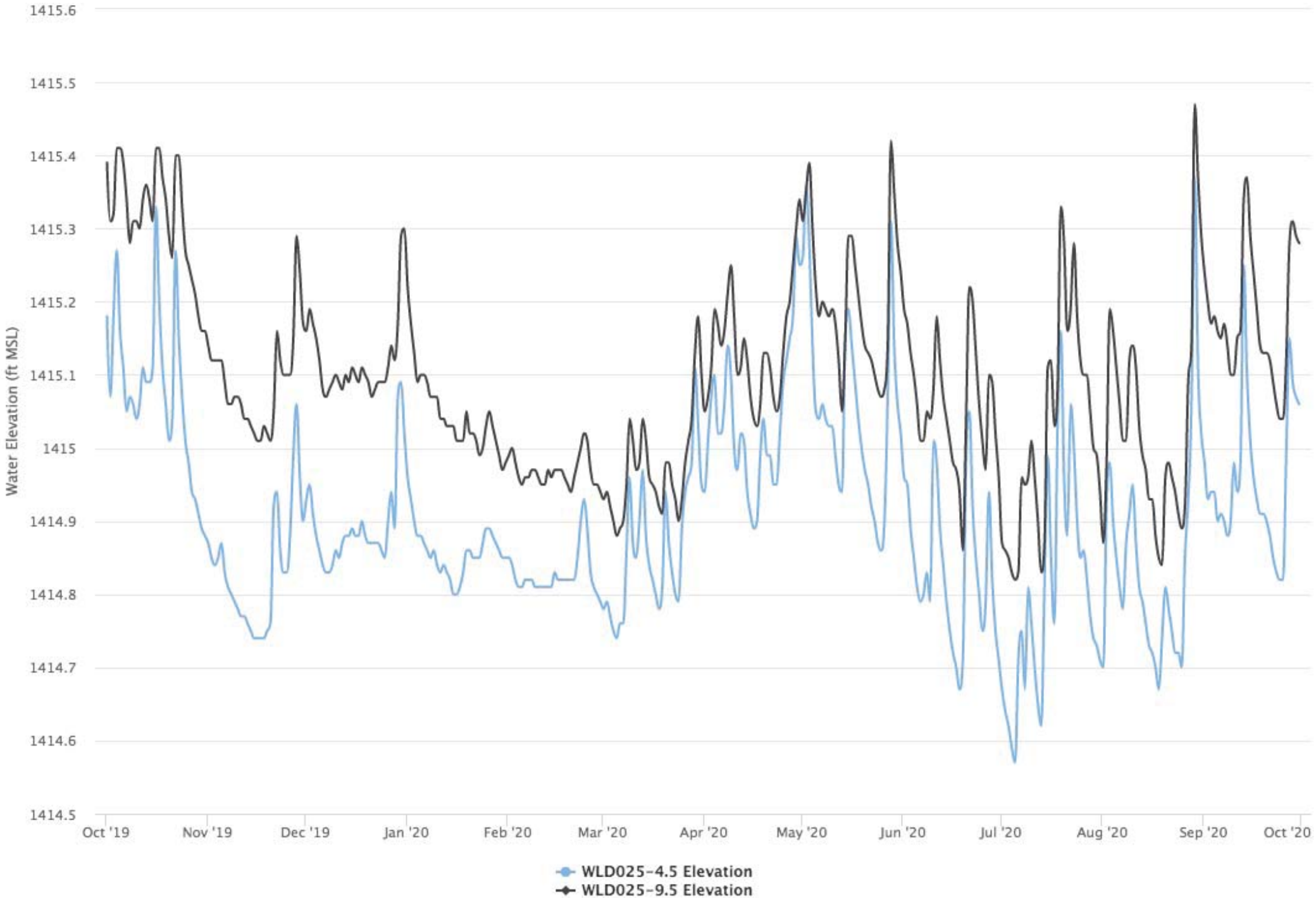
# Mine Permit Groundwater Hydrograph

Water Year 2020



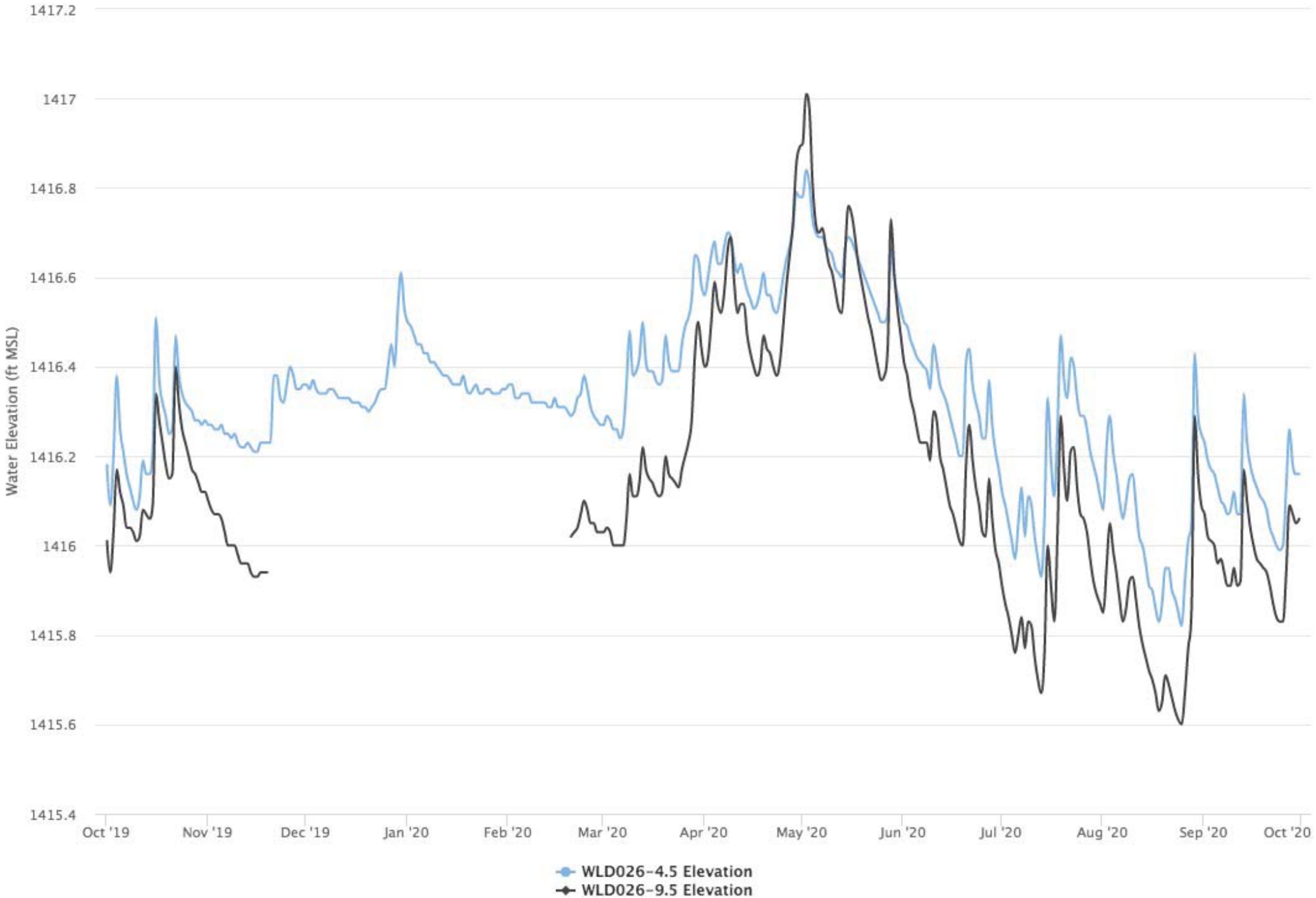
# Mine Permit Groundwater Hydrograph

Water Year 2020



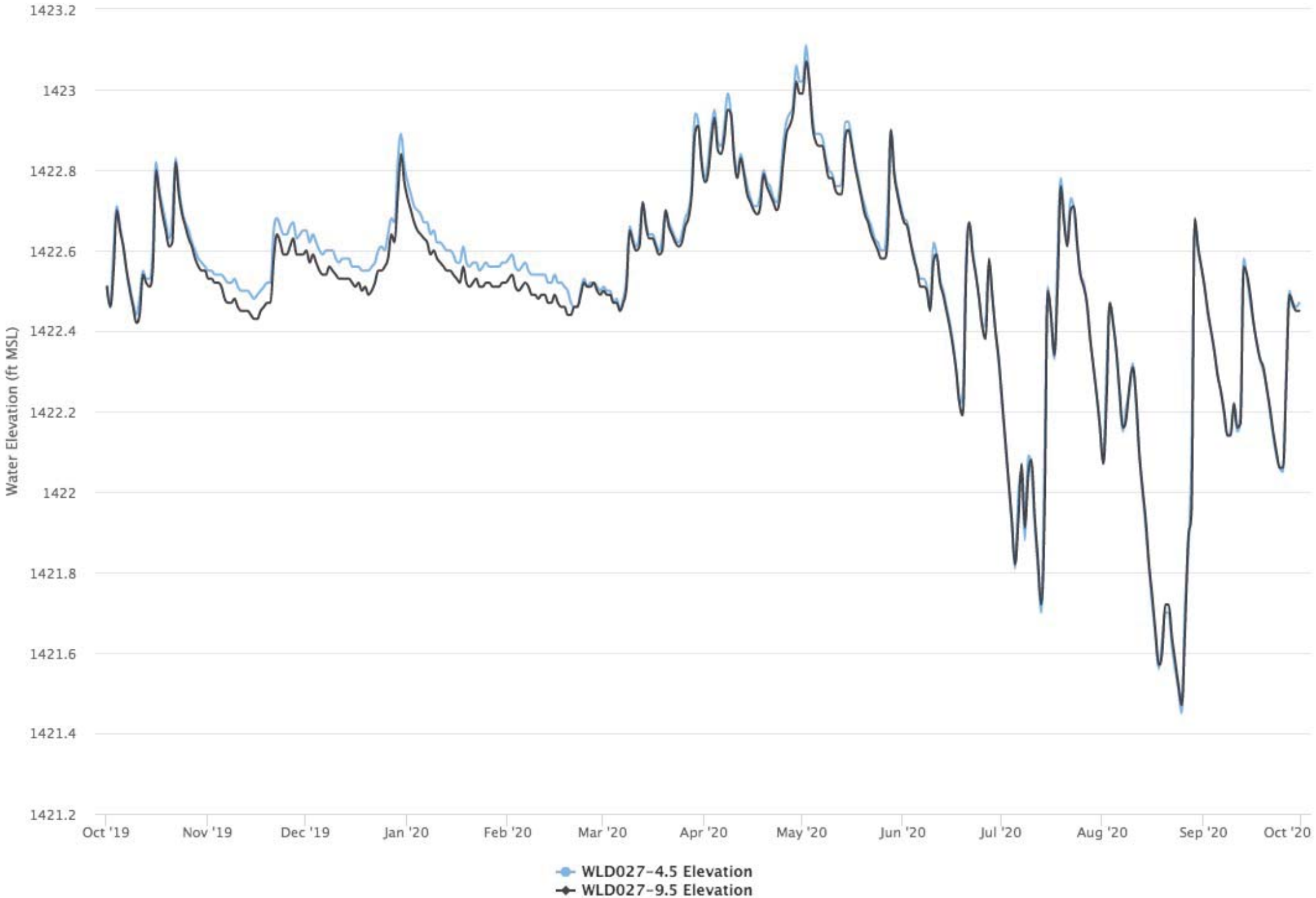
# Mine Permit Groundwater Hydrograph

Water Year 2020



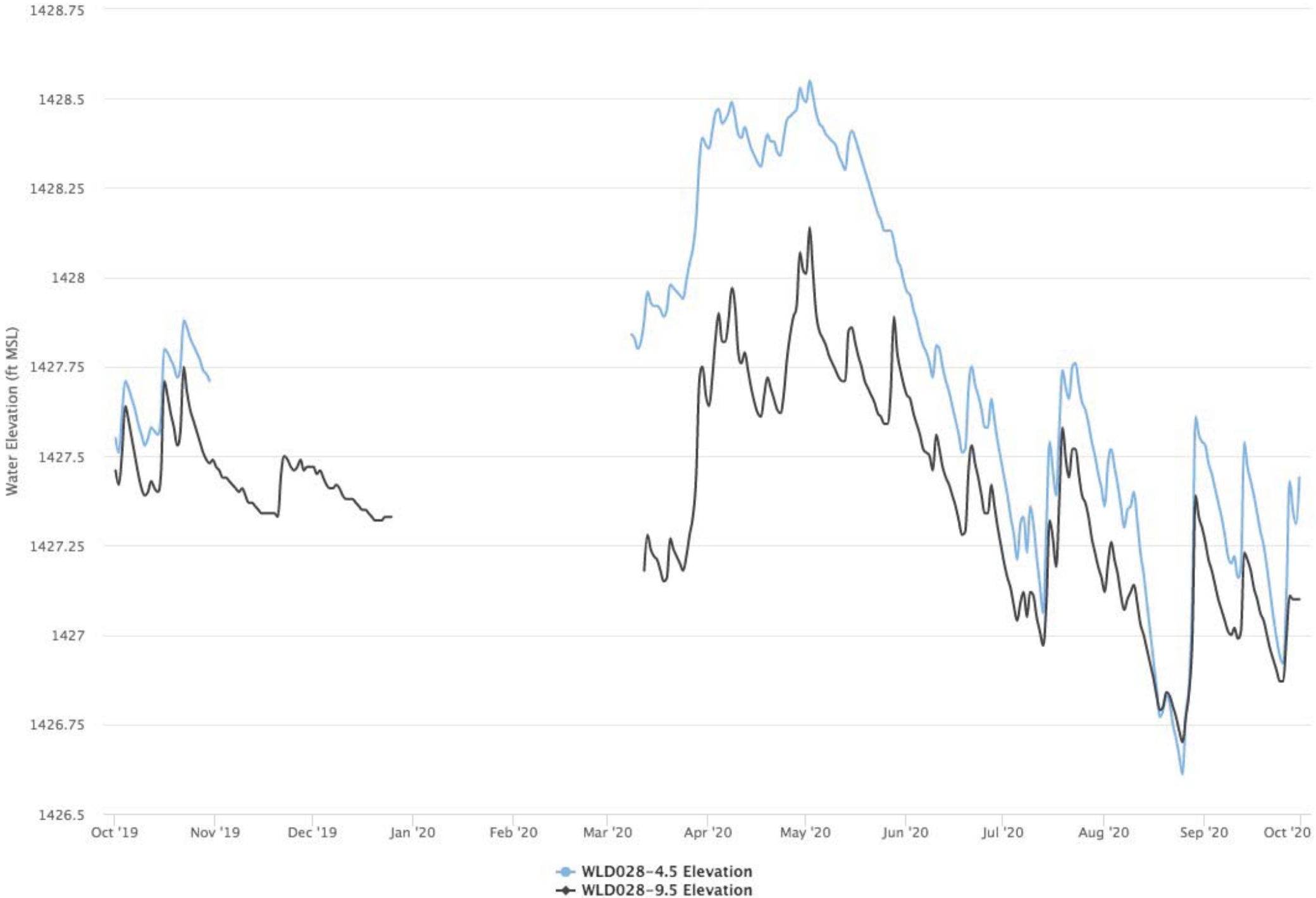
# Mine Permit Groundwater Hydrograph

Water Year 2020



# Mine Permit Groundwater Hydrograph

Water Year 2020



## **Appendix P**

### **Eagle Mine**

#### **Discrete Groundwater Elevations**

**Mine Permit Water Elevation Data  
2020 Full Network Quarterly Discrete Measurements  
Eagle Project**

Location	1st Qtr 2020		2nd Qtr 2020		3rd Qtr 2020		4th Qtr 2020	
	Elev. (ft MSL)	Meas. Date	Elev. (ft MSL)	Meas. Date	Elev. (ft MSL)	Meas. Date	Elev. (ft MSL)	Meas. Date
QAL001A	1412.81	02/20/20	NM	05/04/20	1412.62	08/12/20	1412.51	11/04/20
QAL001D	1406.30	02/20/20	NM	05/04/20	1406.73	08/12/20	1406.57	11/04/20
QAL002A	1433.72	02/20/20	NM	05/04/20	1435.32	08/12/20	1434.50	11/03/20
QAL002D	1395.67	02/20/20	NM	05/04/20	1395.97	08/12/20	1395.95	11/03/20
QAL003A	1424.81	02/20/20	NM	05/04/20	1425.76	09/01/20	1425.63	11/04/20
QAL003B	1411.60	02/20/20	NM	05/04/20	1412.00	09/01/20	1412.03	11/04/20
QAL004A	1424.25	02/20/20	1426.24	05/27/20	1425.23	08/31/20	1424.78	11/04/20
QAL004D	1423.62	02/20/20	1426.96	05/27/20	1423.63	08/31/20	1430.34	11/04/20
QAL005A	NM	03/02/20	1456.42	05/29/20	1454.65	08/31/20	1455.06	11/04/20
QAL005D	NM	03/02/20	1454.23	05/29/20	1453.15	08/31/20	1453.23	11/04/20
QAL006A	1414.20	02/21/20	NM	05/04/20	1415.23	08/12/20	1415.54	11/04/20
QAL006B	1400.40	02/21/20	NM	05/04/20	1402.28	08/12/20	1401.60	11/04/20
QAL007A	1430.53	02/21/20	1431.86	05/29/20	1432.59	08/12/20	1431.36	11/04/20
QAL007D	1438.43	02/21/20	1440.33	05/29/20	1440.05	08/12/20	1439.07	11/04/20
QAL008A	1393.53	02/21/20	1394.13	05/27/20	1394.31	09/01/20	1393.81	11/03/20
QAL008D	1355.74	02/21/20	1354.90	05/27/20	1355.13	09/01/20	1355.10	11/03/20
QAL009A	1356.04	02/21/20	1355.31	05/26/20	1356.11	08/12/20	1356.45	11/04/20
QAL009D	1355.95	02/21/20	1355.19	05/26/20	1356.00	08/12/20	1356.31	11/04/20
QAL010A	1422.34	02/20/20	1425.17	05/26/20	1424.06	09/01/20	1423.27	11/04/20
QAL015	NM	03/02/20	1292.90	05/29/20	1292.74	09/01/20	1292.92	11/04/20
QAL016	F	02/21/20	1274.80	05/29/20	1274.84	08/13/20	1274.78	11/05/20
QAL017	1251.00	02/21/20	NM	05/04/20	1250.94	08/13/20	1251.35	11/05/20
QAL018	NM	02/21/20	1248.32	05/29/20	1247.87	08/13/20	1247.97	11/05/20
QAL019	F	02/21/20	NM	05/04/20	1285.19	08/13/20	1285.21	11/05/20
QAL020	1334.45	02/21/20	1334.94	05/29/20	1334.63	08/13/20	1334.81	11/05/20
QAL021	NM	02/21/20	NM	05/04/20	1389.56	08/13/20	1389.71	11/05/20
QAL022	NM	02/21/20	1298.26	05/29/20	NM	09/08/20	1298.25	11/04/20
QAL023-1.0	F	02/20/20	1418.36	05/27/20	1418.34	08/31/20	1418.44	11/03/20
QAL023-4.5	F	02/20/20	1418.35	05/27/20	1418.35	08/31/20	1418.46	11/03/20
QAL023B	1414.06	02/20/20	1414.31	05/27/20	1414.78	08/31/20	1414.78	11/03/20
QAL024A	1418.02	02/21/20	1419.32	05/29/20	1418.93	08/31/20	1418.42	11/04/20
QAL025A	1417.23	01/27/20	1416.67	05/06/20	1411.82	08/10/20	1413.71	10/26/20
QAL025B	1417.11	01/27/20	1416.60	05/06/20	1418.30	08/10/20	1417.52	10/26/20
QAL025D	1413.26	02/04/20	1412.73	05/06/20	1414.39	08/03/20	1413.74	10/26/20
QAL026A	1417.38	01/27/20	1416.21	05/07/20	1418.13	08/04/20	1417.59	10/26/20
QAL026D	1410.07	02/04/20	1409.49	05/06/20	1410.79	08/03/20	1410.47	10/26/20
QAL026E	1410.27	01/27/20	1409.50	05/06/20	1410.77	08/11/20	1410.43	10/26/20
QAL029A	1414.27	02/05/20	1413.74	05/04/20	1414.28	08/03/20	1414.40	11/03/20
QAL029D	1407.47	02/06/20	1406.67	05/04/20	1407.82	08/04/20	1407.63	11/02/20
QAL031D	1373.92	02/21/20	1372.77	05/27/20	1373.09	09/01/20	1373.40	11/03/20
QAL043-1.0	1419.36	02/20/20	1419.51	05/27/20	1419.74	08/31/20	1419.92	11/03/20
QAL043-4.5	1419.36	02/20/20	1419.52	05/27/20	1419.73	08/31/20	1419.91	11/03/20
QAL043B	1414.36	02/20/20	1414.65	05/27/20	1415.11	08/31/20	1415.08	11/03/20
QAL044-1.0	1424.04	02/20/20	1424.61	05/27/20	1424.55	08/31/20	1424.78	11/03/20
QAL044-4.5	1424.12	02/20/20	1424.68	05/27/20	1424.52	08/31/20	1424.76	11/03/20
QAL044B	1414.61	02/20/20	1414.89	05/27/20	1415.42	08/31/20	1415.35	11/03/20
QAL050A	1366.41	02/04/20	1365.58	05/05/20	1365.50	08/04/20	1366.09	11/02/20
QAL051A	1368.11	02/05/20	1366.56	05/04/20	1366.19	08/03/20	1366.64	11/02/20
QAL051D	1368.40	02/06/20	1366.48	05/04/20	1366.12	08/03/20	1366.57	11/02/20
QAL052A	1354.25	02/05/20	1353.22	05/04/20	1353.54	08/03/20	1353.65	11/02/20
QAL053A	1387.01	02/04/20	1386.30	05/05/20	1386.54	08/03/20	1386.96	11/03/20
QAL055A	1368.67	02/06/20	1367.01	05/04/20	1367.35	08/03/20	1368.00	11/03/20
QAL056A	1394.94	02/05/20	1394.77	05/04/20	1395.70	08/04/20	1395.02	11/03/20
QAL057A	1365.84	02/05/20	1364.50	05/04/20	1364.53	08/03/20	1365.31	11/03/20
QAL057D	1365.98	02/05/20	1364.43	05/04/20	1364.70	08/03/20	1365.37	11/03/20
QAL060A	1405.67	01/27/20	1404.98	05/07/20	1406.12	08/10/20	1405.88	10/27/20
QAL061A	1417.17	01/27/20	1406.36	05/07/20	1407.59	08/10/20	1407.28	10/27/20
QAL062A	1408.37	01/29/20	1407.71	05/07/20	1407.88	08/11/20	1408.63	10/27/20
QAL063A	1402.10	01/27/20	1401.54	05/07/20	1402.47	08/10/20	1402.31	10/27/20



**Mine Permit Water Elevation Data  
2020 Full Network Quarterly Discrete Measurements  
Eagle Project**

Location	1st Qtr 2020		2nd Qtr 2020		3rd Qtr 2020		4th Qtr 2020	
	Elev. (ft MSL)	Meas. Date	Elev. (ft MSL)	Meas. Date	Elev. (ft MSL)	Meas. Date	Elev. (ft MSL)	Meas. Date
QAL064D	1416.04	02/20/20	1416.32	05/27/20	1416.68	08/31/20	1416.71	11/04/20
QAL065D	1415.63	02/20/20	1416.18	05/27/20	1416.09	08/31/20	1416.24	11/03/20
QAL066D	1415.07	02/20/20	1415.48	05/27/20	1415.85	08/31/20	1415.80	11/03/20
QAL067A	1415.48	01/29/20	1414.76	05/07/20	1415.97	08/10/20	1415.64	10/27/20
QAL068A	1423.06	01/30/20	1421.83	05/26/20	1423.97	08/10/20	1423.36	10/26/20
QAL068B	1414.68	01/30/20	1414.05	05/26/20	BP	08/10/20	1415.02	10/26/20
QAL068D	1414.76	01/30/20	1414.20	05/26/20	1415.50	08/10/20	1415.10	10/26/20
QAL069A	1384.86	01/29/20	1384.56	05/06/20	1386.32	08/11/20	1385.81	10/26/20
QAL070A	1373.94	02/21/20	1372.70	05/06/20	NM	09/08/20	1373.90	11/03/20
QAL071A	1405.15	01/29/20	1405.36	05/07/20	1406.62	08/11/20	1405.69	10/27/20
QAL073A	1385.16	02/21/20	1384.72	05/06/20	NM	09/08/20	1386.39	11/03/20
QAL074A	1403.26	01/29/20	1403.67	05/06/20	1404.71	08/11/20	1403.92	10/27/20
QAL075A	1349.80	02/04/20	1349.12	05/05/20	1349.00	08/03/20	1349.23	11/02/20
QAL075D	1351.34	02/04/20	1350.60	05/05/20	1350.44	08/03/20	1350.72	11/02/20
QAL076E	1314.19	02/21/20	NM	05/04/20	1314.22	09/01/20	1314.17	11/04/20
QAL077E	1233.79	02/21/20	NM	05/04/20	1234.40	09/01/20	1234.30	11/04/20
STRM002	1399.46	02/24/20	1399.33	05/13/20	1400.51	08/18/20	1400.58	10/20/20
STRM011	NM	03/02/20	1415.21	05/27/20	1415.47	08/31/20	1416.27	11/04/20
WLD001-1.0	F	02/18/20	NM	05/04/20	NM	09/08/20	NM	11/09/20
WLD001-4.5	F	02/18/20	NM	05/04/20	NM	09/08/20	NM	11/09/20
WLD001-9.5	F	02/18/20	NM	05/04/20	NM	09/08/20	NM	11/09/20
WLD002	NM	01/27/20	1431.03	05/29/20	NM	09/08/20	NM	11/09/20
WLD004	NM	03/02/20	NM	05/04/20	NM	09/08/20	1446.68	11/04/20
WLD005	NM	03/02/20	NM	05/04/20	NM	09/08/20	1451.21	11/04/20
WLD006	NM	03/02/20	NM	05/04/20	NM	09/08/20	1455.48	11/04/20
WLD007	NM	03/02/20	NM	05/04/20	NM	09/08/20	1450.66	11/04/20
WLD008	NM	03/02/20	NM	05/04/20	NM	09/08/20	1453.69	11/04/20
WLD010	NM	03/02/20	NM	05/04/20	NM	09/08/20	1447.62	11/04/20
WLD011	NM	03/02/20	NM	05/04/20	NM	09/08/20	1446.94	11/04/20
WLD012	NM	03/02/20	NM	05/04/20	NM	09/08/20	1446.31	11/04/20
WLD017	NM	03/02/20	NM	05/04/20	NM	09/08/20	1423.91	11/04/20
WLD018	NM	03/02/20	NM	05/04/20	NM	09/08/20	1423.35	11/04/20
WLD019	NM	03/02/20	NM	05/04/20	NM	09/08/20	1421.11	11/04/20
WLD020	NM	03/02/20	NM	05/04/20	NM	09/08/20	1419.73	11/04/20
WLD021	NM	03/02/20	NM	05/04/20	NM	09/08/20	1416.20	11/04/20
WLD022-1.0	1423.69	02/20/20	1422.19	05/27/20	1422.15	09/01/20	1422.23	11/04/20
WLD022-4.5	1422.01	02/20/20	1422.35	05/27/20	1422.18	09/01/20	1422.19	11/04/20
WLD022-9.5	F	02/20/20	1422.78	05/27/20	1422.56	09/01/20	1422.45	11/04/20
WLD023-1.0	NM	03/02/20	1413.79	05/29/20	1413.61	09/01/20	1413.74	11/04/20
WLD023-4.5	NM	03/02/20	1413.55	05/29/20	1413.34	09/01/20	1413.52	11/04/20
WLD023-9.5	NM	03/02/20	1415.75	05/29/20	1415.29	09/01/20	1415.44	11/04/20
WLD024-1.0	1422.72	02/20/20	NM	05/04/20	1423.14	09/01/20	1423.16	11/04/20
WLD024-4.5	1422.97	02/20/20	NM	05/04/20	1423.33	09/01/20	1423.27	11/04/20
WLD024-9.5	F	02/20/20	NM	05/04/20	1423.59	09/01/20	1423.38	11/04/20
WLD025-1.0	F	02/20/20	1416.15	05/27/20	1414.82	08/31/20	1415.37	11/03/20
WLD025-4.5	1414.58	02/20/20	1414.74	05/27/20	1414.83	08/31/20	1415.38	11/05/20
WLD025-9.5	1414.68	02/20/20	1414.85	05/27/20	1415.07	08/31/20	1415.37	11/05/20
WLD026-1.0	1415.36	02/20/20	1415.47	05/27/20	1415.41	08/31/20	1415.63	11/03/20
WLD026-4.5	F	02/20/20	1416.11	05/27/20	1415.90	08/31/20	1416.26	11/03/20
WLD026-9.5	F	02/20/20	1416.06	05/27/20	1415.79	08/31/20	1416.38	11/03/20
WLD027-1.0	F	02/20/20	1423.03	05/27/20	1422.49	08/31/20	1422.91	11/03/20
WLD027-4.5	1422.50	02/20/20	1422.65	05/27/20	1422.62	08/31/20	1422.80	11/03/20
WLD027-9.5	1422.47	02/20/20	1422.66	05/27/20	1422.64	08/31/20	1422.77	11/03/20
WLD028-1.0	F	02/20/20	1427.82	05/27/20	1427.40	07/31/20	1428.01	11/04/20
WLD028-4.5	1427.50	03/11/20	1428.18	05/27/20	1427.50	08/31/20	1427.92	11/04/20
WLD028-9.5	1427.22	02/20/20	1427.39	05/27/20	1427.35	07/31/20	1427.51	11/04/20
WLD029-1.0	NM	03/03/20	NM	05/04/20	1427.45	08/31/20	1429.10	11/03/20
WLD029-4.5	NM	03/03/20	NM	05/04/20	1427.00	07/31/20	1429.12	11/03/20
WLD029-9.5	NM	03/03/20	NM	05/04/20	1427.13	08/31/20	1429.16	11/03/20
WLD030	NM	03/02/20	NM	05/04/20	NM	09/08/20	1455.12	11/04/20
YDRM002	1412.21	02/18/20	1413.41	05/19/20	NM	08/18/20	1412.63	10/20/20

**Mine Permit Water Elevation Data  
2020 Full Network Quarterly Discrete Measurements  
Eagle Mine**

<b>Footnote</b>	<b>Explanation</b>
BP	Below pump. Maximum water elevation is shown.
D	Dry.
F	Frozen.
NM	Not measured.
R	Measured value was rejected based on quality control procedures.

## **Appendix Q**

### **Eagle Mine**

#### **Continuous Surface Water Monitoring Results**

**2020 Water Year  
Continuous Monitoring Results  
Surface Water Location STRE002  
Eagle Mine**

Parameter	Month	Background Mean	Background Min	Background Max	Background SD	Water Year Mean	Water Year Min	Water Year Max
Temperature (°C)	2019/10	7.5	3.2	14.6	1.5	7.0	2.7	12.2
	2019/11	3.4	-0.1	9.3	0.5	1.6	-0.2	3.3
	2019/12	0.8	-0.2	3.2	0.4	0.5	-0.2	1.3
	2020/01	0.6	-0.2	0.8	0.5	NA	NA	NA
	2020/02	0.5	-0.2	2.4	0.2	NA	NA	NA
	2020/03	1.5	-0.2	4.7	0.3	NA	NA	NA
	2020/04	4.2	-0.1	10.8	1.6	NA	NA	NA
	2020/05	9.7	1.3	17.8	1.0	NA	NA	NA
	2020/06	13.0	8.1	17.0	0.7	14.5	12.9	16.7
	2020/07	14.1	10.6	18.2	1.0	16.0	13.4	18.5
	2020/08	13.5	10.0	17.6	0.7	14.1	11.8	16.2
2020/09	11.4	7.0	16.6	0.8	11.0	8.0	13.0	
Flow (cfs)	2019/10	22.9	12.0	119.0	7.1	21.3	14.2	43.5
	2019/11	18.5	12.4	37.8	3.1	17.0	16.2	18.6
	2019/12	17.8	12.1	58.8	4.1	NA	NA	NA
	2020/01	18.1	12.0	45.0	3.5	NA	NA	NA
	2020/02	17.3	12.0	50.0	5.6	NA	NA	NA
	2020/03	23.3	12.0	110.9	5.7	NA	NA	NA
	2020/04	37.0	12.0	131.5	10.3	NA	NA	NA
	2020/05	22.2	11.8	160.6	6.3	NA	NA	NA
	2020/06	18.0	12.0	90.1	3.5	16.8	12.8	28.0
	2020/07	14.0	11.8	33.0	1.5	17.1	12.2	40.0
	2020/08	14.5	11.8	74.4	2.3	15.9	12.0	42.7
2020/09	16.9	11.7	69.8	3.2	14.1	12.1	29.8	
Specific Conductivity (uS/cm@25°C)	2019/10	127.8	70.0	146.0	14.4	126.9	103.4	148.2
	2019/11	130.2	80.0	148.0	9.2	117.1	101.6	126.3
	2019/12	132.9	89.0	153.0	6.7	108.1	103.5	113.5
	2020/01	133.3	115.0	145.0	3.9	NA	NA	NA
	2020/02	133.2	111.0	144.0	3.1	NA	NA	NA
	2020/03	122.0	54.0	148.0	13.6	NA	NA	NA
	2020/04	95.6	50.0	146.0	18.2	NA	NA	NA
	2020/05	122.0	37.0	149.0	9.3	NA	NA	NA
	2020/06	129.1	94.0	169.0	6.4	NA	NA	NA
	2020/07	146.4	119.0	165.0	7.4	NA	NA	NA
	2020/08	146.1	107.0	163.0	6.5	118.4	111.0	123.5
2020/09	138.2	80.0	149.0	6.0	117.8	107.7	126.0	

**2020 Water Year  
Continuous Monitoring Results  
Surface Water Location STRM004  
Eagle Mine**

Parameter	Month	Background Mean	Background Min	Background Max	Background SD	Water Year Mean	Water Year Min	Water Year Max
Temperature (°C)	2019/10	7.5	2.3	15.2	1.6	6.9	2.1	12.5
	2019/11	3.0	0.0	9.6	0.5	1.0	-0.1	2.7
	2019/12	0.3	-0.1	2.5	0.2	0.2	-0.1	1.5
	2020/01	0.2	-0.1	1.9	0.3	0.2	-0.1	0.9
	2020/02	0.1	0.0	1.3	0.1	0.1	-0.1	1.2
	2020/03	0.9	-0.1	5.0	0.4	0.8	-0.1	2.2
	2020/04	4.2	-0.1	11.3	1.9	2.2	-0.1	4.5
	2020/05	10.1	1.9	18.2	1.0	11.3	5.3	15.2
	2020/06	13.8	7.9	18.6	1.2	12.7	10.2	15.1
	2020/07	14.8	11.0	19.0	1.3	15.5	13.4	17.1
	2020/08	14.2	10.4	18.1	0.7	14.0	11.8	15.7
2020/09	11.8	7.3	17.3	4.5	11.0	8.4	12.7	
Flow (cfs)	2019/10	7.7	3.9	41.1	2.2	9.2	6.0	20.1
	2019/11	6.8	4.2	23.1	2.5	7.4	6.3	9.3
	2019/12	6.7	4.6	18.9	1.6	NA	NA	NA
	2020/01	5.6	3.5	13.2	1.8	NA	NA	NA
	2020/02	5.7	2.8	15.5	1.8	NA	NA	NA
	2020/03	8.2	3.1	56.7	3.0	8.0	5.0	29.0
	2020/04	14.9	5.2	44.5	2.5	16.6	9.2	35.7
	2020/05	8.3	4.4	59.9	2.5	11.4	6.8	33.6
	2020/06	5.7	3.0	27.4	1.1	5.3	3.4	8.0
	2020/07	4.6	2.8	9.9	0.4	4.4	3.1	9.7
	2020/08	4.8	2.8	28.0	1.1	4.6	3.4	11.1
2020/09	5.2	2.8	24.0	2.2	5.5	4.6	8.2	
Specific Conductivity (uS/cm@25°C)	2019/10	87.3	56.0	140.0	9.2	96.3	86.7	104.8
	2019/11	87.1	59.0	96.0	4.2	95.4	86.8	104.8
	2019/12	84.7	61.0	95.0	11.6	94.1	77.9	101.0
	2020/01	91.3	67.0	97.0	1.6	96.2	86.1	100.5
	2020/02	94.5	58.0	103.0	3.5	98.2	93.8	102.5
	2020/03	88.6	44.0	105.0	8.1	88.8	68.4	96.0
	2020/04	69.5	33.0	105.0	12.6	84.2	62.3	98.4
	2020/05	85.6	37.0	114.0	9.2	78.3	60.3	93.0
	2020/06	88.5	57.0	116.0	14.3	78.2	70.8	88.0
	2020/07	97.1	82.0	114.0	6.2	93.8	88.0	99.2
	2020/08	100.6	70.0	119.0	9.2	98.3	96.1	100.8
2020/09	81.3	57.0	130.0	48.8	93.6	91.4	97.0	

**2020 Water Year  
Continuous Monitoring Results  
Surface Water Location STRM005  
Eagle Mine**

Parameter	Month	Background Mean	Background Min	Background Max	Background SD	Water Year Mean	Water Year Min	Water Year Max
Temperature (°C)	2019/10	7.9	2.6	15.5	2.4	8.4	5.7	12.5
	2019/11	3.1	0.0	7.6	0.2	1.0	-0.1	2.6
	2019/12	0.3	-0.1	2.2	0.2	0.0	-0.1	0.8
	2020/01	0.3	-0.1	2.6	0.2	0.0	-0.1	0.6
	2020/02	0.0	-0.1	1.4	0.1	0.0	-0.1	1.2
	2020/03	0.5	-0.1	3.7	0.3	1.0	-0.1	2.5
	2020/04	4.2	0.1	11.1	1.4	2.7	0.2	5.0
	2020/05	10.4	2.1	17.5	1.0	9.9	4.9	17.6
	2020/06	15.4	9.2	20.5	1.0	15.2	11.2	19.2
	2020/07	17.2	11.9	21.3	1.1	18.2	14.5	20.7
	2020/08	16.6	12.7	21.1	0.4	15.9	13.3	18.2
2020/09	13.1	9.2	18.7	1.1	11.9	8.5	13.8	
Flow (cfs)	2019/10	64.2	29.2	346.6	29.2	61.0	43.6	95.8
	2019/11	52.8	29.2	188.7	24.1	NA	NA	NA
	2019/12	55.7	33.6	131.3	17.6	NA	NA	NA
	2020/01	44.9	38.0	83.3	2.7	NA	NA	NA
	2020/02	59.6	40.7	119.3	0.0	NA	NA	NA
	2020/03	126.0	36.0	456.2	115.0	84.4	43.7	353.7
	2020/04	126.8	41.7	459.4	21.5	154.8	75.9	314.4
	2020/05	67.2	32.5	781.5	28.7	95.5	55.0	262.0
	2020/06	40.5	26.3	164.1	9.9	49.2	41.4	63.9
	2020/07	29.8	24.0	52.0	22.0	45.3	39.1	77.1
	2020/08	28.8	23.2	82.0	4.0	44.3	37.8	106.9
2020/09	38.6	21.8	155.5	14.2	43.8	39.9	61.7	
Specific Conductivity (uS/cm@25°C)	2019/10	112.0	29.0	147.0	26.8	115.2	94.8	127.7
	2019/11	123.5	65.0	143.0	15.9	115.1	92.4	133.9
	2019/12	126.6	79.0	145.0	8.4	NA	NA	NA
	2020/01	129.3	99.0	145.0	4.7	NA	NA	NA
	2020/02	128.1	91.0	143.0	5.3	NA	NA	NA
	2020/03	119.1	55.0	141.0	9.4	101.0	66.8	118.5
	2020/04	77.5	36.0	121.0	11.3	77.7	54.7	95.0
	2020/05	112.5	30.0	141.0	8.1	87.2	57.8	111.3
	2020/06	130.9	78.0	149.0	4.2	91.4	77.1	119.2
	2020/07	142.9	111.0	161.0	8.4	133.1	77.3	148.8
	2020/08	145.0	101.0	163.0	11.4	132.0	74.3	146.6
2020/09	133.3	90.0	150.0	15.7	120.7	95.3	130.0	

**2020 Water Year  
Continuous Monitoring Results  
Surface Water Location YDRM002  
Eagle Mine**

Parameter	Month	Background Mean	Background Min	Background Max	Background SD	Water Year Mean	Water Year Min	Water Year Max
Temperature (°C)	2019/10	8.5	2.7	17.2	1.9	7.2	2.1	12.9
	2019/11	2.4	0.0	9.3	0.5	0.5	-0.1	2.0
	2019/12	0.1	0.0	1.4	0.0	-0.1	-0.1	0.0
	2020/01	0.0	-0.1	1.0	0.1	-0.1	-0.1	-0.1
	2020/02	0.0	0.0	0.2	0.0	-0.1	-0.1	-0.1
	2020/03	0.4	-0.1	4.9	0.3	0.3	-0.1	2.2
	2020/04	4.3	0.0	11.4	2.1	1.5	-0.1	4.0
	2020/05	11.5	0.8	21.6	1.4	10.5	4.2	19.2
	2020/06	16.5	9.8	22.2	1.2	16.6	12.9	20.5
	2020/07	18.6	12.4	23.6	1.4	19.5	15.4	22.2
	2020/08	17.9	11.7	23.2	0.9	17.0	13.8	19.5
2020/09	14.3	8.5	21.0	0.7	12.5	9.6	14.8	
Flow (cfs)	2019/10	34.6	7.1	214.9	25.4	35.5	26.0	60.5
	2019/11	26.8	10.0	94.0	9.9	24.8	20.7	29.7
	2019/12	21.1	10.6	74.0	6.9	NA	NA	NA
	2020/01	18.4	10.0	41.1	4.1	NA	NA	NA
	2020/02	16.8	12.2	29.7	2.9	NA	NA	NA
	2020/03	25.7	11.4	173.1	11.1	43.0	27.7	83.8
	2020/04	91.8	14.9	306.2	29.0	98.1	42.7	214.8
	2020/05	47.2	8.1	204.3	22.2	92.1	31.9	238.6
	2020/06	21.2	8.0	61.2	8.6	25.9	17.4	36.6
	2020/07	11.6	6.2	32.6	1.9	22.9	13.5	50.4
	2020/08	9.0	4.3	45.6	2.7	21.9	13.8	78.1
2020/09	13.1	5.5	68.5	5.9	25.8	21.4	34.2	
Specific Conductivity (uS/cm@25°C)	2019/10	61.3	30.0	102.0	18.8	44.6	36.0	55.0
	2019/11	53.1	32.0	74.0	7.6	56.7	43.2	64.6
	2019/12	62.0	32.0	91.0	9.0	51.9	41.5	58.5
	2020/01	64.6	52.0	76.0	5.8	45.7	36.8	50.9
	2020/02	69.6	55.0	79.0	5.6	54.5	49.8	57.8
	2020/03	57.0	28.0	75.0	12.4	47.7	32.9	57.4
	2020/04	35.2	19.0	72.0	7.1	26.6	19.0	33.3
	2020/05	45.9	20.0	92.0	11.7	30.0	19.9	43.2
	2020/06	67.1	44.0	94.0	4.6	53.6	38.1	66.1
	2020/07	81.6	53.0	105.0	7.7	62.5	46.0	74.0
	2020/08	87.4	47.0	107.0	10.2	66.7	44.5	75.3
2020/09	80.3	42.0	103.0	11.0	59.3	45.8	71.3	

Source: North Jackson Company, REACH System (mean daily values)

NA = Continuous record suppressed where >50% of values missing or data 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**

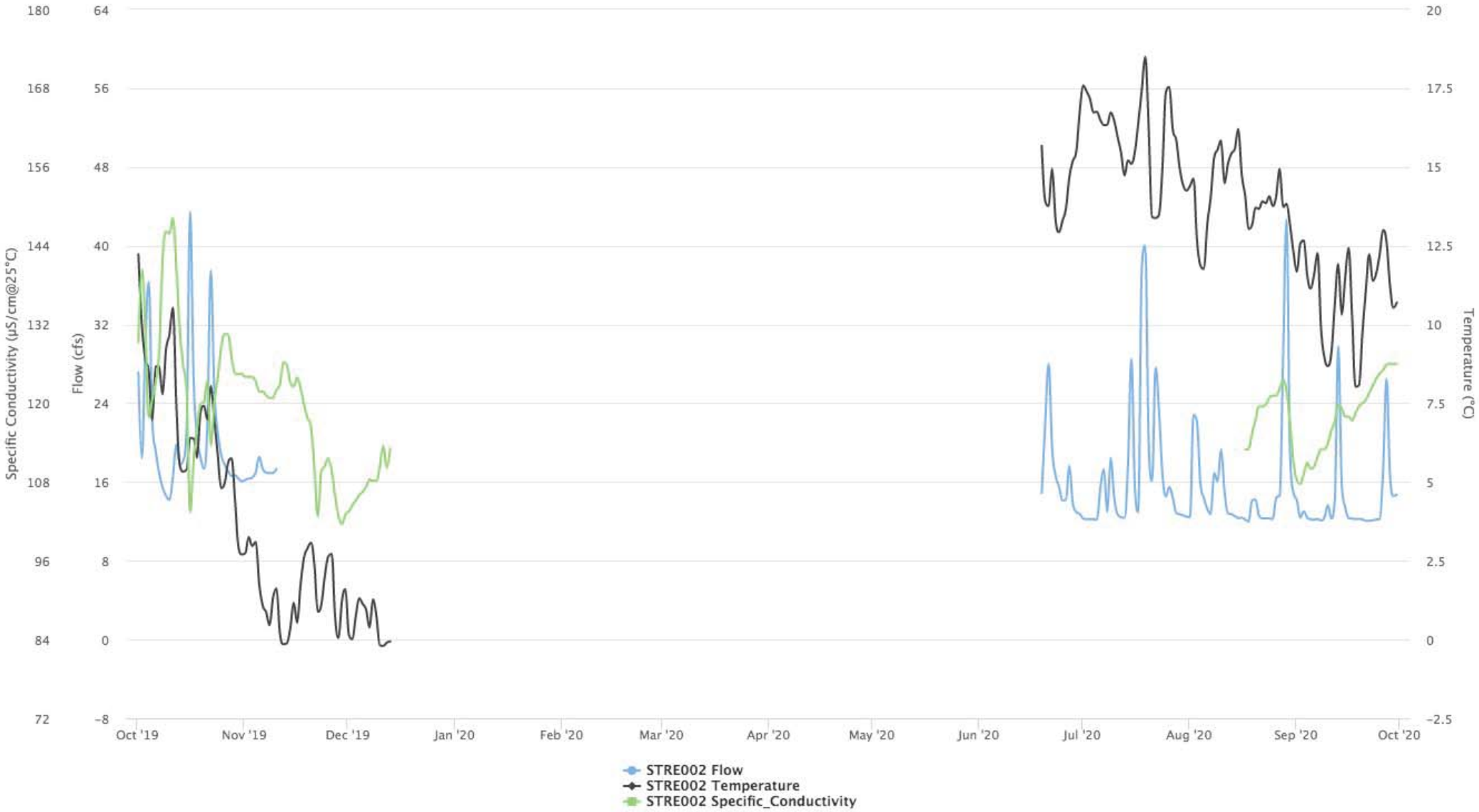
### **Eagle Mine**

### **Surface Water Hydrographs**



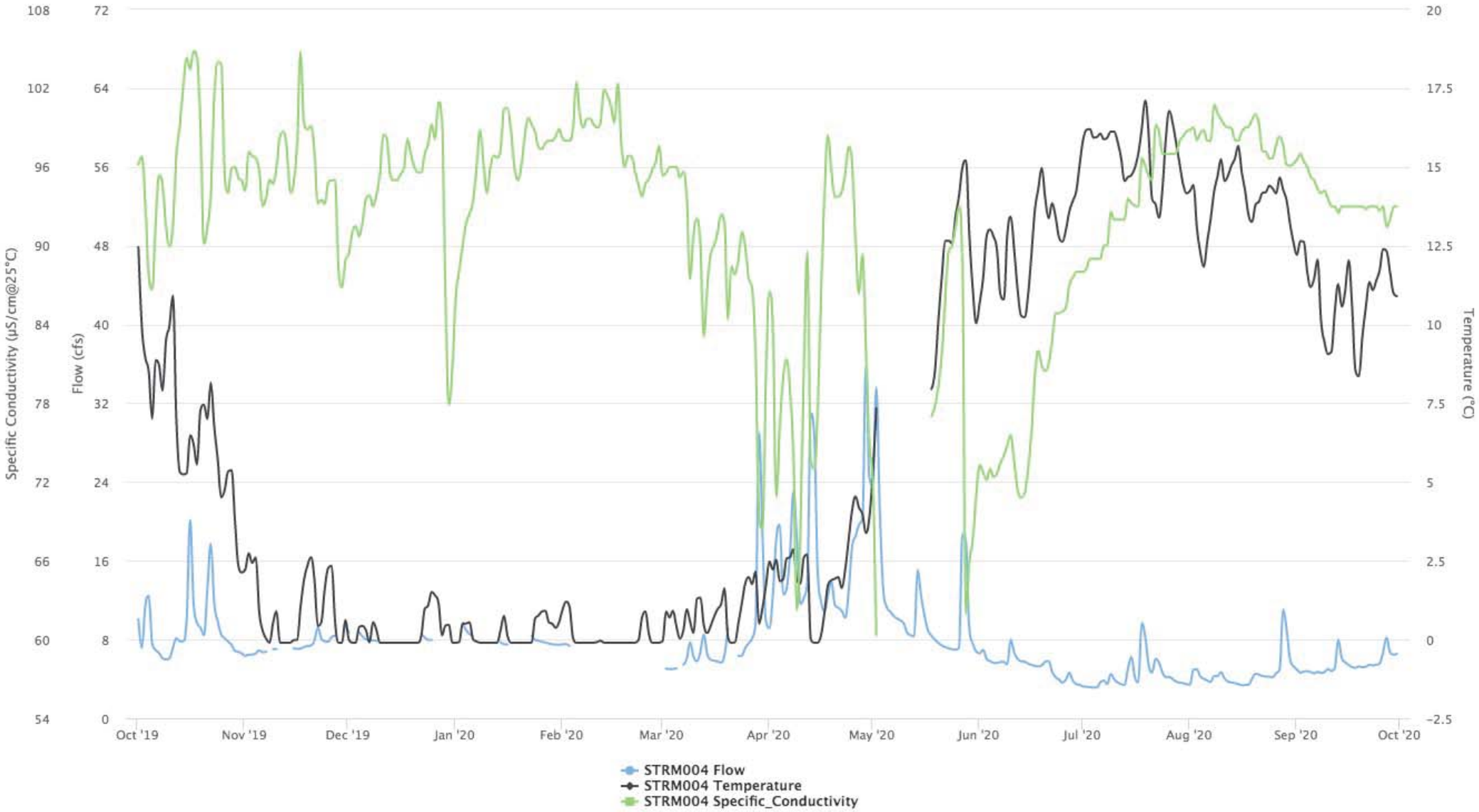
# Mine Permit Surface Water Hydrograph

Water Year 2020



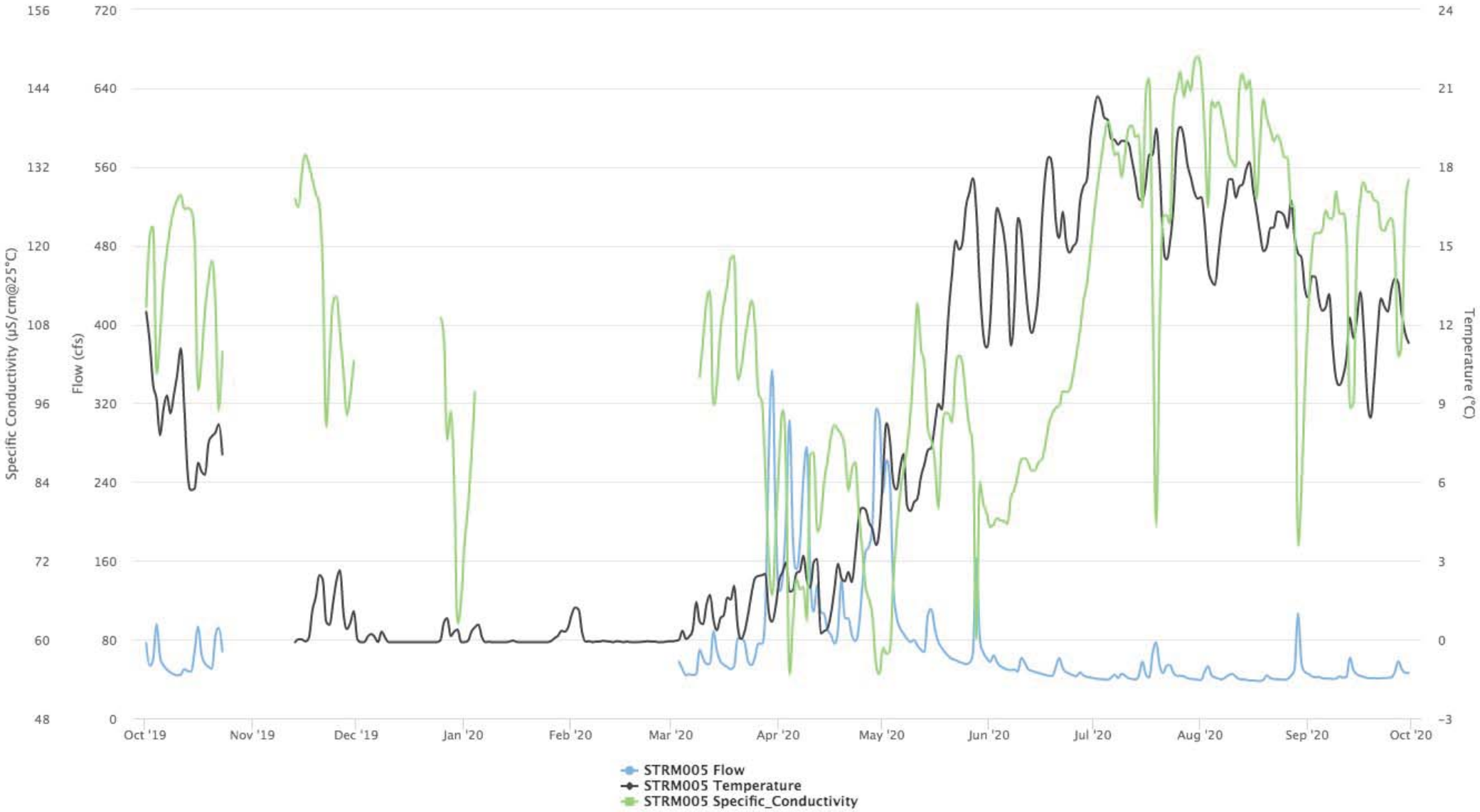
# Mine Permit Surface Water Hydrograph

Water Year 2020



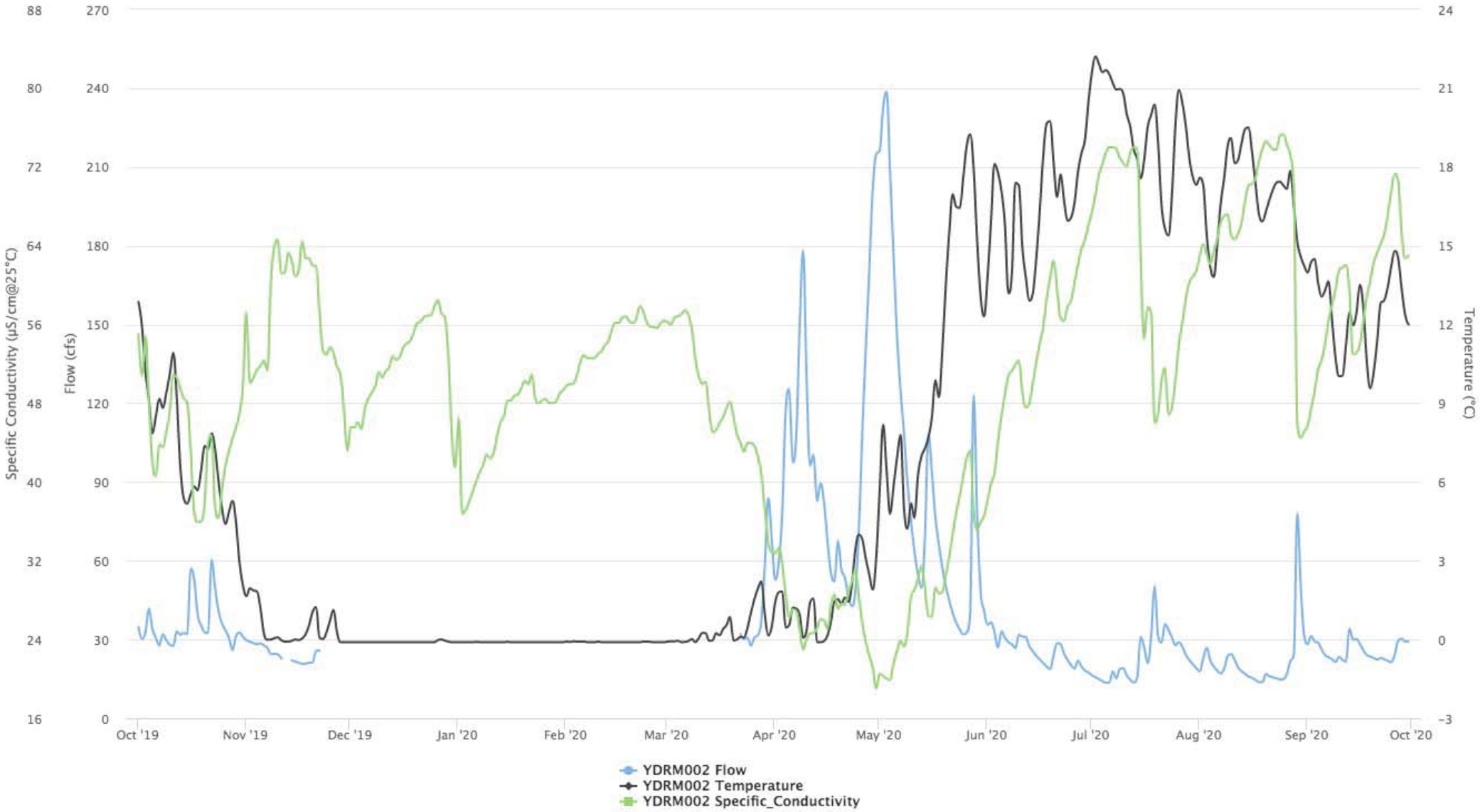
# Mine Permit Surface Water Hydrograph

Water Year 2020



# Mine Permit Surface Water Hydrograph

Water Year 2020



## **Appendix S**

### **Eagle Mine**

#### **Flora & Fauna Survey Location Map**

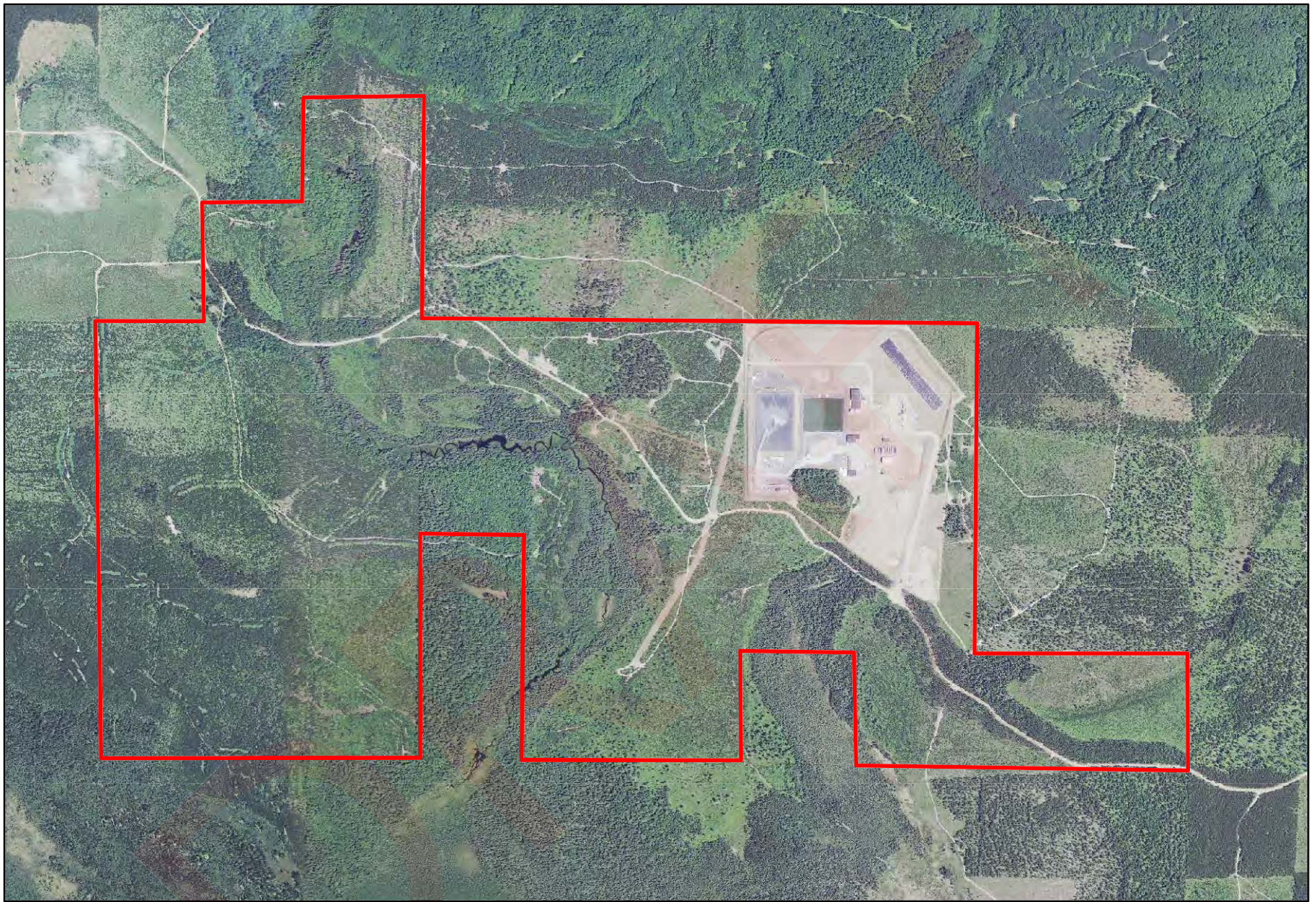

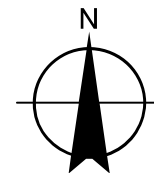
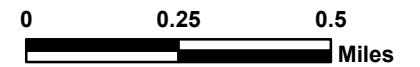


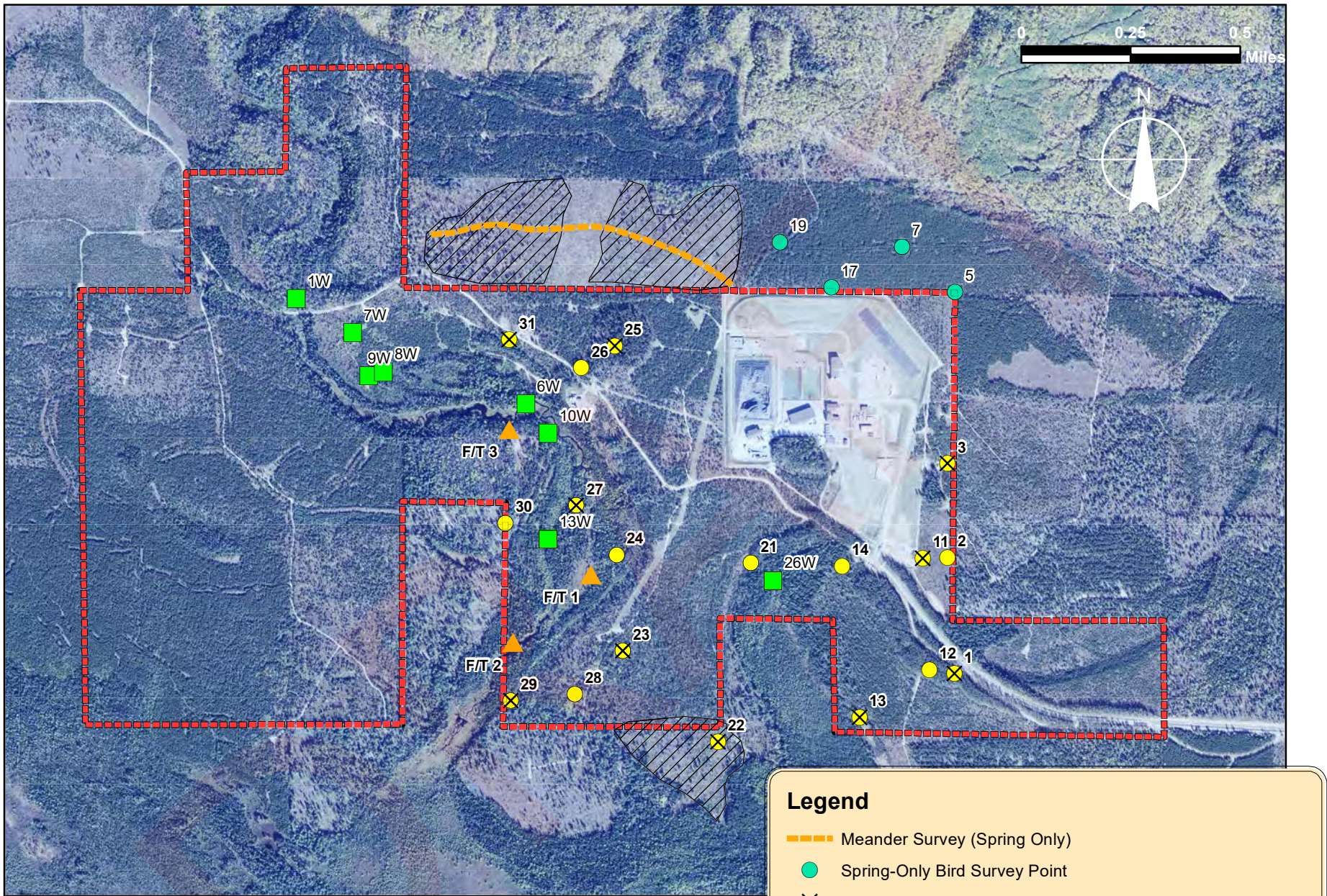
Figure 1-2. Study Area



**Legend**

 Study Area





**Figure 1-3. Biological and Wetland Survey Areas**

**Legend**

- Meander Survey (Spring Only)
- Spring-Only Bird Survey Point
- × Small Mammal Trapping Point (Fall Only)
- Spring/Fall Bird & Spring/Fall Upland Vegetation Survey Point
- Wetland Vegetation Survey Point
- ▲ Frog/Toad Survey Point
- ▨ Kirtland's Warbler Habitat Currently Mapped by USFWS
- ▭ Study Area

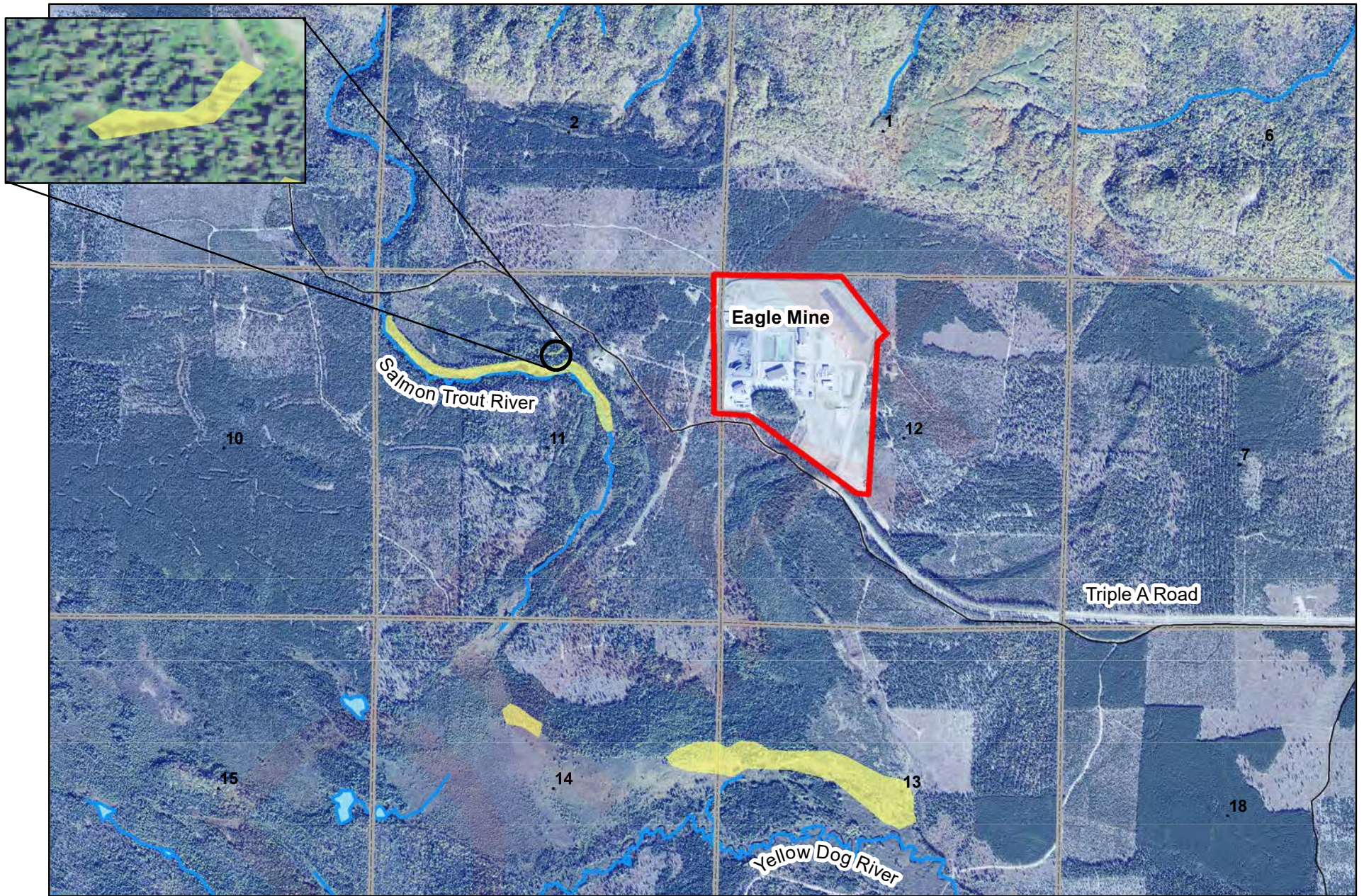
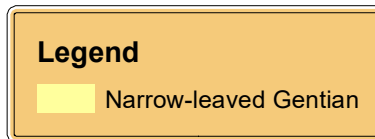
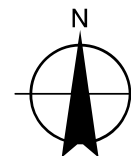
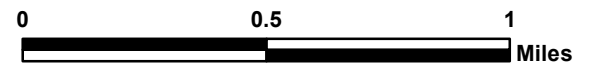
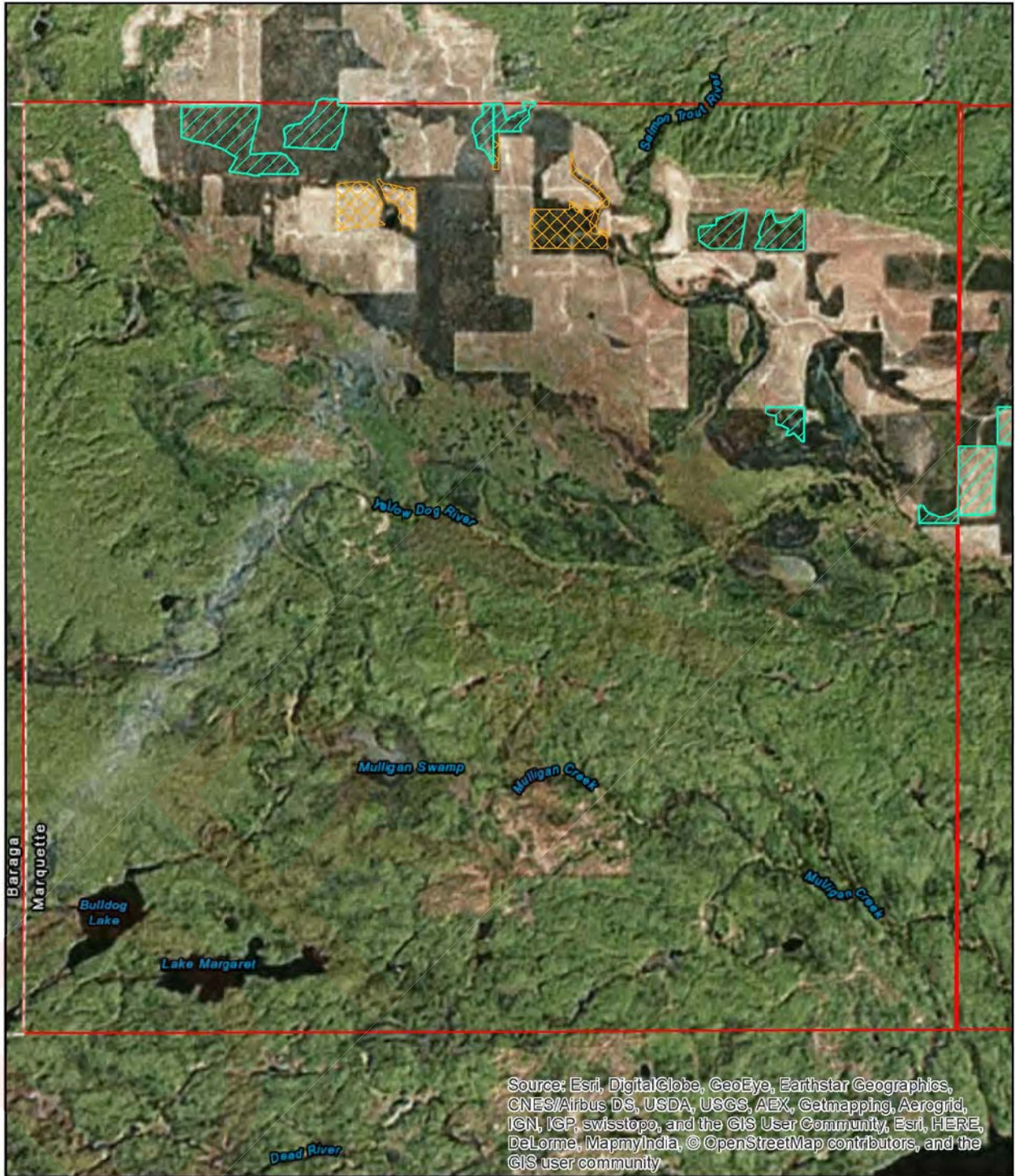


Figure 5-1. Narrow-leaved Gentian Survey (2018)







# T50N, R29W Suitable KW Habitat



## Legend

-  Weyerhaeuser Ownership
-  Marquette County Ownership

0 1 2 4 Miles

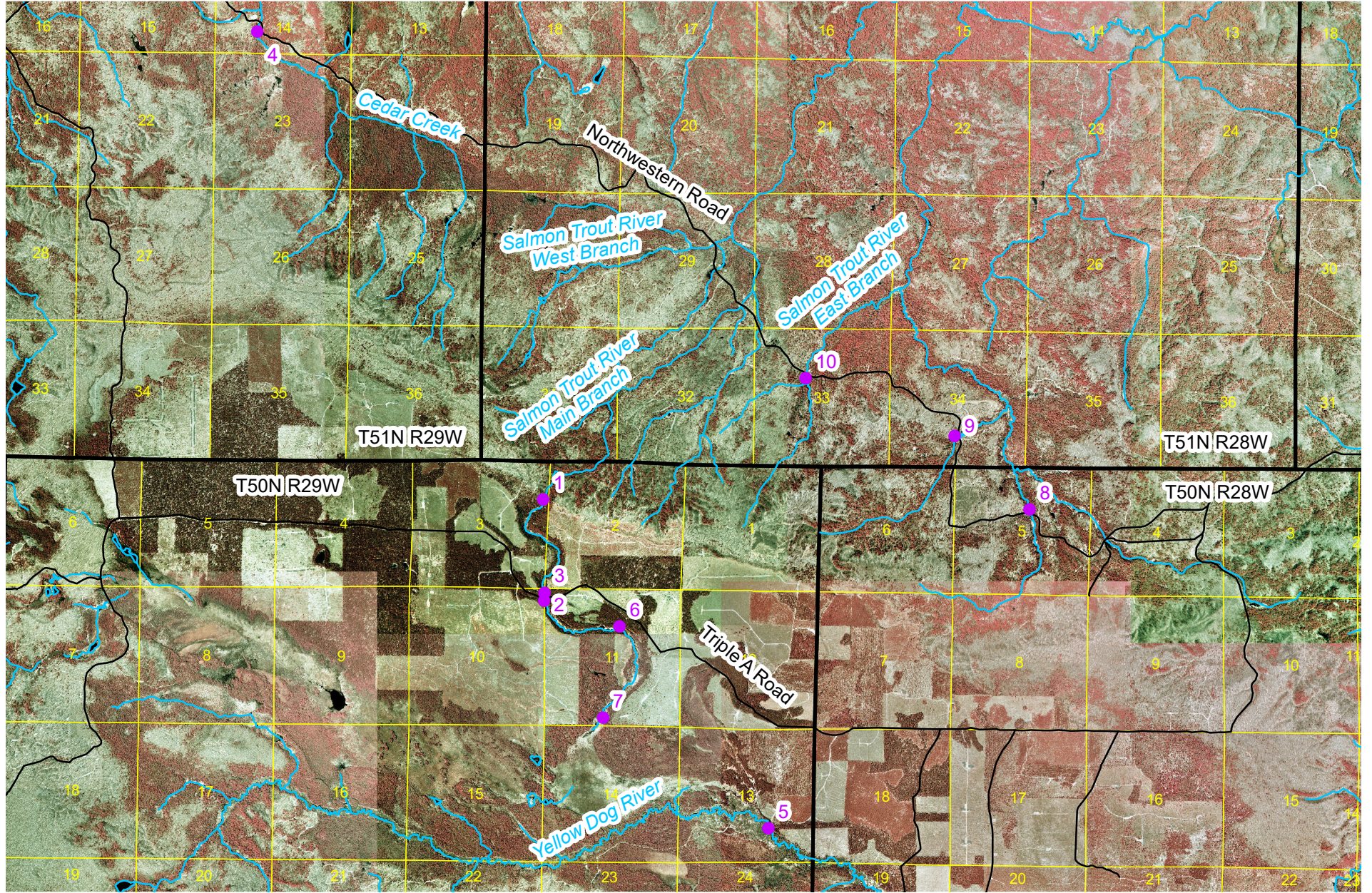


**Figure 5-3. Kirtland's Warbler Habitat - US Fish & Wildlife Service**

## **Appendix T**

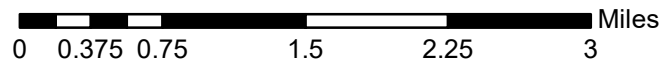
### **Eagle Mine**

#### **Aquatic Survey Location Map**



**Legend**

- Survey Stations
- Township/Range
- Rivers
- Sections



**AeM**

ADVANCED  
ECOLOGICAL  
MANAGEMENT

PROJECT	Eagle Mine
TITLE	Aquatic Sampling Locations
FIGURE	1-2

## **Appendix U**

### **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’s mining, storage, and treatment facilities have been designed, constructed, and operated in a manner that is protective of the environment through the use of proven technologies and engineering practices.

### 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
- Leaks from containment systems for stockpiles or disposal and storage facilities, and
- 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 fugitive dust management plan, which includes sweeping and watering, is in place to minimize the generation of dust.

#### **1.1.1.2 Temporary Development Rock Storage Area (TDRSA)**

Development of the mine began with 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.

In accordance with MP 01 2007, condition F4 and the Limestone Addition Plan (January 2017), when development rock is placed in the TDRSA and stored for greater than one year, 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 with a HDPE geo-membrane to further limit the generation of ARD by minimizing contact with precipitation. As an added measure, the time in which development rock will be stored 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 or gob 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 event that the water that comes in contact with the development rock become acidic, it will not be exposed to the environment due to the design of the TDRSA. 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 Area (COSA) 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 sixty-six 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 sixty-six 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 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 bulk explosives selected for use at the Eagle Mine are comprised of ammonium nitrate and small percentages of sodium and calcium nitrate, and 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 bulk emulsion, all explosives components are stored in a locked explosives magazine located underground.

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

The main impacts of an uncontrolled explosion on the surface would be in the immediate area of the explosion and would include direct injury from the blast zone, falling debris, fire, and the release of combustion products. Combustion products expected from the explosives are carbon monoxide and nitrogen oxides. Neither of these products is expected to be generated in high enough concentrations for significant above ground or off-site exposures to occur. Dust could also be generated but would likely settle to the ground before migrating beyond the Eagle Mine site. Uncontrolled underground explosions have not been considered since the environmental effects would not be different from controlled explosions in normal mine operations. In the event of a surface explosion, 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 570-gallon tank for on-road diesel. An additional 1,700-gallon diesel fuel storage tank is located in the non-contact area near the powerhouse generator (with a 500-gallon backup tank) and a 500-gallon diesel tank associated with the fire water system is located inside the water treatment plant. 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 93,600 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 Pollution Incident Prevention Plan (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.

Bulk Tank Failure - 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.

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

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

Absorbent 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 EGLE and other agencies as required.

In the event of a release in the contact area, fuels would be routed (due to site grading) to the contact water basins where they would be 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 pyrophoric material that oxidizes exothermically when exposed to air. Due to the exothermic reaction, ignition can occur, especially if the surface area is increased with the occurrence of finely divided material. This situation is often encountered in a petroleum refinery, where finely divided iron sulfide scales form in refinery units in oxygen deficient atmospheres. When subsequently exposed to air, these crystals of iron sulfide oxidize rapidly back to iron oxide. While this condition can also occur in underground mines, this problem should be adequately controlled through proper mine ventilation.

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 to the environment.

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 is only allowed in designated areas on the site. Contingency measures include having the required safety equipment, appropriate personnel training and standard operating procedures. Given these measures, uncontrolled or large surface fires are considered a low probability event with negligible risk.

Because the 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 Guideline 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. In addition, all personnel are required to complete a “hot work” permit whenever work is being performed where an ignition source is present. Water pipelines and network of fire hydrants have been installed throughout the site and additional fire extinguishers are also located in high risk areas. On-site firefighting equipment includes:

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

#### **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 EGLE).
- 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 six 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 sweeping and 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 used at WTP along with the storage volumes and physical state of each chemical.

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

Item No.	Chemical Name	CAS No.	Storage Volume (Gallons)	Storage Volumes (pounds)	Delivery State
1	Sodium Hydroxide (50%)	1310-73-2	5,000 gallons	63,308 lbs.	Liquid
2	Sodium Hydroxide (Euco-Fill 25 & Eucon Retarder 100)	1310-73-2	2,000 gallons	18,659 lbs.	Liquid
3	Sodium Hypochlorite (12.5%)	7681-52-9	55 gallons	573 lbs.	Liquid
4	Sodium Carbonate (Soda Ash)	497-19-8	-	34,000 lbs.	Solid
5	Ferric Chloride (35%)	7705-08-0	900 gallons	10,499 lbs.	Liquid
6	Hydrochloric Acid (32%)	7647-01-0	5,000 gallons	15,744 lbs.	Liquid
7	Suppressor 1615 (Antifoam)	N/A	330 gallons	2,708	Liquid
8	Nitric Acid (30%)	7697-37-2	600 gallons	1,773 lbs.	Liquid
9	Sulfuric Acid (93%)	7664-93-9	660 gallons	10,116 lbs.	Liquid
10	Sodium Metabisulfite	7681-57-4	-	50 lbs.	Solid
11	PC-191-T (Antiscalant)	20592-85-2	520 gallons	11,078 lbs.	Liquid
12	POL-EZ 83904 Polymer	64742-47-8	110 gallons	999 lbs.	Liquid
13	Nalco Enact 7880 Polymer	10043-52-4	110 gallons	1,191 lbs.	Liquid
14	Citric Acid	77-92-9	-	2,000 lbs.	Liquid
15	Carbon Dioxide Gas	124-38-9	-	800 lbs.	Gas
16	Propane (on site)	74-98-6	4 cylinders at WTP; 5 tanks	390,200 lbs.	Gas
17	High pH RO Cleaner	-	-	800 lbs.	Liquid

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 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, a crown pillar management plan has been developed that includes subsidence monitoring measured both through surface and underground extensometers as well as five survey monuments that detect vertical subsidence and progressive ground movement. The surface extensometer is downloaded and survey completed on a monthly basis. The underground extensometers are continually monitored and tied into a telemetry system for on-demand data retrieval. In the event of unanticipated subsidence, the mining sequence and backfill methods as described above and in Section 4, will be evaluated and adjusted to reduce the subsidence. Adjustments to the stope sequence, backfill methods, crown pillar thickness, and backfill mix would be adjusted as needed to minimize subsidence. In addition, ground support inspections are completed 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 EGLE.

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

Eagle Mine has adopted an emergency response structure that allows key individuals to take immediate responsibility and control of the situation and ensures appropriate public authorities, safety agencies

and the general public are notified, depending on the nature of the emergency. A brief description of the key individuals is as follows:

- **Health & Safety Officer:** The facility H&S manager and H&S staff are responsible for monitoring activities in response to any emergencies. During an emergency, H&S representatives will manage special situations that expose responders to hazards, coordinate emergency response personnel, mine rescue teams, fire response, and ensure relevant emergency equipment is available for emergency service. This individual will also ensure appropriate personnel are made available to respond to the situation.
- **Environmental Officer:** The facility environmental manager will be responsible for managing any environmental aspects of an emergency 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 and will work with other site personnel, including the 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 maintained an average of 17 team members (two teams) over the course of 2020. Teams are comprised of volunteers from Cementation and Lundin. In 2020, training included exploration in smoke (theatrical), basic first aid, CPR, firefighting, and operation and maintenance of both the BG4 closed-circuit breathing apparatus (CCBA) and MX6 gas instruments. In addition, the team assessed ventilation with the use of anemometers and smoke tubes.

In addition to the Mine Rescue team, 15 Cementation employees are certified in Basic First and CPR. 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.

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
- Underground refuge stations
- Mine elevator
- Spill kits (hydrocarbon and chemical)
- High expansion foam machines
- Portable drift seal.

This equipment is located both underground and at the surface facilities. Fire extinguishers are located at appropriate locations throughout the facility, 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: UP Health System Marquette – (906) 449-3000  
Bell Hospital – (906) 486-4431
- 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
- EGLE 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: William Seppanen, (906) 323-6608
- MSHA: 1-800-746-1553

### **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 and the second component is completion of a mock field or desktop exercise.

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

The second component of an effective Contingency Plan is to conduct desktop exercises or mock field tests. At least one desktop exercise or mock field test will be performed each year. The Safety Officer will work with the Environmental Officer and Emergency Response Coordinator to first define the situation that will be tested. The types of test situations may include responding to a release of a hazardous substance, fire or natural disaster such as a tornado. A list of objectives will be developed for planning and evaluating each identified test situation. 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 crisis management team and emergency response team will evaluate the effectiveness of the response and make recommendations to improve the system. These recommendations will then be incorporated into a revision of the facility Contingency Plan.

## **Appendix V**

### **Financial Assurance**

# EAGLE MINE AND HUMBOLDT MILL CLOSURE

## 2020 CLOSURE PLAN ESTIMATE

Code	Description	SLR Estimate November 2018	Difference from Previous Estimate	Closure Estimate (USD)	Comments
	Functional Currency	USD			
	Current Day Cost	2020			
	Expected Operations Completion Date	2025			Previous was 2023
	Expected Closure Completion Date	2028/29			SLR provides 2 years for Mine Closure and 3 years for Mill Closure (winter work is avoided)
	Expected Post-Closure Completion Date	2029			SLR provides for an initial post-closure period of 5 years to allow Sites to come to equilibrium.
	Post-Closure Monitoring Completion Date	2049			SLR provides 15 years to demonstrate no further action is required including monitoring.
	<b>Closure at Life of Mine</b>				
<b>1000</b>	<b>Eagle Mine and Related Facilities Closure</b>				
<b>1100</b>	<b>Eagle Mine Underground</b>				
1110	Underground Mine Equipment	\$220,367	\$26,444	\$246,811	Decontaminate, Prepare for Transport, Load and Haul all Mining Equipment from Site
1130	Demolition of Underground Infrastructure	\$1,097,368	\$131,684	\$1,229,052	Underground Infrastructure Demolition, Load, Haul to Surface Processing Area
1160	Backfill of Mine (Backfill of Stopes Complete at Start of Closure)	\$105,990	\$15,899	\$121,889	(The estimate assumes that backfilling of the mine stopes has been completed upon start of closure)
1170	Closure Elements Construction	\$2,485,000	\$308,500	\$2,793,500	
<b>1200</b>	<b>Surface Facilities and Infrastructure</b>				
1210	Mobile Equipment	\$17,619	\$2,643	\$20,262	Allow for Surface Equipment at 50 percent of the UG Equipment (Excluding Loaders, Haul Units and Drills)
1220	Building Demolition	\$2,876,566	\$345,188	\$3,221,754	Mine Building Demolition, Load, Haul to Processing Area
1230	Demolition of Mine Surface Infrastructure	\$877,657	\$131,648	\$1,009,305	Mine Surface Infrastructure Demolition, Load, Haul to Processing Area
1240	Concrete and Asphalt Demolition	\$678,132	\$81,376	\$759,507	(Recycle for Mine Fill)
1250	Drainage Facilities and Road Removal	\$749,467	\$112,420	\$861,887	Water Basins, TDRSA, Drainage Channels and Road Removal
1260	Site Backfill, Grading and Preparation for Revegetation	\$1,262,697	\$189,405	\$1,452,102	Regrade the Site Using Material from Site Berms
1270	Closure Elements Construction	\$636,000	\$95,400	\$731,400	Permanent Drainage Facilities (provide for drainage channels, sediment basins and drainage infrastructure)
1280	General Site Planting and Revegetation	\$1,277,555	\$191,633	\$1,469,188	(Total Site Area for Revegetation equals Approximately 160 Acres)
1290	Other Miscellaneous Closure Requirements	\$0	\$0	\$0	
<b>2000</b>	<b>Humboldt Mill Closure</b>				
<b>2200</b>	<b>Surface Facilities and Infrastructure</b>				
2210	Mobile Equipment	\$17,619	\$2,643	\$20,262	Decommission, Prepare for Transport and Load Equipment
2220	Building Demolition	\$4,004,980	\$480,598	\$4,485,577	Mill Building Demolition, Load, Haul to Processing Area
2230	Demolition of Surface Infrastructure	\$1,119,326	\$167,899	\$1,287,225	Mill Surface Infrastructure Demolition, Load, Haul to Processing Area
2240	Concrete and Asphalt Demolition	\$876,097	\$131,414	\$1,007,511	Concrete SOG and Foundation Removal and Asphalt
2250	Drainage Facilities and Road Removal	\$111,445	\$16,717	\$128,162	Fill Stormwater Basins
2260	Site Backfill, Grading and Preparation for Revegetation	\$1,016,951	\$122,034	\$1,138,985	Import Topsoil
2270	Closure Elements Construction	\$379,375	\$45,525	\$424,900	Permanent Drainage Facilities (provide for drainage channels, sediment basins and drainage infrastructure)
2280	General Site Planting and Revegetation	\$507,051	\$76,058	\$583,109	(Total Site Area for Revegetation equals Approximately 60 Acres)
2290	Other Miscellaneous Closure Requirements	\$896,893	\$134,534	\$1,031,427	Fencing, signage, soil removal, spillways, increase FS for Rock Face north of mill building
	Subtotal Direct Closure Costs	\$21,214,154	\$2,809,661	\$24,023,816	
<b>5000</b>	<b>Contractor's Indirect Costs</b>				
5100	Mine Closure	\$2,905,814	\$372,437	\$3,278,251	
5200	Humboldt Mill Closure	\$3,704,897	\$462,062	\$4,166,958	
	<b>Summary</b>				
	<b>Eagle Mine Subtotal</b>	\$15,190,231	\$2,004,677	\$17,194,908	
	<b>Humboldt Mill Subtotal</b>	\$12,634,634	\$1,639,483	\$14,274,117	
	<b>Total Direct Closure Construction Cost</b>	<b>\$27,824,865</b>	<b>\$3,644,160</b>	<b>\$31,469,025</b>	
<b>7000</b>	<b>Site Operations, Maintenance and Monitoring (OM&amp;M)</b>				
	<b>Provide OM&amp;M (5 yr Mine WTP, 4 Yr Mill WTP)</b>				
7100	Eagle Mine (5 years) *	\$4,554,268	\$0	\$4,554,268	2020 Using same as 2018 & 2019 of 5 year operating level w/ updated costs
7200	Humboldt Mill (4 years) *	\$10,253,927	\$0	\$10,253,927	2020 Using same 2019 of 4 year operating plan w/ updated costs
	<b>Post-Closure Phase I - Five Year Period Following Completion of Closure Construction</b>				
7300	Eagle Mine (5 year)	\$3,500,162	\$350,016	\$3,850,178	Adjusted out Lundin oversight
7400	Humboldt Mill (5 year)	\$1,556,541	\$155,654	\$1,712,195	Adjusted out Lundin oversight
	<b>Provide 15 Years of Care, Maintenance and Monitoring</b>				
	<b>Long Term Care and Maintenance</b>				
	Eagle Mine	\$4,749,120	\$474,912	\$5,224,032	Adjusted out Lundin oversight
	Humboldt Mill	\$3,922,915	\$392,292	\$4,315,207	Adjusted out Lundin oversight
	<b>Eagle Mine Subtotal</b>	\$27,993,781	\$2,829,605	\$30,823,386	
	<b>Humboldt Mill Subtotal</b>	\$28,368,017	\$2,187,429	\$30,555,446	
	<b>Total</b>	<b>\$56,361,798</b>	<b>\$5,017,034</b>	<b>\$61,378,832</b>	
	<b>Total for Project before inflation</b>	\$56,361,798	\$5,017,034	\$61,378,832	
	<b>Escalation Factor - Detroit CPI estimate as prepared with 2018 year-end dollars except as noted above * Water Treatment costs at current dollars and excluded from CPI Calculation</b>	\$581,750	\$70,238	\$651,989	
ADD	<b>ADD - Fill Open Stopes with CRF &amp; Clear TDRSA of waste material</b>	\$967,720	\$0	\$967,720	Mine site cost only in 2020 Dollars-Do not inflate
	<b>Total for Project including inflation (excludes Contingency)</b>	\$57,911,268	\$5,087,272	\$62,998,540	
	<b>EGLE Administrative Oversight</b>	\$5,983,860	\$0	\$5,983,860	2016 Added by MDEQ as Part 425.301 (b) of the permit notes "The department (MDEQ) may require financial assurance in an amount larger than calculated by operator..." Breakout was \$2,589,102 Mill Site and \$3,394,758 Mine Site
	<b>Estimate to EGLE - Total for Project</b>	<b>\$63,895,128</b>	<b>\$5,087,272</b>	<b>\$68,982,400</b>	
	<b>Breakdown by Mine and Mill for Bonding Valuation of Each</b>				
	Mine Site Total Estimate			\$30,823,386	
	CPI Escation Apportionment			\$367,768	
	ADD - Fill Open Stopes with CRF & Clear TDRSA of waste material			\$967,720	
	Portion of EGLE Administrative Oversight per note above			\$3,394,758.00	
	<b>2020 Estimate for Mine Site Apportionment</b>			<b>\$35,553,631</b>	
	Mine Site Total Estimate			\$30,555,446	
	CPI Escation Apportionment			\$284,221	
	Portion of EGLE Administrative Oversight per note above			\$2,589,102.00	
	<b>2020 Estimate for Mill Site Apportionment</b>			<b>\$33,428,769</b>	

## **Appendix W**

### **Eagle Mine**

### **Organizational Information Update**



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

## Organizational Information

### Eagle Mine LLC

January 05, 2021

**Registered Address:** Eagle Mine, LLC  
1209 Orange Street  
Wilmington, DE 19801

**Business Address:** Eagle Mine, LLC  
4547 County Road 601  
Champion, MI 49814

#### Board of Directors

Darby Stacey                      4547 County Road 601  
Champion, MI 49814

Peter Richardson                4547 County Road 601  
Champion, MI 49814

Scott Manninen, CFO            4547 County Road 601  
Champion, MI 49814





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**Officers**

Jinhee Magie	Treasurer	4547 County Road 601 Champion, MI 49814
Annie Laursen	Secretary	4547 County Road 601 Champion, MI 49814
Darby Stacey	President/Managing Director	4547 County Road 601 Champion, MI 49814
Scott Manninen	CFO	4547 County Road 601 Champion, MI 49814