2024 ANNUAL WATER QUALITY REPORT

Keokuk Ferro-Sil Monofill
2542 Carbide Lane
Keokuk, Iowa
Permit No. 56-SDP-17-91P

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Prepared for:

Twin Rivers Holding Company, LLC
c/o Glencore Ltd.
330 Madison Avenue
New York, NY 10017

Data collection and assessment:

Carol E. Wilson, President
CHEM-ECO Environmental, Inc.
P.O. Box 367
Anamosa, IA 52205

LICENSED PROFESSIONAL ENGINEER JESSICA A. COCA P25623 IOWA	**I hereby certify that this document was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Iowa.**
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Acronyms/Abbreviations:

AL = Action Level
CL = Control Limit (M+/-2SD)
GWQAP = Groundwater Quality Assessment Plan
HAL = Lifetime Health Advisory Level
M+/-2SD = Mean Plus/Minus Two Standard Deviations
MCL = EPA Maximum Contaminant Level
mg/L = milligrams per liter
NA = Not analyzed
NC = No Change
PGS = Protected Groundwater Source
RAMP = Remedial Action/Mitigation Plan
RL = Reporting Limit
SS = Statewide Standard
SDWR = Secondary Drinking Water Regulations

1.0 EXECUTIVE SUMMARY

This report contains information on the analytical results of sampling performed in 2024 as required by the closure permit and Closure Plan for Keokuk Ferro-Sil Monofill. The spring sampling event took place on 25 April 2024. The fall sampling event took place on 17 October 2024.

This site is a closed landfill containing industrial pollution-control waste from the production of ferrosilicon alloy at Keokuk Ferro-Sil.

The 30-year post closure period extends to 4 April 2037.

2.0 SITE BACKGROUND

2.1 Site History

This industrial monofill contains waste only from Keokuk Ferro-Sil, generated during the production of ferrosilicon alloys at the foundry, which operated at another location in Keokuk. Two sealed, submerged-arc furnaces at the foundry were charged with quartzite rock (containing silicon), coal, coke, wood chips, and steel turnings to produce the ferrosilicon alloy ingots. The waste consists of dried sludge from the furnace exhaust scrubbers and dust collected from a bag house which controlled kish-handling emissions. Keokuk Ferro-Sil ceased operation in 2001. The final transfer of waste from the plant-site to the landfill was carried out in January 2003.

Prior to construction of the landfill in 1993, this site was undeveloped woodland and grassland. The berms and liner forming the fill area were constructed of compacted clay from on-site. After the plant closed and the final waste was placed, the surface of the waste in the filled area was graded to prevent erosion. Beginning in August 2007, a compacted clay cap two feet thick was placed over the graded waste disposal area. The cap was then covered with two feet of non-compacted soil. The cap and cover soil were also site materials. This work was completed in October 2007. Vegetation was successfully re-established on the cover during 2008, as well as on the surface of the site borrow area. Since that time, multiple projects have been undertaken to repair and maintain this site, including:

Installation of drain tile along the south edge of the filled area to eliminate two rock-lined drop-down drainage channels in favor of discharge piping directly to the creek (2011-2012).

Installation of drain tile along the northwest edge of the borrow area, to eliminate a rock-lined drop-down drainage channel in favor of discharge piping directly to the creek (2011) and repairs to a severely eroded zone on the slope.

Construction of an earthen berm around the leachate collection pond to increase the holding capacity (2012).

Construction of terraces on the landfill slope above the leachate pond to repair a landslide in that area, reduce the slope to prevent future landslides, and to direct run-off away from the pond (2014).

Filling an erosion channel that had developed along the eastern side of the landfill cover and re-establishment of vegetation in the repaired area.

Repairs to the road leading from the gate to the leachate pond (2014, 2017, 2021, 2024).

Replacement of hinges on monitoring well covers and other well maintenance (2011 - 2023). Replacement of all well caps and locks (2019). Replacement of all well locks with shorter hasps to improve security (2023).

Removal of saplings and woody plants from the south slope of the filled area and other locations, including the edge of the leachate pond, where tree roots might affect the liner, cap, or cover (2016, 2022, 2024).

Spraying with herbicides to control sapling and woody plant growth at multiple locations and mowing around pond and on landfill cover (2017-2019, 2022, 2024).

Re-establishment of a pump to draw down and control the elevation of the leachate pond to less than 608 feet msl, including installation of electrical service to the site (2016-2017). Pump replacement (2019, 2024). Work in 2024 included pond draw-down to 601 ft msl to improve conditions for pump installation.

Off-site, a portion of the force main connecting the leachate pond to the City of Keokuk municipal sewer was replaced in 2024 due to soil erosion causing exposure of the piping.

High-pressure flushing of the leachate collection system piping (2015, 2018, 2021, 2024), including draw-down of the pond if needed to observe the discharge from the system. The clean-out will next be repeated in 2027.

2.2 Site Geology/Hydrology

This description of the site geology is excerpted from the Hydrogeological Investigation Plan prepared for Keokuk Ferro-Sil, Inc. by James M Montgomery Consulting Engineers, August 1989:

> The site is located on the eastern edge of the Gordon Channel, a channel gouged out by the Mississippi River during the Quaternary Period. Bedrock elevation at the site is approximately 400 feet NGVD and minimum surface elevation is 600 feet. Therefore, 200 feet of unconsolidated sediments exist on site. The Gordon Channel primarily contains glacial till with minor amounts of sand and gravel. These surficial aquifers are inextensive and only produce water in quantities that can be used locally. Water table levels are probably quite deep, with over 100 foot depths to the water table being reported (Gordon, Iowa Geological Survey, 1980).
>
> The bedrock aquifer will not be monitored due to its considerable depth while the upper surficial aquifer(s) will be monitored. The monitoring points chosen in the next chapter are estimations based on review of the aforementioned data and will be adjusted in the field after the initial wells have been drilled and data collected.

2.3 Permit History

The closure permit for this site was issued 4 April 2007. The permit has since been revised 25 January 2016, 30 November 2017, and 30 January 2018.

The permit and the revisions require that hydrologic monitoring at the site shall be conducted in accordance with the approved Hydrologic Monitoring System Plan (HMSP) dated January 1992 as submitted by James M Montgomery Consulting Engineers, the Amended HMSP dated December 16, 1993, by Tech Services Co., Inc. and Department approved on August 25, 1994 and the following:

> The HMSP shall include up-gradient groundwater monitoring points MW-5, MW-7, and MW-12; and down-gradiant groundwater monitoring points MW-8, MW-14, MW-15 and MW-16.
>
> Monitoring points MW-4, MW-6, MW-9, MW-11 and MW-13 shall be retained as water level measuring points.
>
> The permit holder shall annually collect a leachate sample from the lagoon and analyze it for the constituents listed in special provision #5d.
>
> #5d reads: continued semiannual sampling shall take place in April and October each year for analysis of ammonia nitrogen, chloride, chemical oxygen demand, conductivity, pH, fluoride, sodium, sulfate, sulfide, and total aluminum, total barium, total boron, total iron, total lithium, and total strontium.

It should be noted that until 2009, semi-annual groundwater and surface water monitoring at the Keokuk Ferro-Sil Monofill had taken place supported by a trust set up by the company before closure. When the trust was depleted, monitoring was discontinued until the current property owner requested that the work resume, beginning in October 2013. This report updates the 2023 Annual Water Quality Report to add the data from sampling events carried out in April and October 2024.

Similarly, monthly groundwater measurement and other data-gathering undertaken to comply with the Closure Permit issued in April 2007 were also discontinued in March 2009, then resumed at the request of the current property owner in September 2013. These measurements collected during 2024 are included in this report in Table 4 - Monitoring Well Maintenance and Performance Summary.

3.0 DATA SUMMARY

3.1 Table 1 – Monitoring Program Summary

Table 1 is a summary of the wells in the hydrological monitoring system. Water levels in each well and the pond surface elevation have been measured monthly. Groundwater samples are collected semi-annually from seven wells and the leachate pond as noted in the table. No deviations to this schedule of data collection from each monitoring well have occurred.

Additional data was collected from leachate pond samples taken in March, April, August, September, and October 2024 to provide waste water quality information to the City of Keokuk Water Pollution Control Plant in support of a revised waste water discharge permit. These sampling events are noted as supplemental for the leachate pond in Table 1. This data is included with this report as Attachment D.

Additional data was also collected from Monitoring Well 16 in March, May, August, and September 2024 to assess the on-going water quality concern at that well. This includes the period during which the nearby leachate pond was drawn down and recovering. These sampling events are noted as supplemental for MW-16 in Table 1.

3.2 Table 2 - Monitoring Program Implementation Schedule

Table 2 tracks compliance with permitted sampling frequencies and required parameters to aid in scheduling. No deviation to the permit-required sampling has occurred in the fourteen sampling events since January 2018. It is planned that sampling will continue in the spring and the fall of 2025 as required.

3.3 Table 3 - Monitoring Well Maintenance and Performance Revaluation Schedule

Table 3 tracks compliance with applicable regulations. Static water levels in all wells are measured monthly along with the leachate pond surface elevation. Well depths are measured annually. Permeability testing was completed in March 2021 on the seven wells in the monitoring system. This testing will be repeated as required in 2026.

To measure permeability, the static water level of each well was recorded to the nearest 0.01 inch. A known volume was bailed from the well and the water level noted again. The water level was then recorded at approximately 30 second intervals for a period of ten minutes.

Permeability (K) was calculated using the Bouwer-Rice method to analyze the collected data. Well geometry and recovery data was entered into BR Slug Version 3.0 acquired from the IDNR to calculate K for each well. The software includes several data checks to make certain that a valid result will be generated.

3.4 Table 4 - Monitoring Well Maintenance and Performance Summary

Table 4 provides a summary of the well depths, screen elevation, and monthly groundwater level measurements. Note that all well screens are submerged. Records of previous permeability testing could not be located in the site record, so this information begins with the data collected in 2021. Although some wells are slow to recover during purging, the sampling protocol described in this report is adequate to address this circumstance.

Well depths in Table 4 have been revised based on the monitoring well diagrams submitted to IDNR in 1993 and 1994. Well depths were measured in October 2024 using a weighted tape measure. No well showed significant silting based on these measurements.

In two piezometers, PZ-4 and PZ-11, obstructions were encountered during well depth measurement previously and again in October 2024. The obstruction at PZ-4 occurs at 11.5 feet below top of casing. The obstruction at PZ-11 occurs at 46 feet below top of casing. The obstructions prevent the weight from sliding freely through the casings, but can be overcome by persistently changing the angle of the tape. The narrower water level indicator probe is able to slide freely in both wells, compared to the weight used for well depth measurements.

The static water level at PZ-4 varied from 592 to 596 ft msl in 2023 and from 592 to 594 ft msl in 2024. This is in contrast to previous years during which the elevation has been much more variable, rising to 629 ft msl (March 2021) and 613 ft msl (April 2022). The variability does not appear to correlate to the annual precipitation for this area. Totals in 2021, 2023, and 2024 are nearly the same (31 to 34 inches), while 40 inches was reported in 2022.

An assessment of PZ-4 and PZ-11 is planned in March 2025 to determine the nature of the obstructions.

As supported by the static water levels measured during 2024 the hydrologic setting and groundwater flow trends are nearly unchanged from 2023. Figure 1 is a layout of the closed landfill site. Figures 2 and 3 depict groundwater contours at the spring and fall sampling events in 2024.

3.5 Table 5 - Background Summary

Table 5 summarizes the background levels detected for each monitored constituent. Up-gradient wells are MW-5, MW-7 and MW-12. Some constituents have been monitored since 1996, resulting in many more data points when compared to sulfate and fluoride for which monitoring began in 2015. Sulfide was added in 2017. Control limits are calculated by summing the concentrations of each constituent at each up-gradient well, calculating the mean and adding two standard deviations. Fluoride data collected in April 2017 has been removed from the control limit calculation at the direction of IDNR in a letter dated 26 December 2019. High concentrations of fluoride in samples from all three wells during that sampling event have never been repeated in any subsequent event.

The analytical results for sulfide from October 2020 have also been removed from the control limit calculation. The reporting limit for that round of sampling was 10 mg/L instead of 1.0 mg/L and use of that data in the statistical analysis skews the control limit upward. Samples from down-gradiant wells also all had elevated detection limits or elevated detected concentrations compared to all previous results.

Graphs of the constituent concentrations over time for all wells updated with data from 2024 sampling events are included in Attachment A.

3.6 Table 6 - Summary of Well Constituents with No Immediately Preceding Control Limit Exceedances

Table 6 provides a summary of background levels compared to detections during the most recent spring and fall sampling events for constituents that had not been previously or recently identified as exceeding a control limit. During 2024, there are no new instances of constituents exceeding a control limit at any well.

3.7 Table 7 - Summary of Ongoing and Newly Identified Control Limit Exceedances

Table 7 summarizes the ongoing control limit exceedances at each monitored well and includes concentrations in excess of the identified health-based action levels for each constituent.

There are no issues with the monitoring network such as dry, damaged, or deteriorating wells.

MW-8 at the southeast edge of the filled area has ongoing control limit exceedances of ammonia nitrogen, strontium, and sulfate, but the concentrations are not increasing. This well also has ongoing exceedances of health-based standards for lithium and sodium. The most recent iron concentration measured in October 2024 (0.337 mg/L) now slightly exceeds the secondary drinking water standard (0.3 mg/L). This variability with iron has occurred occasionally in past sampling events as well.

MW-14 adjacent to the leachate collection pond continues to have excess ammonia nitrogen, boron, and sulfate, but all show no trend. For total iron and total strontium concentrations exceeding the control limits, the trend is increasing. This well also has ongoing exceedances of the health-based standards for lithium and sodium, which show no trend and a decreasing trend, respectively.

MW-15 west of the landfill has ongoing control limit exceedances of lithium and strontium, both of which exhibit no trend. This well also has ongoing exceedances of health-based standards for sodium and sulfate, for which the concentrations show no trend and an increasing trend, respectively .

MW-16 adjacent to the leachate pond has ongoing control limit exceedances of chloride, iron, lithium, sodium, strontium and sulfate. Because the concentrations represented a reversal of a steady trend of improved water quality at this well for the five years preceding 2023, supplemental samples were collected during March, August, and September 2024 to provide additional data, including during a period following draw-down and recovery of the nearby leachate pond (May, June, July, August) while a new pump was installed and the force main was reconstructed. Mann-Kendall analysis of the concentration trends for these constituents shows the following complicated situation:

Constituent	2023 Trend	2024 Trend
Chloride	Increasing	Increasing
Iron, total	Decreasing	No trend
Lithium, total	Decreasing	Decreasing
Sodium, total	Decreasing	Decreasing
Strontium, total	Decreasing	Increasing
Sulfate	Decreasing	Increasing

With the exception of MW-16, additional investigation does not appear warranted in any case for the listed exceedances other than continued semi-annual monitoring.

With respect to MW-16, the area around the leachate pond has been observed every month when the pond elevation is measured and also evaluated by the engineer during the required spring and fall site inspections. There has been no visible evidence that water has been released to the soil from the leachate pond. No wetted areas were noted on the surface of the slope between the pond and the creek that might indicate a release. The pond surface elevation has remained below the level at which seepage could occur over the top of the poly liner for many years, and there are no visible run-off channels from the pond in any direction. During 2024, the draw-down of the pond for pump repair persisted for several months, relieving pressure on the liner during that time. If the current water quality at MW-16 is related to an undiscovered release from the pond, it would be expected that the draw-down would result in a measurable improvement at the well at some point. A recommendation for continued monitoring is detailed in Section 4.0.

3.8 Table 8 - Analytical Data Summary

Table 8 shows historic analytical data for each monitored constituent at each well, beginning in 1996 for some parameters and in 2015 for total metals, sulfate, and fluoride. Collection of sulfide data began in 2017. Supplemental sampling at MW-16 and the leachate pond during 2024 is included in this table.

3.9 Sampling Protocol

Semi-annual sampling is carried out at Keokuk Ferro-Sil Monofill and includes seven monitoring wells and the leachate pond.

Wells are purged prior to sampling. A minimum of two well volumes are purged. As a third well volume is removed, pH, temperature, and conductivity are monitored. When variability of these measurements has stabilized to less than 10 percent, samples are collected. In most cases, this stability is demonstrated before three well volumes have been purged.

No wells are bailed dry during purging. A crew of four workers are involved in the sample collection.

One worker measures the static water level and begins purging at MW-12 , then proceeds to MW-5, 7, 8, 14, 16, and 15. A second worker measures the static water level and begins purging at MW-14, then proceeds to MW-16, 15, 12, 5, 7, and 8, following behind the first crew member.

A dedicated bailer is used at each well. Purging continues at the first well until two well volumes are removed or a partial bailer-full is encountered, at which time the crew member stops bailing and proceeds to the next well. The purging will be taken up again by the second purge-crew member when that worker reaches that well. This allows the well to recover to some extent such that purging can continue.

The sampling crew members follow the purging crews, beginning at MW-12 when at least two well volumes have been purged. One member of the sampling crew continues to purge the third well volume, while the second crew member measures the pH, temperature, and conductivity from each bailer of water removed. When the variability of the measurements is less than 10 percent for all parameters, the samples are collected into the properly labeled containers for that well and placed in a cooler on ice. The sampling crew then continues on to MW-5, 7, 8, 14, 16 and 15.

This method of purging and sampling provides valid representative samples of the groundwater from each of the wells included in the monitoring program.

Static water levels at MW-4, 6, 9, 11, and 13 are also measured by the purging crew.

The pond surface elevation is surveyed against a known bench-mark by the sampling crew.

The pond sampling is carried out from the dock which extends to the pump enclosure. The depth of the pond is measured and a submersible digital pyrometer is used to measure the water temperature through each foot of depth from the bottom to the surface to determine if temperature stratification is present. If temperature strata are present, equal volumes of sample are collected from each strata. If the temperature differences are not significant, then equal volumes of sample are collected from each two feet of depth.

The pond sample is collected using a discrete-depth sampler (Van Dorn-type cylinder). The device is lowered to each pre-determined depth to collect a sample at that depth. A known volume of each collected sample is composited into a single, clean polyethylene container. When all discrete samples have been collected, the composite is transferred into properly labeled containers and placed in a cooler on ice.

3.10 Table 9 - Historic Control Limit & Action Level Exceedances

This table summarizes the historical extent of groundwater impact and provides a demonstration of sequential degradation of monitored constituents. Exceedances of both action levels and control limits are depicted. As shown, no new exceedance has occurred at any well except for a slight increase in Total Iron at MW-8 greater than the SDWR.

3.11 Table 10 - Groundwater Quality Assessment Plan Trend Analysis

This table lists each well, the corresponding constituent lists and the sample frequency for each well in the monitoring program. There are currently no corrective action activities under way in the monitoring program.

A Mann-Kendall trend analysis was applied. Negative values of S with confidence 80% or greater were identified as decreasing concentrations. Positive values of S with confidence 80% or greater are identified as increasing. A return of zero for S or a confidence value less than 80% indicates no trend.

The statistical trends have not changed for most well/constituent pairs except for the following:

Location	Constituent	2023 Trend	2024 Trend
MW-15	Strontium, total	Increasing	No trend
MW-16	Iron, total	Decreasing	No trend
MW-16	Strontium, total	Decreasing	Increasing
MW-16	Sulfate	Decreasing	Increasing

Unchanged trends of increasing concentration over time were found as follow:

Location	Constituent	2023 Trend	2024 Trend
MW-8	Strontium, total	Increasing	Increasing
MW-8	Sulfate	Increasing	Increasing
MW-14	Iron, total	Increasing	Increasing
MW-14	Strontium, total	Increasing	Increasing
MW-15	Sulfate	Increasing	Increasing (does not exceed CL)
MW-16	Chloride	Increasing	Increasing

3.12 Table 11 - Leachate Management Summary

This table summarizes the data used to evaluate leachate control system performance. As shown, during the portions of the year that the pump was operating properly, the leachate pond elevation was stable and the storage volume was adequate. In March and April, the pond surface elevations were found to have risen above the pump set point, even though the pump was observed to be operating. Leachate levels remained below the top of the poly liner during this time. Initially it was believed that the pump needed time to catch up with heavy rains in March and April. However, in May, further investigation showed that although the pump continued to run, there was no discharge at the manhole in Kindustry Park. While working to assess needed repairs, the pond was completely drawn down with an external pump in May and remained much lower than normal until the end of August. Pump operation was resumed in September and have continued without issue for the remainder of the year.

Pump hours are monitored and used to determine the volume of leachate pumped from the pond to the municipal sanitary sewer as allowed by a permit issued by the City of Keokuk. Because it is known that the pump motor was operating but that the system was not capable of directing the typical flow to the force main during March and April and then the pond was emptied, the actual discharge for the year includes quantities based on hours of operation at 64 gpm and an estimate of the volume removed during draw-down, for a total of 496,152 gallons of leachate to the POTW in the past 12 months.

Also during the time the pond was drawn down, a portion of the buried sanitary force main that serves to deliver leachate from the Keokuk Ferro-Sil Landfill to the city sewer system in Kindustry Park was replaced by new piping and relocated through a new easement. This installation addresses the portion of the force main that had become exposed due to erosion along the previous route. A set of as-built drawings was provided to IDNR by e-mail on 30 September 2024 as part of the engineer's Fall Inspection Report. It was demonstrated that the force main is functioning properly by again using an external pump to deliver 75,000 gallons from the pond through the new piping.

On 3 October 2024, a contractor was brought on-site to carry out high pressure jetting of the leachate collection system, as required by the closure permit every three years. This work demonstrated that the system is clear and functioning. A report regarding this work is included in Attachment D.

No further repairs or proposed changes to the leachate management system have been identified at this time.

3.13 Gas Monitoring

The waste disposed at this site does not generate any methane or other gas.

4.0 Recommendations

As described in this report, the groundwater quality at Keokuk Ferro-Sil Monofill continues to be mostly stable in the down-gradient monitoring wells other than MW-16.

Up until the semi-annual sampling events during 2023, water quality at MW-16 adjacent to the leachate pond had first improved and then remained steady over five years, which was presumed to be related to the introduction of a pump to control the leachate level in the pond. There is no evidence that there is a new issue with the integrity of the pond based on the measured elevations of the pond surface and visual inspection of the area around the pond.

It is recommended that the draw-down of the leachate pond that was carried out during 2024 should be used as a starting point for further investigation of the water quality issues at MW-16. It would be expected that over time, there would be a trend of decreasing constituent concentrations followed by a resumption of deteriorating water quality if a release from the pond is affecting this well. It is recommended that supplemental sampling for this well be carried out quarterly during 2025, with analysis for chloride, total iron, total lithium, total sodium, total strontium, and sulfate.

Groundwater and leachate pond elevations will be measured semi-annually, unless a need for more frequent data collection is identified.

No other changes to the monitoring program are recommended at this time.

Table 1
Monitoring Program Summary
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Monitoring Well	Formation	Current Monitoring Program	Change for next sampling event	Current Control Limit Exceedances	Total # of Samples in each monitoring program since January 1, 2018		
					Routine	Supplemental	Remedial Action
MW-4	Glacial Till	Monthly water level	NC		0	0	0
MW-5	Glacial Till - Silty Clayey Sand	Upgradient - Routine semi-annual sampling; Monthly water level	NC	Total iron	14	0	0
MW-6	Glacial Till - Silty Clayey Sand	Monthly water level	NC		0	0	0
MW-7	Glacial Till - Silty Clayey Sand	Upgradient - Routine semi-annual sampling; Monthly water level	NC		14	0	0
MW-8	Glacial Till - Clayey Sandy Silt	Downgradient - Routine semi-annual sampling; Monthly water level	NC	Ammonia nitrogen, Total strontium, Sulfate	14	0	0
MW-9	Glacial Till - Clayey Sandy Silt	Monthly water level	NC		0	0	0
MW-11	Glacial Till - Silty Clay/Clayey Silt	Monthly water level	NC		0	0	0
MW-12	Glacial Till - Clayey Silt	Upgradient - Routine semi-annual sampling; Monthly water level	NC		14	0	0
MW-13	Glacial Till - Clayey Silt	Monthly water level	NC		0	0	0
MW-14	Glacial Till - Silty Clay/Clayey Sand	Downgradient - Routine semi-annual sampling; Monthly water level	NC	Ammonia nitrogen, Total boron, Total iron, Total strontium, Sulfate	14	0	0
MW-15	Glacial Till - Silty Clay/Clayey Sand	Downgradient - Routine semi-annual sampling; Monthly water level	NC	Total lithium, Total strontium	14	0	0
MW-16	Glacial Till - Silty Clay/Clayey Sand	Downgradient - Routine semi-annual sampling; Monthly water level	NC	Chloride, Total iron, Total lithium, Total sodium, Total strontium, Sulfate	14	4	0
Other monitoring points							
Leachate Pond	Glacial Till - Silty Clay/Clayey Sand	Annual routine sampling; Monthly surface elevation	NC	NA	14	7	0

NC = No Change

Table 2
Monitoring Program Implementation Schedule
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Sampling Points	Recent Sampling Dates and Constituents														Upcoming Sampling Dates and Constituents	
	4/26/2018	10/18/2018	4/25/2019	10/17/2019	4/23/2020	10/15/2020	4/22/2021	10/28/2021	4/28/2022	10/13/2022	04/20/2023	10/19/2023	04/25/2024	10/17/2024	April 2025	October 2025
MW-4																
MW-5	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B
MW-6																
MW-7	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B
MW-8	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B
MW-9																
MW-11																
MW-12	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B
MW-13																
MW-14	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B
MW-15	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B
MW-16	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B
Pond	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B	List B

List A (applicable constituents): pH, conductivity, chloride, fluoride, sulfate, chemical oxygen demand, ammonia nitrogen, total metals: aluminum, barium, boron, iron, lithium, sodium, strontium

List B (applicable constituents): List A plus sulfide (added 30 January 2018)

Table 3
Monitoring Well Maintenance and Performance Revaluation Schedule
2024 Annual Water Quality Report
Keokuk Ferro-Sil Monofill
Permit No. 56-SDP-17-91P

Compliance with:	Monitoring Calendar Years							
	2020	2021	2022	2023	2024	2025	2026	2027
567 IAC 114.21(2)"a" high and low water levels (add required frequency)	Monthly - Completed	Monthly - Completed	Monthly - Completed	Monthly - Completed	Monthly - Completed	Scheduled	Scheduled	Scheduled
567 IAC 114.21(2)"b" changes in the hydrologic setting and flow paths	Semi-Annual - Completed	Semi-Annual - Completed	Semi-Annual - Completed	Semi-Annual - Completed	Semi-Annual - Completed	Scheduled	Scheduled	Scheduled
567 IAC 114.21(2)"c" well depths	Not Completed	Annual - Completed	Annual - Completed	Annual - Completed	Annual - Completed	Scheduled	Scheduled	Scheduled
567 IAC 114.21(2)"d" in-situ permeability tests	Not Completed	Completed -Every 5 Years					Scheduled	

Table 4
Monitoring Well Maintenance and Performance Summary
2024 Annual Water Quality Report
Keokuk Ferro-Sil Monofill
Permit No. 56-SDP-17-91P

(includes all wells, underdrains etc.)

Well	Top of Casing, ft msl	Top of Screen, ft msl	Total Depth, ft		12/29/2023	1/29/2024	2/21/2024	3/28/2024	4/25/2024	5/23/2024	6/29/2024	7/30/2024	8/29/2024	9/26/2024	10/17/2024	11/25/2024	Maximum Depth Discrepancy (ft)	The original data could not be located Baseline Permeablity (cm/s/date)	Current Permeability 3/29/2021	Current Permeability % Change
MW-5	617.06	547.46	79.6	Groundwater Level (ft)	3.19	2.64	3.1	2.78	2.69	3.45	4.96	3.12	4.02	5.35	5.71	3.62	0	2.07E-05	2.07E-05	0%
				Groundwater Elevation (Ft MSL)	613.87	614.42	613.96	614.28	614.37	613.61	612.1	613.94	613.04	611.71	611.35	613.44				
				Measured Well Depth (ft)											79.6					
				Submerged screen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				
MW-7	651.39	585.54	75.85	Groundwater Level (ft)	41.11	41.15	41.16	41.33	41.49	42.03	41.37	40.57	40.87	40.51	40.52	41.14	-0.05	2.95E-06	2.95E-06	0%
				Groundwater Elevation (Ft MSL)	610.28	610.24	610.23	610.06	609.9	609.36	610.02	610.82	610.52	610.88	610.87	610.25				
				Measured Well Depth (ft)											75.8					
				Submerged screen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				
MW-8	606.49	556.23	60.26	Groundwater Level (ft)	15.81	15.81	15.69	15.61	15.72	15.49	15.73	15.87	15.97	16	16.38	15.89	0.04	1.61E-06	1.61E-06	0%
				Groundwater Elevation (Ft MSL)	590.68	590.68	590.8	590.88	590.77	591	590.76	590.62	590.52	590.49	590.11	590.6				
				Measured Well Depth (ft)											60.3					
				Submerged screen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				
MW-12*	**655.97**	585.28	80.69	Groundwater Level (ft)	17.97	18.29	18.19	18.43	18.34	17.74	17.4	17.55	17.79	18.09	18.67	18.39	0.01	2.59E-06	2.59E-06	0%
				Groundwater Elevation (Ft MSL)	638	637.68	637.78	637.54	637.63	638.23	638.57	638.42	638.18	637.88	637.3	637.58				
				Measured Well Depth (ft)											80.7					
				Submerged screen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				
MW-14	608.11	555.8	62.31	Groundwater Level (ft)	30.36	30.32	30.37	30.39	30.47	30.56	31.44	30.59	30.72	31.42	30.93	30.77	-0.21	1.96E-05	1.96E-05	0%
				Groundwater Elevation (Ft MSL)	577.75	577.79	577.74	577.72	577.64	577.55	576.67	577.52	577.39	576.69	577.18	577.34				
				Measured Well Depth (ft)											62.1					
				Submerged screen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				
MW-15	623.85	571.1	62.75	Groundwater Level (ft)	12.18	11.1	10.19	9.27	8.25	8.54	10.51	11.51	11.19	12.92	13.41	12.25	-0.45	4.47E-05	4.47E-05	0%
				Groundwater Elevation (Ft MSL)	611.67	612.75	613.66	614.58	615.6	615.31	613.34	612.34	612.66	610.93	610.44	611.6				
				Measured Well Depth (ft)											62.3					
				Submerged screen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				
MW-16	608.64	556.2	62.44	Groundwater Level (ft)	30.95	30.93	30.96	31	32.05	31.21	31.42	31.27	31.34	31.38	31.51	31.07	-0.74	7.64E-05	7.64E-05	0%
				Groundwater Elevation (Ft MSL)	577.69	577.71	577.68	577.64	576.59	577.43	577.22	577.37	577.3	577.26	577.13	577.57				
				Measured Well Depth (ft)											61.7					
				Submerged screen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				
MW-4 PZ	634.62	554.04	90.6	Groundwater Level (ft)	41.55	40.91	40.99	39.97	39.67	40.73	41.28	41.89	41.67	41.43	42.43	42.05	-0.3			
				Groundwater Elevation (Ft MSL)	593.07	593.71	593.63	594.65	594.95	593.89	593.34	592.73	592.95	593.19	592.19	592.57				
				Measured Well Depth (ft)											90.3					
				Submerged screen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				
MW-6 PZ*	**616.51**	527.31	99.2	Groundwater Level (ft)	37.94	37.54	37.75	37.66	37.62	37.57	37.77	37.73	37.82	37.94	38.1	37.74	0.6			
				Groundwater Elevation (Ft MSL)	578.57	578.97	578.76	578.85	578.89	578.94	578.74	578.78	578.69	578.57	578.41	578.77				
				Measured Well Depth (ft)											99.8					
				Submerged screen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				
MW-9 PZ	606.46	575.88	40.58	Groundwater Level (ft)	15.54	15.3	15.02	15.23	15.34	15.01	15.17	15.36	15.42	15.51	16.34	16.19	0.02			
				Groundwater Elevation (Ft MSL)	590.92	591.16	591.44	591.23	591.12	591.45	591.29	591.1	591.04	590.95	590.12	590.27				
				Measured Well Depth (ft)											40.6					
				Submerged screen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				
MW-11 PZ	648.76	585.3	73.46	Groundwater Level (ft)	45.91	45.78	46.07	45.97	46.09	45.96	46.07	45.97	46.31	46.13	46.47	46.11	0.54			
				Groundwater Elevation (Ft MSL)	602.85	602.98	602.69	602.79	602.67	602.8	602.69	602.79	602.45	602.63	602.29	602.65				
				Measured Well Depth (ft)											74					
				Submerged screen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				
MW-13 PZ	656.52	622.5	42.8	Groundwater Level (ft)	17.77	18.09	17.88	18.16	18.08	17.44	17.56	17.31	17.53	17.93	18.5	18.22	0			
				Groundwater Elevation (Ft MSL)	638.75	638.43	638.64	638.36	638.44	639.08	638.96	639.21	638.99	638.59	638.02	638.3				
				Measured Well Depth (ft)											42.8					
				Submerged screen	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y				

*Repairs to hinges on well covers in 2011 required removal of short portions from the tops of the casings at MW-6 and MW-12.

Table 5
Background Summary
2024 Annual Water Quality Report
Keokuk Ferro-Sil Monofill
Permit No. 56-SDP-17-91P

Interwell Background/Control Limit (MW-5, MW-7 and MW-12)

Constituent	Units	Samples	Detections	Background level	Statistical Test	Action Level	Source
Chloride	mg/L	135	135	160.72	M+/-2SD	250	SDWR
Fluoride	mg/L	51	24	0.86	M+/-2SD	4	MCL
COD	mg/L	135	87	29.09	M+/-2SD	None	None
Ammonia nitrogen	mg/L	135	38	0.91	M+/-2SD	10	MCL[1]
Aluminum, total	mg/L	55	6	0.056	M+/-2SD	0.05	SDWR
Barium, total	mg/L	55	55	0.13	M+/-2SD	2	MCL
Boron, total	mg/L	55	24	0.25	M+/-2SD	6	SS/HAL[2]
Iron, total	mg/L	54	30	0.62	M+/-2SD	0.3	SDWR
Lithium, total	mg/L	56	54	0.16	M+/-2SD	0.014	SS[3]
Sodium, total	mg/L	56	56	175.3	M+/-2SD	20	HAL
Strontium, total	mg/L	56	56	1.50	M+/-2SD	4	SS/HAL [2]
Sulfate	mg/L	56	56	725.6	M+/-2SD	250	SDWR
Sulfide	mg/L	45	3	2.31	M+/-2SD	None	None

[1] The MCL is for nitrate as nitrogen.

[2] Statewide standard - protected groundwater source. (Same as the Lifetime Health Advisory Level - HAL for this constituent.)

[3] Statewide standard - protected groundwater source.

Table 6
Summary of Well/Constituents Pairs with *No Immediately Preceding Control Limit Exceedances*
2024 Annual Water Quality Report
Keokuk Ferro-Sil Monofill
Permit No. 56-SDP-17-91P

Well	Constituent	Units	Most recent result		Control Limit
			Mar-24	Oct-24	
MW-8					
MW-14					
MW-15					
MW-16					

There are no new instances of constituents exceeding control limits at any well.

Table 7
Summary of Ongoing and Newly Identified Control Limit Exceedances
2024 Annual Water Quality Report
Keokuk Ferro-Sil Monofill
Permit No. 56-SDP-17-91P

Well	Constituent	Units	Most recent result Oct 2024	Control Limit	Action Level/ Statewide Standard	
MW-8	Ammonia nitrogen	mg/L	**3.15**	**0.91**	10	MCL (nitrate as N)
	Iron, total	mg/L	0.337	0.62	**0.3**	SWDR
	Lithium, total	mg/L	0.0176	0.16	**0.014**	SS
	Sodium, total	mg/L	112	175.3	**20**	HAL
	Strontium, total	mg/L	**2.28**	**1.5**	4	HAL/SS
	Sulfate	mg/L	**833**	**725.6**	250	SDWR
MW-14	Ammonia nitrogen	mg/L	**3.71**	**0.91**	10	MCL (nitrate as N)
	Boron, total	mg/L	**0.266**	**0.245**	6	HAL/SS
	Iron, total	mg/L	**1.77**	**0.62**	0.3	SWDR
	Lithium, total	mg/L	0.0193	0.16	**0.014**	SS
	Sodium, total	mg/L	109	175.3	**20**	HAL
	Strontium, total	mg/L	**2.41**	**1.5**	4	HAL/SS
	Sulfate	mg/L	**1260**	**725.6**	250	SDWR
MW-15	Lithium, total	mg/L	**0.251**	**0.16**	0.014	SS
	Sodium, total	mg/L	103	175.3	**20**	HAL
	Strontium, total	mg/L	**1.79**	**1.5**	4	HAL/SS
	Sulfate	mg/L	652	725.6	**250**	SDWR
MW-16	Chloride	mg/L	**195**	**160.1**	250	SDWR
	Iron, total	mg/L	**0.949**	**0.61**	0.3	SWDR
	Lithium, total	mg/L	**0.315**	**0.16**	0.014	SS
	Sodium, total	mg/L	**235**	**175.3**	20	HAL
	Strontium, total	mg/L	**3.35**	**1.5**	4	HAL/SS
	Sulfate	mg/L	**2020**	**725.6**	250	SDWR

Table 8
Analytical Data Summary
2024 Annual Water Quality Report
Keokuk Ferro-Sil Monofill
Permit No. 56-SDP-17-91P

Constituent (CAS #)	Sample Date	Units	MW-5 Upgradient	MW-7 Upgradient	MW-8 DwnGrad	MW-12 Upgradient	MW-14 DwnGrad	MW-15 DwnGrad	MW-16 DwnGrad	Pond DwnGrad
Chloride	10 Apr 1996	mg/L	81	27	25	13	16	21	71	
SDWR = 250	11 Oct 1996	mg/L	74	32	25	15	15	26	85	
	18 Apr 1997	mg/L	76	31	25	15	16	28	82	
	13 Oct 1997	mg/L	71	31	25	15	16	31	76	
	14 Apr 1998	mg/L	83	31	22	16	13	6	100	
	26 Aug 1998	mg/L	84	32	24	15	14	62	98	
	24 Apr 1999	mg/L	70	32	25	15	16	68	93	
	15 Oct 1999	mg/L	85	32	25	15	16	na	100	
	29 Apr 2000	mg/L	84	36.7	24.9	14.2	15.5	69.8	103	
	14 Oct 2000	mg/L	97	34	27	16	17	84	120	
	21 Apr 2001	mg/L	98	30.5	25	13.9	57.3	94.9	126	
	30 Sept 2003	mg/L	113	27.5	26.1	14.7	14.8	90.6	129	
	29 Mar 2004	mg/L	110	33	24.4	15.4	17.1	79.3	115	
	29 Sep 2004	mg/L	115	31	29.4	16.3	17.1	80.9	134	
	24 Mar 2005	mg/L	111	31	23.9	14.2	15.9	80.2	128	
	27 Sep 2005	mg/L	113	31	24.9	14.6	15.1	81.2	141	
	25 Apr 2006	mg/L	132	30	24.6	15.2	14.7	81.3	203	
	17 Oct 2006	mg/L	133	30	23.3	15.1	16	81.1	232	
	30 Apr 2007	mg/L	154	28	20.1	14	14.9	79	246	963
	30 Oct 2007	mg/L	154	24	24	14.9	15	82.8	258	
	14 Apr 2008	mg/L	177	31	24.4	14.5	14.7	84.2	251	
	29 Oct 2008	mg/L	157	29	25.1	14	14.2	81.3	283	
	28 Oct 2013	mg/L	190	13	23.7	16.5	20.2	81.6	315	
	30 Mar 2014	mg/L	191	21	24.5	15.7	13.9	73.7	250	
	29 Oct 2014	mg/L	203	30	24.5	15.4	15.6	71.4	272	
	28 Apr 2015	mg/L	162	28	25.9	12.9	15.8	70.2	248	
	22 Oct 2015	mg/L	160	26.7	24.8	14	13.7	67.8	261	
	20 Apr 2016	mg/L	144	25.8	22.4	15.2	14.2	59	235	81.6
	6 Oct 2016	mg/L	135	27.4	24.9	17.9	15.4	64.5	238	
	20 Apr 2017	mg/L	146	26.4	25.6	14.6	14.4	71.9	552	410
	5 Oct 2017	mg/L	135	26.1	24.6	14.3	13.4	62.8	244	
	26 Apr 2018	mg/L	131	27.8	23.7	14	13	61.3	103	273
	18 Oct 2018	mg/L	138	27	24.3	15	13.7	60.6	78.4	135
	25 Apr 2019	mg/L	125	39.6	24.4	14.7	13.3	61.7	144	158
	17 Oct 2019	mg/L	113	32.8	24.2	15.7	13.2	61.7	53.8	202
	23 Apr 2020	mg/L	115	30.1	24	15.1	13.7	60.2	41.4	211
	15 Oct 2020	mg/L	111	29.3	22.6	14	12.3	60.7	8.56	304
	22 Apr 2021	mg/L	104	23.9	20.4	13.6	11.7	53.4	12.5	121
	28 Oct 2021	mg/L	116	27.9	23.6	15.1	13.3	59.9	16.1	278
	28 Apr 2022	mg/L	117	25.5	23.4	15.1	<2.25	63.9	13.7	188
	13 Oct 2022	mg/L	111	23.6	21.6	14	12.8	57.5	12.9	282
	20 Apr 2023	mg/L	128	24.2	22.8	14.8	13	59.6	126	205
	19 Oct 2023	mg/L	139	27.7	25.1	16.7	13.5	66.2	226	262
	28 Mar 2024	mg/L							183	
	25 Apr 2024	mg/L	150						221	179
	26 Sep 2024	mg/L							212	239
	17 Oct 2024	mg/L	132						195	255
Fluoride	7/20/2015	mg/L								0.998
MCL = 4	20 Apr 2016	mg/L	<0.500	<0.500	<0.500	0.677	<0.500	<0.500	<0.500	
SDWR = 2	6 Oct 2016	mg/L	0.674	<0.500	<0.500	1.22	0.581	0.535	<0.500	
	20 Apr 2017	mg/L	6.55	1.46	0.923	11.7	<0.500	0.807	76.3	39.3
	5 Oct 2017	mg/L	0.591	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500	
	26 Apr 2018	mg/L	0.614	<0.500	<0.500	<0.5	<0.500	<0.500	0.621	16.1
	18 Oct 2018	mg/L	0.698	<0.500	<0.500	0.576	<0.500	<0.500	<0.500	1.22
	25 Apr 2019	mg/L	0.694	<0.500	<0.500	<0.5	<0.500	<0.500	<0.500	1.7
	17 Oct 2019	mg/L	0.753	<0.500	<0.500	0.606	<0.500	0.727	<0.500	1.35
	23 Apr 2020	mg/L	0.78	<0.500	<0.500	0.582	<0.500	<0.500	<0.500	1.5
	15 Oct 2020	mg/L	0.71	<0.500	<0.500	<0.500	<0.500	3.66	0.577	1.43
	22 Apr 2021	mg/L	0.71	<0.275	<0.275	0.391	<0.275	<0.275	0.327	<0.275
	28 Oct 2021	mg/L	<0.275	<0.275	<0.275	<0.275	<0.275	<0.275	<0.275	<0.275
	28 Apr 2022	mg/L	<0.220	<0.220	<0.220	0.23	<0.220	<0.220	<0.220	0.878
	13 Oct 2022	mg/L	0.223	<0.220	<0.220	0.311	<0.220	<0.220	<0.220	1.16
	20 Apr 2023	mg/L	0.512	<0.375	<0.375	<0.375	<0.375	<0.375	<0.375	1.54
	19 Oct 2023	mg/L	0.604	<0.375	<0.375	0.408	<0.375	<0.375	<0.375	1.33
	25 Apr 2024	mg/L	0.502	<0.375	<0.375	<0.375	<0.375	<0.375	<0.375	1.49
	29 Aug 2024	mg/L								9.26
	17 Oct 2024	mg/L	0.467	0.443	<0.375	<0.375	<0.375	<0.375	<0.375	1.55

Table 8 - Continued
Analytical Data Summary
2024 Annual Water Quality Report
Keokuk Ferro-Sil Monofill
Permit No. 56-SDP-17-91P

Constituent (CAS #)	Sample Date	Units	MW-5 Upgradient	MW-7 Upgradient	MW-8 DwnGrad	MW-12 Upgradient	MW-14 DwnGrad	MW-15 DwnGrad	MW-16 DwnGrad	Pond DwnGrad
Chemical Oxygen Demand	10 Apr 1996	mg/L	9.7	5	11	<5.0	7.8	19	21	
No health-based standard	11 Oct 1996	mg/L	5.4	<5.0	12	<5.0	32	26	21	
	18 Apr 1997	mg/L	<5.0	<5.0	<5.0	<5.0	14	27	11	
	13 Oct 1997	mg/L	<5.0	5.4	14	<5.0	<5.0	43	19	
	14 Apr 1998	mg/L	18	18	180	2	550	620	98	
	26 Aug 1998	mg/L	33	15	160	6	430	500	160	
	24 Apr 1999	mg/L	<5.0	<5.0	<5.0	<5.0	<5.0	47	7.8	
	15 Oct 1999	mg/L	<5.0	<5.0	5.4	<5.0	19	na	22	
	29 Apr 2000	mg/L	9.8	<5.0	<5.0	<5.0	28	72	19	
	14 Oct 2000	mg/L	<5.0	<5.0	<5.0	<5.0	23	47	6	
	21 Apr 2001	mg/L	7.1	<5.0	<5.0	<5.0	26	66	19	
	30 Sept 2003	mg/L	<5.0	5.1	<5.0	<5.0	<5.0	28	14	
	29 Mar 2004	mg/L	17	17	11	24	17	34	26	
	29 Sep 2004	mg/L	24	18	18	9.3	28	15	40	
	24 Mar 2005	mg/L	33	32	8.3	<5.0	58	54	16	
	27 Sep 2005	mg/L	13	28	24	51	28	49	30	
	25 Apr 2006	mg/L	10.1	10.2	47	39.9	42.9	30.8	51.9	
	17 Oct 2006	mg/L	7.9	6.5	19.4	7.6	65.1	71.5	24.6	
	30 Apr 2007	mg/L	<5.0	<5.0	17	<5.0	12.9	21.4	19.4	408
	30 Oct 2007	mg/L	18.2	<5.00	<5.00	<5.00	<5.00	32.8	10.5	
	14 Apr 2008	mg/L	13	10	36	13.4	26.6	48.5	31.5	
	29 Oct 2008	mg/L	24.4	15.4	13.3	10.3	69.8	27.1	45.5	
	28 Oct 2013	mg/L	7	14.4	7.3	5.7	25.7	58.9	160	
	30 Mar 2014	mg/L	5.9	12.8	7.3	11.4	6.6	27.6	18.6	
	29 Oct 2014	mg/L	9.3	9	<5.0	<5.00	12.5	24.7	19.6	
	28 Apr 2015	mg/L	10.2	21.4	10.6	10.2	<5.0	27.4	47.7	
	22 Oct 2015	mg/L	9.87	6.87	8.2	<5.00	8.2	19.2	21.9	
	20 Apr 2016	mg/L	12.6	<5.00	7.27	<5.0	7.27	14.9	21.1	
	6 Oct 2016	mg/L	15.1	8.76	16.8	8.76	15.1	26.5	14.4	
	20 Apr 2017	mg/L	15.5	11.8	19.5	9.78	41.3	22.5	30.6	19.2
	5 Oct 2017	mg/L	35.4	47.3	37.1	<5.0	12.5	67.7	47.3	
	26 Apr 2018	mg/L	5.03	5.03	9.9	<5.0	8.93	17.4	10.6	37.2
	18 Oct 2018	mg/L	8.4	27.3	17.7	7.07	16.4	19.4	22.3	22
	25 Apr 2019	mg/L	<5.0	36.5	12.2	<5.0	41.6	24.3	21.6	35.5
	17 Oct 2019	mg/L	<5.0	18.7	<5.00	<5.0	5.24	16.3	9.5	40.1
	23 Apr 2020	mg/L	8.46	21.4	8.81	<5.0	10.6	22.4	13.4	35
	15 Oct 2020	mg/L	12.8	<5.00	10.5	5.57	12.2	22.4	20.1	41.5
	22 Apr 2021	mg/L	13.6	17.4	9.52	<4.80	13.6	17.4	15	29
	28 Oct 2021	mg/L	11.6	10.5	11.9	9.42	9.78	26.9	26.2	38
	28 Apr 2022	mg/L	8.81	<4.80	<4.80	<4.80	7.69	27.5	14.8	31.6
	13 Oct 2022	mg/L	8.61	9.58	<4.80	<4.80	7.31	32	10.9	30.1
	20 Apr 2023	mg/L	7.72	17.8	16.5	11.8	18.8	25.9	19.5	33.7
	19 Oct 2023	mg/L	8.44	<4.80	7.07	<4.80	11.9	20.4	20.4	45.8
	28 Mar 2024	mg/L								40.9
	25 Apr 2024	mg/L	7.65	11.9	9.28	7.98	9.28	19.7	17.1	28.5
	29 Aug 2024	mg/L								28.5
	26 Sep 2024	mg/L								42
	17 Oct 2024	mg/L	11.4	6.03	14.1	<9.60	9.83	23.1	20.3	35

Table 8 - Continued
Analytical Data Summary
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Keokuk Ferro-Sil Monofill
Permit No. 56-SDP-17-91P

Constituent (CAS #)	Sample Date	Units	MW-5 Upgradient	MW-7 Upgradient	MW-8 DwnGrad	MW-12 Upgradient	MW-14 DwnGrad	MW-15 DwnGrad	MW-16 DwnGrad	Pond DwnGrad
Ammonia Nitrogen	10 Apr 1996	mg/L	<0.20	1.4	4.2	0.29	3.2	1.3	1.3	
MCL = 10 (nitrate as N)	11 Oct 1996	mg/L	<0.20	0.78	4.5	<0.20	3.9	2	1.1	
	18 Apr 1997	mg/L	<0.20	0.57	3.9	<0.20	3.6	1.8	1.4	
	13 Oct 1997	mg/L	<0.20	0.76	4.2	<0.20	3.2	1.7	0.92	
	14 Apr 1998	mg/L	0.2	0.9	4.6	0.2	4.6	0.8	1.1	
	26 Aug 1998	mg/L	0.2	0.8	4.4	0.1	4.4	0.9	0.6	
	24 Apr 1999	mg/L	<0.20	0.86	4.5	<0.20	5	0.63	0.54	
	15 Oct 1999	mg/L	0.25	0.38	4.4	<0.20	4.3		0.21	
	29 Apr 2000	mg/L	0.23	0.91	4.11	<0.20	4.16	0.62	0.49	
	14 Oct 2000	mg/L	<0.20	0.53	4.48	<0.20	3.9	0.47	0.44	
	21 Apr 2001	mg/L	<0.20	0.5	3.42	<0.20	4.09	0.64	0.37	
	30 Sept 2003	mg/L	<0.20	<0.20	1.69	<0.20	1.96	<0.20	<0.20	
	29 Mar 2004	mg/L	<0.20	<0.20	<0.20	<0.20	0.92	<0.20	<0.20	
	29 Sep 2004	mg/L	1.4	<0.20	<0.20	<0.20	1.97	<0.20	1.29	
	24 Mar 2005	mg/L	<0.20	<0.20	<0.20	<0.20	2.06	<0.20	<0.20	
	27 Sep 2005	mg/L	<0.20	<0.20	<0.20	<0.20	2.53	<0.20	<0.20	
	25 Apr 2006	mg/L	<0.20	<0.20	2.11	<0.20	3.72	<0.20	0.357	
	17 Oct 2006	mg/L	<0.20	<0.20	1.21	<0.20	2.68	<0.20	0.361	
	30 Apr 2007	mg/L	<0.20	<0.20	0.514	<0.20	3	<0.20	<0.200	16.4
	30 Oct 2007	mg/L	0.397	<0.200	1.75	<0.200	2.96	<0.200	<0.200	
	14 Apr 2008	mg/L	<0.200	<0.200	3.27	<0.200	3.56	<0.200	0.527	
	29 Oct 2008	mg/L	<0.200	<0.200	3.16	<0.200	2.41	<0.200	6.05	
	28 Oct 2013	mg/L	<0.200	<0.200	1.1	<0.200	23.3	12.6	28.9	
	30 Mar 2014	mg/L	<0.200	<0.200	1.45	<0.200	4.02	11.7	0.492	
	29 Oct 2014	mg/L	<0.200	<0.200	4.38	<0.200	4.13	4.71	<0.200	
	28 Apr 2015	mg/L	<0.460	1.04	3.86	<0.500	3.95	<0.490	<0.510	
	22 Oct 2015	mg/L	<0.200	1.23	4.89	<0.200	1.85	<0.200	<0.200	
	20 Apr 2016	mg/L	<0.200	1.18	0.587	<0.200	3.96	<0.200	<0.200	<0.200
	6 Oct 2016	mg/L	<0.200	0.746	3.25	<0.200	4.47	<0.200	<0.200	
	20 Apr 2017	mg/L	<0.200	0.704	0.37	<0.200	3.84	<0.200	<0.200	<0.500
	5 Oct 2017	mg/L	<0.200	<0.200	1.62	<0.200	3.83	<0.200	0.532	
	26 Apr 2018	mg/L	<0.200	1.13	<0.200	<0.200	3.97	<0.200	<0.200	<0.500
	18 Oct 2018	mg/L	<0.200	0.615	1.05	<0.200	3.12	<0.200	<0.200	<0.200
	25 Apr 2019	mg/L	<0.200	<0.200	<0.200	<0.200	3.13	<0.200	<0.200	<0.200
	17 Oct 2019	mg/L	<0.200	<0.200	1.77	<0.200	3.72	<0.200	<0.200	<0.200
	23 Apr 2020	mg/L	<0.200	0.2	<0.200	<0.200	3.12	<0.200	<0.200	<0.200
	15 Oct 2020	mg/L	<0.200	<0.200	<0.200	<0.200	3.25	<0.200	<0.200	0.632
	22 Apr 2021	mg/L	<0.0690	0.544	2.77	<0.0690	3.87	<0.0690	<0.0690	<0.0690
	28 Oct 2021	mg/L	<0.0690	0.439	2.03	<0.0690	3.25	<0.0690	<0.0690	0.28
	28 Apr 2022	mg/L	<0.100	1.26	2.61	<0.100	4.17	<0.100	<0.100	<0.100
	13 Oct 2022	mg/L	<0.100	0.628	1.93	<0.100	2.21	<0.100	<0.100	0.253
	20 Apr 2023	mg/L	<0.220	0.657	<0.220	<0.220	3.53	<0.220	0.542	<0.220
	19 Oct 2023	mg/L	<0.100	0.373	3.08	<0.100	3.97	<0.100	0.295	<0.100
	25 Apr 2024	mg/L	0.128	0.783	1.66	<0.100	4.53	<0.100	0.692	0.304
	17 Oct 2024	mg/L	<0.100	1.01	3.15	<0.100	3.71	<0.100	0.435	<0.210
Aluminum, total	20 Jul 2015	mg/L								1.38
SDWR = 0.05	28 Apr 2015	mg/L	0.109			0.0528	0.119	0.184	0.148	
	20 Apr 2016	mg/L	<0.050	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	0.152
	6 Oct 2016	mg/L	<0.050	<0.05	<0.050	<0.050	<0.050	<0.050	<0.050	
	20 Apr 2017	mg/L	<0.050	<0.05	<0.050	<0.050	<0.050	<0.050	0.0684	0.128
	5 Oct 2017	mg/L	<0.050	<0.05	<0.050	<0.050	<0.050	<0.050	0.0674	
	26 Apr 2018	mg/L	<0.050	<0.05	<0.050	<0.05	<0.0500	<0.050	<0.050	0.0543
	18 Oct 2018	mg/L	<0.050	<0.05	<0.150	<0.050	<0.150	<0.050	0.171	0.139
	25 Apr 2019	mg/L	<0.050	<0.05	<0.050	<0.05	<0.050	0.142	0.0515	0.678
	17 Oct 2019	mg/L	<0.050	<0.05	<0.200	<0.05	<0.200	<0.200	0.0661	0.34
	23 Apr 2020	mg/L	<0.050	<0.05	<0.050	<0.05	<0.050	<0.050	<0.050	0.475
	15 Oct 2020	mg/L	<0.050	<0.05	<0.050	<0.05	<0.050	<0.050	0.104	0.4
	22 Apr 2021	mg/L	<0.0150	<0.0150	0.0285	<0.0150	0.0261	<0.0150	0.0588	0.0453
	28 Oct 2021	mg/L	<0.0170	<0.0170	<0.0170	<0.0170	<0.0170	<0.0170	0.0681	0.77
	28 Apr 2022	mg/L	<0.0170	<0.0170	<0.0680	<0.0170	<0.0680	<0.0680	<0.0170	0.154
	13 Oct 2022	mg/L	<0.0170	0.0323	<0.0170	0.029	<0.0170	<0.0170	<0.0170	0.122
	20 Apr 2023	mg/L	<0.0170	0.0384	<0.0170	0.069	0.0403	0.221	0.0302	0.0618
	19 Oct 2023	mg/L	<0.0680	<0.0170	<0.0170	<0.0170	0.0239	0.018	0.0202	0.664
	25 Apr 2024	mg/L	<0.0210	<0.0210	<0.0210	<0.0210	<0.0210	<0.0210	<0.0210	0.06
	17 Oct 2024	mg/L	<0.0210	<0.0210	<0.0210	<0.0210	<0.0210	<0.0210	0.0351	0.0322

Table 8 - Continued
Analytical Data Summary
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Keokuk Ferro-Sil Monofill
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Constituent (CAS #)	Sample Date	Units	MW-5 Upgradient	MW-7 Upgradient	MW-8 DwnGrad	MW-12 Upgradient	MW-14 DwnGrad	MW-15 DwnGrad	MW-16 DwnGrad	Pond DwnGrad
Barium, total	30 Apr 2007	mg/L								0.522
MCL = 2	20 Jul 2015	mg/L								0.28
	28 Apr 2015	mg/L	0.0296			0.0212	0.0334	0.0374	0.0156	
	20 Apr 2016	mg/L	0.0154	0.102	0.078	0.0189	0.0302	0.0321	0.0139	0.194
	6 Oct 2016	mg/L	0.0141	0.0954	0.081	0.0201	0.0279	0.0324	0.0132	
	20 Apr 2017	mg/L	0.0168	0.109	0.0655	0.0211	0.0299	0.0297	0.0167	0.0643
	5 Oct 2017	mg/L	0.0147	0.109	0.0712	0.0214	0.0283	0.0271	0.0209	
	26 Apr 2018	mg/L	0.0149	0.0828	0.0581	0.024	0.0344	0.0256	0.0644	0.0883
	18 Oct 2018	mg/L	0.0121	0.124	0.0645	0.023	0.0247	0.0257	0.0667	0.109
	25 Apr 2019	mg/L	0.0104	0.0444	0.0386	0.0192	0.0221	0.0244	0.0783	0.105
	17 Oct 2019	mg/L	0.0112	0.0806	0.0538	0.0188	0.025	0.0285	0.149	0.13
	23 Apr 2020	mg/L	0.0136	0.111	0.0382	0.0211	0.0263	0.0278	0.086	0.118
	15 Oct 2020	mg/L	0.00921	0.122	0.0412	0.0206	0.0249	0.0272	0.0795	0.247
	22 Apr 2021	mg/L	0.0136	0.0959	0.0617	0.0256	0.0308	0.0302	0.0848	0.15
	28 Oct 2021	mg/L	0.0106	0.124	0.0545	0.0287	0.0241	0.0255	0.0968	0.205
	28 Apr 2022	mg/L	0.0114	0.0995	0.0488	0.027	0.0245	0.0214	0.0767	0.112
	13 Oct 2022	mg/L	0.0119	0.12	0.0513	0.0331	0.0266	0.0275	0.085	0.242
	20 Apr 2023	mg/L	0.0121	0.109	0.0412	0.036	0.0259	0.0297	0.0373	0.136
	19 Oct 2023	mg/L	0.0121	0.0422	0.054	0.0371	0.0268	0.026	0.0162	0.285
	25 Apr 2024	mg/L	0.0121	0.111	0.0396	0.0367	0.0262	0.0236	0.015	0.138
	17 Oct 2024	mg/L	0.0137	0.112	0.0529	0.0368	0.0244	0.0264	0.014	0.107
Boron, total	20 Jul 2015	mg/L								<0.250
HAL = 6	28 Apr 2015	mg/L	<0.050			0.0739	0.254	<0.050	0.0578	
	20 Apr 2016	mg/L	<0.200	0.247	0.218	<0.200	0.301	<0.200	<0.200	
	6 Oct 2016	mg/L	<0.200	0.217	<0.200	<0.200	0.227	<0.200	<0.200	
	20 Apr 2017	mg/L	<0.200	0.209	0.208	<0.200	0.257	<0.200	<0.200	<0.200
	5 Oct 2017	mg/L	<0.200	0.228	<0.400	<0.200	<0.400	<0.200	<0.400	
	26 Apr 2018	mg/L	<0.200	0.235	0.226	<0.200	0.276	<0.200	<0.200	0.278
	18 Oct 2018	mg/L	<0.200	0.239	<0.600	<0.200	<0.600	<0.200	<0.200	<0.200
	25 Apr 2019	mg/L	<0.200	<0.200	<0.200	<0.200	0.211	<0.200	<0.200	0.281
	17 Oct 2019	mg/L	<0.200	<0.200	<0.800	<0.200	<0.800	<0.800	<0.200	0.288
	23 Apr 2020	mg/L	<0.100	0.172	0.208	<0.100	0.295	<0.100	<0.100	0.247
	15 Oct 2020	mg/L	<0.100	0.174	0.196	<0.100	0.272	<0.100	<0.100	0.256
	22 Apr 2021	mg/L	<0.0580	0.187	0.197	0.075	0.278	<0.0580	<0.0580	0.206
	28 Oct 2021	mg/L	0.0892	0.236	0.236	0.127	0.301	0.0791	0.118	0.361
	28 Apr 2022	mg/L	<0.0580	0.222	0.184	0.0861	0.248	<0.0580	<0.0580	0.215
	13 Oct 2022	mg/L	<0.0580	0.198	0.171	0.0963	0.237	<0.0580	<0.0580	0.307
	20 Apr 2023	mg/L	<0.0760	0.21	0.186	0.104	0.266	<0.0760	<0.0760	0.25
	19 Oct 2023	mg/L	<0.304	0.0955	0.2	0.0901	0.28	<0.0760	0.0789	0.374
	25 Apr 2024	mg/L	<0.0760	0.177	0.165	<0.0760	0.252	<0.0760	<0.0760	0.192
	17 Oct 2024	mg/L	<0.0760	0.201	0.171	<0.0760	0.266	<0.0760	<0.0760	0.311
Iron, total	30 Apr 2007	mg/L								2.33
SDWR = 0.3	20 Apr 2016	mg/L	<0.100	0.142	<0.100	<0.100	0.962	0.346	0.226	0.664
	6 Oct 2016	mg/L	<0.100	<0.100	0.222	<0.100	1.54	1.91	1.02	
	20 Apr 2017	mg/L	0.449	<0.100	<0.100	<0.100	1.09	0.259	0.999	0.643
	5 Oct 2017	mg/L	0.218	0.265	0.14	<0.100	1.53	1.01	4.86	
	26 Apr 2018	mg/L	<0.100	0.405	0.197	<0.100	2	0.138	0.453	0.409
	18 Oct 2018	mg/L	0.273	0.214	0.482	<0.100	1.16	0.115	1.93	0.527
	25 Apr 2019	mg/L	<0.100	0.118	0.704	<0.100	3.41	0.231	0.716	1.79
	17 Oct 2019	mg/L	<0.100	0.228	<0.400	<0.100	2.35	<0.400	0.218	0.62
	23 Apr 2020	mg/L	<0.100	0.353	0.212	<0.100	1.91	<0.100	0.508	1.04
	15 Oct 2020	mg/L	<0.100	0.276	0.304	<0.100	2.04	0.119	0.205	0.661
	22 Apr 2021	mg/L	<0.0360	0.534	0.229	<0.0360	2.58	0.0692	0.111	0.296
	28 Oct 2021	mg/L	0.0703	0.911	0.0527	<0.0360	1.26	0.0589	0.126	1.04
	28 Apr 2022	mg/L	0.019	0.389	0.0924	<0.0360	2.19	0.0854	<0.0360	0.437
	13 Oct 2022	mg/L	0.0924	0.45	0.168	0.0737	1.72	0.227	0.0534	0.244
	20 Apr 2023	mg/L	0.375	0.299	0.154	0.173	3.03	0.992	0.204	0.425
	19 Oct 2023	mg/L	0.179	0.507	0.151	<0.0360	2.14	0.167	0.664	0.661
	28 Mar 2024	mg/L							1.75	0.397
	25 Apr 2024	mg/L	0.179	0.503	0.257	0.0488	2.32	0.101	1.35	0.421
	29 Aug 2024	mg/L							2.81	0.321
	26 Sep 2024	mg/L							2.33	0.483
	17 Oct 2024	mg/L	0.866	0.600	0.337	0.0526	1.77	0.126	0.949	0.111

Table 8 - Continued
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Constituent (CAS #)	Sample Date	Units	MW-5 Upgradient	MW-7 Upgradient	MW-8 DwnGrad	MW-12 Upgradient	MW-14 DwnGrad	MW-15 DwnGrad	MW-16 DwnGrad	Pond DwnGrad
Lithium, total	20 Jul 2015	mg/L								0.183
SS = 0.014 (PGS)	28 Apr 2015	mg/L	0.112			<0.050	<0.0500	0.212	0.317	
	20 Apr 2016	mg/L	0.0977	0.0574	<0.050	0.052	<0.050	0.211	0.327	
	6 Oct 2016	mg/L	0.0925	0.0698	<0.050	<0.050	<0.050	0.21	0.29	
	20 Apr 2017	mg/L	0.0924	0.0928	0.0139	0.0434	0.0135	0.187	0.272	0.328
	5 Oct 2017	mg/L	0.121	0.108	<0.020	0.0555	<0.020	0.256	0.343	
	26 Apr 2018	mg/L	0.0936	0.0482	0.0149	0.0474	0.0164	0.204	0.0603	0.391
	18 Oct 2018	mg/L	0.0977	0.116	<0.030	0.0527	<0.030	0.237	0.0684	0.232
	25 Apr 2019	mg/L	0.0792	0.202	0.0132	0.0489	0.0126	0.193	0.0521	0.258
	17 Oct 2019	mg/L	0.101	0.146	<0.400	0.0498	<0.040	0.219	0.0652	0.332
	23 Apr 2020	mg/L	0.107	0.156	0.0155	0.0474	0.0142	0.235	0.0477	0.316
	15 Oct 2020	mg/L	0.1	0.16	0.0169	0.0517	0.0153	0.236	0.047	0.382
	22 Apr 2021	mg/L	0.112	0.126	0.0164	0.0533	0.0173	0.252	0.0389	0.277
	28 Oct 2021	mg/L	0.1	0.107	0.0142	0.0504	0.0152	0.22	0.0451	0.388
	28 Apr 2022	mg/L	0.105	0.0646	0.0142	0.047	0.0116	0.211	0.0377	0.282
	13 Oct 2022	mg/L	0.103	0.0718	0.0144	0.0443	0.0148	0.205	0.0369	0.374
	20 Apr 2023	mg/L	0.0992	0.0894	0.0159	0.0474	0.0157	0.218	0.199	0.313
	19 Oct 2023	mg/L	0.108	0.0331	0.0181	0.0524	0.0185	0.228	0.328	0.424
	28 Mar 2024	mg/L							0.24	0.274
	25 Apr 2024	mg/L	0.109	0.104	0.0177	0.0541	0.0184	0.233	0.311	0.305
	29 Aug 2024	mg/L							0.281	0.353
	26 Sep 2024	mg/L							0.269	0.364
	17 Oct 2024	mg/L	0.115	0.0827	0.0176	0.0568	0.0193	0.251	0.315	0.41
Sodium, total	20 Jul 2015	mg/L								66.1
HAL = 20	28 Apr 2015	mg/L	152			60.3	108	95.1	251	
	20 Apr 2016	mg/L	144	77.9	108	62.5	104	92	244	75.2
	6 Oct 2016	mg/L	149	80.3	113	60	103	92.5	233	
	20 Apr 2017	mg/L	156	72.4	110	59.7	107	91.4	225	102
	5 Oct 2017	mg/L	146	72.8	106	60.8	102	95.7	227	
	26 Apr 2018	mg/L	148	66.3	116	65.3	128	98.6	62.6	117
	18 Oct 2018	mg/L	131	79	106	59.4	102	91.2	45.4	53.5
	25 Apr 2019	mg/L	118	127	98.5	58.8	94.6	83.8	72	66.7
	17 Oct 2019	mg/L	153	111	107	52.7	101	89.9	59.5	84.5
	23 Apr 2020	mg/L	161	103	118	61.2	111	106	63.9	90.7
	15 Oct 2020	mg/L	146	95.9	105	57.8	102	96.7	23.7	107
	22 Apr 2021	mg/L	152	98.1	110	61.1	110	100	44.7	71
	28 Oct 2021	mg/L	140	76.2	100	58.3	93.5	88.8	38.4	102
	28 Apr 2022	mg/L	154	82.2	108	61.9	105	95.8	50.1	81.7
	13 Oct 2022	mg/L	149	72.5	101	57.6	97.9	90.1	47.3	107
	20 Apr 2023	mg/L	133	65.2	99.2	55	96.1	89.2	149	75.7
	19 Oct 2023	mg/L	154	34.9	117	66.2	113	105	239	131
	28 Mar 2024	mg/L							176	86.5
	25 Apr 2024	mg/L	146	74.3	108	64.6	108	97.8	234	84.4
	29 Aug 2024	mg/L							230	77.7
	26 Sep 2024	mg/L							223	91.8
	17 Oct 2024	mg/L	154	79.7	112	64.5	109	103	235	107
Strontium, total	20 Jul 2015	mg/L								0.713
SS/HAL = 4	28 Apr 2015	mg/L	1.43			0.442	2.51	1.73	3.1	
	20 Apr 2016	mg/L	1.27	0.837	2.19	0.431	2.54	1.78	3.02	
	6 Oct 2016	mg/L	1.24	0.804	2.35	0.436	2.83	1.53	3.09	
	20 Apr 2017	mg/L	1.42	0.906	2.24	0.478	2.63	1.78	2.92	1.83
	5 Oct 2017	mg/L	1.27	0.951	2.1	0.514	2.39	1.75	2.83	
	26 Apr 2018	mg/L	1.33	0.761	2.09	0.542	2.91	1.6	0.507	1.52
	18 Oct 2018	mg/L	1.13	1.02	2.21	0.491	2.44	1.61	0.459	0.962
	25 Apr 2019	mg/L	1.03	0.626	2.42	0.504	2.77	1.56	0.654	1.07
	17 Oct 2019	mg/L	1.19	0.745	2.14	0.474	2.4	1.53	0.664	0.856
	23 Apr 2020	mg/L	1.36	0.879	2.24	0.53	2.69	1.71	0.605	1.03
	15 Oct 2020	mg/L	1.17	0.882	2.11	0.506	2.55	1.61	0.363	1.13
	22 Apr 2021	mg/L	1.24	0.859	2.29	0.562	2.75	1.79	0.504	0.917
	28 Oct 2021	mg/L	1.19	0.933	2.22	0.58	2.37	1.6	0.542	1.04
	28 Apr 2022	mg/L	1.36	1.06	2.62	0.655	2.93	1.86	0.615	0.951
	13 Oct 2022	mg/L	1.12	0.934	2.85	0.579	3.15	1.61	0.532	1.1
	20 Apr 2023	mg/L	1.13	0.981	2.34	0.64	2.6	1.75	2.5	0.926
	19 Oct 2023	mg/L	1.24	0.462	2.85	0.725	3.11	2.12	3.98	1.31
	28 Mar 2024	mg/L							2.77	0.886
	25 Apr 2024	mg/L	1.10	1.01	2.24	0.638	2.37	1.73	3.18	0.884
	29 Aug 2024	mg/L							3.36	1.21
	26 Sep 2024	mg/L							3.38	1.36
	17 Oct 2024	mg/L	1.14	1.03	2.28	0.67	2.41	1.79	3.35	1.59

Table 8 - Continued
Analytical Data Summary
2024 Annual Water Quality Report
Keokuk Ferro-Sil Monofill
Permit No. 56-SDP-17-91P

Constituent (CAS #)	Sample Date	Units	MW-5 Upgradient	MW-7 Upgradient	MW-8 DwnGrad	MW-12 Upgradient	MW-14 DwnGrad	MW-15 DwnGrad	MW-16 DwnGrad	Pond DwnGrad
Sulfate	20 Jul 2015	mg/L								64.6
SDWR = 250	28 Apr 2015	mg/L	855			250	1390	603	2000	
	20 Apr 2016	mg/L	695	350	850	240	1260	571	1840	
	6 Oct 2016	mg/L	680	354	864	248	1460	620	2090	
	20 Apr 2017	mg/L	679	384	864	283	1250	647	2020	559
	5 Oct 2017	mg/L	688	370	887	237	1440	631	1990	
	26 Apr 2018	mg/L	663	366	864	240	1420	626	84.4	313
	18 Oct 2018	mg/L	620	354	875	256	1390	586	62.2	278
	25 Apr 2019	mg/L	601	274	869	243	1400	604	89.8	187
	17 Oct 2019	mg/L	618	317	838	243	515	557	54	120
	23 Apr 2020	mg/L	618	280	855	248	1400	597	52.6	142
	15 Oct 2020	mg/L	607	295	894	258	1380	605	18.3	193
	22 Apr 2021	mg/L	525	326	822	235	1320	540	27.6	129
	28 Oct 2021	mg/L	591	317	923	267	1360	649	63.1	129
	28 Apr 2022	mg/L	623	354	996	270	1520	773	50.3	106
	13 Oct 2022	mg/L	488	308	908	257	1370	659	47.4	154
	20 Apr 2023	mg/L	483	315	830	267	1290	605	1310	131
	19 Oct 2023	mg/L	538	312	955	305	1460	693	2120	188
	28 Mar 2024	mg/L							1870	
	25 Apr 2024	mg/L	465	287	914	279	1380	699	2100	114
	29 Aug 2024	mg/L								185
	26 Sep 2024	mg/L							2210	268
	17 Oct 2024	mg/L	462	323	833	276	1260	652	2020	241
Sulfide	20 Apr 2017	mg/L	<1.0	<1.0	<1.00	<1.00	<1.00	<1.00	<1.0	<1.00
No health-based standard	5 Oct 2017	mg/L	<1.0	<1.0	<1.0	<1.0	5.2	2.5	1.98	
	26 Apr 2018	mg/L	<1.0	<1.0	6.11	<1.0	1.01	2.59	5.39	<1.00
	18 Oct 2018	mg/L	<1.0	4.4	<1.0	<1.0	<1.0	<1.0	<1.0	<1.00
	25 Apr 2019	mg/L	<1.0	<1.0	<1.0	<1.0	1.27	<1.0	<1.0	<1.0
	17 Oct 2019	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	23 Apr 2020	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
	15 Oct 2020	mg/L	<10.0	17.1	11.3	<10.0	<10.0	11.5	10.4	11.9
	22 Apr 2021	mg/L	<0.231	<0.231	<0.231	<0.231	<0.231	<0.231	<0.231	<0.231
	28 Oct 2021	mg/L	<0.231	<0.231	<0.231	<0.231	<0.231	<0.231	<0.231	<0.231
	28 Apr 2022	mg/L	<0.231	<0.231	<0.231	<0.231	<0.231	<0.231	<0.231	<0.231
	13 Oct 2022	mg/L	4.62	<0.231	<0.231	<0.231	<0.231	<0.231	<0.231	<0.231
	20 Apr 2023	mg/L	<0.231	<0.231	<0.231	<0.231	<0.231	<0.231	<0.231	<0.231
	19 Oct 2023	mg/L	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41	<1.41
	25 Apr 2024	mg/L	<0.231	<0.231	<0.231	<0.231	<0.231	<0.231	<0.231	
	17 Oct 2024	mg/L	0.432	<0.231	<0.231	<0.231	<0.231	0.288	<0.231	0.384

Table 9
Historic Control Limit & Action Level Exceedances
2024 Annual Water Quality Report
Keokuk Ferrosil Monofill - Permit No. 56-SDP-17-91P

Key: gray =CL; black =action level **Well**	**Constituent**	**28 Apr 2015**	**22 Oct 2015**	**20 Apr 2016**	**6 Oct 2016**	**20 Apr 2017**	**5 Oct 2017**	**26 Apr 2018**	**18 Oct 2018**	**25 Apr 2019**	**17 Oct 2019**	**23 Apr 2020**	**15 Oct 2020**	**22 Apr 2021**	**28 Oct 2021**	**28 Apr 2022**	**13 Oct 2022**	**20 Apr 2023**	**19 Oct 2023**	**25 Apr 2024**	**17 Oct 2024**
MW-8	Ammonia nitrogen																				
	Iron, total	NA	NA																		
	Lithium, total	NA	NA																		
	Sodium, total																				
	Strontium, total	NA	NA																		
	Sulfate	NA	NA																		
MW-14	Ammonia nitrogen																				
	Boron, total		NA																		
	Iron, total	NA	NA																		
	Lithium, total		NA																		
	Sodium, total		NA																		
	Strontium, total		NA																		
	Sulfate		NA																		
	Sulfide	NA	NA	NA	NA																
MW-15	Aluminum, total																				
	Chemical oxygen demand																				
	Iron, total	NA	NA																		
	Lithium, total		NA																		
	Sodium, total		NA																		
	Strontium, total		NA																		
	Sulfate		NA																		
	Sulfide	NA	NA	NA	NA																
MW-16	Chloride																				
	Chemical oxygen demand																				
	Aluminum, total		NA																		
	Iron, total	NA	NA																		
	Lithium, total		NA																		
	Sodium, total		NA																		
	Strontium, total		NA																		
	Sulfate		NA																		
	Sulfide	NA	NA	NA	NA																

In some instances, information for both action levels and control limits are shown for monitored constituents.

Table 10
Groundwater Quality Assessment Plan Trend Analysis
2024 Annual Water Quality Report
Keokuk Ferrosil Monofill
Permit No. 56-SDP-17-91P

Well	Current SSL	Trend by Mann-Kandall Analysis			Currently exceeds CL?	Monitoring Frequency
		Trend	S	Confidence		
MW-8	Ammonia nitrogen	Decreasing	-273	99.80%	Yes	Semi-Annual
	Iron, total	No trend	16	58.90%	No	
	Lithium, total	No trend	21	59.10%	No	
	Strontium, total	Increasing	51	93.10%	Yes	
	Sulfate	Increasing	28	91.30%	Yes	
MW-14	Ammonia nitrogen	No trend	2	63.20%	Yes	Semi-Annual
	Boron, total	No trend	20	78.40%	Yes	
	Iron, total	Increasing	53	99.5%	Yes	
	Lithium, total	No trend	-2	77.5%	No	
	Sodium, total	Decreasing	-7	84.0%	No	
	Strontium, total	Increasing	8	91.30%	Yes	
	Sulfate	No trend	-20	56.60%	Yes	
MW-15	Aluminum, total	Decreasing	-25	83.20%	No	Semi-Annual
	Iron, total	Decreasing	-38	91.20%	No	
	Lithium, total	No trend	36	71.90%	Yes	
	Sodium, total	No trend	23	66.00%	No	
	Strontium, total	No trend	38	50%	Yes	
	Sulfate	Increasing	33	90.70%	No	
MW-16	Aluminum, total	No trend	-32	73.70%	No	Semi-Annual
	Chloride	Increasing	132	80.80%	Yes	
	Iron, total	No trend	0	99.90%	Yes	
	Lithium, total	Decreasing	-29	99.80%	Yes	
	Sodium, total	Decreasing	-9	98.60%	Yes	
	Strontium, total	Increasing	35	92.60%	Yes	
	Sulfate	Increasing	3	97.90%	Yes	

Table 11
Leachate Management Summary
2024 Leachate Control System Performance Evaluation Report
Keokuk Ferrosil Monofill
Permit No. 56-SDP-17-91P

Month	Pond Surface Elevation, ft msl	Pump Hours	Elapsed Run Time, Minutes	Discharge to Keokuk POTW, gal (64 GPM)
December	603.84	3857:53:00	371	23,744
January	603.81	3876:41:00	1,128	72,192
February	603.63	3887:57:00	676	43,264
March	604.45	3896:08:00	Pump malfunctioning	31,424
April	604.7	4341:40:00	Pump malfunctioning	0
May	601.32	4793:36:00	Pond drawn down	223,100
June	601.78	No pump	No discharge	
July	602.66	No pump	No discharge	
August	603.45	No pump	External pump	76,700
September	603.45	4793:36:00		
October	603.46	4793:36:00		
November	603.75	4800:18:00	402	25,728
2024 Annual Total				496,152

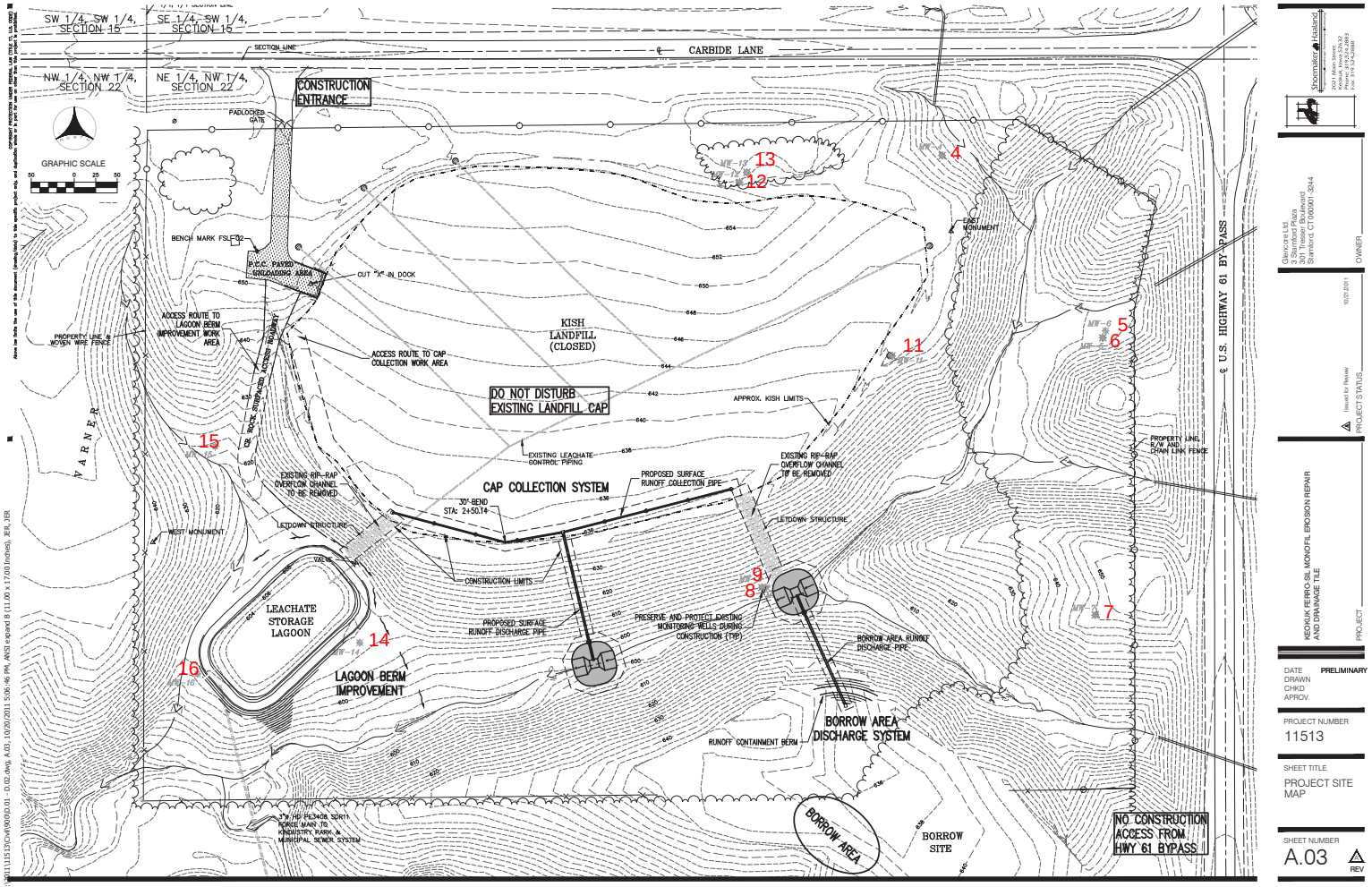


Figure 1 - Keokuk Ferro-Sil Landfill Layout
Monitoring wells are numbered 5,7,8,12,14,15 & 16
Piezometers 4, 6, 9, 11, 13
Water levels at all points and the pond are measured monthly

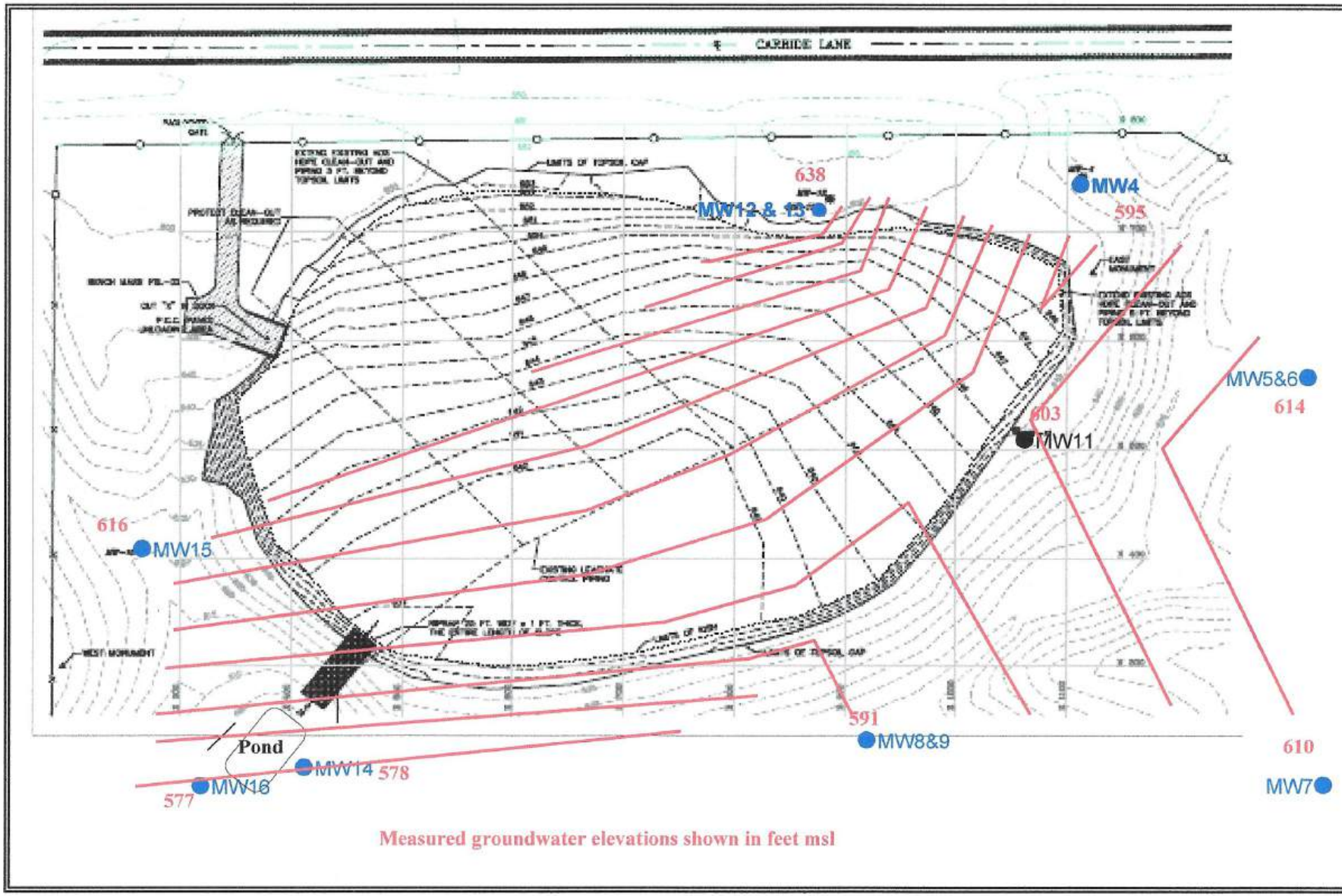


Figure 2
Keokuk Ferro-Sil Monofill
Features and Groundwater Elevations April 2024

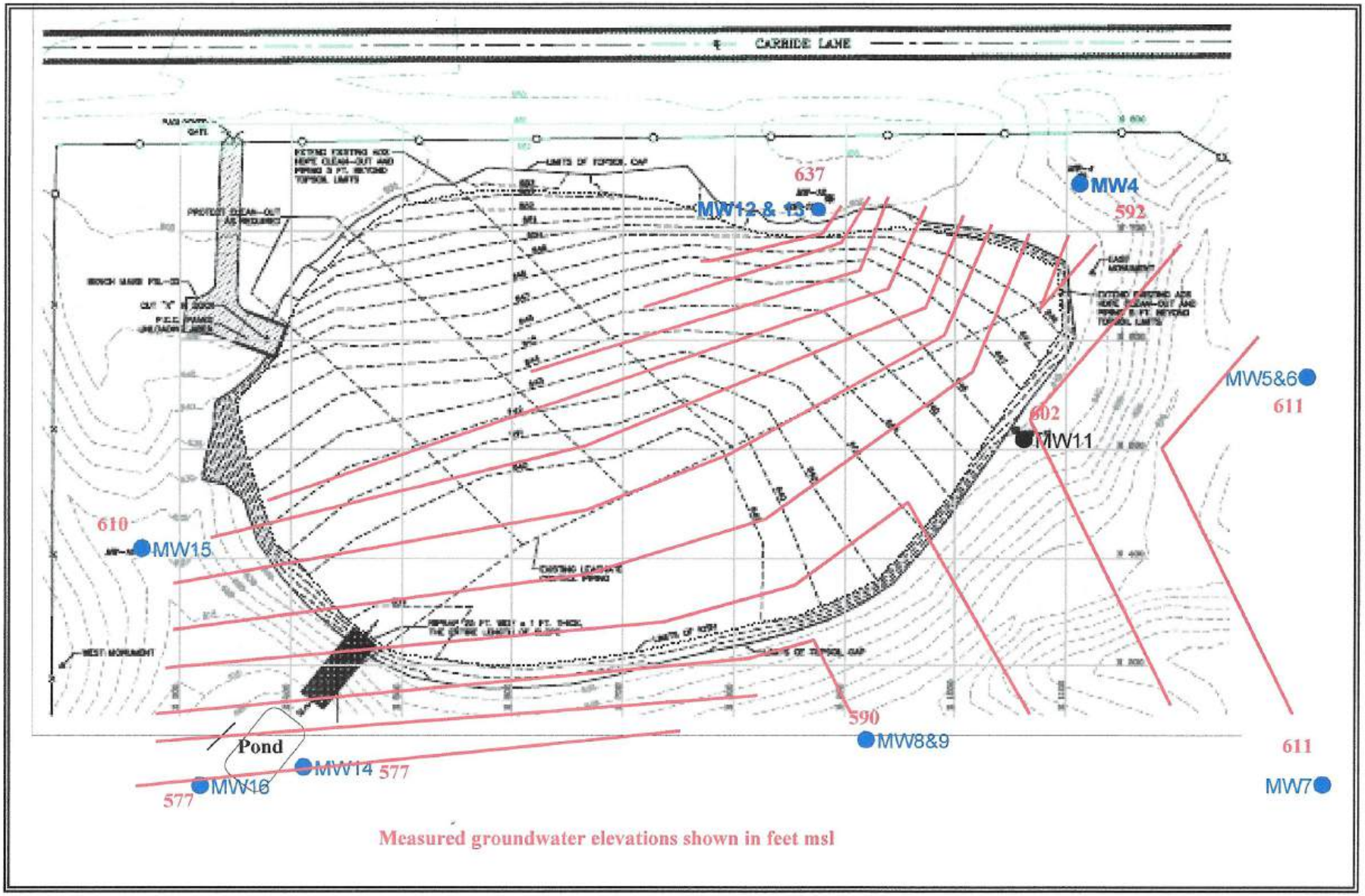
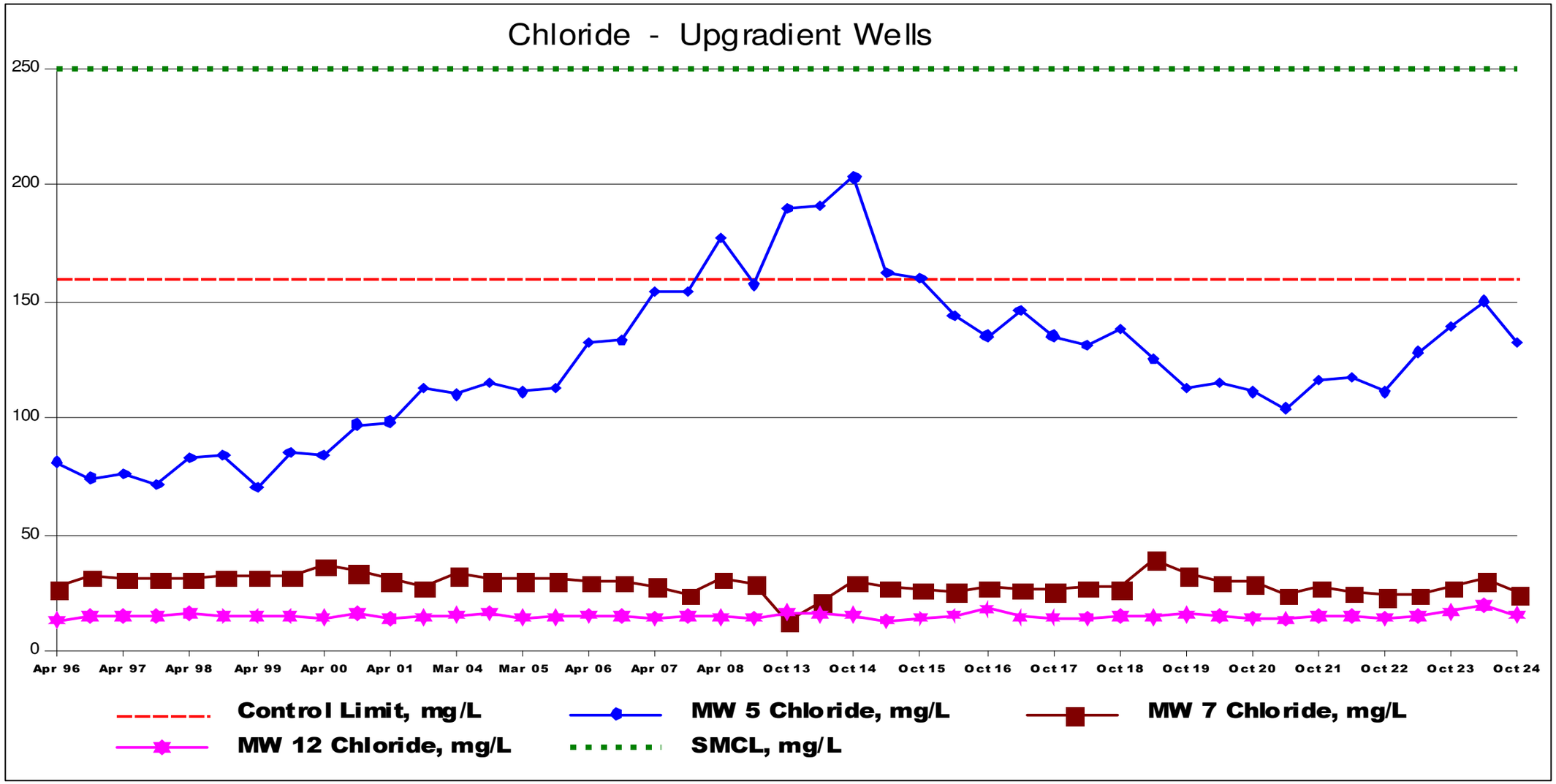


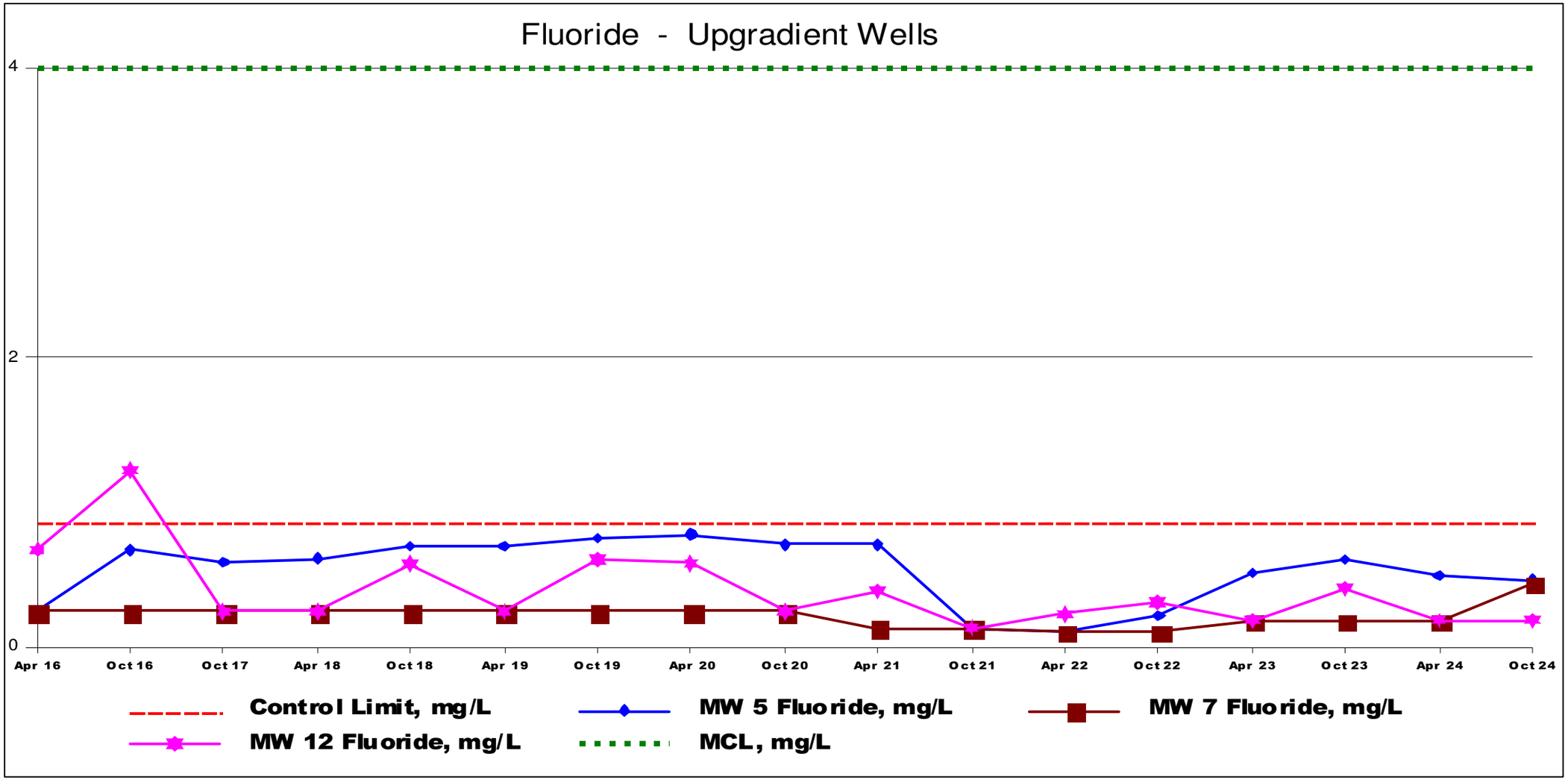
Figure 3
Keokuk Ferro-Sil Monofill
Features and Groundwater Elevations October 2024

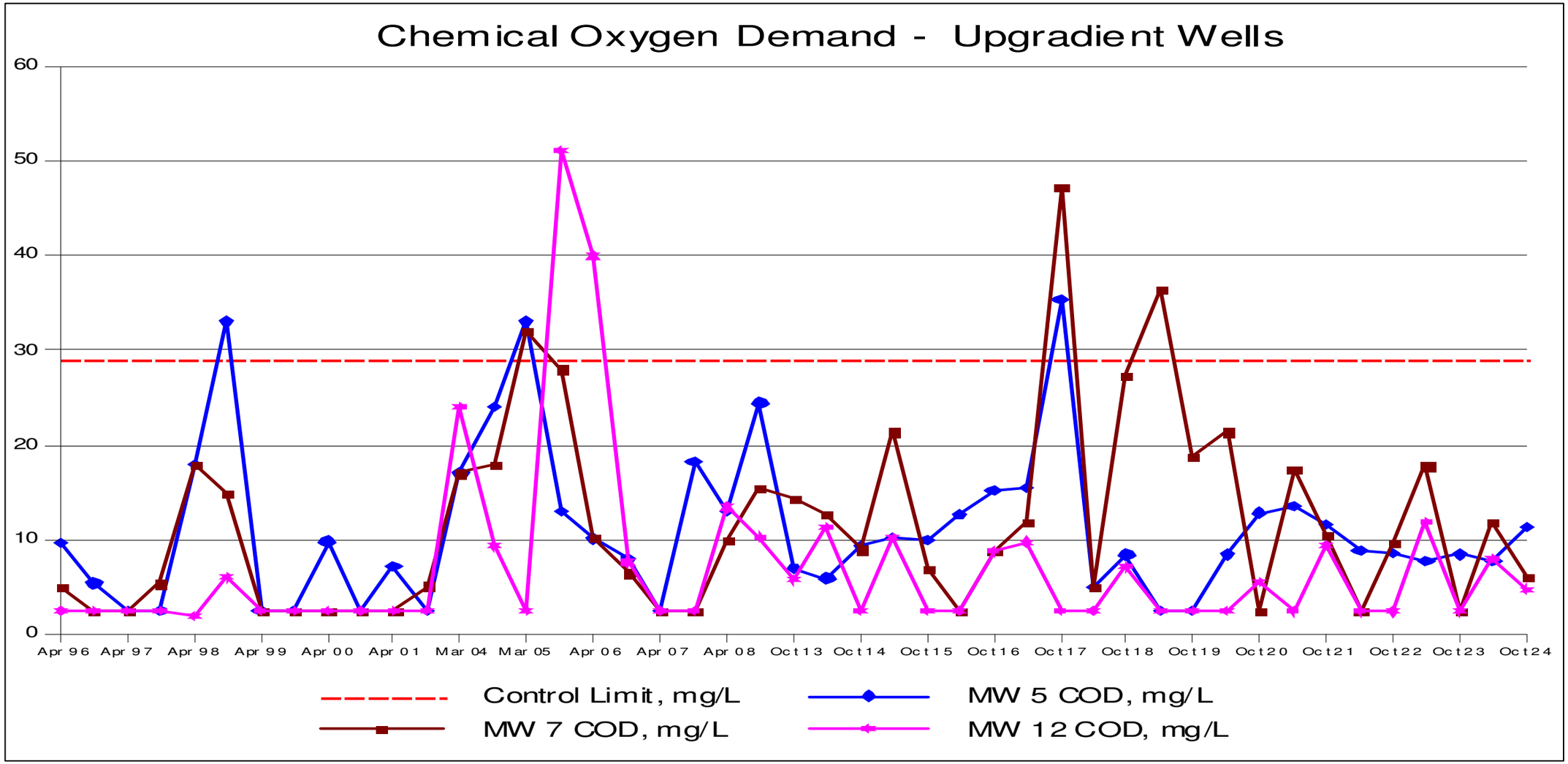
Keokuk Ferro-Sil Monofill
2542 Carbide Lane
Keokuk, Iowa
Permit No. 56-SDP-17-91P

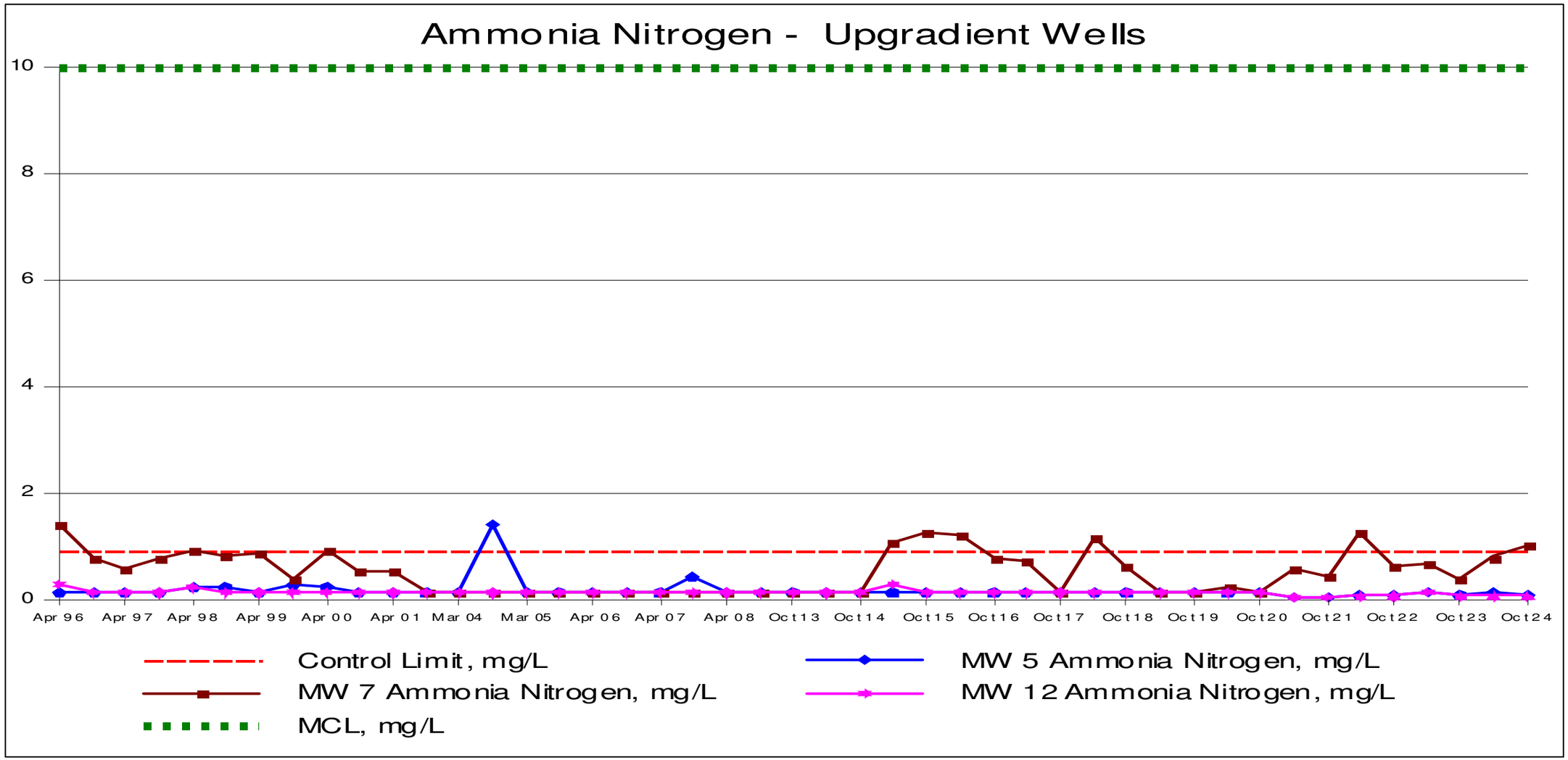
Attachment A

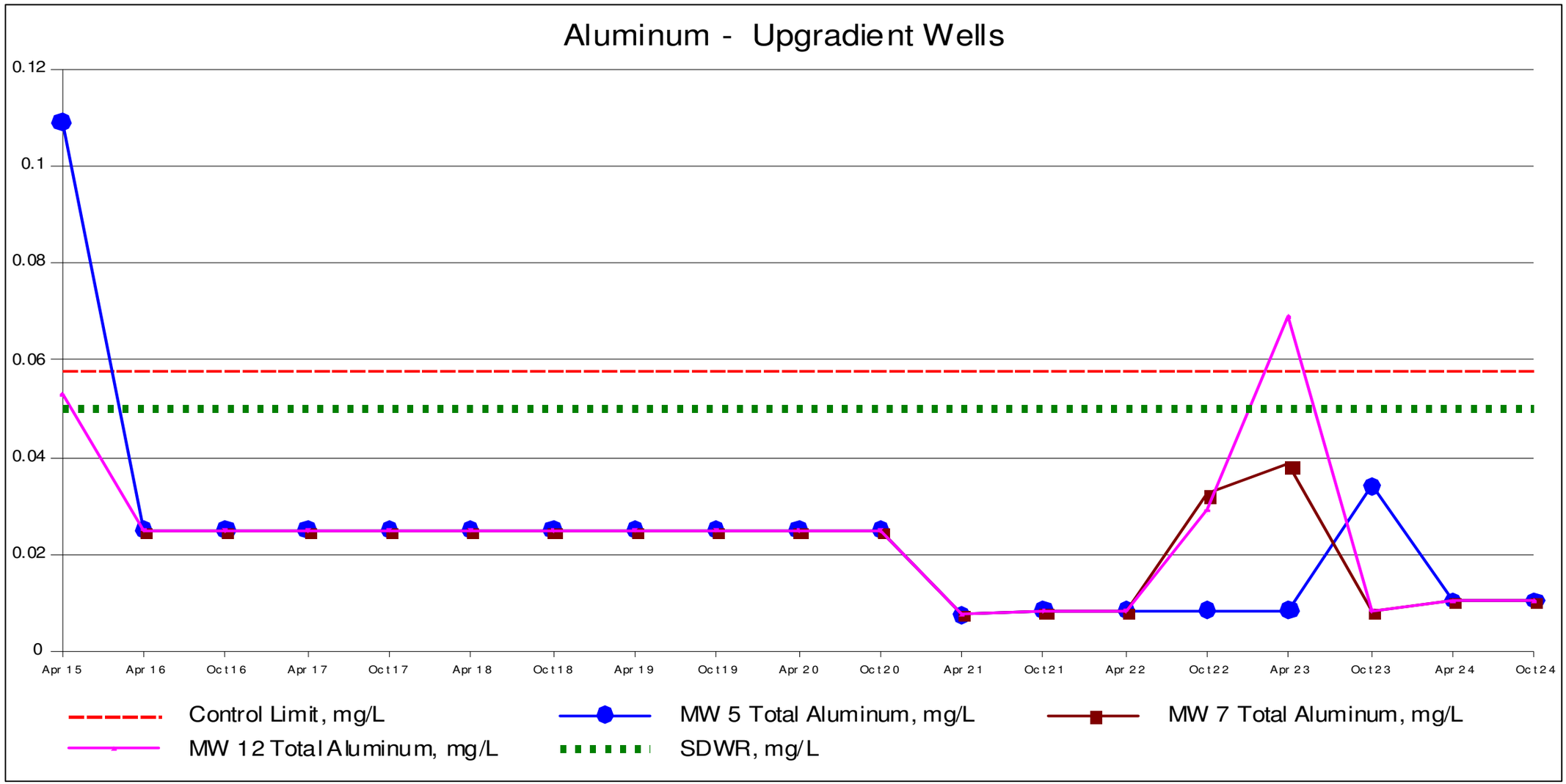
Line Graphs of Constituent Concentrations over Time

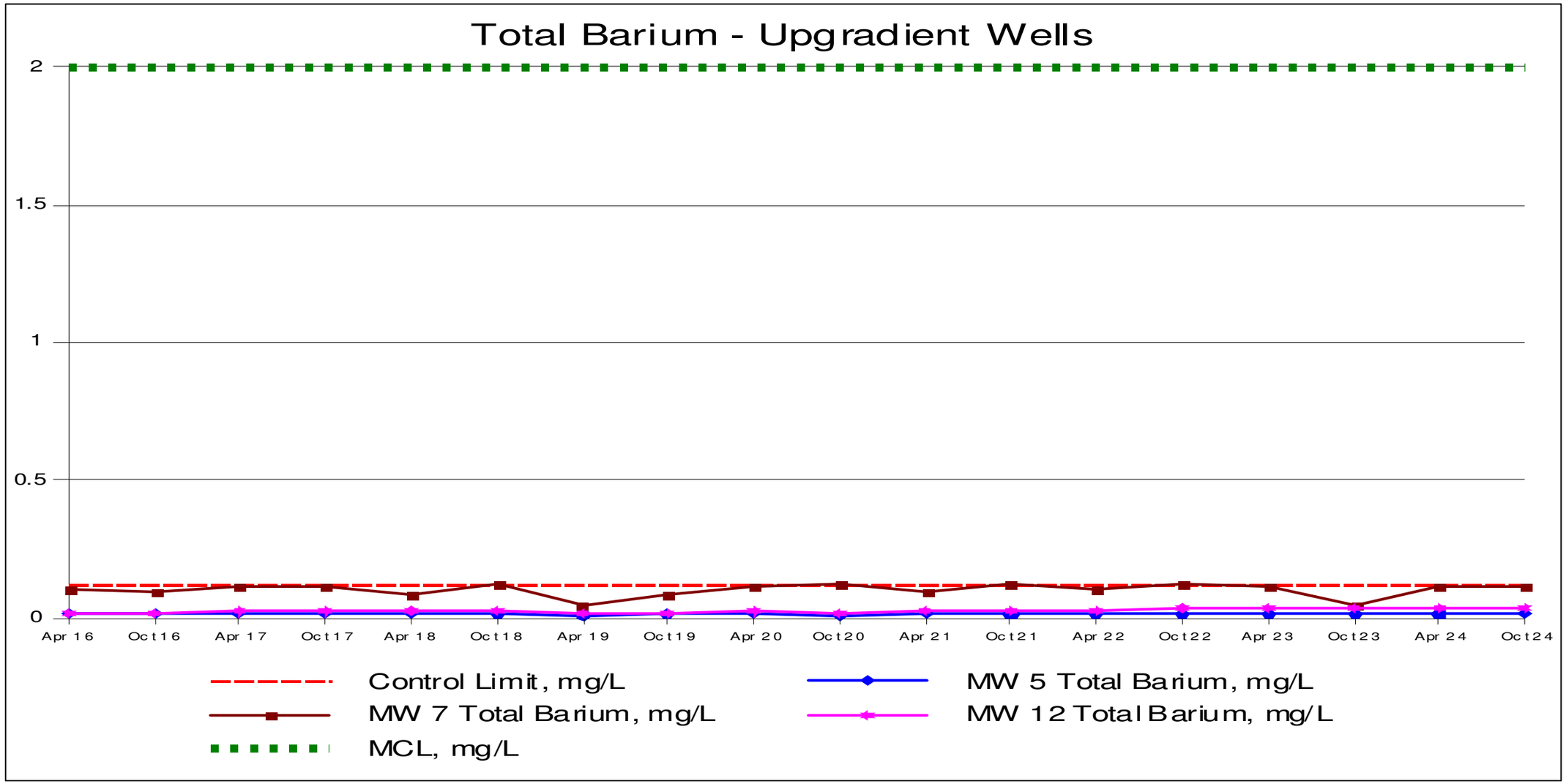

Chloride - Upgradient Wells
250
200
150
100
50
0
Apr 96
Apr 97
Apr 98
Apr 99
Apr 00
Apr 01
Mar 04
Mar 05
Apr 06
Apr 07
Apr 08
Oct 13
Oct 14
Oct 15
Oct 16
Oct 17
Oct 18
Oct 19
Oct 20
Oct 21
Oct 22
Oct 23
Oct 24
Control Limit, mg/L
MW 5 Chloride, mg/L
MW 7 Chloride, mg/L
MW 12 Chloride, mg/L
SMCL, mg/L

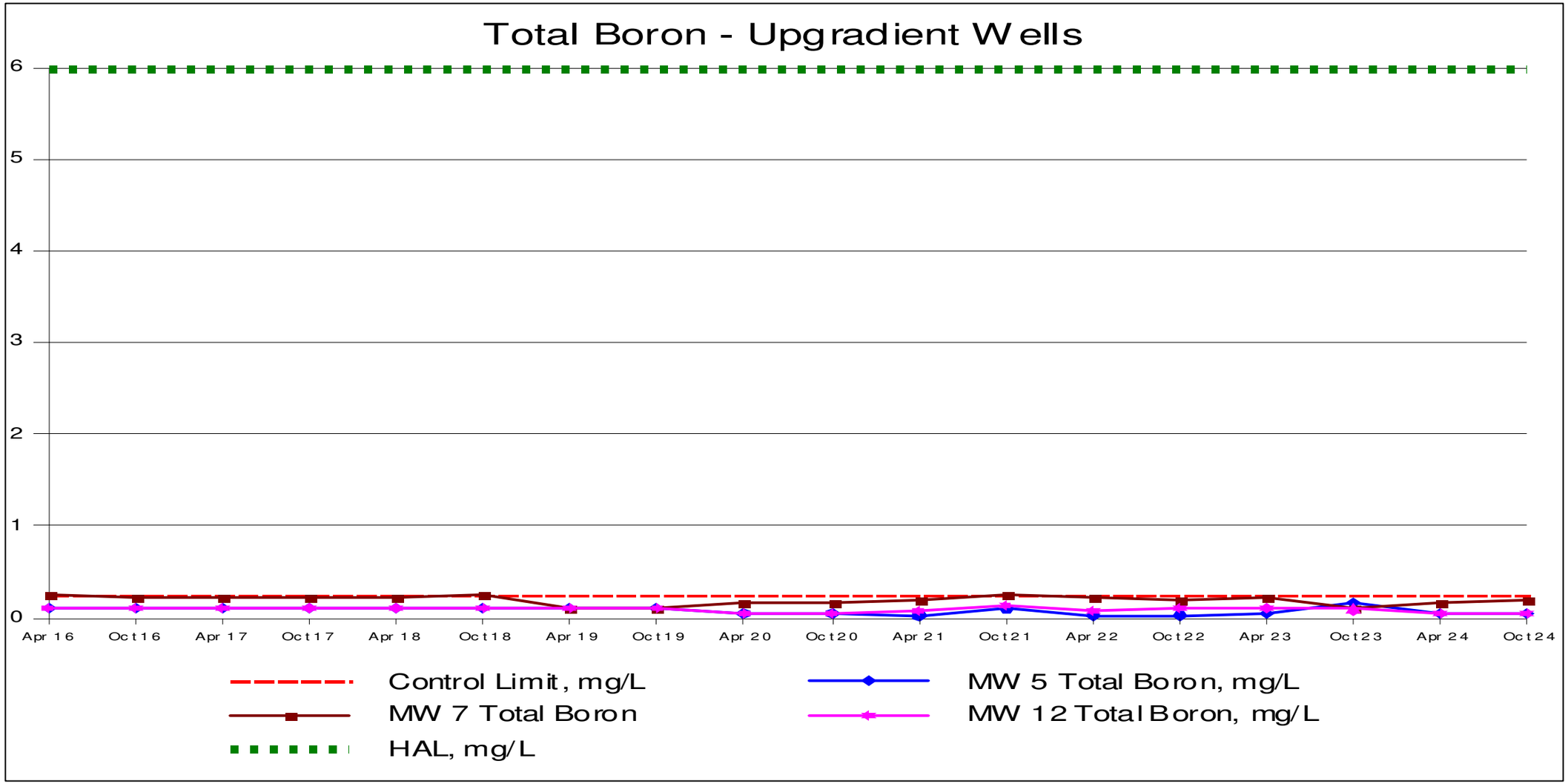

Fluoride - Upgradient Wells
4
2
0
Apr 16
Oct 16
Oct 17
Apr 18
Oct 18
Apr 19
Oct 19
Apr 20
Oct 20
Apr 21
Oct 21
Apr 22
Oct 22
Apr 23
Oct 23
Apr 24
Oct 24
Control Limit, mg/L
MW 5 Fluoride, mg/L
MW 7 Fluoride, mg/L
MW 12 Fluoride, mg/L
MCL, mg/L

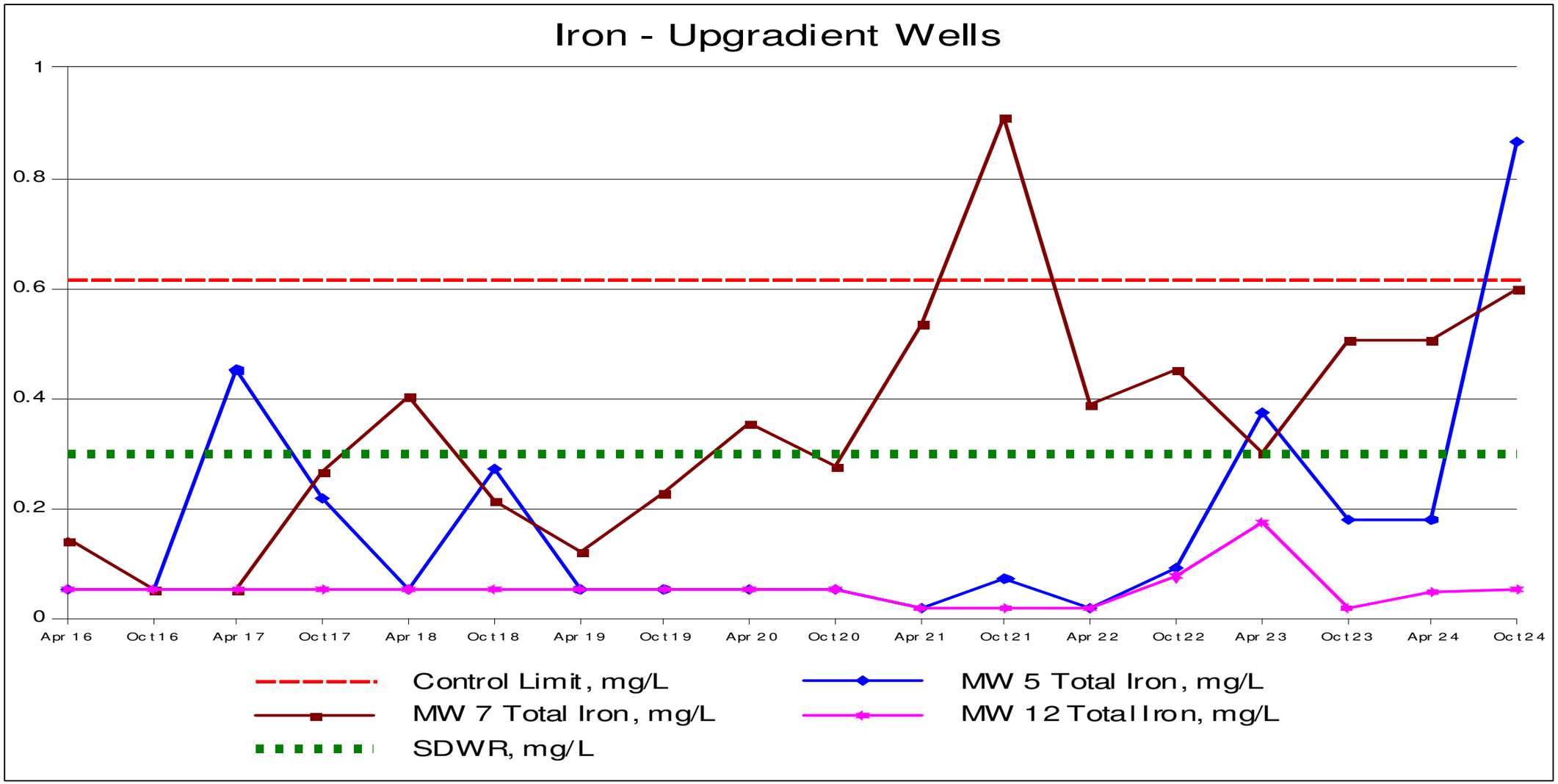

Chemical Oxygen Demand - Upgradient Wells
60
50
40
30
20
10
0
Apr 96
Apr 97
Apr 98
Apr 99
Apr 00
Apr 01
Mar 04
Mar 05
Apr 06
Apr 07
Apr 08
Oct 13
Oct 14
Oct 15
Oct 16
Oct 17
Oct 18
Oct 19
Oct 20
Oct 21
Oct 22
Oct 23
Oct 24
Control Limit, mg/L
MW 5 COD, mg/L
MW 7 COD, mg/L
MW 12 COD, mg/L

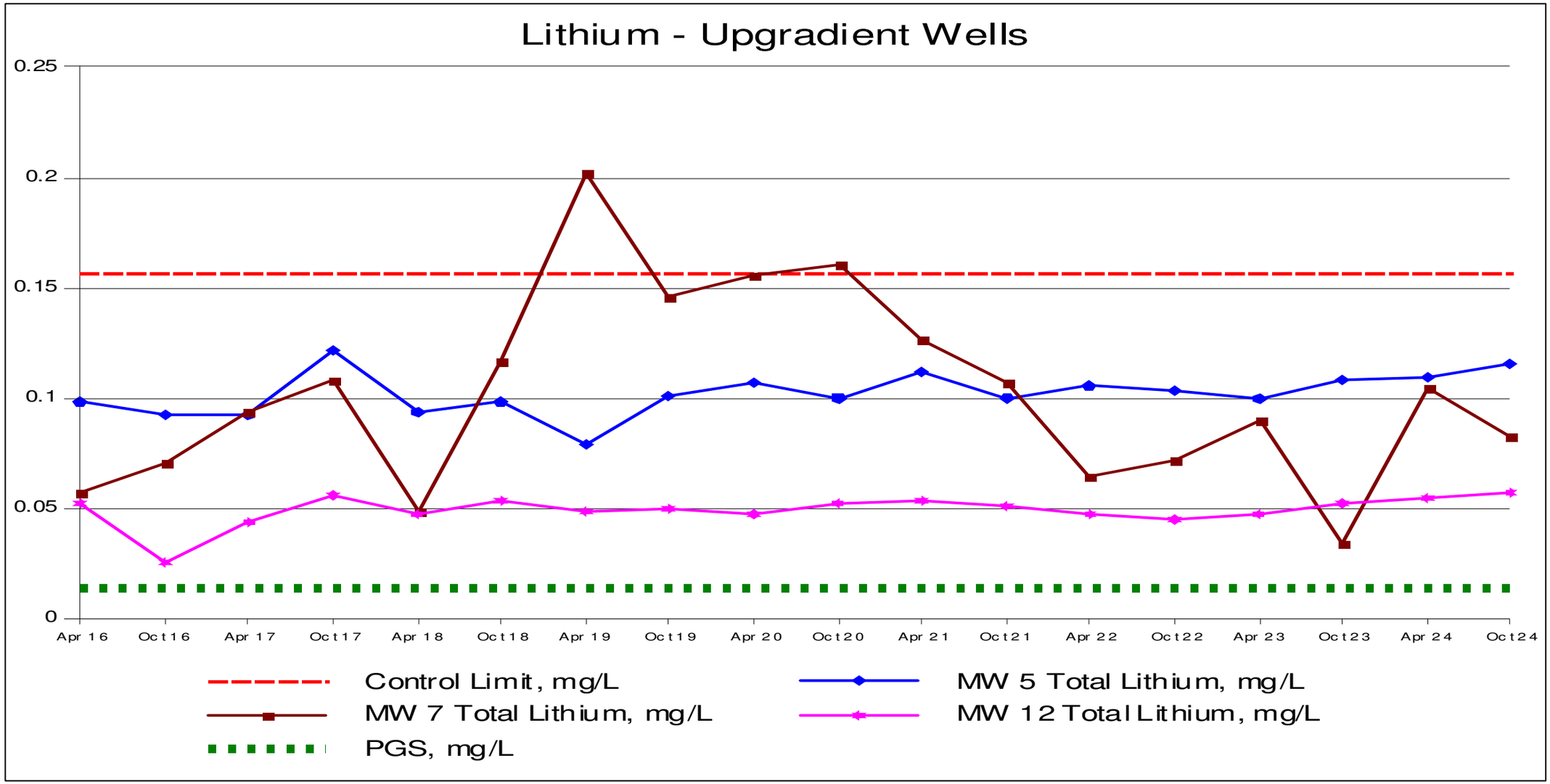

Ammonia Nitrogen - Upgradient Wells
10
8
6
4
2
0
Apr 96
Apr 97
Apr 98
Apr 99
Apr 00
Apr 01
Mar 04
Mar 05
Apr 06
Apr 07
Apr 08
Oct13
Oct14
Oct15
Oct16
Oct17
Oct18
Oct19
Oct20
Oct21
Oct22
Oct23
Oct24
Control Limit, mg/L
MW 7 Ammonia Nitrogen, mg/L
MCL, mg/L
MW 5 Ammonia Nitrogen, mg/L
MW 12 Ammonia Nitrogen, mg/L

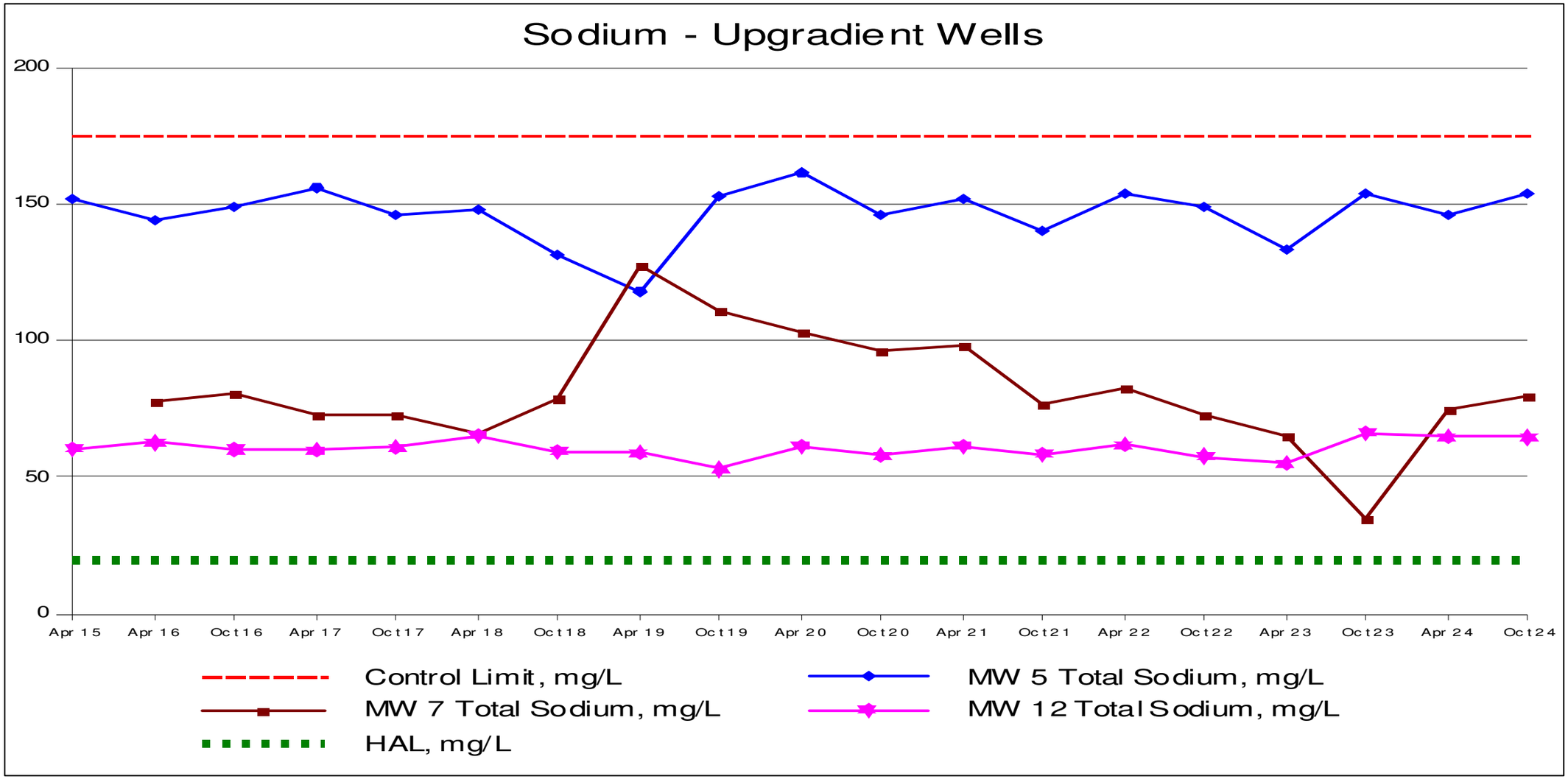

Aluminum - Upgradient Wells
0.12
0.1
0.08
0.06
0.04
0.02
0
Apr 15
Apr 16
Oct16
Apr 17
Oct17
Apr 18
Oct18
Apr 19
Oct19
Apr 20
Oct20
Apr 21
Oct21
Apr 22
Oct22
Apr 23
Oct23
Apr 24
Oct24
Control Limit, mg/L
MW 5 Total Aluminum, mg/L
MW 7 Total Aluminum, mg/L
MW 12 Total Aluminum, mg/L
SDWR, mg/L

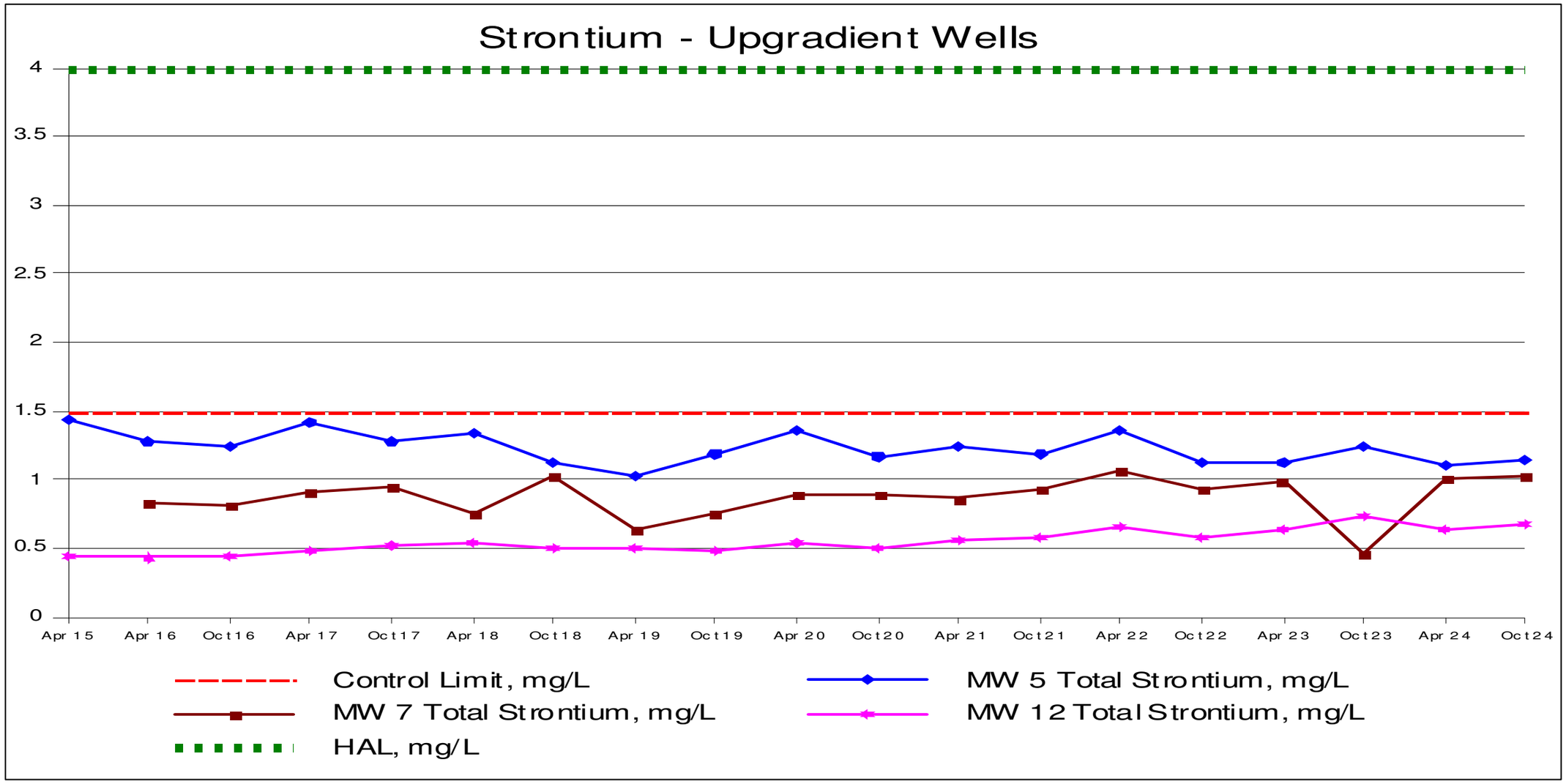

Total Barium - Upgradient Wells
2
1.5
1
0.5
0
Apr 16
Oct16
Apr 17
Oct17
Apr 18
Oct18
Apr 19
Oct19
Apr 20
Oct20
Apr 21
Oct21
Apr 22
Oct22
Apr 23
Oct23
Apr 24
Oct24
Control Limit, mg/L
MW 7 Total Barium, mg/L
MCL, mg/L
MW 5 Total Barium, mg/L
MW 12 Total Barium, mg/L

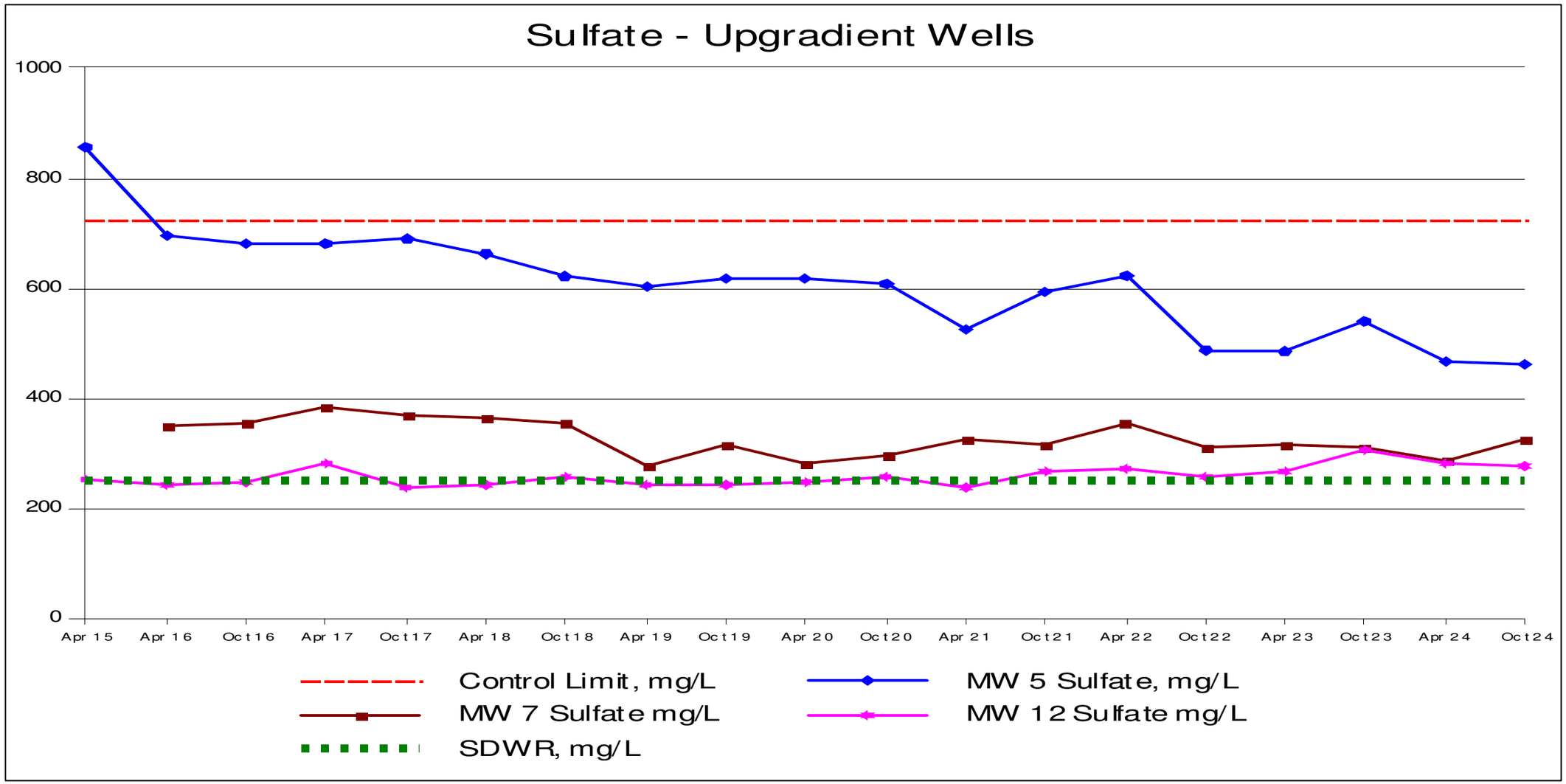

Total Boron - Upgradient Wells
6
5
4
3
2
1
0
Apr 16
Oct 16
Apr 17
Oct 17
Apr 18
Oct 18
Apr 19
Oct 19
Apr 20
Oct 20
Apr 21
Oct 21
Apr 22
Oct 22
Apr 23
Oct 23
Apr 24
Oct 24
Control Limit, mg/L
MW 7 Total Boron
HAL, mg/L
MW 5 Total Boron, mg/L
MW 12 Total Boron, mg/L

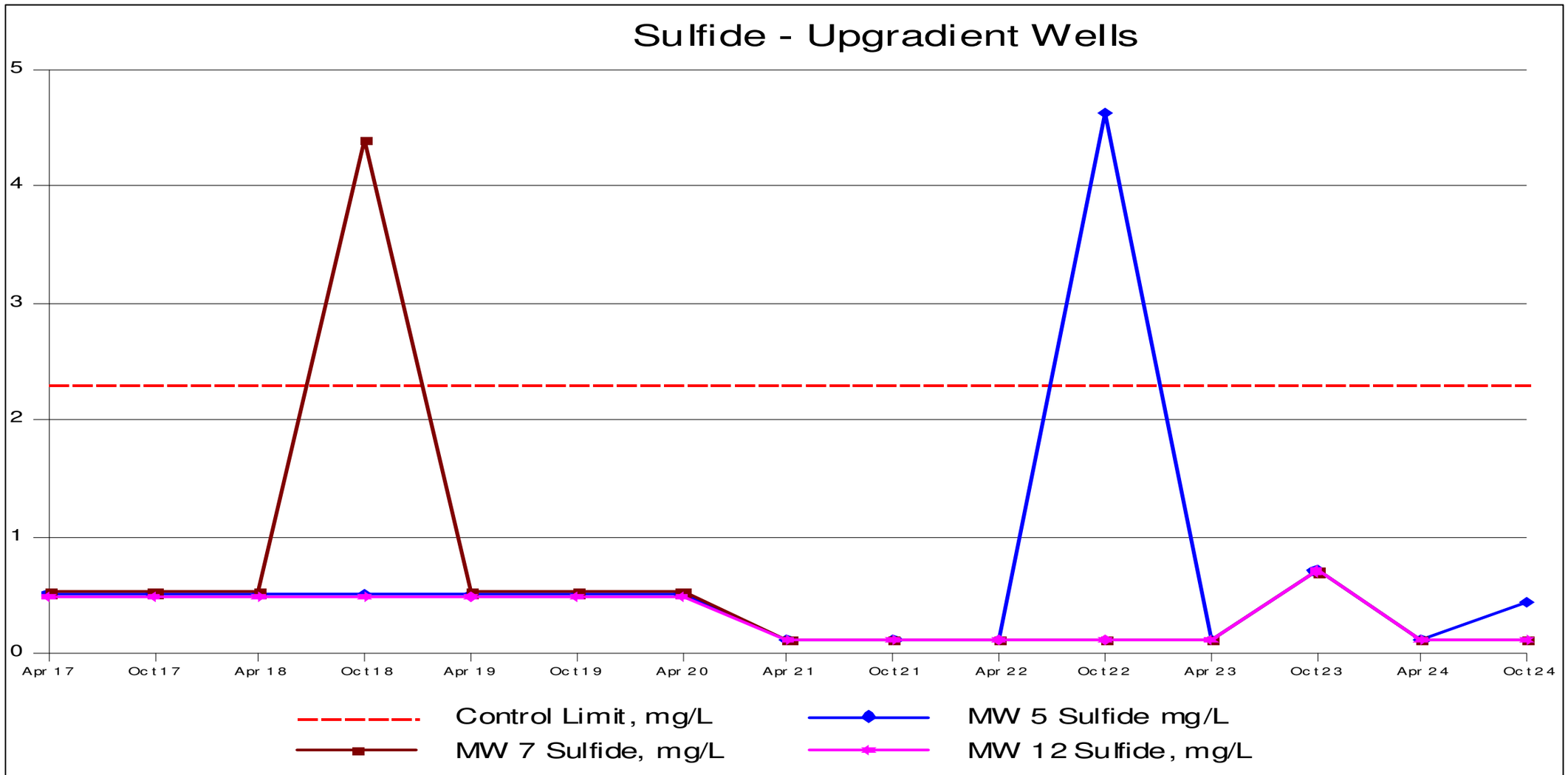

Iron - Upgradient Wells
1
0.8
0.6
0.4
0.2
0
Apr 16
Oct16
Apr 17
Oct17
Apr 18
Oct18
Apr 19
Oct19
Apr 20
Oct20
Apr 21
Oct21
Apr 22
Oct22
Apr 23
Oct23
Apr 24
Oct24
Control Limit, mg/L
MW 7 Total Iron, mg/L
SDWR, mg/L
MW 5 Total Iron, mg/L
MW 12 Total Iron, mg/L

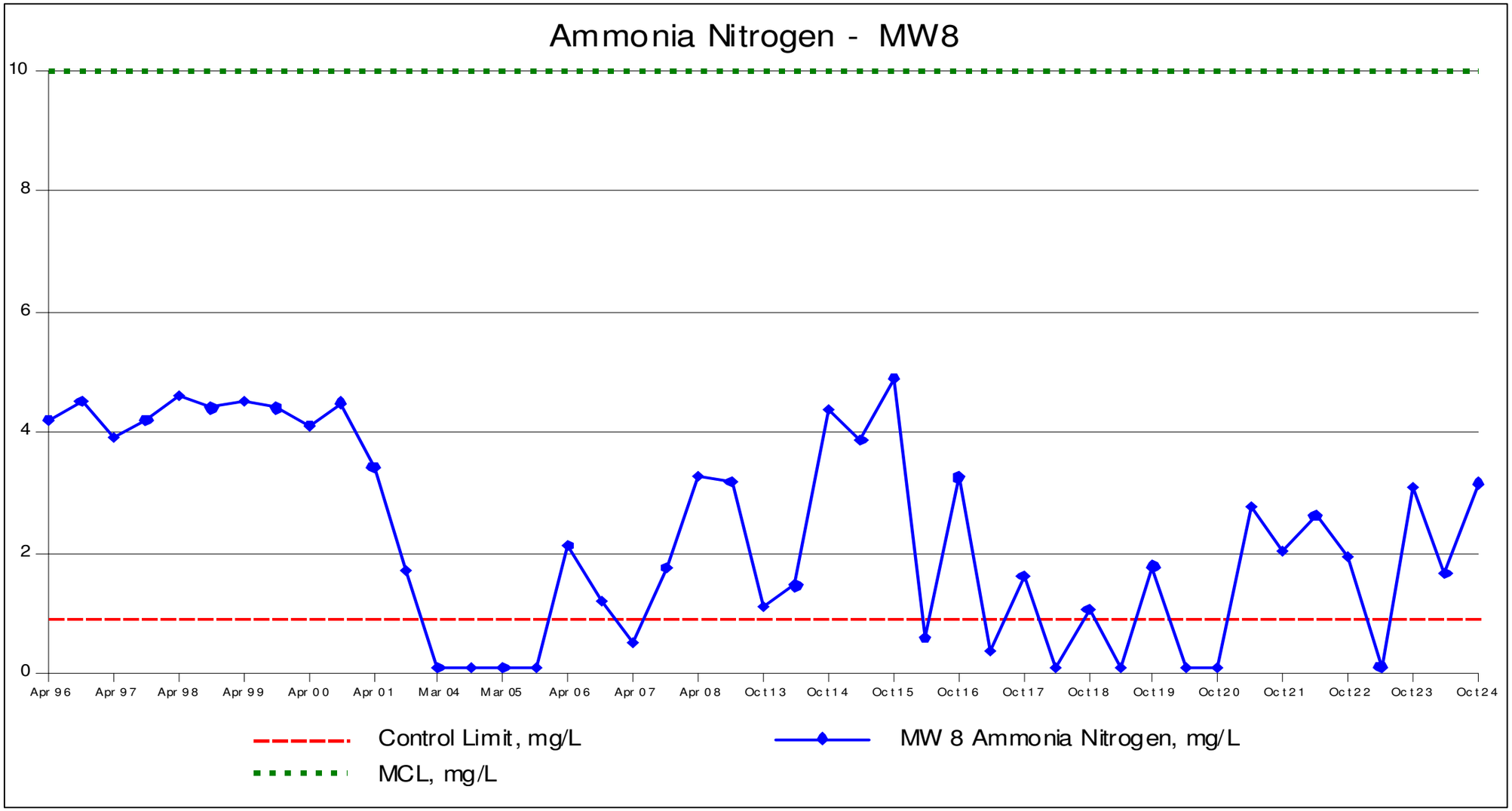

Lithium - Upgradient Wells
0.25
0.2
0.15
0.1
0.05
0
Apr 16
Oct 16
Apr 17
Oct 17
Apr 18
Oct 18
Apr 19
Oct 19
Apr 20
Oct 20
Apr 21
Oct 21
Apr 22
Oct 22
Apr 23
Oct 23
Apr 24
Oct 24
Control Limit, mg/L
MW 5 Total Lithium, mg/L
MW 7 Total Lithium, mg/L
MW 12 Total Lithium, mg/L
PGS, mg/L

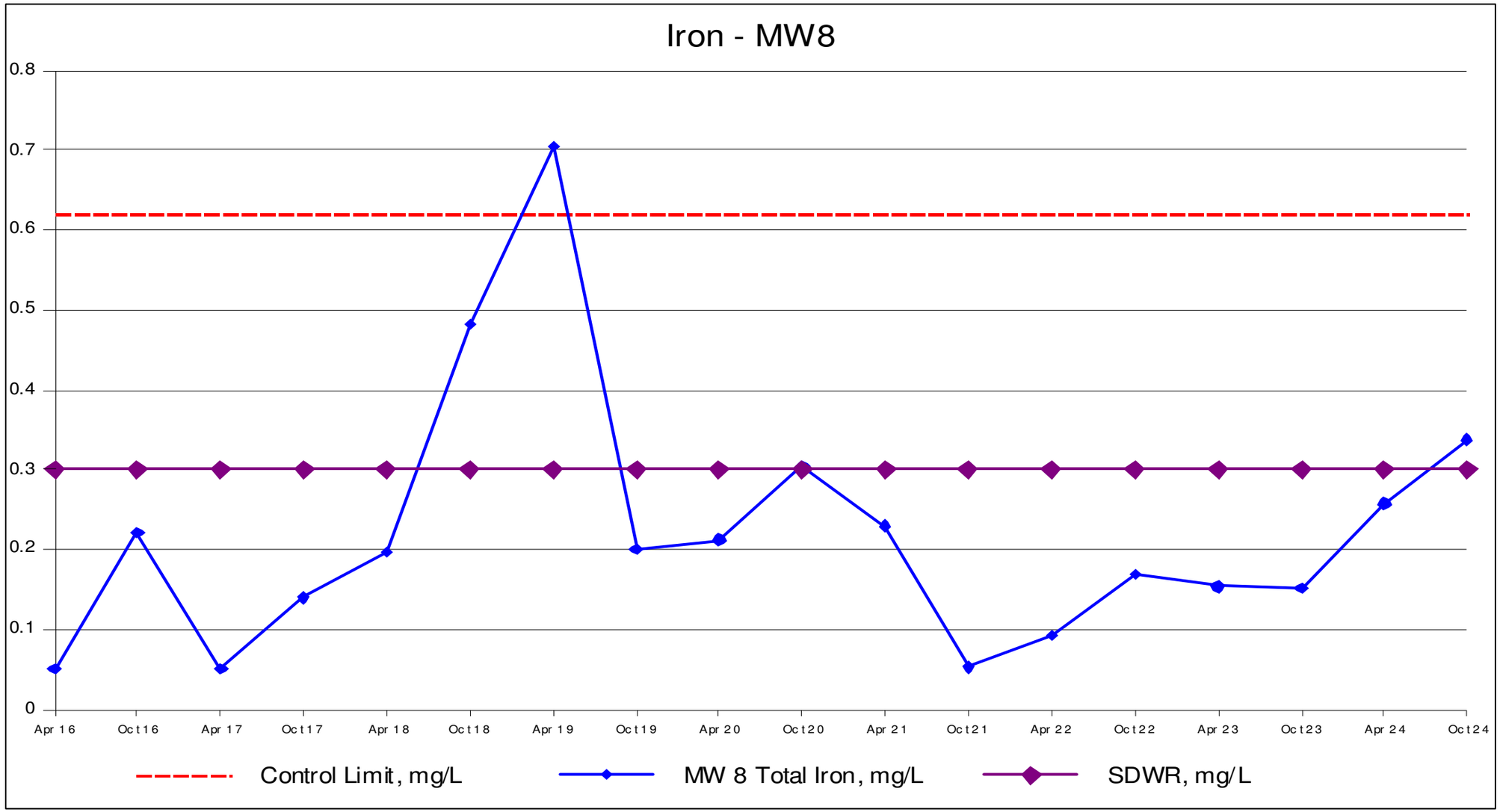

Sodium - Upgradient Wells
200
150
100
50
0
Apr 15
Apr 16
Oct16
Apr 17
Oct17
Apr 18
Oct18
Apr 19
Oct19
Apr 20
Oct20
Apr 21
Oct21
Apr 22
Oct22
Apr 23
Oct23
Apr 24
Oct24
Control Limit, mg/L
MW 5 Total Sodium, mg/L
MW 7 Total Sodium, mg/L
MW 12 Total Sodium, mg/L
HAL, mg/L

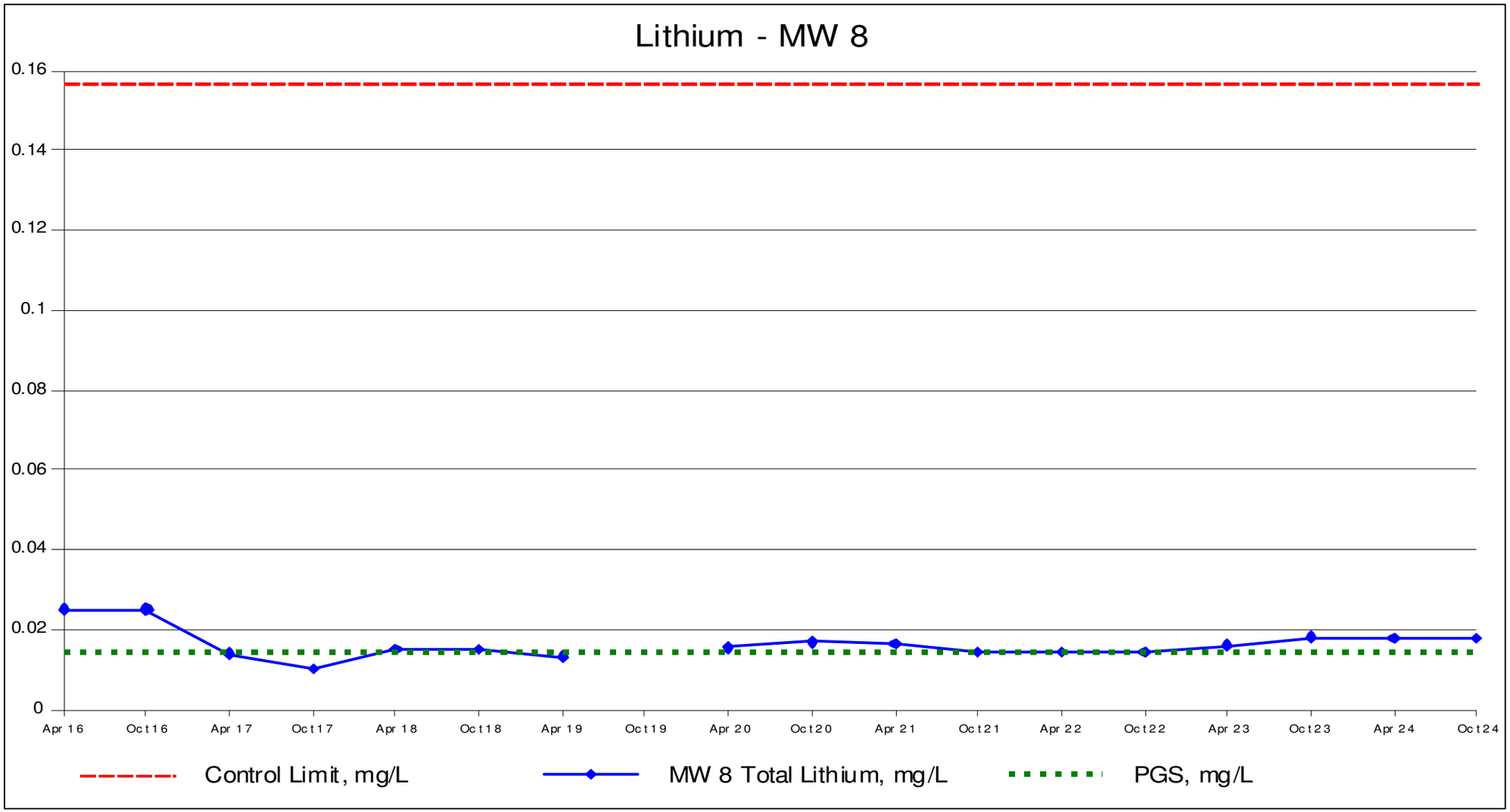

Strontium - Upgradient Wells
4
3.5
3
2.5
2
1.5
1
0.5
0
Apr 15
Apr 16
Oct16
Apr 17
Oct17
Apr 18
Oct18
Apr 19
Oct19
Apr 20
Oct20
Apr 21
Oct21
Apr 22
Oct22
Apr 23
Oct23
Apr 24
Oct24
Control Limit, mg/L
MW 5 Total Strontium, mg/L
MW 7 Total Strontium, mg/L
MW 12 Total Strontium, mg/L
HAL, mg/L

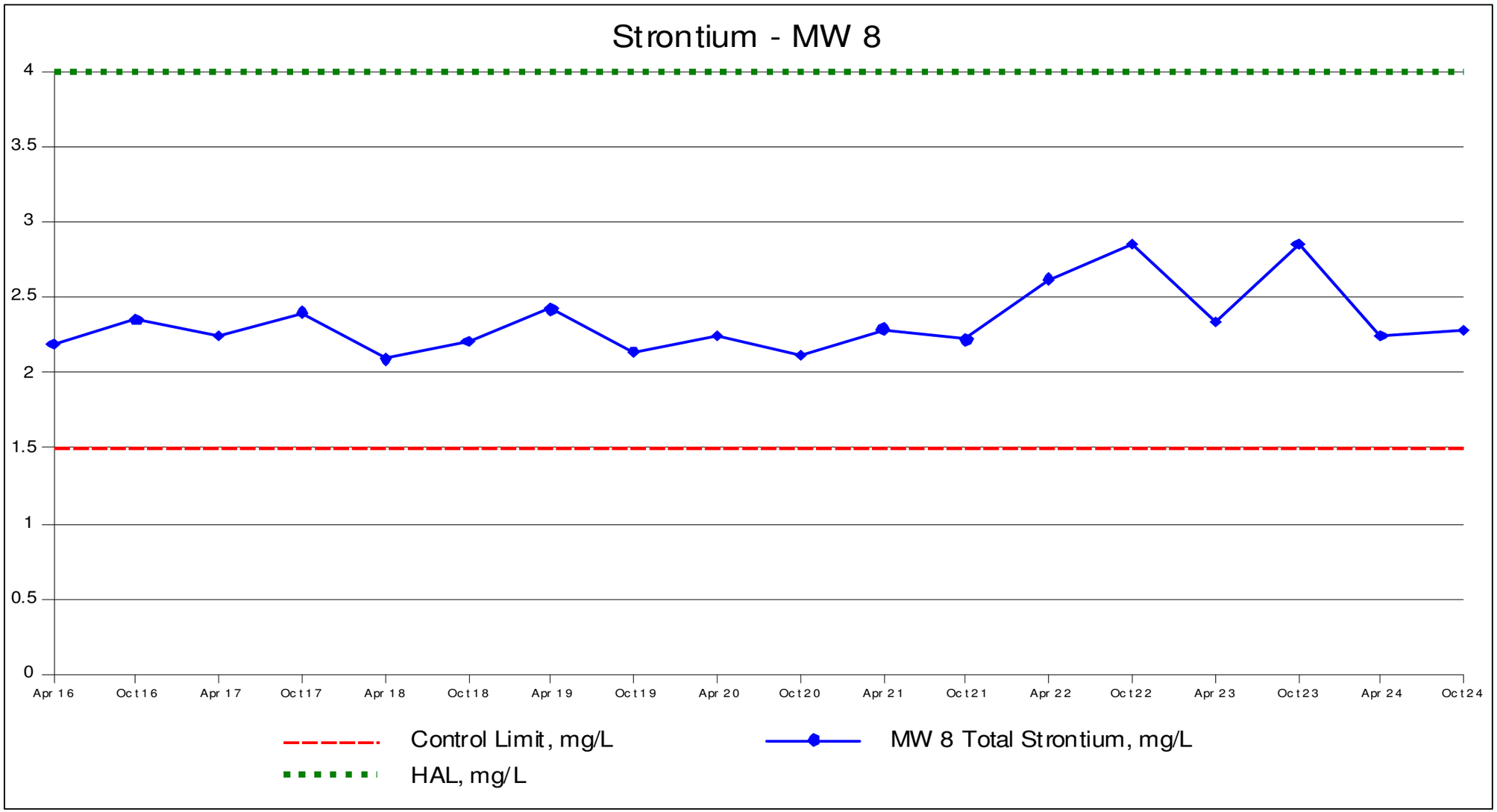

Sulfate - Upgradient Wells
1000
800
600
400
200
0
Apr 15
Apr 16
Oct16
Apr 17
Oct17
Apr 18
Oct18
Apr 19
Oct19
Apr 20
Oct20
Apr 21
Oct21
Apr 22
Oct22
Apr 23
Oct23
Apr 24
Oct24
Control Limit, mg/L
MW 5 Sulfate, mg/L
MW 7 Sulfate mg/L
MW 12 Sulfate mg/L
SDWR, mg/L

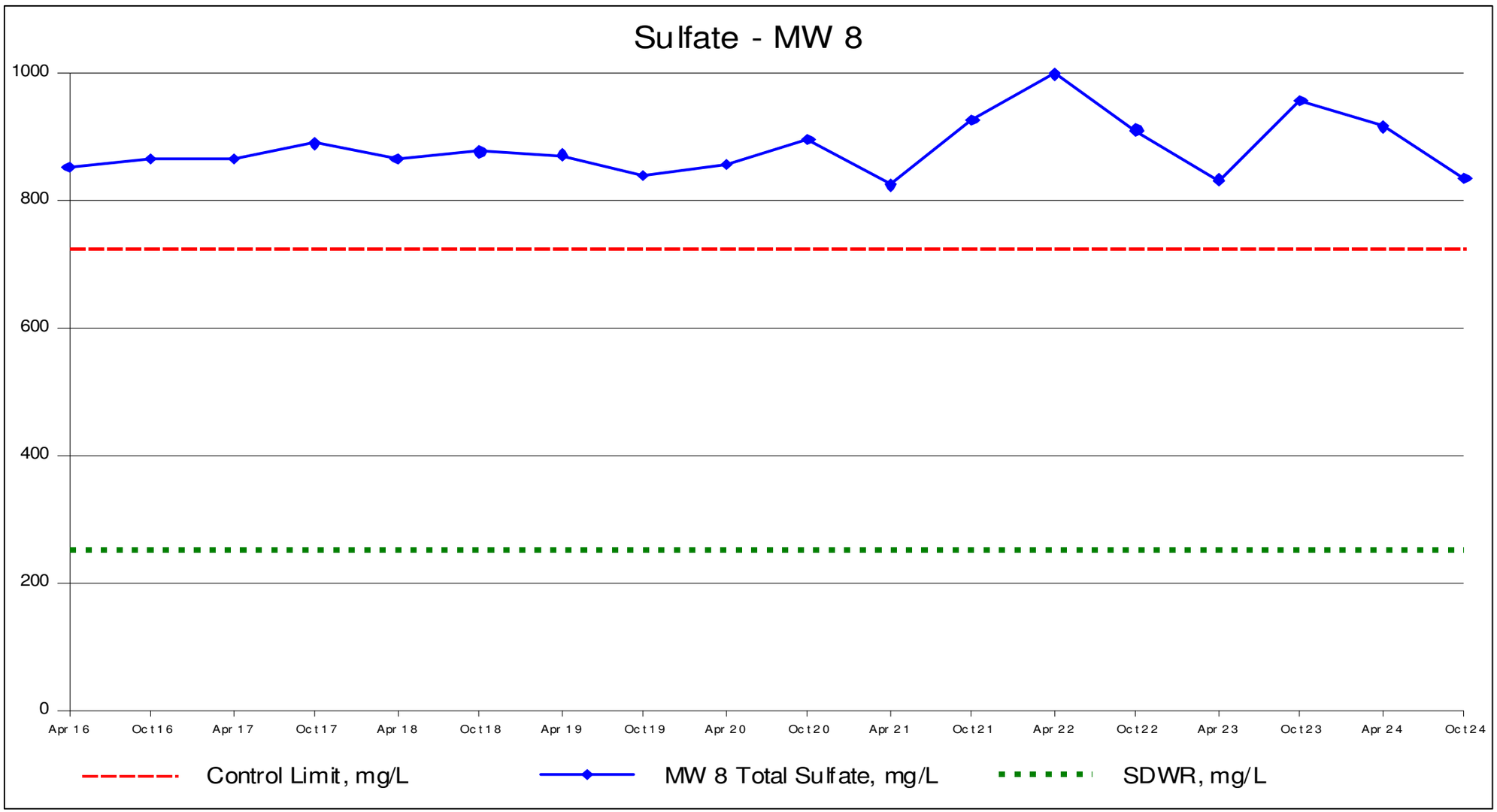

Sulfide - Upgradient Wells
5
4
3
2
1
0
Apr 17
Oct 17
Apr 18
Oct 18
Apr 19
Oct 19
Apr 20
Apr 21
Oct 21
Apr 22
Oct 22
Apr 23
Oct 23
Apr 24
Oct 24
Control Limit, mg/L
MW 5 Sulfide mg/L
MW 7 Sulfide, mg/L
MW 12 Sulfide, mg/L

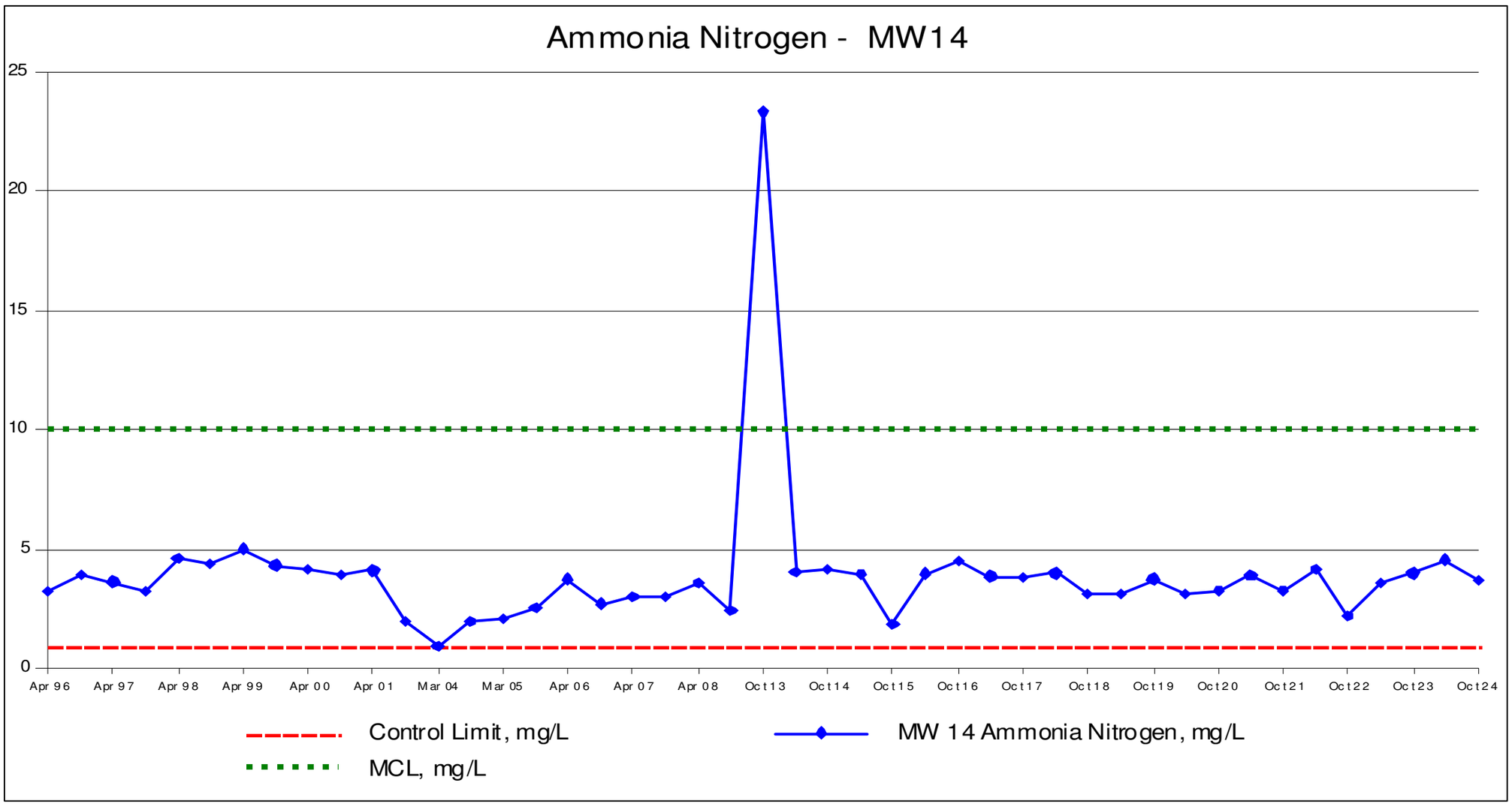

Ammonia Nitrogen - MW8
10
8
6
4
2
0
Apr 96
Apr 97
Apr 98
Apr 99
Apr 00
Apr 01
Mar 04
Mar 05
Apr 06
Apr 07
Apr 08
Oct13
Oct14
Oct15
Oct16
Oct17
Oct18
Oct19
Oct20
Oct21
Oct22
Oct23
Oct24
Control Limit, mg/L
MCL, mg/L
MW 8 Ammonia Nitrogen, mg/L

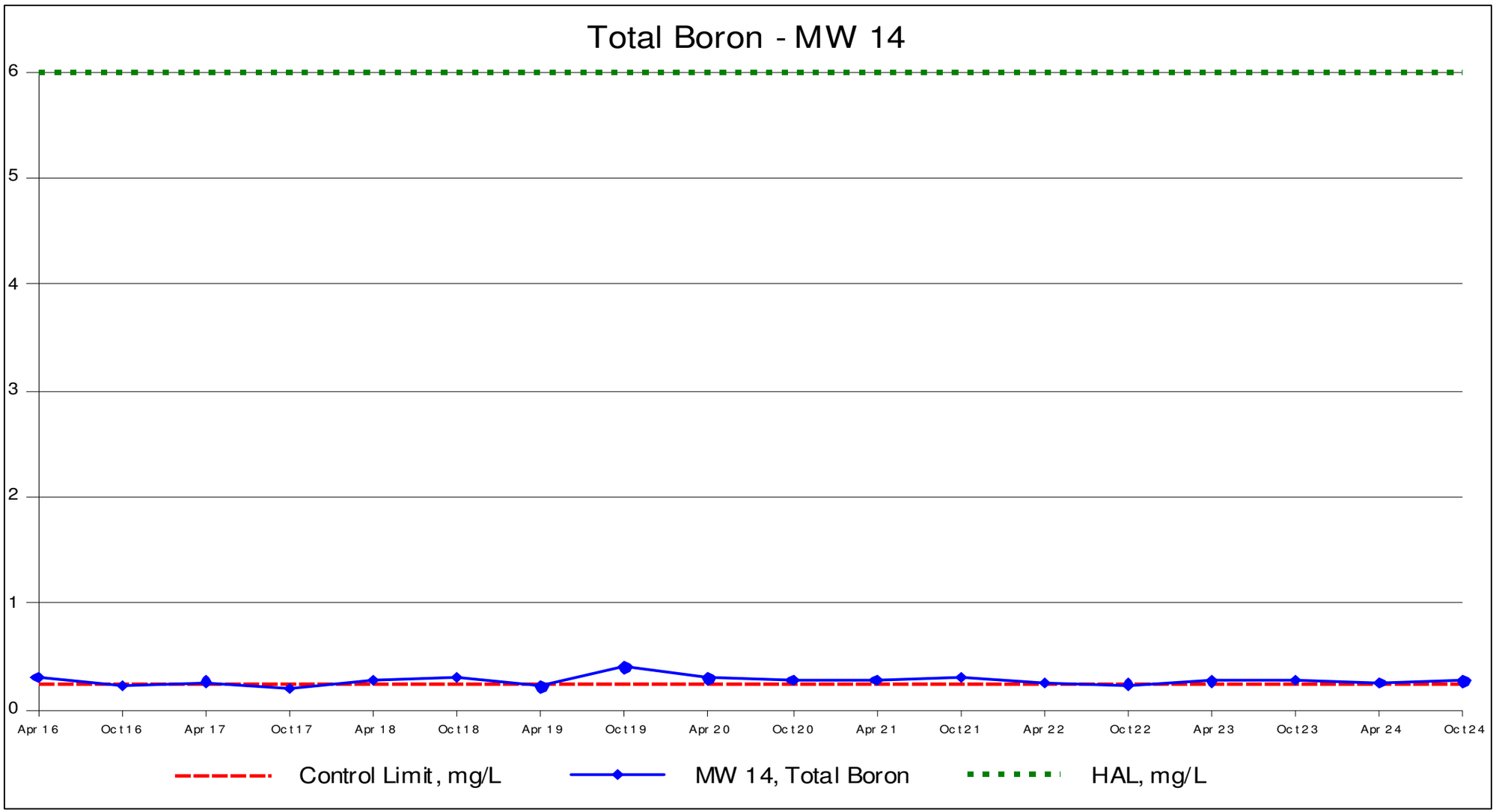

Iron - MW8
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
Apr 16
Oct 16
Apr 17
Oct 17
Apr 18
Oct 18
Apr 19
Oct 19
Apr 20
Oct 20
Apr 21
Oct 21
Apr 22
Oct 22
Apr 23
Oct 23
Apr 24
Oct 24
Control Limit, mg/L
MW 8 Total Iron, mg/L
SDWR, mg/L

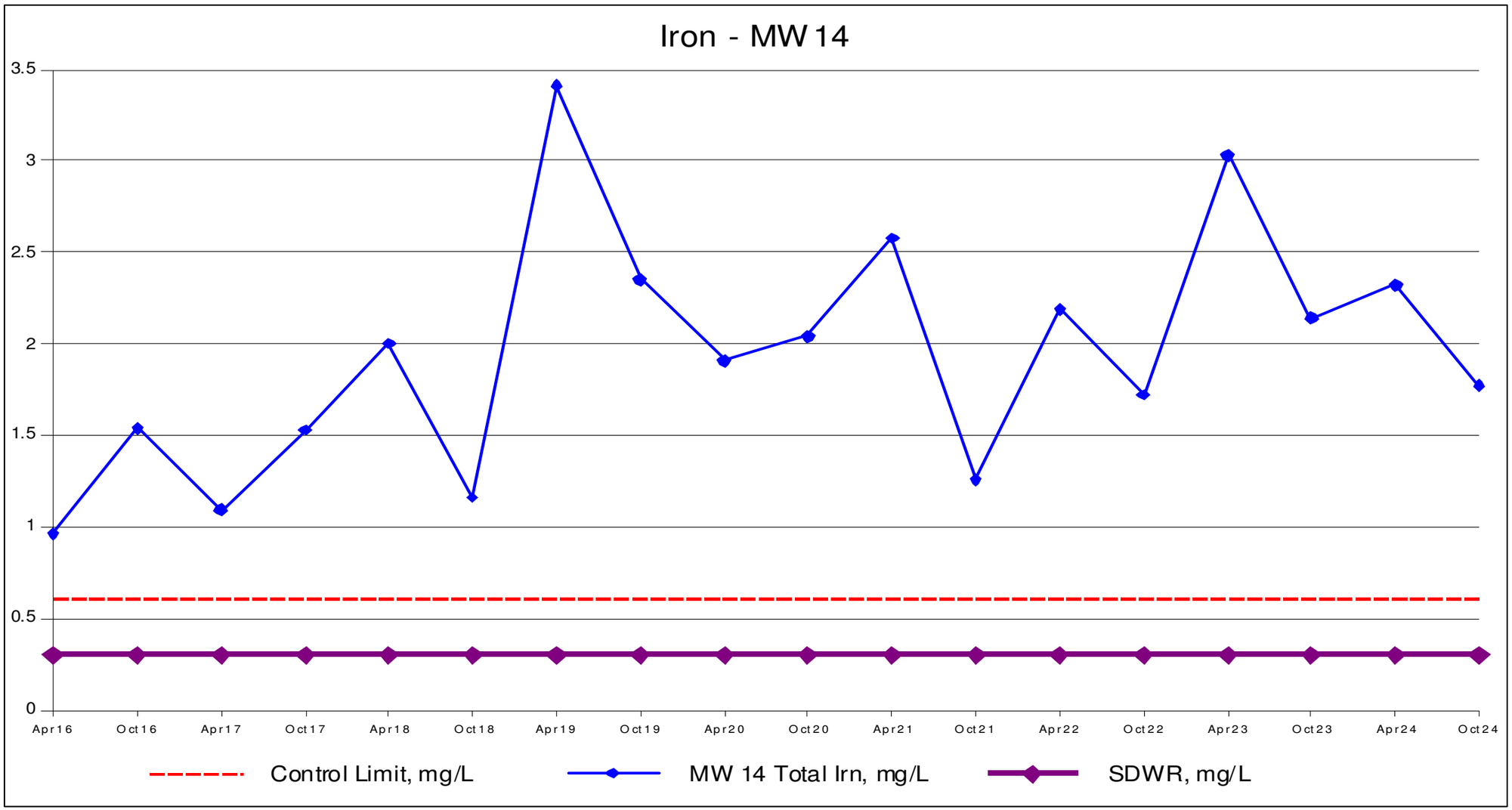

Lithium - MW 8
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
Apr 16
Oct16
Apr 17
Oct17
Apr 18
Oct18
Apr 19
Oct19
Apr 20
Oct20
Apr 21
Oct21
Apr 22
Oct22
Apr 23
Oct23
Apr 24
Oct24
Control Limit, mg/L
MW 8 Total Lithium, mg/L
PGS, mg/L

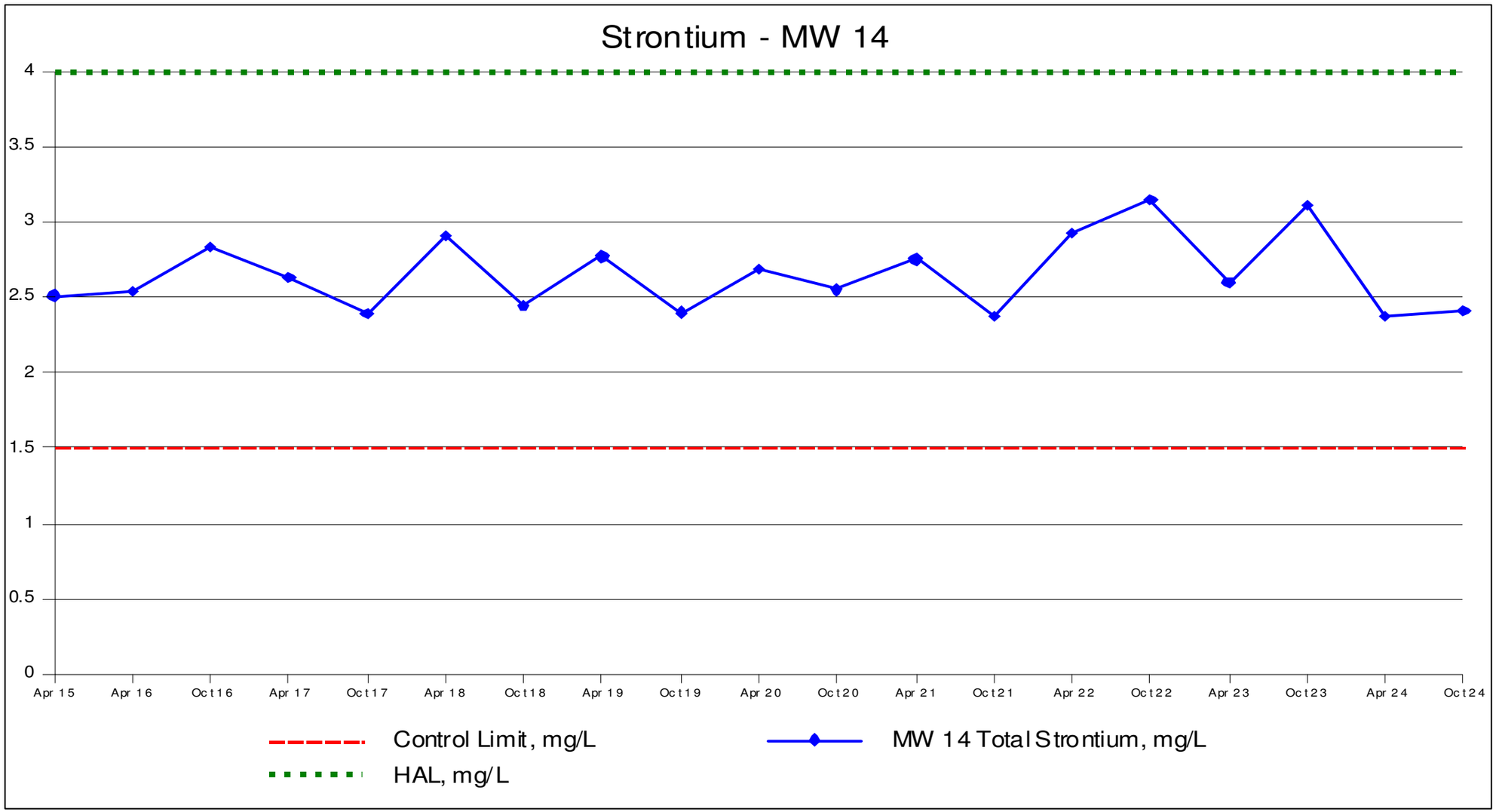

Strontium - MW 8
4
3.5
3
2.5
2
1.5
1
0.5
0
Apr 16
Oct 16
Apr 17
Oct 17
Apr 18
Oct 18
Apr 19
Oct 19
Apr 20
Oct 20
Apr 21
Oct 21
Apr 22
Oct 22
Apr 23
Oct 23
Apr 24
Oct 24
Control Limit, mg/L
MW 8 Total Strontium, mg/L
HAL, mg/L

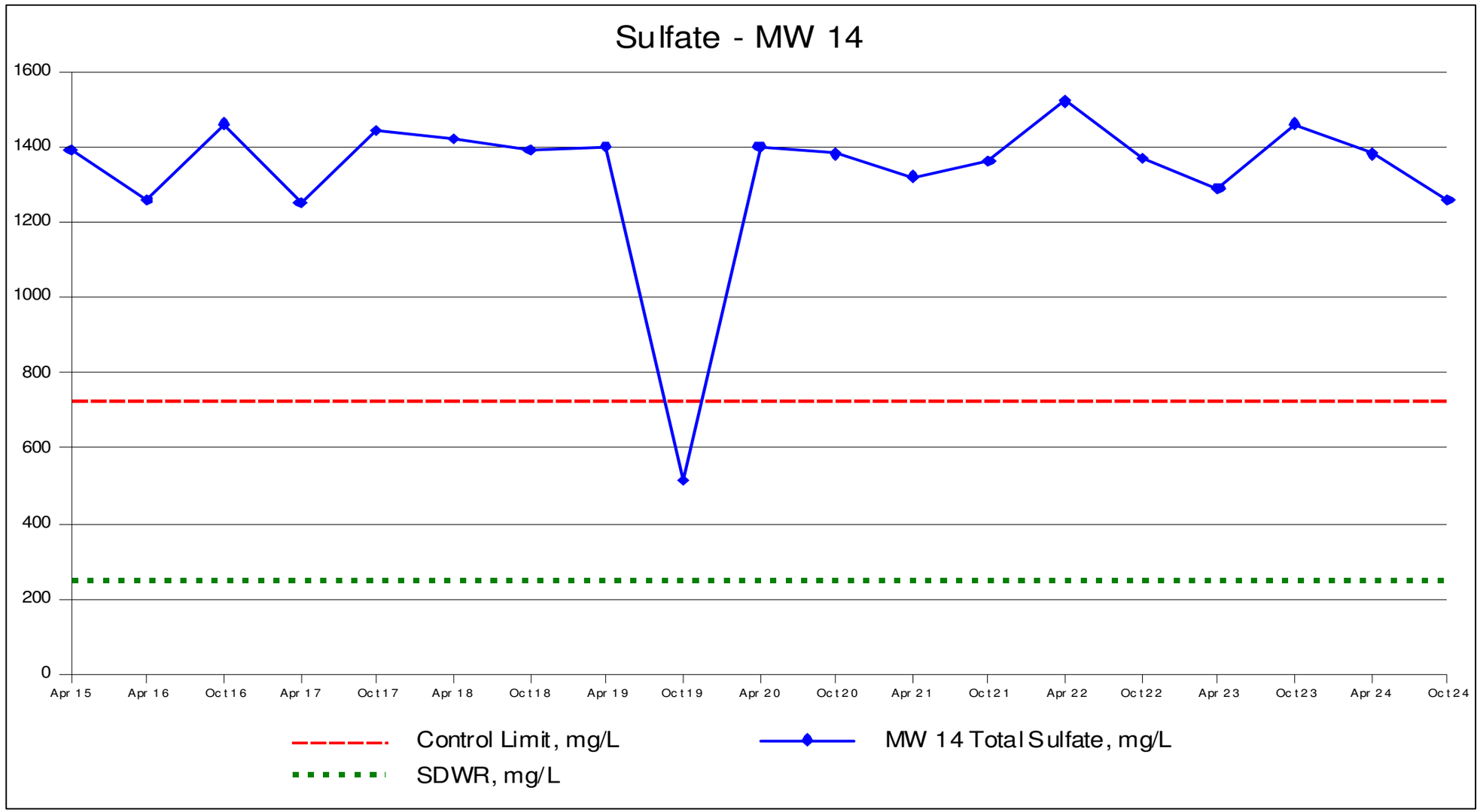

Sulfate - MW 8
1000
800
600
400
200
0
Apr 16
Oct16
Apr 17
Oct17
Apr 18
Oct18
Apr 19
Oct19
Apr 20
Oct20
Apr 21
Oct21
Apr 22
Oct22
Apr 23
Oct23
Apr 24
Oct24
Control Limit, mg/L
MW 8 Total Sulfate, mg/L
SDWR, mg/L

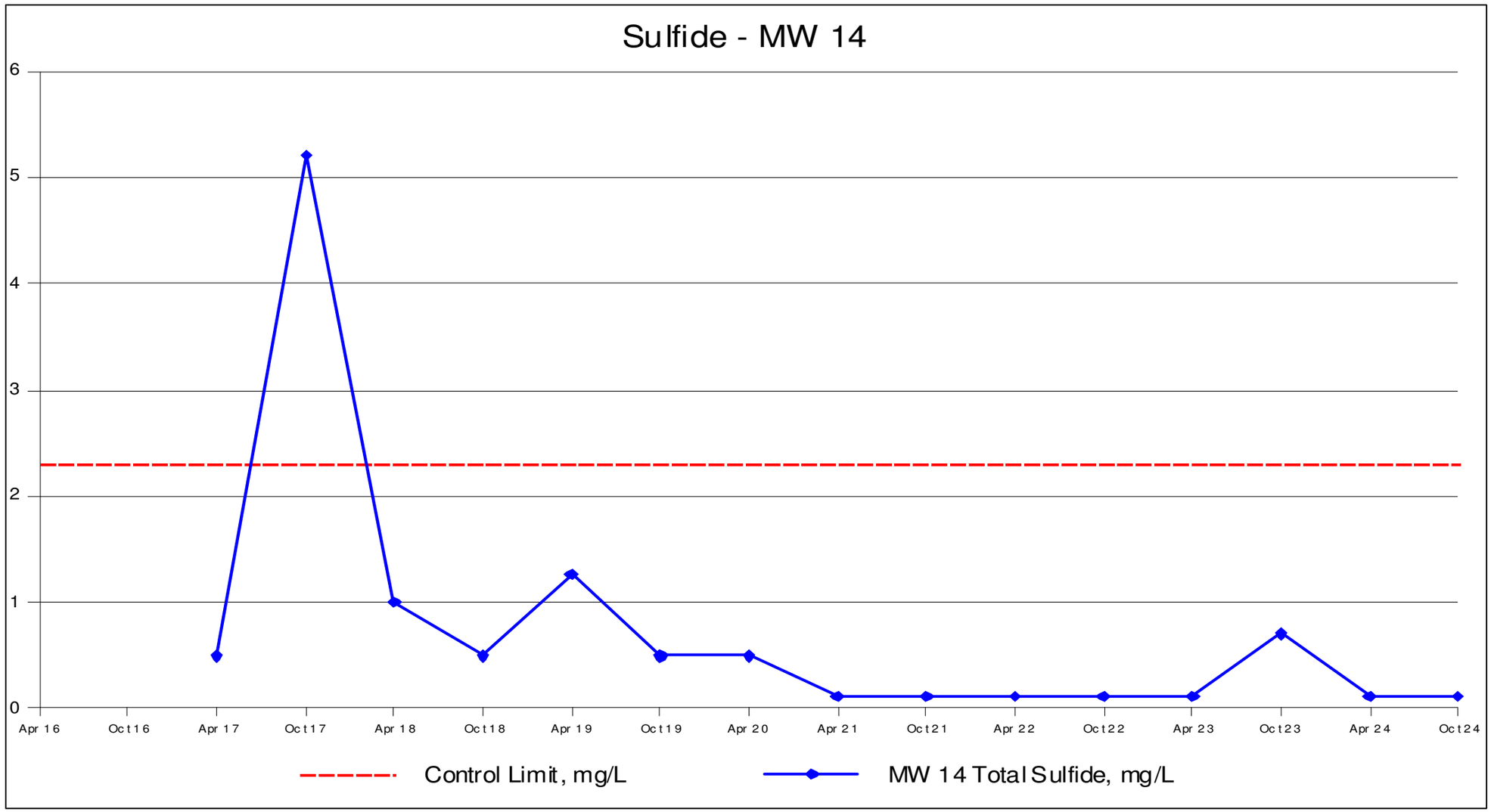

Ammonia Nitrogen - MW14
25
20
15
10
5
0
Apr 96
Apr 97
Apr 98
Apr 99
Apr 00
Apr 01
Mar 04
Mar 05
Apr 06
Apr 07
Apr 08
Oct 13
Oct 14
Oct 15
Oct 16
Oct 17
Oct 18
Oct 19
Oct 20
Oct 21
Oct 22
Oct 23
Oct 24
Control Limit, mg/L
MCL, mg/L
MW 14 Ammonia Nitrogen, mg/L

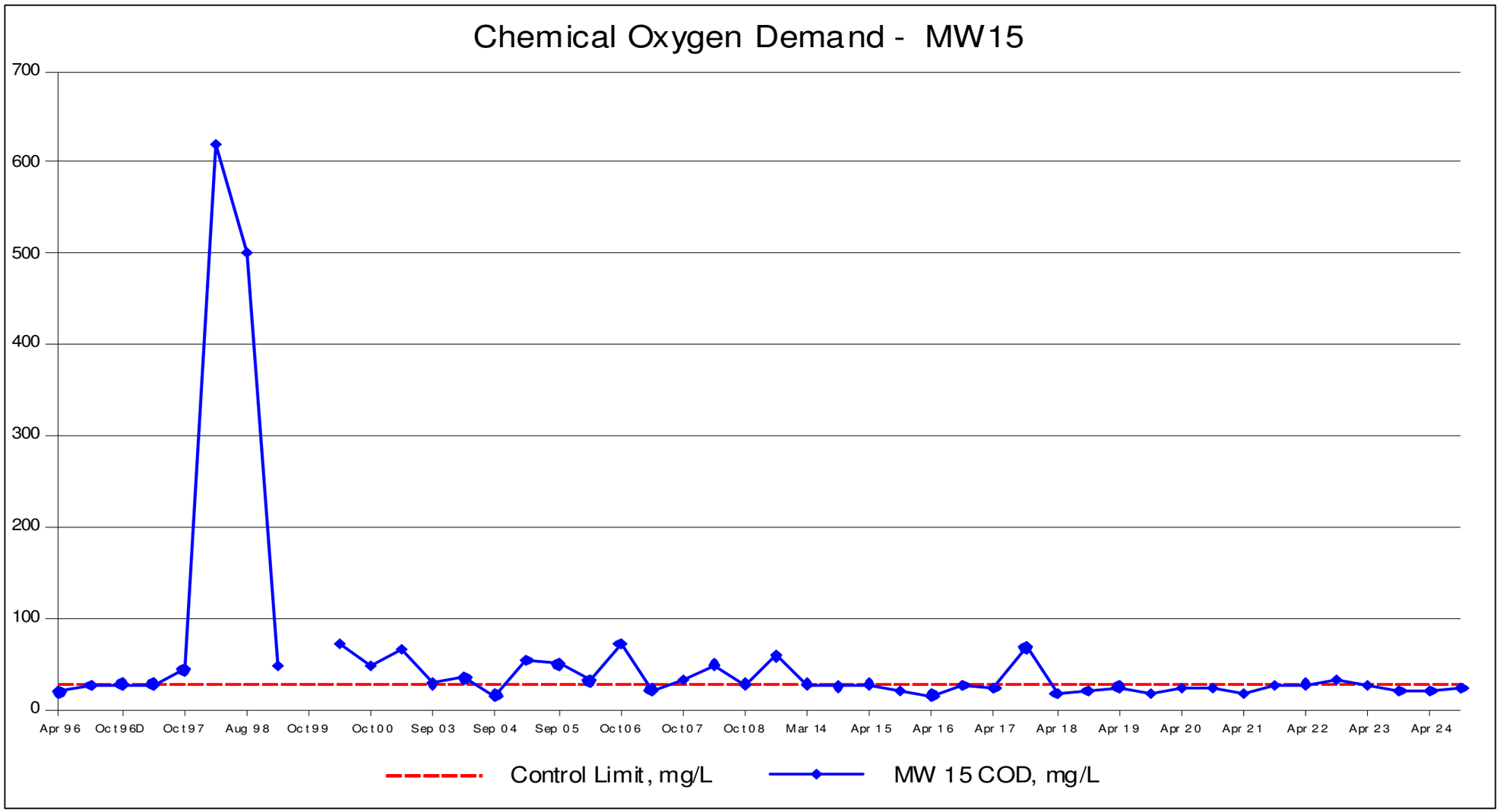

Total Boron - MW 14
6
5
4
3
2
1
0
Apr 16
Oct 16
Apr 17
Oct 17
Apr 18
Oct 18
Apr 19
Oct 19
Apr 20
Oct 20
Apr 21
Oct 21
Apr 22
Oct 22
Apr 23
Oct 23
Apr 24
Oct 24
Control Limit, mg/L
MW 14, Total Boron
HAL, mg/L

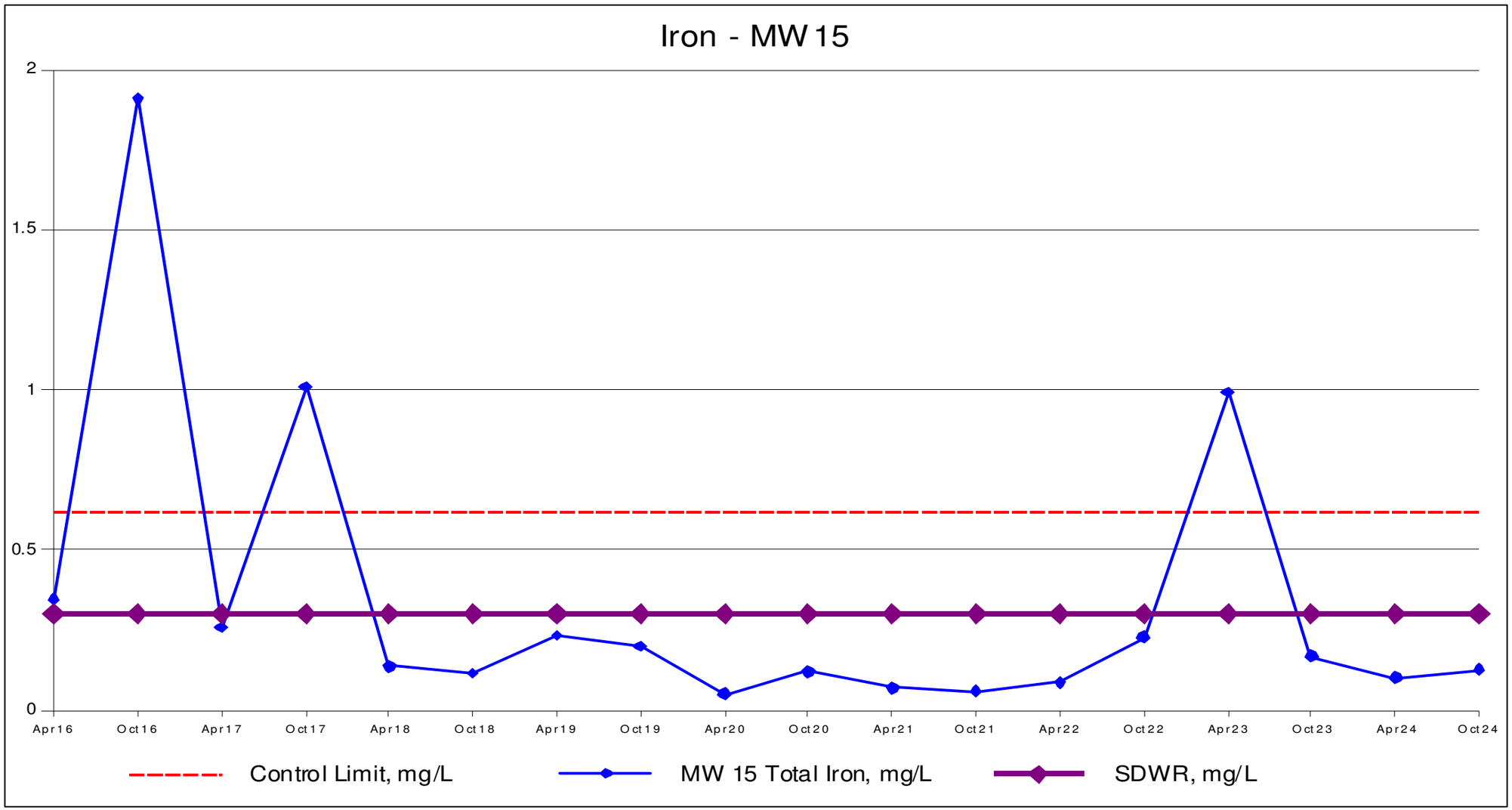

Iron - MW 14
3.5
3
2.5
2
1.5
1
0.5
0
Apr16
Oct16
Apr17
Oct17
Apr18
Oct18
Apr19
Oct19
Apr20
Oct20
Apr21
Oct21
Apr22
Oct22
Apr23
Oct23
Apr24
Oct24
Control Limit, mg/L
MW 14 Total Irn, mg/L
SDWR, mg/L

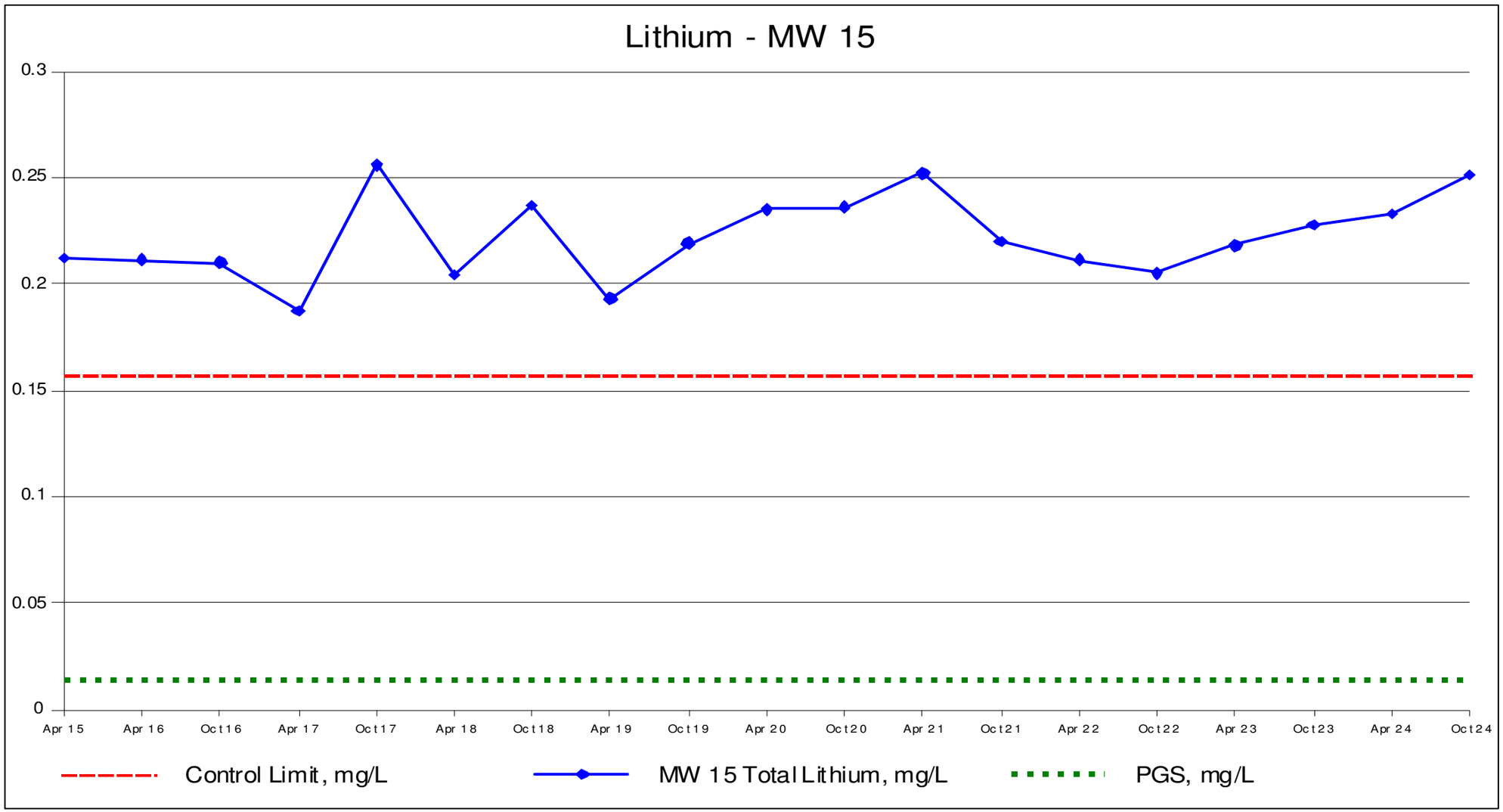

Strontium - MW 14
4
3.5
3
2.5
2
1.5
1
0.5
0
Apr 15
Apr 16
Oct16
Apr 17
Oct17
Apr 18
Oct18
Apr 19
Oct19
Apr 20
Oct20
Apr 21
Oct21
Apr 22
Oct22
Apr 23
Oct23
Apr 24
Oct24
Control Limit, mg/L
HAL, mg/L
MW 14 Total Strontium, mg/L

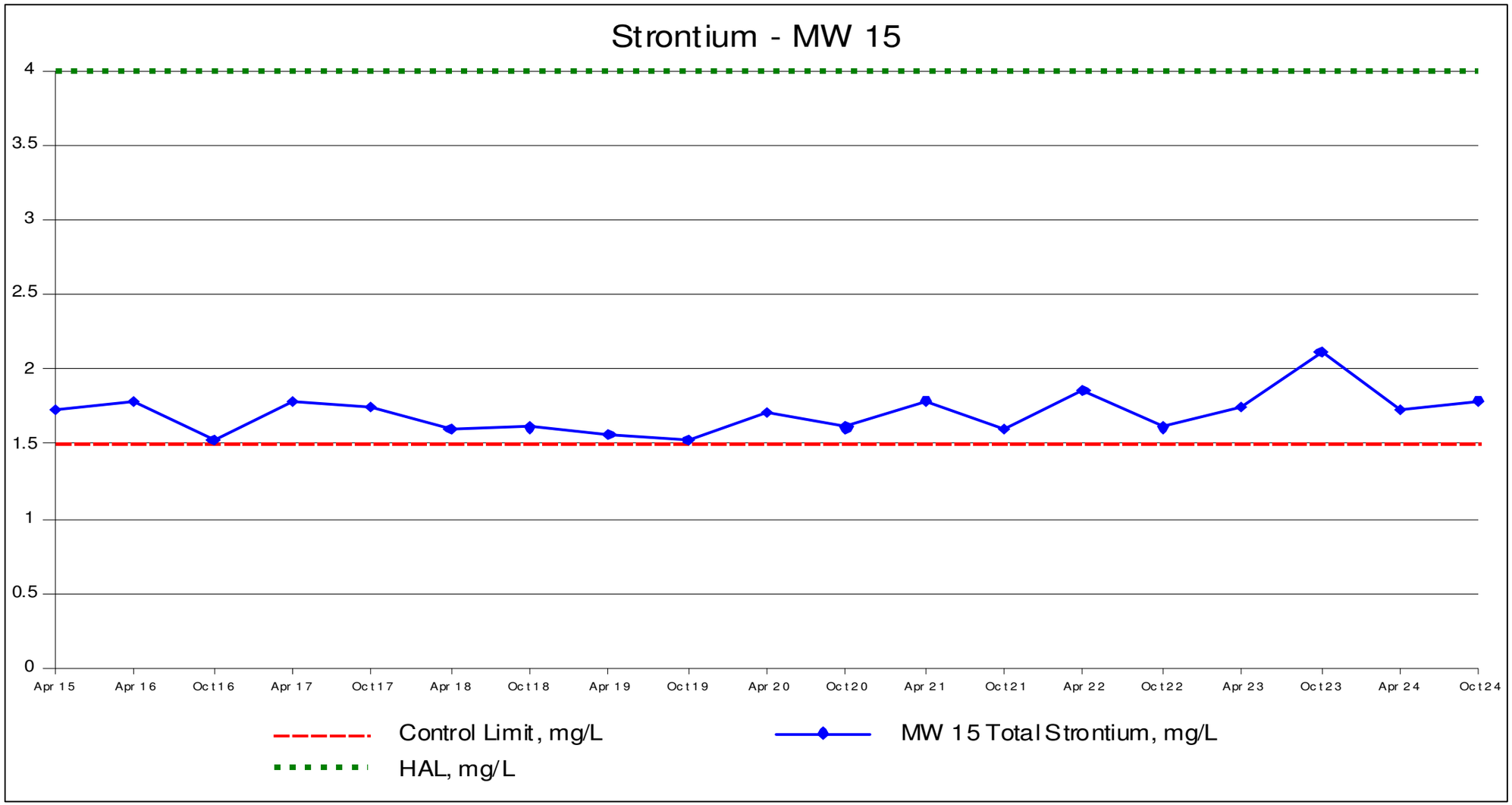

Sulfate - MW 14
1600
1400
1200
1000
800
600
400
200
0
Apr 15
Apr 16
Oct16
Apr 17
Oct17
Apr 18
Oct18
Apr 19
Oct19
Apr 20
Oct20
Apr 21
Oct21
Apr 22
Oct22
Apr 23
Oct23
Apr 24
Oct24
Control Limit, mg/L
SDWR, mg/L
MW 14 Total Sulfate, mg/L

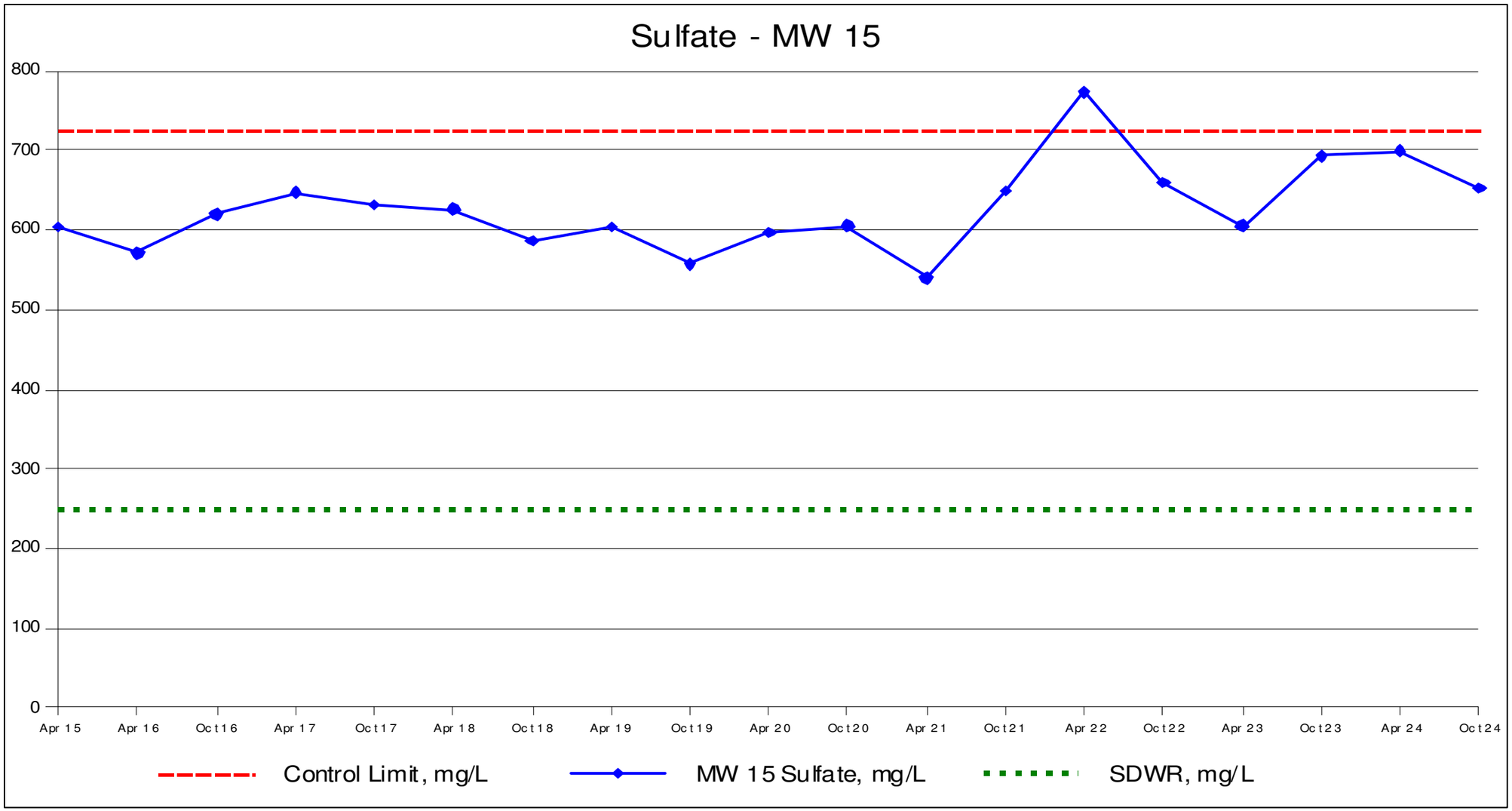

Sulfide - MW 14
6
5
4
3
2
1
0
Apr 16
Oct 16
Apr 17
Oct 17
Apr 18
Oct 18
Apr 19
Oct 19
Apr 20
Apr 21
Oct 21
Apr 22
Oct 22
Apr 23
Oct 23
Apr 24
Oct 24
Control Limit, mg/L
MW 14 Total Sulfide, mg/L

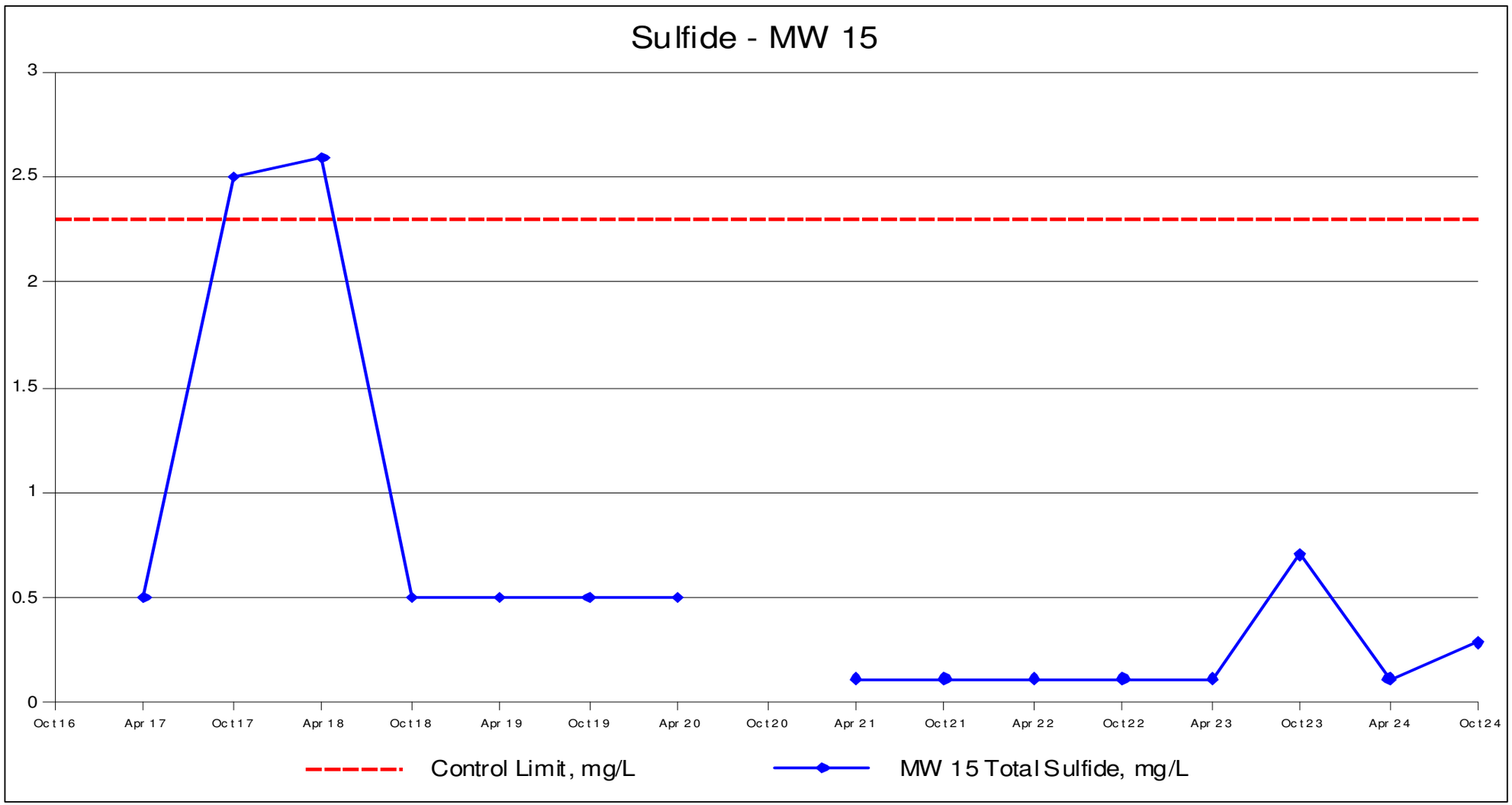

Chemical Oxygen Demand - MW15
700
600
500
400
300
200
100
0
Apr 96
Oct 96D
Oct 97
Aug 98
Oct 99
Oct 00
Sep 03
Sep 04
Sep 05
Oct 06
Oct 07
Oct 08
Mar 14
Apr 15
Apr 16
Apr 17
Apr 18
Apr 19
Apr 20
Apr 21
Apr 22
Apr 23
Apr 24
Control Limit, mg/L
MW 15 COD, mg/L

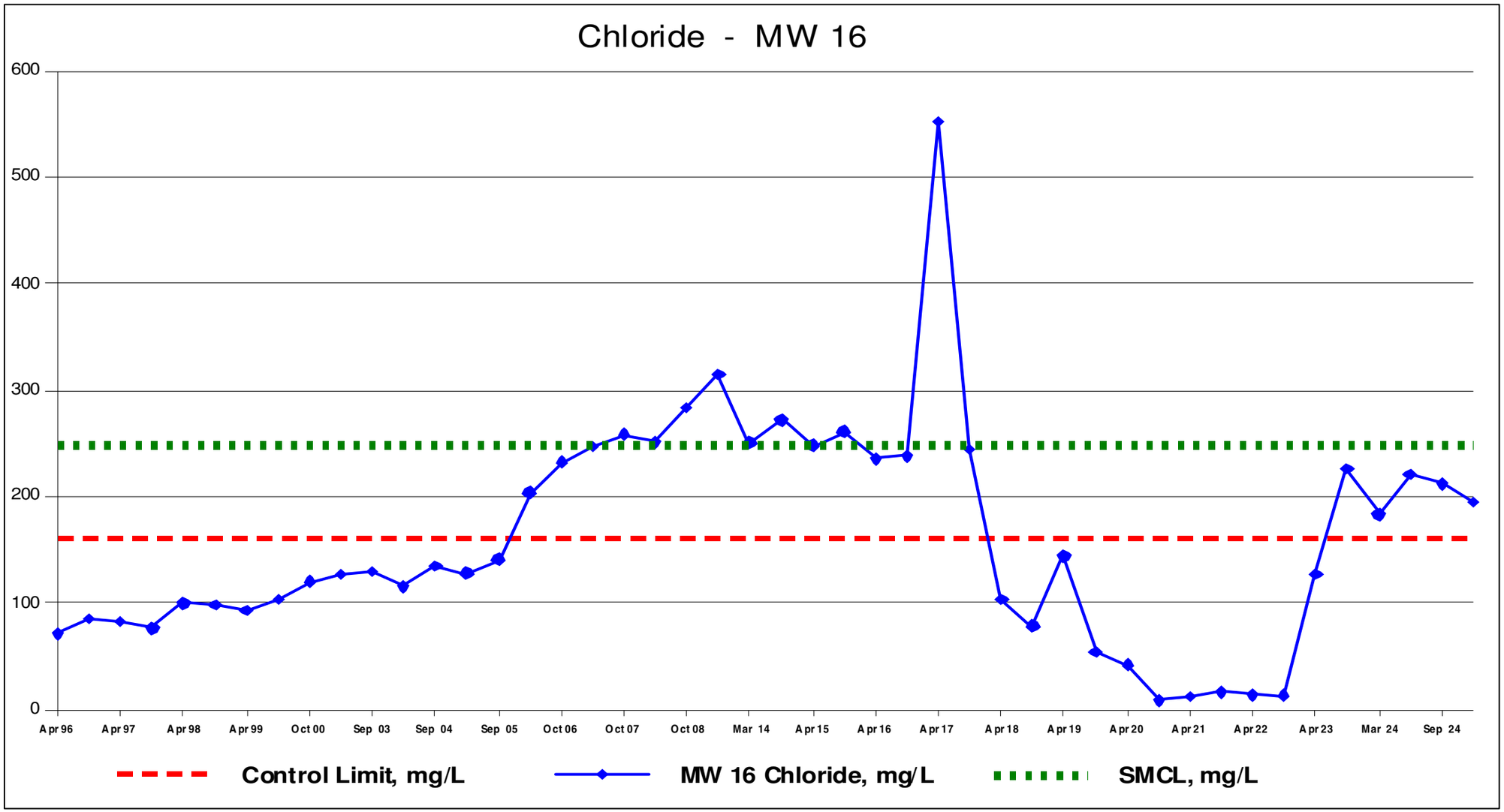

Iron - MW 15
2
1.5
1
0.5
0
Apr16
Oct16
Apr17
Oct17
Apr18
Oct18
Apr19
Oct19
Apr20
Oct20
Apr21
Oct21
Apr22
Oct22
Apr23
Oct23
Apr24
Oct24
Control Limit, mg/L
MW 15 Total Iron, mg/L
SDWR, mg/L

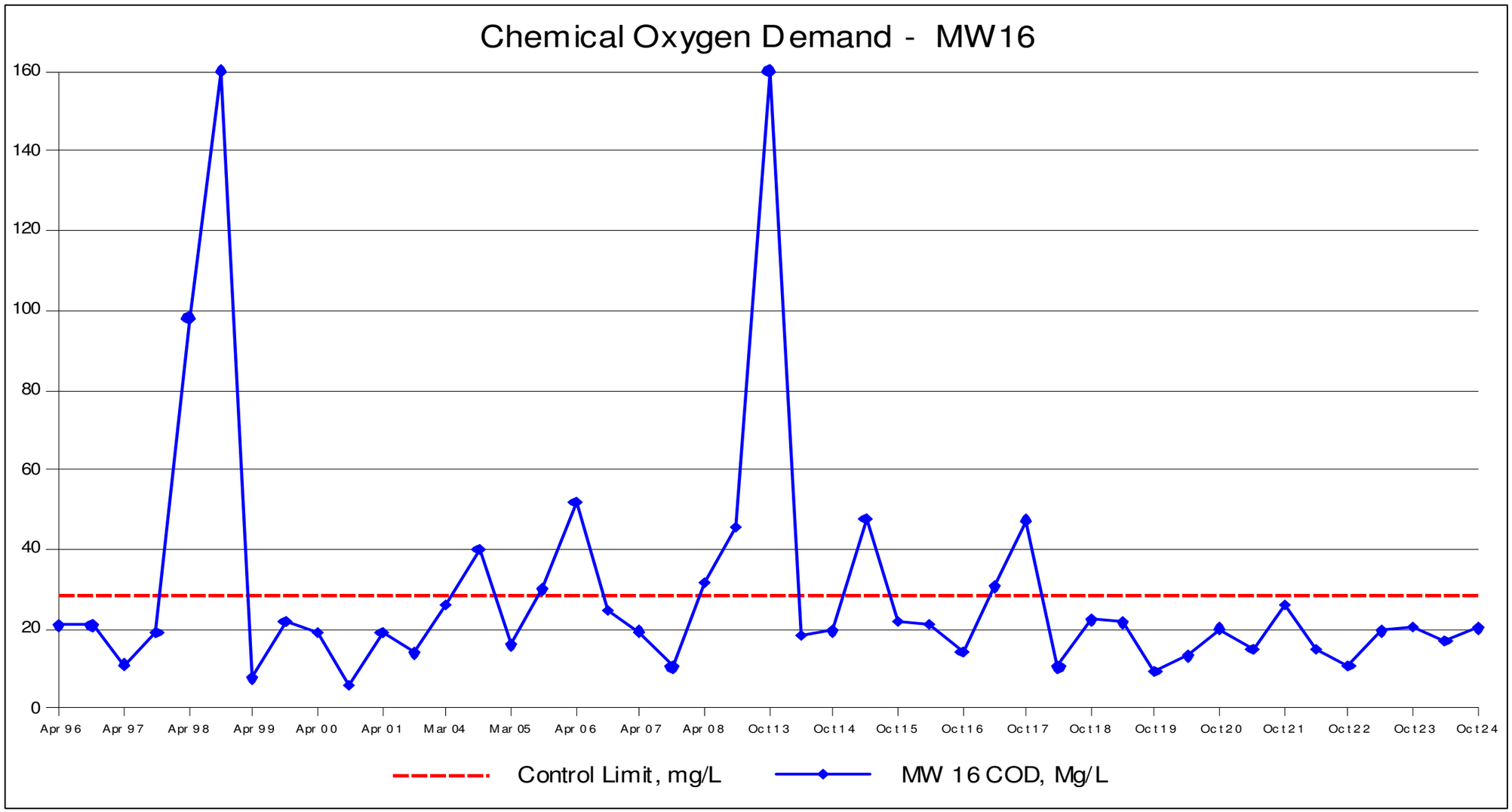

Lithium - MW 15
0.3
0.25
0.2
0.15
0.1
0.05
0
Apr 15
Apr 16
Oct16
Apr 17
Oct17
Apr 18
Oct18
Apr 19
Oct19
Apr 20
Oct20
Apr 21
Oct21
Apr 22
Oct22
Apr 23
Oct23
Apr 24
Oct24
Control Limit, mg/L
MW 15 Total Lithium, mg/L
PGS, mg/L

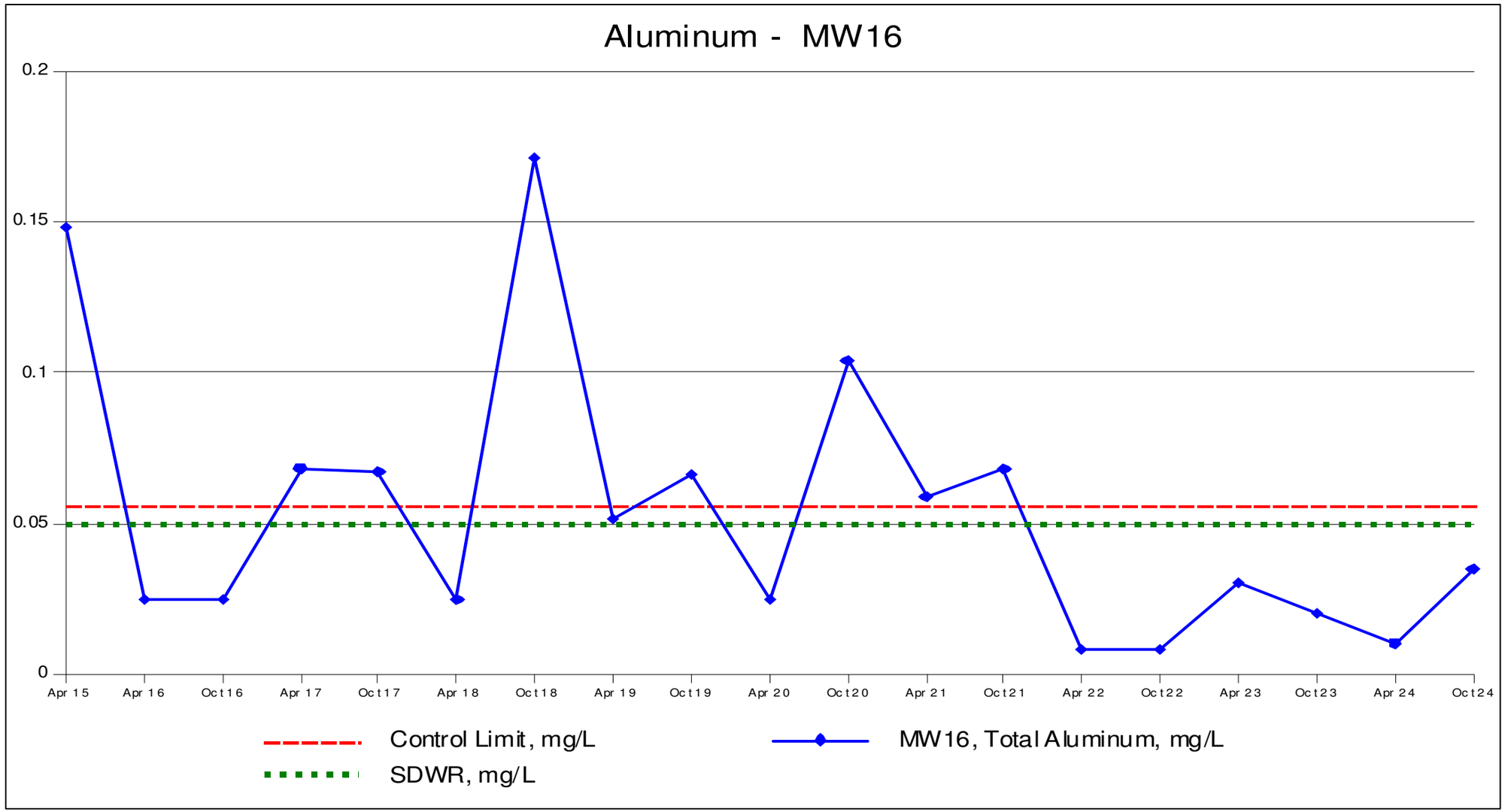

Strontium - MW 15
4
3.5
3
2.5
2
1.5
1
0.5
0
Apr 15
Apr 16
Oct16
Apr 17
Oct17
Apr 18
Oct18
Apr 19
Oct19
Apr 20
Oct20
Apr 21
Oct21
Apr 22
Oct22
Apr 23
Oct23
Apr 24
Oct24
Control Limit, mg/L
HAL, mg/L
MW 15 Total Strontium, mg/L

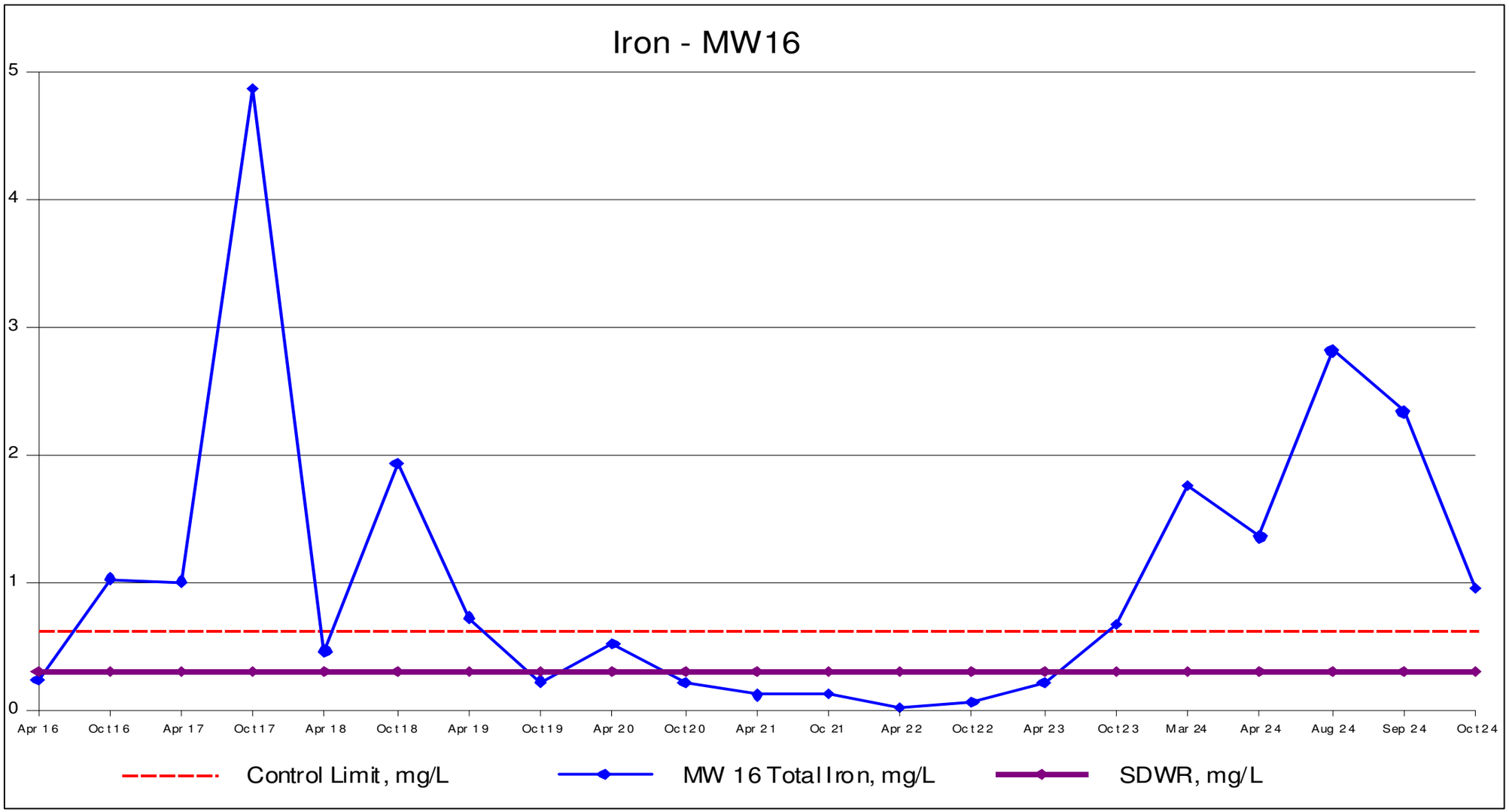

Sulfate - MW 15
800
700
600
500
400
300
200
100
0
Apr 15
Apr 16
Oct16
Apr 17
Oct17
Apr 18
Oct18
Apr 19
Oct19
Apr 20
Oct20
Apr 21
Oct21
Apr 22
Oct22
Apr 23
Oct23
Apr 24
Oct24
Control Limit, mg/L
MW 15 Sulfate, mg/L
SDWR, mg/L

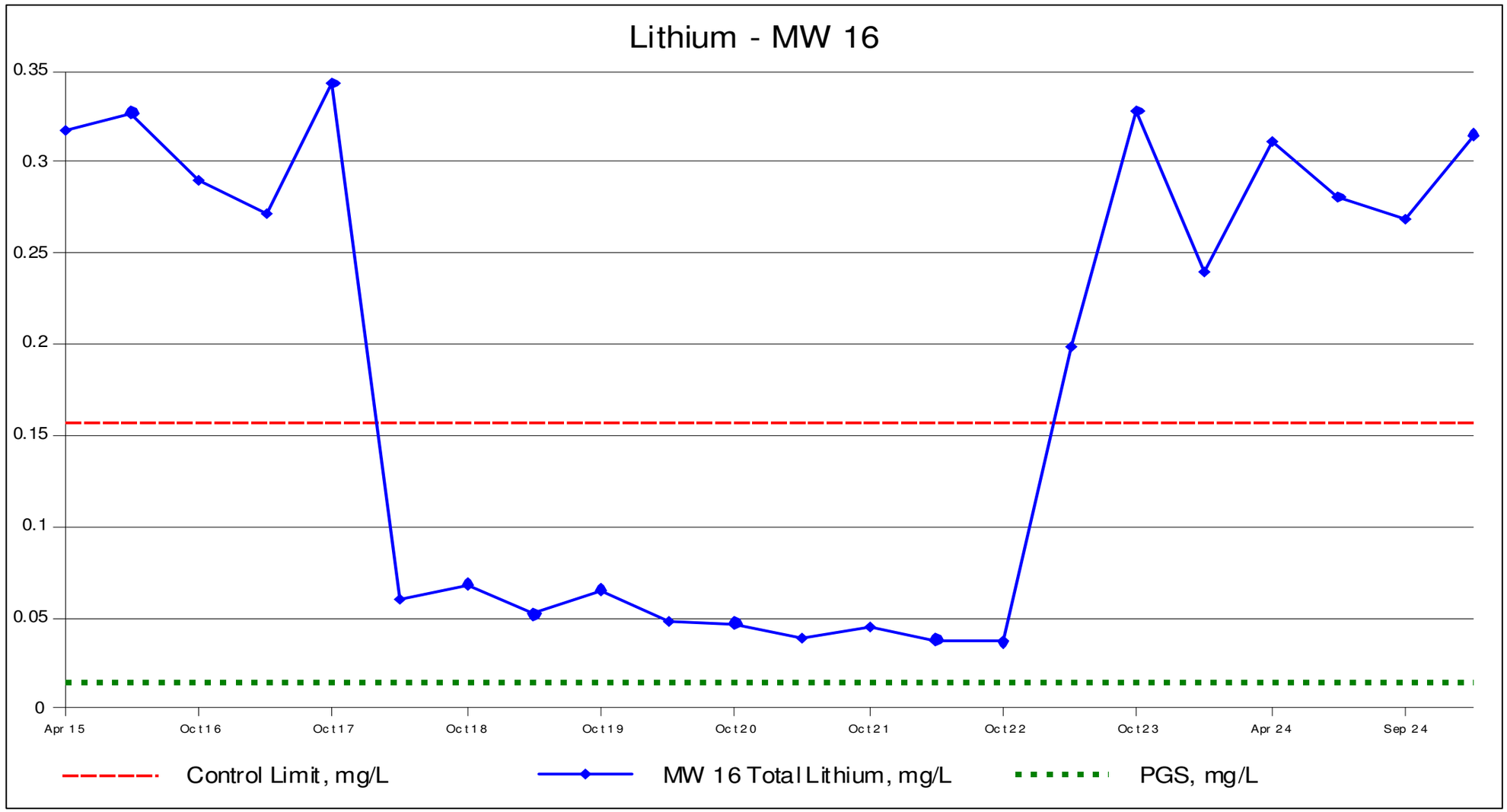

Sulfide - MW 15
3
2.5
2
1.5
1
0.5
0
Oct16
Apr 17
Oct17
Apr 18
Oct18
Apr 19
Oct19
Apr 20
Oct20
Apr 21
Oct21
Apr 22
Oct22
Apr 23
Oct23
Apr 24
Oct24
Control Limit, mg/L
MW 15 Total Sulfide, mg/L

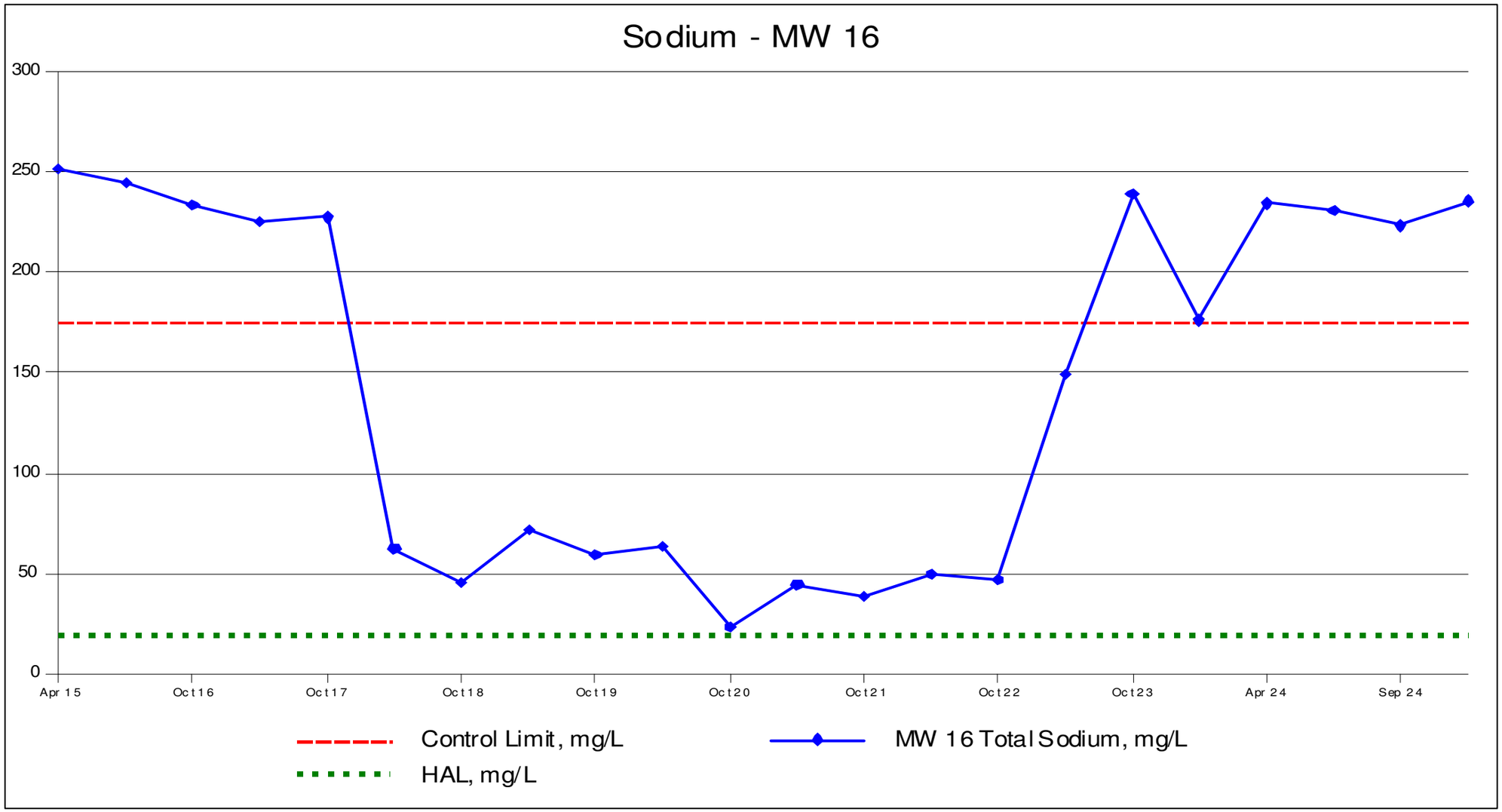

Chloride - MW 16
600
500
400
300
200
100
0
Apr 96
Apr 97
Apr 98
Apr 99
Oct 00
Sep 03
Sep 04
Sep 05
Oct 06
Oct 07
Oct 08
Mar 14
Apr 15
Apr 16
Apr 17
Apr 18
Apr 19
Apr 20
Apr 21
Apr 22
Apr 23
Mar 24
Sep 24
Control Limit, mg/L
MW 16 Chloride, mg/L
SMCL, mg/L

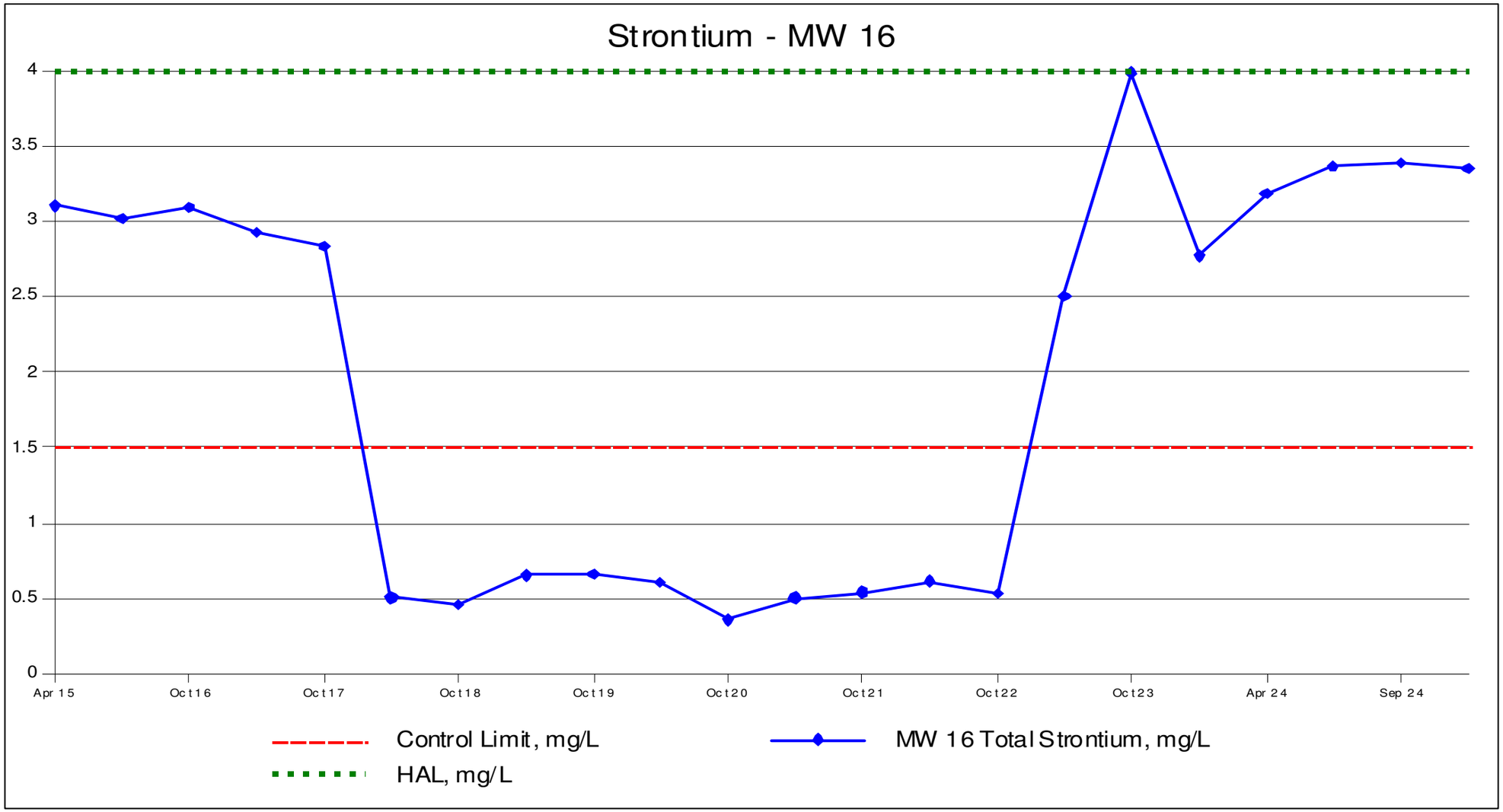

Chemical Oxygen Demand - MW16
160
140
120
100
80
60
40
20
0
Apr 96
Apr 97
Apr 98
Apr 99
Apr 00
Apr 01
Mar 04
Mar 05
Apr 06
Apr 07
Apr 08
Oct13
Oct14
Oct15
Oct16
Oct17
Oct18
Oct19
Oct20
Oct21
Oct22
Oct23
Oct24
Control Limit, mg/L
MW 16 COD, Mg/L

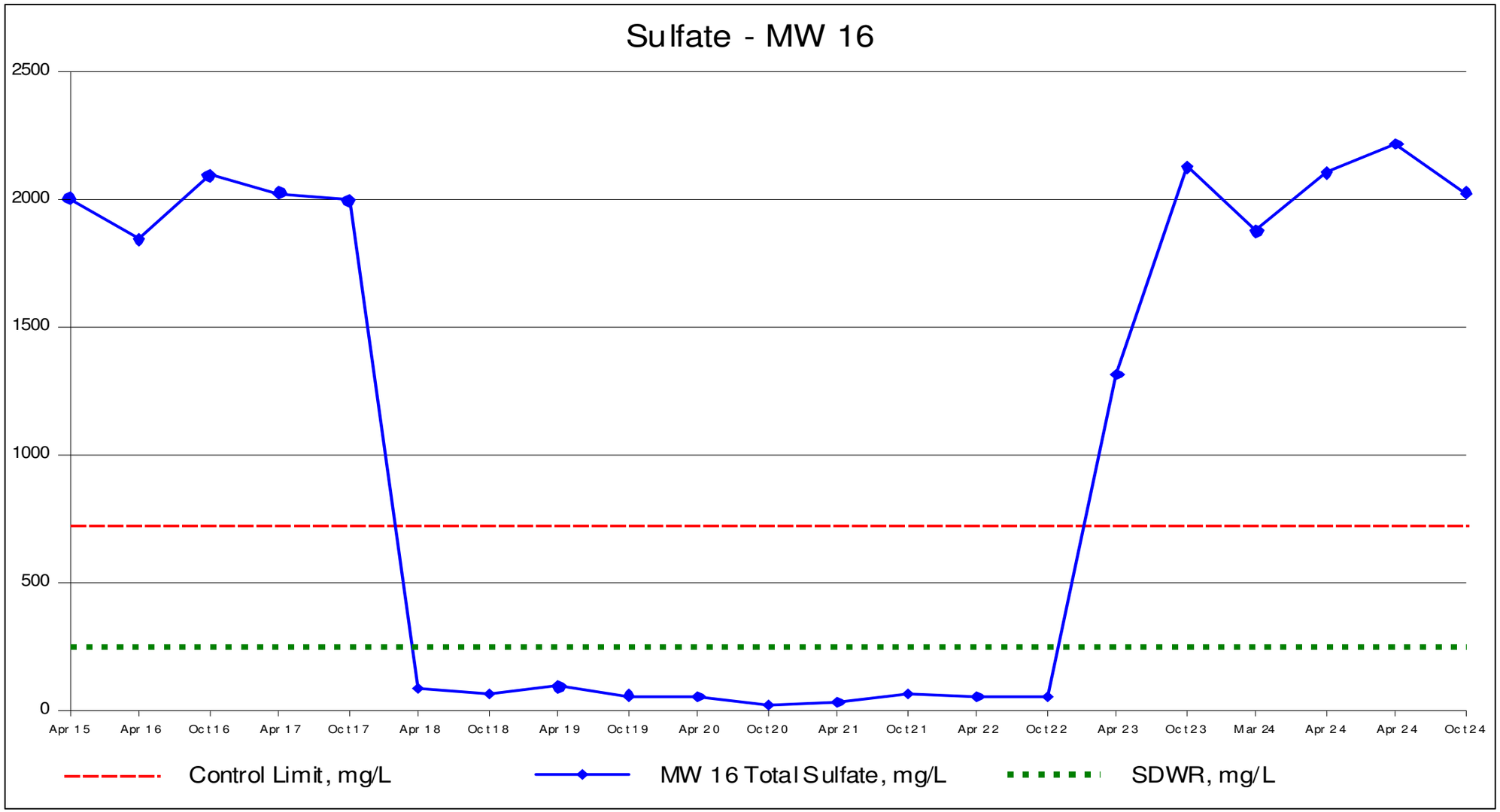

Aluminum - MW16
0.2
0.15
0.1
0.05
0
Apr 15
Apr 16
Oct 16
Apr 17
Oct 17
Apr 18
Oct 18
Apr 19
Oct 19
Apr 20
Oct 20
Apr 21
Oct 21
Apr 22
Oct 22
Apr 23
Oct 23
Apr 24
Oct 24
Control Limit, mg/L
SDWR, mg/L
MW16, Total Aluminum, mg/L

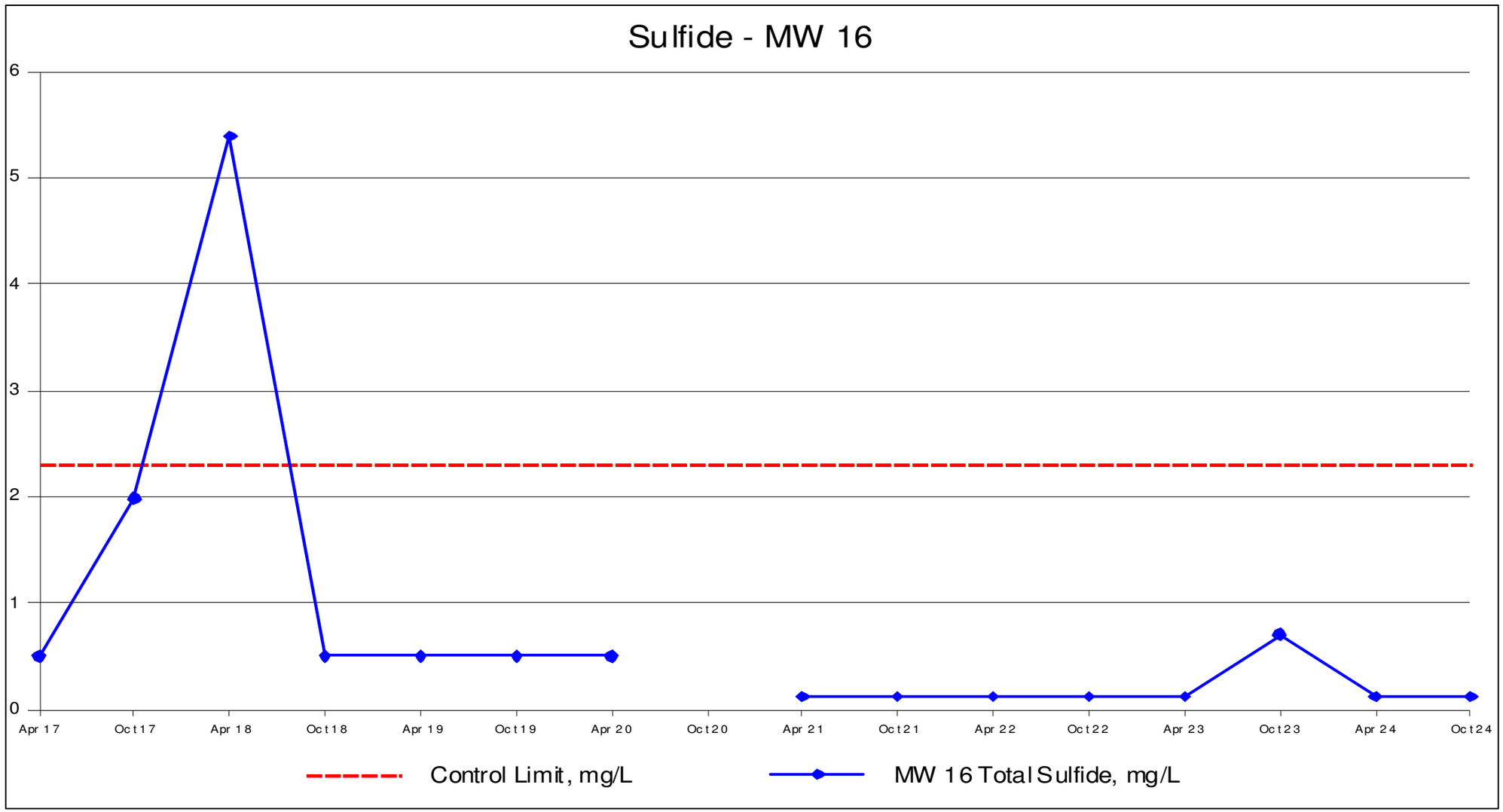

Iron - MW16
5
4
3
2
1
0
Apr 16
Oct16
Apr 17
Oct17
Apr 18
Oct18
Apr 19
Oct19
Apr 20
Oct20
Apr 21
Oc 21
Apr 22
Oct22
Apr 23
Oct23
Mar 24
Apr 24
Aug 24
Sep 24
Oct24
Control Limit, mg/L
MW 16 Total Iron, mg/L
SDWR, mg/L


Lithium - MW 16
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Apr 15
Oct16
Oct17
Oct18
Oct19
Oct20
Oct21
Oct22
Oct23
Apr 24
Sep 24
Control Limit, mg/L
MW 16 Total Lithium, mg/L
PGS, mg/L


Sodium - MW 16
300
250
200
150
100
50
0
Apr 15
Oct16
Oct17
Oct18
Oct19
Oct20
Oct21
Oct22
Oct23
Apr 24
Sep 24
Control Limit, mg/L
HAL, mg/L
MW 16 Total Sodium, mg/L


Strontium - MW 16
4
3.5
3
2.5
2
1.5
1
0.5
0
Apr 15
Oct 16
Oct 17
Oct 18
Oct 19
Oct 20
Oct 21
Oct 22
Oct 23
Apr 24
Sep 24
Control Limit, mg/L
HAL, mg/L
MW 16 Total Strontium, mg/L


Sulfate - MW 16
2500
2000
1500
1000
500
0
Apr 15
Apr 16
Oct16
Apr 17
Oct17
Apr 18
Oct18
Apr 19
Oct19
Apr 20
Oct20
Apr 21
Oct21
Apr 22
Oct22
Apr 23
Oct23
Mar 24
Apr 24
Apr 24
Oct24
Control Limit, mg/L
MW 16 Total Sulfate, mg/L
SDWR, mg/L


Sulfide - MW 16
6
5
4
3
2
1
0
Apr 17
Oct 17
Apr 18
Oct 18
Apr 19
Oct 19
Apr 20
Oct 20
Apr 21
Oct 21
Apr 22
Oct 22
Apr 23
Oct 23
Apr 24
Oct 24
Control Limit, mg/L
MW 16 Total Sulfide, mg/L

Keokuk Ferro-Sil Monofill
2542 Carbide Lane
Keokuk, Iowa
Permit No. 56-SDP-17-91P

Attachment B - Field Data Sheets

April 2024

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-4	Upgradient	✔	Downgradient	

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 634.62	Ground elevation: 632.44
Depth of well: 90.6	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	04/25/2024	39.67	594.95
After purging			
Before sampling			

C. Well Purging NA - Piezometer only

Quantity of water removed from well (gallons): NA

Number of well volumes (based on current water level): NA

Was well pumped or bailed dry? NA

Equipment used:

	Bailer type		Dedicated?	
	Pump type		Dedicated?	
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions:

Field measurements (stabilized):

Water temperature:	Equipment used:
pH	Equipment used:
Specific conductivity:	Equipment used:

Comments: This well is used only for water level measurement.

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-5	Upgradient	✔	Downgradient	

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 617.06	Ground elevation: 615.46
Depth of well: 79.6	Inside casing diameter (inches): 2.0
Equipment used: Slope Indicator	

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	04/25/2024	2.69	614.37
After purging			
Before sampling			

C. Well Purging

Quantity of water removed from well (gallons): 33.5

Number of well volumes (based on current water level): 2.7

Was well pumped or bailed dry? No.

Equipment used:

	Bailer type	**Polyethylene**	**Dedicated?**	**Yes**
	Pump type	Waterra	Dedicated?	Yes
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions: 48°F overcast

Field measurements (stabilized):

Water temperature: 11.3 C	Equipment used: General
pH 6.92	Equipment used: General
Specific conductivity: 1790	Equipment used: Omega

Comments:

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-6	Upgradient	✔	Downgradient	

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 616.51	Ground elevation: 615.81
Depth of well: 99.20	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	04/25/2024	37.62	~~618.77~~ 578.99
After purging			
Before sampling			

C. Well Purging NA - Piezometer only

Quantity of water removed from well (gallons): NA

Number of well volumes (based on current water level): NA

Was well pumped or bailed dry? NA

Equipment used:

	Bailer type		Dedicated?	
	Pump type		Dedicated?	
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions:

Field measurements (stabilized):

Water temperature:	Equipment used:
pH	Equipment used:
Specific conductivity:	Equipment used:

Comments: This well is used only for water level measurement. When the well hinge cover was repaired on this well, it was necessary to remove 2 5/8 inches from the top of the well casing. The TOC elevation has been adjusted to this new height.

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-7	Upgradient	✔	Downgradient	

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 651.39	Ground elevation: 649.04
Depth of well: 75.85	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	04/25/2024	41.49	609.90
After purging			
Before sampling			

C. Well Purging

Quantity of water removed from well (gallons): 14.0

Number of well volumes (based on current water level): 2.6

Was well pumped or bailed dry? No

Equipment used:

	Bailer type	**Polyethylene**	**Dedicated?**	**Yes**
	Pump type	Waterra	Dedicated?	Yes
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions: 48° F overcast

Field measurements (stabilized):

Water temperature: 12.6 C	Equipment used: General
pH 7.38	Equipment used: General
Specific conductivity: 1210	Equipment used: Omega

Comments:

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-8	Upgradient		Downgradient	✔

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 606.49	Ground elevation: 604.23
Depth of well:60.26	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	04/25/2024	15.72	590.77
After purging			
Before sampling			

C. Well Purging

Quantity of water removed from well (gallons): 16.0

Number of well volumes (based on current water level): 2.3

Was well pumped or bailed dry? no

Equipment used:

	Bailer type	**Polyethylene**	**Dedicated?**	**Yes**
	Pump type	Waterra	Dedicated?	Yes
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions: 48° F overcast

Field measurements (stabilized):

Water temperature: 13.5 C	Equipment used: General
pH 7.20	Equipment used: General
Specific conductivity: >1990	Equipment used: Omega

Comments:

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-9	Upgradient		Downgradient	✔

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 606.46	Ground elevation: 604.38
Depth of well: 40.58	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	04/25/2024	15.34	591.12
After purging			
Before sampling			

C. Well Purging NA - Piezometer only

Quantity of water removed from well (gallons): NA

Number of well volumes (based on current water level): NA

Was well pumped or bailed dry? NA

Equipment used:

	Bailer type		Dedicated?	
	Pump type		Dedicated?	
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions:

Field measurements (stabilized):

Water temperature:	Equipment used:
pH	Equipment used:
Specific conductivity:	Equipment used:

Comments: This well is used only for water level measurement.

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-11	Upgradient		Downgradient	✔

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 648.76	Ground elevation: 647.10
Depth of well: 73.46	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	04/25/2024	46.09	602.67
After purging			
Before sampling			

C. Well Purging NA - Piezometer only

Quantity of water removed from well (gallons): NA

Number of well volumes (based on current water level): NA

Was well pumped or bailed dry? NA

Equipment used:

	Bailer type		Dedicated?	
	Pump type		Dedicated?	
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions:

Field measurements (stabilized):

Water temperature:	Equipment used:
pH	Equipment used:
Specific conductivity:	Equipment used:

Comments: This well is used only for water level measurement.

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-12	Upgradient	✔	Downgradient	

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 655.97	Ground elevation: 653.58
Depth of well: 80.69	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	04/25/2024	18.34	637.63
After purging			
Before sampling			

C. Well Purging

Quantity of water removed from well (gallons):	23.0
Number of well volumes (based on current water level):	2.3
Was well pumped or bailed dry?	no

Equipment used:

	Bailer type	**Polyethylene**	**Dedicated?**	**Yes**
	Pump type	Waterra	Dedicated?	Yes
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions: 48° F, overcast

Field measurements (stabilized):

Water temperature:	12.7 C	Equipment used: General
pH	6.98	Equipment used: General
Specific conductivity:	1000	*Equipment used:* Omega

Comments: When the well hinge cover was repaired on this well, it was necessary to remove 1.75 inches from the top of the well casing. The TOC elevation has been adjusted to this new height.

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-13	Upgradient	✔	Downgradient	

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 656.52	Ground elevation:
Depth of well: 42.80	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	04/25/2024	18.08	638.44
After purging			
Before sampling			

C. Well Purging NA - Piezometer only

Quantity of water removed from well (gallons): NA

Number of well volumes (based on current water level): NA

Was well pumped or bailed dry? NA

Equipment used:

	Bailer type		Dedicated?	
	Pump type		Dedicated?	
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions:

Field measurements (stabilized):

Water temperature:	Equipment used:
pH	Equipment used:
Specific conductivity:	Equipment used:

Comments: This well is used only for water level measurement.

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-14	Upgradient		Downgradient	✔

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 608.11	Ground elevation: 606.30
Depth of well: 62.31	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	04/25/2024	30.47	
After purging			
Before sampling			

C. Well Purging

Quantity of water removed from well (gallons): 13.6

Number of well volumes (based on current water level): 2.9

Was well pumped or bailed dry? no

Equipment used:

	Bailer type	**Polyethylene**	**Dedicated?**	**Yes**
	Pump type	Waterra	Dedicated?	Yes
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions: 48° F overcast

Field measurements (stabilized):

Water temperature: 14.1 C	Equipment used: General
pH 6.97	Equipment used: General
Specific conductivity: >1990	Equipment used: Omega

Comments:

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-15	Upgradient		Downgradient	✔

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 623.85	Ground elevation: 621.60
Depth of well: 62.75	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	04/25/2024	8.25	
After purging			
Before sampling			

C. Well Purging

Quantity of water removed from well (gallons): 21.0

Number of well volumes (based on current water level): 2.5

Was well pumped or bailed dry? no

Equipment used:

	Bailer type	**Polyethylene**	**Dedicated?**	**Yes**
	Pump type	Waterra	Dedicated?	Yes
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions: 48°F overcast

Field measurements (stabilized):

Water temperature:	13.8 C	Equipment used: General
pH	6.96	Equipment used: General
Specific conductivity:	21990	Equipment used: Omega

Comments:

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-16	Upgradient		Downgradient	✔

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 608.64	Ground elevation: 606.20
Depth of well: 62.44	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	04/25/2024	32.05	576.59
After purging			
Before sampling			

C. Well Purging

Quantity of water removed from well (gallons): 14.40

Number of well volumes (based on current water level): 3.2

Was well pumped or bailed dry? no

Equipment used:

	Bailer type	**Polyethylene**	**Dedicated?**	**Yes**
	Pump type	Waterra	Dedicated?	Yes
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions: 48°F overcast

Field measurements (stabilized):

Water temperature: 16.1 C	Equipment used: General
pH 6.9	Equipment used: General
Specific conductivity: 71990	*Equipment used: Omega*

Comments:

Keokuk Ferro-Sil Monofill
2542 Carbide Lane
Keokuk, Iowa
Permit No. 56-SDP-17-91P

Attachment B - Field Data Sheets

October 2024

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	**Carbide Lane, Keokuk, IA**			**56-SDP-17-91P**	
Sampling point: MW-4	**Upgradient**	✔	**Downgradient**		
Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*					

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 634.62	Ground elevation: 632.44
Depth of well: 90.6	Inside casing diameter (inches): 2.0
Equipment used: Slope Indicator	

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	10/17/2024	42.43	592.19
After purging			
Before sampling			

C. Well Purging NA - Piezometer only

Quantity of water removed from well (gallons): NA

Number of well volumes (based on current water level): NA

Was well pumped or bailed dry? NA

Equipment used:

	Bailer type		Dedicated?	
	Pump type		Dedicated?	
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions:

Field measurements (stabilized):

Water temperature:	Equipment used:
pH	Equipment used:
Specific conductivity:	Equipment used:

Comments: This well is used only for water level measurement.

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-5	Upgradient	✔	Downgradient	

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 617.06	Ground elevation: 615.46
Depth of well: 79.6	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	10/17/2024	5.71	611.35
After purging			
Before sampling			

C. Well Purging

Quantity of water removed from well (gallons): 27.5

Number of well volumes (based on current water level): 2.3

Was well pumped or bailed dry? no

Equipment used:

	Bailer type	**Polyethylene**	**Dedicated?**	**Yes**
	Pump type	Waterra	Dedicated?	Yes
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions: 51°F Clear

Field measurements (stabilized):

Water temperature: 14.8 C	Equipment used: General
pH 6.7	Equipment used: General
Specific conductivity: 1890	Equipment used: Omega

Comments:

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-6	Upgradient	✔	Downgradient	

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 616.51	Ground elevation: 615.81
Depth of well: 99.20	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	10/17/2024	38.10	578.41
After purging			
Before sampling			

C. Well Purging NA - Piezometer only

Quantity of water removed from well (gallons): NA

Number of well volumes (based on current water level): NA

Was well pumped or bailed dry? NA

Equipment used:

	Bailer type		Dedicated?	
	Pump type		Dedicated?	
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions:

Field measurements (stabilized):

Water temperature:	Equipment used:
pH	Equipment used:
Specific conductivity:	Equipment used:

Comments: This well is used only for water level measurement. When the well hinge cover was repaired on this well, it was necessary to remove 2 5/8 inches from the top of the well casing. The TOC elevation has been adjusted to this new height.

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-7	Upgradient	✔	Downgradient	

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 651.39	Ground elevation: 649.04
Depth of well: 75.85	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	10/17/2024	40.52	610.87
After purging			
Before sampling			

C. Well Purging

Quantity of water removed from well (gallons): 15.0

Number of well volumes (based on current water level): 2.7

Was well pumped or bailed dry? no

Equipment used:

	Bailer type	**Polyethylene**	**Dedicated?**	**Yes**
	Pump type	Waterra	Dedicated?	Yes
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions: 51°F Clear

Field measurements (stabilized):

Water temperature: 13.1 C	Equipment used: General
pH 7.16	Equipment used: General
Specific conductivity: 1070	Equipment used: Omega

Comments:

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-8	Upgradient		Downgradient	✔

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 606.49	Ground elevation: 604.23
Depth of well:60.26	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	10/17/2024	16.38	590.11
After purging			
Before sampling			

C. Well Purging

Quantity of water removed from well (gallons): 18.6

Number of well volumes (based on current water level): 2.7

Was well pumped or bailed dry? no

Equipment used:

	Bailer type	**Polyethylene**	**Dedicated?**	**Yes**
	Pump type	Waterra	Dedicated?	Yes
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions: 51°F Clear

Field measurements (stabilized):

Water temperature: 14.7 C	Equipment used: General
pH 6.9	Equipment used: General
Specific conductivity: >1990	Equipment used: Omega

Comments:

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-9	Upgradient		Downgradient	✔

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 606.46	Ground elevation: 604.38
Depth of well: 40.58	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	10/17/2024	16.34	590.12
After purging			
Before sampling			

C. Well Purging NA - Piezometer only

Quantity of water removed from well (gallons): NA

Number of well volumes (based on current water level): NA

Was well pumped or bailed dry? NA

Equipment used:

	Bailer type		Dedicated?	
	Pump type		Dedicated?	
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions:

Field measurements (stabilized):

Water temperature:	Equipment used:
pH	Equipment used:
Specific conductivity:	Equipment used:

Comments: This well is used only for water level measurement.

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	**Carbide Lane, Keokuk, IA**			**56-SDP-17-91P**	
Sampling point: MW-11		**Upgradient**		**Downgradient**	✔
Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*					

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 648.76	Ground elevation: 647.10
Depth of well: 73.46	Inside casing diameter (inches): 2.0
Equipment used: Slope Indicator	

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	10/17/2024	46.47	602.00
After purging			
Before sampling			

C. Well Purging NA - Piezometer only

Quantity of water removed from well (gallons): NA				
Number of well volumes (based on current water level): NA				
Was well pumped or bailed dry? NA				
Equipment used:				
	Bailer type		Dedicated?	
	Pump type		Dedicated?	
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions:	
Field measurements (stabilized):	
Water temperature:	Equipment used:
pH	Equipment used:
Specific conductivity:	Equipment used:

Comments: This well is used only for water level measurement.

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-12	Upgradient	✔	Downgradient	

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 655.97	Ground elevation: 653.58
Depth of well: 80.69	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	10/17/2024	18.67	637.3
After purging			
Before sampling			

C. Well Purging

Quantity of water removed from well (gallons): 24.5

Number of well volumes (based on current water level): 2.5

Was well pumped or bailed dry? no

Equipment used:

	Bailer type	**Polyethylene**	**Dedicated?**	**Yes**
	Pump type	Waterra	Dedicated?	Yes
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions: 51°F Clear

Field measurements (stabilized):

Water temperature: 13.3 C	Equipment used: General
pH 6.95	Equipment used: General
Specific conductivity: 1020	Equipment used: Omega

Comments: When the well hinge cover was repaired on this well, it was necessary to remove 1.75 inches from the top of the well casing. The TOC elevation has been adjusted to this new height.

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-13	Upgradient	✔	Downgradient	

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 656.52	Ground elevation:
Depth of well: 42.80	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	10/17/2024	18.50	638.02
After purging			
Before sampling			

C. Well Purging NA - Piezometer only

Quantity of water removed from well (gallons): NA

Number of well volumes (based on current water level): NA

Was well pumped or bailed dry? NA

Equipment used:

	Bailer type		Dedicated?	
	Pump type		Dedicated?	
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions:

Field measurements (stabilized):

Water temperature:	Equipment used:
pH	Equipment used:
Specific conductivity:	Equipment used:

Comments: This well is used only for water level measurement.

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-14	Upgradient		Downgradient	✔

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 608.11	Ground elevation: 606.30
Depth of well: 62.31	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	10/17/2024	30.93	577.18
After purging			
Before sampling			

C. Well Purging

Quantity of water removed from well (gallons): 15.0

Number of well volumes (based on current water level): 3.3

Was well pumped or bailed dry? no

Equipment used:

	Bailer type	**Polyethylene**	**Dedicated?**	**Yes**
	Pump type	Waterra	Dedicated?	Yes
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions: 51°F Clear

Field measurements (stabilized):

Water temperature: 14 C	Equipment used: General
pH 6.73	Equipment used: General
Specific conductivity: >1990	Equipment used: Omega

Comments:

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-15	Upgradient		Downgradient	✔

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 623.85	Ground elevation: 621.60
Depth of well: 62.75	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	10/17/2024	13.41	610.44
After purging			
Before sampling			

C. Well Purging

Quantity of water removed from well (gallons): 18.5

Number of well volumes (based on current water level): 2.5

Was well pumped or bailed dry? no

Equipment used:

	Bailer type	**Polyethylene**	**Dedicated?**	**Yes**
	Pump type	Waterra	Dedicated?	Yes
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions: 51° F clear

Field measurements (stabilized):

Water temperature: 15.8 C	Equipment used: General
pH 6.72	Equipment used: General
Specific conductivity: 71990	Equipment used: Omega

Comments:

Landfill Sampling Data

Keokuk Ferro-Sil, Inc.	Carbide Lane, Keokuk, IA	56-SDP-17-91P

Sampling point: MW-16	Upgradient		Downgradient	✔

Sampler name: Carol Wilson, *CHEM-ECO Environmental, Inc.*

A. Monitoring Well/Piezometer Conditions

Properly capped?	Yes	✓	No		If no, explain:
Standing water or litter?	Yes		No	✓	If yes, explain:

B. Groundwater Elevation Measurement (±0.01 foot MSL)

Elevation: top of inner well casing 608.64	Ground elevation: 606.20
Depth of well: 62.44	Inside casing diameter (inches): 2.0

Equipment used: Slope Indicator

Groundwater level (±0.01 foot below top of inner casing, MSL)

	Date/time	Depth to Groundwater	GW elevation
Before purging	10/17/2024	31.51	577.13
After purging			
Before sampling			

C. Well Purging

Quantity of water removed from well (gallons): 16.1

Number of well volumes (based on current water level): 3.5

Was well pumped or bailed dry? no

Equipment used:

	Bailer type	Polyethylene	Dedicated?	Yes
	Pump type	Waterra	Dedicated?	Yes
	If not dedicated, method of cleaning?			

D. Field Measurement

Weather conditions: 51°F Clear

Field measurements (stabilized):

Water temperature: 15.3 C	Equipment used: General
pH 6.6	Equipment used: General
Specific conductivity: >1990	Equipment used: Omega

Comments:

Keokuk Ferro-Sil Monofill
2542 Carbide Lane
Keokuk, Iowa
Permit No. 56-SDP-17-91P

Attachment C – Laboratory Reports 2024

Semi-Annual Sampling

25 April 2024
17 October 2024

Supplemental Sampling

MW-16 and Leachate Pond 28 March 2024
MW-16 and Leachate Pond 29 August 2024
MW-16 and Leachate Pond 26 September 2024

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ANALYTICAL REPORT

PREPARED FOR

Attn: Steven Demasi
Glencore Ltd
Three Stamford Plaza
301 Trersser Blvd
Stamford, Connecticut 06901

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JOB DESCRIPTION

Keokuk Ferro-Sil Landfill

JOB NUMBER

310-279940-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization

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Authorized for release by
Hannah Dietz, Project Management Assistant I
Hannah.Dietz@et.eurofinsus.com
(319)277-2401

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Job Narrative
310-279940-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 4/26/2024 2:45 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 8.8°C.

HPLC/IC
Method 9056A_ORGFM_28D: The following samples were diluted due to the nature of the sample matrix: MW-7 (310-279940-2), MW-8 (310-279940-3), MW-12 (310-279940-4), MW-14 (310-279940-5), MW-15 (310-279940-6) and MW-16 (310-279940-7). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Metals
Method 6020B: The reference method requires samples to be preserved to a pH of <2. The following sample was received with insufficient preservation at a pH of >2: MW-15 (310-279940-6). The sample(s) was preserved to the appropriate pH in the laboratory.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Sample Summary

Client: Glencore Ltd
Job ID: 310-279940-1
Project/Site: Keokuk Ferro-Sil Landfill

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-279940-1	MW-5	Groundwater	04/25/24 00:00	04/26/24 14:45
310-279940-2	MW-7	Groundwater	04/25/24 00:00	04/26/24 14:45
310-279940-3	MW-8	Groundwater	04/25/24 00:00	04/26/24 14:45
310-279940-4	MW-12	Groundwater	04/25/24 00:00	04/26/24 14:45
310-279940-5	MW-14	Groundwater	04/25/24 00:00	04/26/24 14:45
310-279940-6	MW-15	Groundwater	04/25/24 00:00	04/26/24 14:45
310-279940-7	MW-16	Groundwater	04/25/24 00:00	04/26/24 14:45
310-279940-8	Pond	Wastewater	04/25/24 00:00	04/26/24 14:45

Detection Summary

Client: Glencore Ltd
Project/Site: Keokuk Ferro-Sil Landfill

Job ID: 310-279940-1

Client Sample ID: MW-5 — Lab Sample ID: 310-279940-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	150		5.00	2.25	mg/L	5		9056A	Total/NA
Fluoride	0.502	J	1.00	0.375	mg/L	5		9056A	Total/NA
Sulfate	465		5.00	2.10	mg/L	5		9056A	Total/NA
Barium	0.0121		0.00200	0.000660	mg/L	1		6020B	Total/NA
Iron	0.179		0.100	0.0360	mg/L	1		6020B	Total/NA
Lithium	0.109		0.0100	0.00250	mg/L	1		6020B	Total/NA
Sodium	146		1.00	0.480	mg/L	1		6020B	Total/NA
Strontium	1.10		0.00100	0.000530	mg/L	1		6020B	Total/NA
Ammonia as N	0.128	J	0.200	0.100	mg/L	1		350.1	Total/NA
Chemical Oxygen Demand	7.65		5.00	4.80	mg/L	1		5220D LL	Total/NA

Client Sample ID: MW-7 — Lab Sample ID: 310-279940-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	30.5		5.00	2.25	mg/L	5		9056A	Total/NA
Sulfate	287		5.00	2.10	mg/L	5		9056A	Total/NA
Barium	0.111		0.00200	0.000660	mg/L	1		6020B	Total/NA
Boron	0.177		0.100	0.0760	mg/L	1		6020B	Total/NA
Iron	0.503		0.100	0.0360	mg/L	1		6020B	Total/NA
Lithium	0.104		0.0100	0.00250	mg/L	1		6020B	Total/NA
Sodium	74.3		1.00	0.480	mg/L	1		6020B	Total/NA
Strontium	1.01		0.00100	0.000530	mg/L	1		6020B	Total/NA
Ammonia as N	0.783		0.200	0.100	mg/L	1		350.1	Total/NA
Chemical Oxygen Demand	11.9		5.00	4.80	mg/L	1		5220D LL	Total/NA

Client Sample ID: MW-8 — Lab Sample ID: 310-279940-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	28.5		5.00	2.25	mg/L	5		9056A	Total/NA
Sulfate	914		20.0	8.40	mg/L	20		9056A	Total/NA
Barium	0.0396		0.00200	0.000660	mg/L	1		6020B	Total/NA
Boron	0.165		0.100	0.0760	mg/L	1		6020B	Total/NA
Iron	0.257		0.100	0.0360	mg/L	1		6020B	Total/NA
Lithium	0.0177		0.0100	0.00250	mg/L	1		6020B	Total/NA
Sodium	108		1.00	0.480	mg/L	1		6020B	Total/NA
Strontium	2.24		0.00100	0.000530	mg/L	1		6020B	Total/NA
Ammonia as N	1.66		0.200	0.100	mg/L	1		350.1	Total/NA
Chemical Oxygen Demand	9.28		5.00	4.80	mg/L	1		5220D LL	Total/NA

Client Sample ID: MW-12 — Lab Sample ID: 310-279940-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	19.6		5.00	2.25	mg/L	5		9056A	Total/NA
Sulfate	279		5.00	2.10	mg/L	5		9056A	Total/NA
Barium	0.0367		0.00200	0.000660	mg/L	1		6020B	Total/NA
Iron	0.0488	J	0.100	0.0360	mg/L	1		6020B	Total/NA
Lithium	0.0541		0.0100	0.00250	mg/L	1		6020B	Total/NA
Sodium	64.6		1.00	0.480	mg/L	1		6020B	Total/NA
Strontium	0.638		0.00100	0.000530	mg/L	1		6020B	Total/NA
Chemical Oxygen Demand	7.98		5.00	4.80	mg/L	1		5220D LL	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Glencore Ltd
Project/Site: Keokuk Ferro-Sil Landfill

Job ID: 310-279940-1

Client Sample ID: MW-14 — Lab Sample ID: 310-279940-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	16.4		5.00	2.25	mg/L	5		9056A	Total/NA
Sulfate	1380		20.0	8.40	mg/L	20		9056A	Total/NA
Barium	0.0262		0.00200	0.000660	mg/L	1		6020B	Total/NA
Boron	0.252		0.100	0.0760	mg/L	1		6020B	Total/NA
Iron	2.32		0.100	0.0360	mg/L	1		6020B	Total/NA
Lithium	0.0184		0.0100	0.00250	mg/L	1		6020B	Total/NA
Sodium	108		1.00	0.480	mg/L	1		6020B	Total/NA
Strontium	2.37	B	0.00400	0.00212	mg/L	4		6020B	Total/NA
Ammonia as N	4.53		0.200	0.100	mg/L	1		350.1	Total/NA
Chemical Oxygen Demand	9.28		5.00	4.80	mg/L	1		5220D LL	Total/NA

Client Sample ID: MW-15 — Lab Sample ID: 310-279940-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	70.2		5.00	2.25	mg/L	5		9056A	Total/NA
Sulfate	699		20.0	8.40	mg/L	20		9056A	Total/NA
Barium	0.0236		0.00200	0.000660	mg/L	1		6020B	Total/NA
Iron	0.101		0.100	0.0360	mg/L	1		6020B	Total/NA
Lithium	0.233		0.0100	0.00250	mg/L	1		6020B	Total/NA
Sodium	97.8		1.00	0.480	mg/L	1		6020B	Total/NA
Strontium	1.73		0.00100	0.000530	mg/L	1		6020B	Total/NA
Chemical Oxygen Demand	19.7		5.00	4.80	mg/L	1		5220D LL	Total/NA

Client Sample ID: MW-16 — Lab Sample ID: 310-279940-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	211		5.00	2.25	mg/L	5		9056A	Total/NA
Sulfate	2100		50.0	21.0	mg/L	50		9056A	Total/NA
Barium	0.0150		0.00200	0.000660	mg/L	1		6020B	Total/NA
Iron	1.35		0.100	0.0360	mg/L	1		6020B	Total/NA
Lithium	0.311		0.0100	0.00250	mg/L	1		6020B	Total/NA
Sodium	234		1.00	0.480	mg/L	1		6020B	Total/NA
Strontium	3.18	B	0.00400	0.00212	mg/L	4		6020B	Total/NA
Ammonia as N	0.692		0.200	0.100	mg/L	1		350.1	Total/NA
Chemical Oxygen Demand	17.1		5.00	4.80	mg/L	1		5220D LL	Total/NA

Client Sample ID: Pond — Lab Sample ID: 310-279940-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	179		20.0	9.00	mg/L	20		300.0	Total/NA
Nitrate as N	0.0793	J	0.200	0.0780	mg/L	1		300.0	Total/NA
Fluoride	1.49		0.200	0.0750	mg/L	1		300.0	Total/NA
Sulfate	114		20.0	8.40	mg/L	20		300.0	Total/NA
Arsenic	0.00171	J	0.00200	0.000530	mg/L	1		200.8	Total/NA
Aluminum	0.0600		0.0500	0.0210	mg/L	1		200.8	Total/NA
Barium	0.138		0.00200	0.000660	mg/L	1		200.8	Total/NA
Boron	0.192		0.100	0.0760	mg/L	1		200.8	Total/NA
Iron	0.421		0.100	0.0360	mg/L	1		200.8	Total/NA
Lead	0.000378	J	0.000500	0.000260	mg/L	1		200.8	Total/NA
Lithium	0.305		0.0100	0.00250	mg/L	1		200.8	Total/NA
Molybdenum	0.00240		0.00200	0.00130	mg/L	1		200.8	Total/NA
Nickel	0.00334	J	0.00500	0.00210	mg/L	1		200.8	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: Pond (Continued)
Lab Sample ID: 310-279940-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	84.4		1.00	0.480	mg/L	1		200.8	Total/NA
Strontium	0.884		0.00100	0.000530	mg/L	1		200.8	Total/NA
Zinc	0.0138	J	0.0200	0.00970	mg/L	1		200.8	Total/NA
Ammonia as N	0.304	J	0.500	0.210	mg/L	1		350.1	Total/NA
Total Kjeldahl Nitrogen	0.602	J	1.00	0.570	mg/L	1		351.2	Total/NA
Phosphorus, Total	0.0757	J	0.100	0.0670	mg/L	1		365.1	Total/NA
Chemical Oxygen Demand	28.5		5.00	4.80	mg/L	1		5220D LL	Total/NA
Total Suspended Solids	5.00		5.00	3.70	mg/L	1		I-3765-85	Total/NA
Nitrogen, Total	0.602	J	1.00	0.570	mg/L	1		Total Nitrogen	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Glencore Ltd
Job ID: 310-279940-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-5
Lab Sample ID: 310-279940-1
Date Collected: 04/25/24 00:00
Matrix: Groundwater
Date Received: 04/26/24 14:45

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**150**		5.00	2.25	mg/L			05/03/24 20:32	5
Fluoride	**0.502**	**J**	1.00	0.375	mg/L			05/03/24 20:32	5
Sulfate	**465**		5.00	2.10	mg/L			05/03/24 20:32	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0210		0.0500	0.0210	mg/L		04/30/24 09:00	05/01/24 17:04	1
Barium	**0.0121**		0.00200	0.000660	mg/L		04/30/24 09:00	05/01/24 17:04	1
Boron	<0.0760		0.100	0.0760	mg/L		04/30/24 09:00	05/01/24 17:04	1
Iron	**0.179**		0.100	0.0360	mg/L		04/30/24 09:00	05/01/24 17:04	1
Lithium	**0.109**		0.0100	0.00250	mg/L		04/30/24 09:00	05/01/24 17:04	1
Sodium	**146**		1.00	0.480	mg/L		04/30/24 09:00	05/01/24 17:04	1
Strontium	**1.10**		0.00100	0.000530	mg/L		04/30/24 09:00	05/06/24 17:28	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N (EPA 350.1)	**0.128**	**J**	0.200	0.100	mg/L			04/30/24 20:17	1
Chemical Oxygen Demand (SM 5220D LL)	**7.65**		5.00	4.80	mg/L			05/03/24 11:57	1
Sulfide (SW846 9034)	<0.231		1.00	0.231	mg/L		05/02/24 18:06	05/02/24 22:26	1

Client: Glencore Ltd
Job ID: 310-279940-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-7
Lab Sample ID: 310-279940-2
Date Collected: 04/25/24 00:00
Matrix: Groundwater
Date Received: 04/26/24 14:45

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**30.5**		5.00	2.25	mg/L			05/03/24 20:45	5
Fluoride	<0.375		1.00	0.375	mg/L			05/03/24 20:45	5
Sulfate	**287**		5.00	2.10	mg/L			05/03/24 20:45	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0210		0.0500	0.0210	mg/L		04/30/24 09:00	05/01/24 17:06	1
Barium	**0.111**		0.00200	0.000660	mg/L		04/30/24 09:00	05/01/24 17:06	1
Boron	**0.177**		0.100	0.0760	mg/L		04/30/24 09:00	05/01/24 17:06	1
Iron	**0.503**		0.100	0.0360	mg/L		04/30/24 09:00	05/01/24 17:06	1
Lithium	**0.104**		0.0100	0.00250	mg/L		04/30/24 09:00	05/01/24 17:06	1
Sodium	**74.3**		1.00	0.480	mg/L		04/30/24 09:00	05/01/24 17:06	1
Strontium	**1.01**		0.00100	0.000530	mg/L		04/30/24 09:00	05/06/24 17:31	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N (EPA 350.1)	**0.783**		0.200	0.100	mg/L			04/30/24 20:18	1
Chemical Oxygen Demand (SM 5220D LL)	**11.9**		5.00	4.80	mg/L			05/03/24 11:57	1
Sulfide (SW846 9034)	<0.231		1.00	0.231	mg/L		05/02/24 18:10	05/02/24 22:36	1

Client Sample Results

Client: Glencore Ltd
Job ID: 310-279940-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-8
Lab Sample ID: 310-279940-3

Date Collected: 04/25/24 00:00
Matrix: Groundwater
Date Received: 04/26/24 14:45

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**28.5**		5.00	2.25	mg/L			05/03/24 20:57	5
Fluoride	<0.375		1.00	0.375	mg/L			05/03/24 20:57	5
Sulfate	**914**		20.0	8.40	mg/L			05/06/24 10:26	20

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0210		0.0500	0.0210	mg/L		04/30/24 09:00	05/01/24 17:08	1
Barium	**0.0396**		0.00200	0.000660	mg/L		04/30/24 09:00	05/01/24 17:08	1
Boron	**0.165**		0.100	0.0760	mg/L		04/30/24 09:00	05/01/24 17:08	1
Iron	**0.257**		0.100	0.0360	mg/L		04/30/24 09:00	05/01/24 17:08	1
Lithium	**0.0177**		0.0100	0.00250	mg/L		04/30/24 09:00	05/01/24 17:08	1
Sodium	**108**		1.00	0.480	mg/L		04/30/24 09:00	05/01/24 17:08	1
Strontium	**2.24**		0.00100	0.000530	mg/L		04/30/24 09:00	05/06/24 17:33	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N (EPA 350.1)	**1.66**		0.200	0.100	mg/L			04/30/24 20:19	1
Chemical Oxygen Demand (SM 5220D LL)	**9.28**		5.00	4.80	mg/L			05/03/24 11:57	1
Sulfide (SW846 9034)	<0.231		1.00	0.231	mg/L		05/02/24 18:13	05/02/24 22:46	1

Client: Glencore Ltd
Job ID: 310-279940-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-12
Lab Sample ID: 310-279940-4

Date Collected: 04/25/24 00:00
Matrix: Groundwater
Date Received: 04/26/24 14:45

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**19.6**		5.00	2.25	mg/L			05/03/24 21:09	5
Fluoride	<0.375		1.00	0.375	mg/L			05/03/24 21:09	5
Sulfate	**279**		5.00	2.10	mg/L			05/03/24 21:09	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0210		0.0500	0.0210	mg/L		04/30/24 09:00	05/01/24 17:11	1
Barium	**0.0367**		0.00200	0.000660	mg/L		04/30/24 09:00	05/01/24 17:11	1
Boron	<0.0760		0.100	0.0760	mg/L		04/30/24 09:00	05/01/24 17:11	1
Iron	**0.0488**	**J**	0.100	0.0360	mg/L		04/30/24 09:00	05/01/24 17:11	1
Lithium	**0.0541**		0.0100	0.00250	mg/L		04/30/24 09:00	05/01/24 17:11	1
Sodium	**64.6**		1.00	0.480	mg/L		04/30/24 09:00	05/01/24 17:11	1
Strontium	**0.638**		0.00100	0.000530	mg/L		04/30/24 09:00	05/06/24 17:35	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N (EPA 350.1)	<0.100		0.200	0.100	mg/L			04/30/24 20:20	1
Chemical Oxygen Demand (SM 5220D LL)	**7.98**		5.00	4.80	mg/L			05/03/24 11:57	1
Sulfide (SW846 9034)	<0.231		1.00	0.231	mg/L		05/02/24 18:16	05/02/24 22:55	1

Client: Glencore Ltd
Job ID: 310-279940-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-14
Lab Sample ID: 310-279940-5
Date Collected: 04/25/24 00:00
Matrix: Groundwater
Date Received: 04/26/24 14:45

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**16.4**		5.00	2.25	mg/L			05/03/24 21:21	5
Fluoride	<0.375		1.00	0.375	mg/L			05/03/24 21:21	5
Sulfate	**1380**		20.0	8.40	mg/L			05/06/24 10:38	20

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0210		0.0500	0.0210	mg/L		04/30/24 09:00	05/01/24 17:13	1
Barium	**0.0262**		0.00200	0.000660	mg/L		04/30/24 09:00	05/01/24 17:13	1
Boron	**0.252**		0.100	0.0760	mg/L		04/30/24 09:00	05/01/24 17:13	1
Iron	**2.32**		0.100	0.0360	mg/L		04/30/24 09:00	05/01/24 17:13	1
Lithium	**0.0184**		0.0100	0.00250	mg/L		04/30/24 09:00	05/01/24 17:13	1
Sodium	**108**		1.00	0.480	mg/L		04/30/24 09:00	05/01/24 17:13	1
Strontium	**2.37**	**B**	0.00400	0.00212	mg/L		04/30/24 09:00	05/08/24 16:19	4

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N (EPA 350.1)	**4.53**		0.200	0.100	mg/L			04/30/24 20:22	1
Chemical Oxygen Demand (SM 5220D LL)	**9.28**		5.00	4.80	mg/L			05/03/24 11:57	1
Sulfide (SW846 9034)	<0.231		1.00	0.231	mg/L		05/02/24 18:20	05/02/24 23:05	1

Client: Glencore Ltd
Job ID: 310-279940-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-15
Lab Sample ID: 310-279940-6
Date Collected: 04/25/24 00:00
Matrix: Groundwater
Date Received: 04/26/24 14:45

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**70.2**		5.00	2.25	mg/L			05/03/24 21:33	5
Fluoride	<0.375		1.00	0.375	mg/L			05/03/24 21:33	5
Sulfate	**699**		20.0	8.40	mg/L			05/06/24 10:50	20

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0210		0.0500	0.0210	mg/L		04/30/24 09:00	05/01/24 17:15	1
Barium	**0.0236**		0.00200	0.000660	mg/L		04/30/24 09:00	05/01/24 17:15	1
Boron	<0.0760		0.100	0.0760	mg/L		04/30/24 09:00	05/01/24 17:15	1
Iron	**0.101**		0.100	0.0360	mg/L		04/30/24 09:00	05/01/24 17:15	1
Lithium	**0.233**		0.0100	0.00250	mg/L		04/30/24 09:00	05/01/24 17:15	1
Sodium	**97.8**		1.00	0.480	mg/L		04/30/24 09:00	05/01/24 17:15	1
Strontium	**1.73**		0.00100	0.000530	mg/L		04/30/24 09:00	05/06/24 17:39	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N (EPA 350.1)	<0.100		0.200	0.100	mg/L			04/30/24 20:22	1
Chemical Oxygen Demand (SM 5220D LL)	**19.7**		5.00	4.80	mg/L			05/03/24 11:57	1
Sulfide (SW846 9034)	<0.231		1.00	0.231	mg/L		05/02/24 18:23	05/02/24 23:15	1

Client Sample Results

Client: Glencore Ltd
Project/Site: Keokuk Ferro-Sil Landfill

Job ID: 310-279940-1

Client Sample ID: MW-16

Date Collected: 04/25/24 00:00
Date Received: 04/26/24 14:45

Lab Sample ID: 310-279940-7

Matrix: Groundwater

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**211**		5.00	2.25	mg/L			05/03/24 21:45	5
Fluoride	<0.375		1.00	0.375	mg/L			05/03/24 21:45	5
Sulfate	**2100**		50.0	21.0	mg/L			05/06/24 12:50	50

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0210		0.0500	0.0210	mg/L		04/30/24 09:00	05/01/24 17:17	1
Barium	**0.0150**		0.00200	0.000660	mg/L		04/30/24 09:00	05/01/24 17:17	1
Boron	<0.0760		0.100	0.0760	mg/L		04/30/24 09:00	05/01/24 17:17	1
Iron	**1.35**		0.100	0.0360	mg/L		04/30/24 09:00	05/01/24 17:17	1
Lithium	**0.311**		0.0100	0.00250	mg/L		04/30/24 09:00	05/01/24 17:17	1
Sodium	**234**		1.00	0.480	mg/L		04/30/24 09:00	05/01/24 17:17	1
Strontium	**3.18**	**B**	0.00400	0.00212	mg/L		04/30/24 09:00	05/08/24 16:22	4

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N (EPA 350.1)	**0.692**		0.200	0.100	mg/L			04/30/24 20:24	1
Chemical Oxygen Demand (SM 5220D LL)	**17.1**		5.00	4.80	mg/L			05/03/24 11:57	1
Sulfide (SW846 9034)	<0.231		1.00	0.231	mg/L		05/02/24 18:26	05/02/24 23:25	1

Client: Glencore Ltd
Job ID: 310-279940-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: Pond
Lab Sample ID: 310-279940-8
Date Collected: 04/25/24 00:00
Matrix: Wastewater
Date Received: 04/26/24 14:45

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**179**		20.0	9.00	mg/L			04/29/24 09:32	20
Nitrate as N	**0.0793**	**J**	0.200	0.0780	mg/L			04/26/24 16:35	1
Fluoride	**1.49**		0.200	0.0750	mg/L			04/26/24 16:35	1
Nitrite as N	<0.0430		0.200	0.0430	mg/L			04/26/24 16:35	1
Sulfate	**114**		20.0	8.40	mg/L			04/29/24 09:32	20

Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.00171**	**J**	0.00200	0.000530	mg/L		04/30/24 09:00	05/01/24 18:33	1
Aluminum	**0.0600**		0.0500	0.0210	mg/L		04/30/24 09:00	05/01/24 18:33	1
Barium	**0.138**		0.00200	0.000660	mg/L		04/30/24 09:00	05/01/24 18:33	1
Boron	**0.192**		0.100	0.0760	mg/L		04/30/24 09:00	05/01/24 18:33	1
Cadmium	<0.000100		0.000200	0.000100	mg/L		04/30/24 09:00	05/01/24 18:33	1
Chromium	<0.00120		0.00500	0.00120	mg/L		04/30/24 09:00	05/01/24 18:33	1
Copper	<0.00180		0.00500	0.00180	mg/L		04/30/24 09:00	05/01/24 18:33	1
Iron	**0.421**		0.100	0.0360	mg/L		04/30/24 09:00	05/01/24 18:33	1
Lead	**0.000378**	**J**	0.000500	0.000260	mg/L		04/30/24 09:00	05/01/24 18:33	1
Lithium	**0.305**		0.0100	0.00250	mg/L		04/30/24 09:00	05/01/24 18:33	1
Molybdenum	**0.00240**		0.00200	0.00130	mg/L		04/30/24 09:00	05/01/24 18:33	1
Nickel	**0.00334**	**J**	0.00500	0.00210	mg/L		04/30/24 09:00	05/01/24 18:33	1
Selenium	<0.00140		0.00500	0.00140	mg/L		04/30/24 09:00	05/01/24 18:33	1
Silver	<0.000500		0.00100	0.000500	mg/L		04/30/24 09:00	05/06/24 18:09	1
Sodium	**84.4**		1.00	0.480	mg/L		04/30/24 09:00	05/01/24 18:33	1
Strontium	**0.884**		0.00100	0.000530	mg/L		04/30/24 09:00	05/06/24 18:09	1
Zinc	**0.0138**	**J**	0.0200	0.00970	mg/L		04/30/24 09:00	05/01/24 18:33	1

Method: EPA 245.2 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000110		0.000200	0.000110	mg/L		05/02/24 15:09	05/06/24 13:29	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM (Oil and Grease) (40CFR136A 1664A)	<4.5		5.0	4.5	mg/L		04/30/24 08:00	04/30/24 08:00	1
SGT-HEM (Oil and Grease - Nonpolar) (40CFR136A 1664A)	<4.5		5.0	4.5	mg/L		04/30/24 08:00	04/30/24 08:00	1
Cyanide, Total (EPA 335.4)	<0.00350		0.0100	0.00350	mg/L		04/30/24 08:30	05/02/24 17:26	1
Ammonia as N (EPA 350.1)	**0.304**	**J**	0.500	0.210	mg/L		05/07/24 09:19	05/07/24 14:01	1
Total Kjeldahl Nitrogen (EPA 351.2)	**0.602**	**J**	1.00	0.570	mg/L		04/30/24 05:04	04/30/24 16:33	1
Phosphorus, Total (EPA 365.1)	**0.0757**	**J**	0.100	0.0670	mg/L		05/02/24 09:41	05/02/24 21:49	1
Chemical Oxygen Demand (SM 5220D LL)	**28.5**		5.00	4.80	mg/L			05/03/24 11:57	1
Total Suspended Solids (USGS I-3765-85)	**5.00**		5.00	3.70	mg/L			04/30/24 11:52	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Total (EPA Total Nitrogen)	**0.602**	**J**	1.00	0.570	mg/L			04/30/24 16:33	1

Definitions/Glossary

Client: Glencore Ltd
Job ID: 310-279940-1
Project/Site: Keokuk Ferro-Sil Landfill

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 310-420136/3
Matrix: Water
Analysis Batch: 420136

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.450		1.00	0.450	mg/L			04/25/24 13:34	1
Fluoride	<0.0750		0.200	0.0750	mg/L			04/25/24 13:34	1
Sulfate	<0.420		1.00	0.420	mg/L			04/25/24 13:34	1

Lab Sample ID: LCS 310-420136/4
Matrix: Water
Analysis Batch: 420136

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	9.840		mg/L		98	90 - 110
Fluoride	2.00	2.189		mg/L		109	90 - 110
Sulfate	10.0	10.28		mg/L		103	90 - 110

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-420878/3
Matrix: Water
Analysis Batch: 420878

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.450		1.00	0.450	mg/L			05/03/24 17:07	1
Fluoride	<0.0750		0.200	0.0750	mg/L			05/03/24 17:07	1
Sulfate	<0.420		1.00	0.420	mg/L			05/03/24 17:07	1

Lab Sample ID: LCS 310-420878/4
Matrix: Water
Analysis Batch: 420878

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	10.22		mg/L		102	90 - 110
Fluoride	2.00	2.104		mg/L		105	90 - 110
Sulfate	10.0	9.841		mg/L		98	90 - 110

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 310-420157/1-A
Matrix: Water
Analysis Batch: 420438

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 420157

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.000530		0.00200	0.000530	mg/L		04/30/24 09:00	05/01/24 17:31	1
Aluminum	<0.0210		0.0500	0.0210	mg/L		04/30/24 09:00	05/01/24 17:31	1
Barium	<0.000660		0.00200	0.000660	mg/L		04/30/24 09:00	05/01/24 17:31	1
Boron	<0.0760		0.100	0.0760	mg/L		04/30/24 09:00	05/01/24 17:31	1
Cadmium	<0.000100		0.000200	0.000100	mg/L		04/30/24 09:00	05/01/24 17:31	1
Chromium	<0.00120		0.00500	0.00120	mg/L		04/30/24 09:00	05/01/24 17:31	1
Copper	<0.00180		0.00500	0.00180	mg/L		04/30/24 09:00	05/01/24 17:31	1
Iron	<0.0360		0.100	0.0360	mg/L		04/30/24 09:00	05/01/24 17:31	1
Lead	<0.000260		0.000500	0.000260	mg/L		04/30/24 09:00	05/01/24 17:31	1
Lithium	<0.00250		0.0100	0.00250	mg/L		04/30/24 09:00	05/01/24 17:31	1

Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 310-420157/1-A
Matrix: Water
Analysis Batch: 420438

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 420157

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Molybdenum	<0.00130		0.00200	0.00130	mg/L		04/30/24 09:00	05/01/24 17:31	1
Nickel	<0.00210		0.00500	0.00210	mg/L		04/30/24 09:00	05/01/24 17:31	1
Selenium	<0.00140		0.00500	0.00140	mg/L		04/30/24 09:00	05/01/24 17:31	1
Sodium	<0.480		1.00	0.480	mg/L		04/30/24 09:00	05/01/24 17:31	1
Zinc	<0.00970		0.0200	0.00970	mg/L		04/30/24 09:00	05/01/24 17:31	1

Lab Sample ID: MB 310-420157/1-A
Matrix: Water
Analysis Batch: 420833

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 420157

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	<0.000500		0.00100	0.000500	mg/L		04/30/24 09:00	05/06/24 17:46	1
Strontium	<0.000530		0.00100	0.000530	mg/L		04/30/24 09:00	05/06/24 17:46	1

Lab Sample ID: LCS 310-420157/2-A
Matrix: Water
Analysis Batch: 420438

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 420157

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	0.200	0.2113		mg/L		106	85 - 115
Aluminum	0.200	0.2137		mg/L		107	85 - 115
Barium	0.100	0.1045		mg/L		104	85 - 115
Boron	0.200	0.1774		mg/L		89	85 - 115
Cadmium	0.100	0.1034		mg/L		103	85 - 115
Chromium	0.100	0.1054		mg/L		105	85 - 115
Copper	0.200	0.2260		mg/L		113	85 - 115
Iron	0.200	0.2219		mg/L		111	85 - 115
Lead	0.200	0.2140		mg/L		107	85 - 115
Lithium	0.200	0.2197		mg/L		110	85 - 115
Molybdenum	0.200	0.2042		mg/L		102	85 - 115
Nickel	0.200	0.2194		mg/L		110	85 - 115
Selenium	0.400	0.4001		mg/L		100	85 - 115
Sodium	2.00	2.183		mg/L		109	85 - 115
Zinc	0.200	0.1984		mg/L		99	85 - 115

Lab Sample ID: LCS 310-420157/2-A
Matrix: Water
Analysis Batch: 420833

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 420157

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Silver	0.100	0.1122		mg/L		112	85 - 115
Strontium	0.200	0.2249		mg/L		112	85 - 115

Method: 245.2 - Mercury (CVAA)

Lab Sample ID: MB 310-420542/1-A
Matrix: Water
Analysis Batch: 420788

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 420542

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000110		0.000200	0.000110	mg/L		05/02/24 15:09	05/06/24 13:14	1

Lab Sample ID: LCS 310-420542/2-A
Matrix: Water
Analysis Batch: 420788

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 420542

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001797		mg/L		108	85 - 115

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-420154/1-A
Matrix: Water
Analysis Batch: 420438

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 420154

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0210		0.0500	0.0210	mg/L		04/30/24 09:00	05/01/24 16:06	1
Barium	<0.000660		0.00200	0.000660	mg/L		04/30/24 09:00	05/01/24 16:06	1
Boron	<0.0760		0.100	0.0760	mg/L		04/30/24 09:00	05/01/24 16:06	1
Iron	<0.0360		0.100	0.0360	mg/L		04/30/24 09:00	05/01/24 16:06	1
Lithium	<0.00250		0.0100	0.00250	mg/L		04/30/24 09:00	05/01/24 16:06	1
Sodium	<0.480		1.00	0.480	mg/L		04/30/24 09:00	05/01/24 16:06	1
Strontium	0.0006160	J	0.00100	0.000530	mg/L		04/30/24 09:00	05/01/24 16:06	1

Lab Sample ID: LCS 310-420154/2-A
Matrix: Water
Analysis Batch: 420438

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 420154

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Aluminum	0.200	0.2088		mg/L		104	80 - 120
Barium	0.100	0.1020		mg/L		102	80 - 120
Boron	0.200	0.1806		mg/L		90	80 - 120
Iron	0.200	0.2266		mg/L		113	80 - 120
Lithium	0.200	0.2104		mg/L		105	80 - 120
Sodium	2.00	2.331		mg/L		117	80 - 120
Strontium	0.200	0.2098		mg/L		105	80 - 120

Method: 1664A - HEM and SGT-HEM by Extraction and Gravimetry

Lab Sample ID: MB 310-420165/1-A
Matrix: Water
Analysis Batch: 420256

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 420165

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM (Oil and Grease)	<4.5		5.0	4.5	mg/L		04/30/24 08:00	04/30/24 08:00	1
SGT-HEM (Oil and Grease - Nonpolar)	<4.5		5.0	4.5	mg/L		04/30/24 08:00	04/30/24 08:00	1

Method: 1664A - HEM and SGT-HEM by Extraction and Gravimetry (Continued)

Lab Sample ID: LCS 310-420165/2-A
Matrix: Water
Analysis Batch: 420256

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 420165

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
HEM (Oil and Grease)	40.0	32.60		mg/L		82	78 - 114
SGT-HEM (Oil and Grease - Nonpolar)	20.0	20.40		mg/L		102	64 - 132

Method: 335.4 - Cyanide, Total

Lab Sample ID: MB 310-420220/1-A
Matrix: Water
Analysis Batch: 420553

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 420220

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.00350		0.0100	0.00350	mg/L		04/30/24 08:30	05/02/24 17:05	1

Lab Sample ID: LCS 310-420220/2-A
Matrix: Water
Analysis Batch: 420553

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 420220

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cyanide, Total	0.200	0.1869		mg/L		93	90 - 110

Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 310-420286/150
Matrix: Water
Analysis Batch: 420286

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N	<0.100		0.200	0.100	mg/L			04/30/24 20:06	1

Lab Sample ID: LCS 310-420286/151
Matrix: Water
Analysis Batch: 420286

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ammonia as N	8.55	8.944		mg/L		105	90 - 110

Lab Sample ID: MB 310-420841/1-A
Matrix: Water
Analysis Batch: 420895

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 420841

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N	<0.210		0.500	0.210	mg/L		05/07/24 09:19	05/07/24 14:44	1

Lab Sample ID: LCS 310-420841/2-A
Matrix: Water
Analysis Batch: 420895

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 420841

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ammonia as N	4.00	3.808		mg/L		95	90 - 110

Method: 351.2 - Nitrogen, Total Kjeldahl

Lab Sample ID: MB 310-420170/1-A
Matrix: Water
Analysis Batch: 420280

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 420170

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Kjeldahl Nitrogen	<0.570		1.00	0.570	mg/L		04/30/24 05:04	04/30/24 16:23	1

Lab Sample ID: LCS 310-420170/2-A
Matrix: Water
Analysis Batch: 420280

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 420170

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Kjeldahl Nitrogen	4.01	3.934		mg/L		98	90 - 110

Method: 365.1 - Phosphorus, Total

Lab Sample ID: MB 310-420462/1-A
Matrix: Water
Analysis Batch: 420563

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 420462

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	<0.0670		0.100	0.0670	mg/L		05/02/24 09:41	05/02/24 21:40	1

Lab Sample ID: LCS 310-420462/2-A
Matrix: Water
Analysis Batch: 420563

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 420462

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Phosphorus, Total	1.00	0.9612		mg/L		96	90 - 110

Method: 5220D LL - COD

Lab Sample ID: MB 310-420629/32
Matrix: Water
Analysis Batch: 420629

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	<4.80		5.00	4.80	mg/L			05/03/24 11:57	1

Lab Sample ID: MB 310-420629/90
Matrix: Water
Analysis Batch: 420629

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	<4.80		5.00	4.80	mg/L			05/03/24 11:57	1

Lab Sample ID: LCS 310-420629/33
Matrix: Water
Analysis Batch: 420629

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	125	120.4		mg/L		96	85 - 115

Method: 5220D LL - COD (Continued)

Lab Sample ID: LCS 310-420629/91
Matrix: Water
Analysis Batch: 420629

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Chemical Oxygen Demand			125	119.1		mg/L		95	85 - 115		

Method: 9034 - Sulfide, Acid soluble and Insoluble (Titrimetric)

Lab Sample ID: MB 500-766127/1-A
Matrix: Water
Analysis Batch: 766128

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 766127

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	<0.231		1.00	0.231	mg/L		05/02/24 18:00	05/02/24 22:07	1

Lab Sample ID: LCS 500-766127/2-A
Matrix: Water
Analysis Batch: 766128

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 766127

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Sulfide			3.64	3.663		mg/L		101	80 - 120		

Method: I-3765-85 - Residue, Non-filterable (TSS)

Lab Sample ID: MB 310-420238/1
Matrix: Water
Analysis Batch: 420238

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	<3.70		5.00	3.70	mg/L			04/30/24 11:52	1

Lab Sample ID: LCS 310-420238/2
Matrix: Water
Analysis Batch: 420238

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Total Suspended Solids			100	100.0		mg/L		100	75 - 116		

Lab Sample ID: 310-279940-8 DU
Matrix: Wastewater
Analysis Batch: 420238

Client Sample ID: Pond
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Total Suspended Solids	5.00			5.000		mg/L				0	35

HPLC/IC

Analysis Batch: 420136

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-8	Pond	Total/NA	Wastewater	300.0	
310-279940-8	Pond	Total/NA	Wastewater	300.0	
MB 310-420136/3	Method Blank	Total/NA	Water	300.0	
LCS 310-420136/4	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 420878

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-1	MW-5	Total/NA	Groundwater	9056A	
310-279940-2	MW-7	Total/NA	Groundwater	9056A	
310-279940-3	MW-8	Total/NA	Groundwater	9056A	
310-279940-3	MW-8	Total/NA	Groundwater	9056A	
310-279940-4	MW-12	Total/NA	Groundwater	9056A	
310-279940-5	MW-14	Total/NA	Groundwater	9056A	
310-279940-5	MW-14	Total/NA	Groundwater	9056A	
310-279940-6	MW-15	Total/NA	Groundwater	9056A	
310-279940-6	MW-15	Total/NA	Groundwater	9056A	
310-279940-7	MW-16	Total/NA	Groundwater	9056A	
310-279940-7	MW-16	Total/NA	Groundwater	9056A	
MB 310-420878/3	Method Blank	Total/NA	Water	9056A	
LCS 310-420878/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 420154

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-1	MW-5	Total/NA	Groundwater	3005A	
310-279940-2	MW-7	Total/NA	Groundwater	3005A	
310-279940-3	MW-8	Total/NA	Groundwater	3005A	
310-279940-4	MW-12	Total/NA	Groundwater	3005A	
310-279940-5	MW-14	Total/NA	Groundwater	3005A	
310-279940-6	MW-15	Total/NA	Groundwater	3005A	
310-279940-7	MW-16	Total/NA	Groundwater	3005A	
MB 310-420154/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-420154/2-A	Lab Control Sample	Total/NA	Water	3005A	

Prep Batch: 420157

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-8	Pond	Total/NA	Wastewater	200.8	
MB 310-420157/1-A	Method Blank	Total/NA	Water	200.8	
LCS 310-420157/2-A	Lab Control Sample	Total/NA	Water	200.8	

Analysis Batch: 420438

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-1	MW-5	Total/NA	Groundwater	6020B	420154
310-279940-2	MW-7	Total/NA	Groundwater	6020B	420154
310-279940-3	MW-8	Total/NA	Groundwater	6020B	420154
310-279940-4	MW-12	Total/NA	Groundwater	6020B	420154
310-279940-5	MW-14	Total/NA	Groundwater	6020B	420154
310-279940-6	MW-15	Total/NA	Groundwater	6020B	420154
310-279940-7	MW-16	Total/NA	Groundwater	6020B	420154
310-279940-8	Pond	Total/NA	Wastewater	200.8	420157

Metals (Continued)

Analysis Batch: 420438 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-420154/1-A	Method Blank	Total/NA	Water	6020B	420154
MB 310-420157/1-A	Method Blank	Total/NA	Water	200.8	420157
LCS 310-420154/2-A	Lab Control Sample	Total/NA	Water	6020B	420154
LCS 310-420157/2-A	Lab Control Sample	Total/NA	Water	200.8	420157

Prep Batch: 420542

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-8	Pond	Total/NA	Wastewater	245.1	
MB 310-420542/1-A	Method Blank	Total/NA	Water	245.1	
LCS 310-420542/2-A	Lab Control Sample	Total/NA	Water	245.1	

Analysis Batch: 420788

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-8	Pond	Total/NA	Wastewater	245.2	420542
MB 310-420542/1-A	Method Blank	Total/NA	Water	245.2	420542
LCS 310-420542/2-A	Lab Control Sample	Total/NA	Water	245.2	420542

Analysis Batch: 420833

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-1	MW-5	Total/NA	Groundwater	6020B	420154
310-279940-2	MW-7	Total/NA	Groundwater	6020B	420154
310-279940-3	MW-8	Total/NA	Groundwater	6020B	420154
310-279940-4	MW-12	Total/NA	Groundwater	6020B	420154
310-279940-6	MW-15	Total/NA	Groundwater	6020B	420154
310-279940-8	Pond	Total/NA	Wastewater	200.8	420157
MB 310-420157/1-A	Method Blank	Total/NA	Water	200.8	420157
LCS 310-420157/2-A	Lab Control Sample	Total/NA	Water	200.8	420157

Analysis Batch: 421121

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-5	MW-14	Total/NA	Groundwater	6020B	420154
310-279940-7	MW-16	Total/NA	Groundwater	6020B	420154

General Chemistry

Analysis Batch: 420126

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-8	Pond	Total/NA	Wastewater	Total Nitrogen	

Prep Batch: 420165

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-8	Pond	Total/NA	Wastewater	1664A	
MB 310-420165/1-A	Method Blank	Total/NA	Water	1664A	
LCS 310-420165/2-A	Lab Control Sample	Total/NA	Water	1664A	

Prep Batch: 420170

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-8	Pond	Total/NA	Wastewater	351.2	
MB 310-420170/1-A	Method Blank	Total/NA	Water	351.2	
LCS 310-420170/2-A	Lab Control Sample	Total/NA	Water	351.2	

General Chemistry

Prep Batch: 420220

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-8	Pond	Total/NA	Wastewater	Distill/CN	
MB 310-420220/1-A	Method Blank	Total/NA	Water	Distill/CN	
LCS 310-420220/2-A	Lab Control Sample	Total/NA	Water	Distill/CN	

Analysis Batch: 420238

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-8	Pond	Total/NA	Wastewater	I-3765-85	
MB 310-420238/1	Method Blank	Total/NA	Water	I-3765-85	
LCS 310-420238/2	Lab Control Sample	Total/NA	Water	I-3765-85	
310-279940-8 DU	Pond	Total/NA	Wastewater	I-3765-85	

Analysis Batch: 420256

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-8	Pond	Total/NA	Wastewater	1664A	420165
MB 310-420165/1-A	Method Blank	Total/NA	Water	1664A	420165
LCS 310-420165/2-A	Lab Control Sample	Total/NA	Water	1664A	420165

Analysis Batch: 420280

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-8	Pond	Total/NA	Wastewater	351.2	420170
MB 310-420170/1-A	Method Blank	Total/NA	Water	351.2	420170
LCS 310-420170/2-A	Lab Control Sample	Total/NA	Water	351.2	420170

Analysis Batch: 420286

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-1	MW-5	Total/NA	Groundwater	350.1	
310-279940-2	MW-7	Total/NA	Groundwater	350.1	
310-279940-3	MW-8	Total/NA	Groundwater	350.1	
310-279940-4	MW-12	Total/NA	Groundwater	350.1	
310-279940-5	MW-14	Total/NA	Groundwater	350.1	
310-279940-6	MW-15	Total/NA	Groundwater	350.1	
310-279940-7	MW-16	Total/NA	Groundwater	350.1	
MB 310-420286/150	Method Blank	Total/NA	Water	350.1	
LCS 310-420286/151	Lab Control Sample	Total/NA	Water	350.1	

Prep Batch: 420462

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-8	Pond	Total/NA	Wastewater	365.1	
MB 310-420462/1-A	Method Blank	Total/NA	Water	365.1	
LCS 310-420462/2-A	Lab Control Sample	Total/NA	Water	365.1	

Analysis Batch: 420553

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-8	Pond	Total/NA	Wastewater	335.4	420220
MB 310-420220/1-A	Method Blank	Total/NA	Water	335.4	420220
LCS 310-420220/2-A	Lab Control Sample	Total/NA	Water	335.4	420220

Analysis Batch: 420563

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-8	Pond	Total/NA	Wastewater	365.1	420462
MB 310-420462/1-A	Method Blank	Total/NA	Water	365.1	420462

General Chemistry (Continued)

Analysis Batch: 420563 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 310-420462/2-A	Lab Control Sample	Total/NA	Water	365.1	420462

Analysis Batch: 420629

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-1	MW-5	Total/NA	Groundwater	5220D LL	
310-279940-2	MW-7	Total/NA	Groundwater	5220D LL	
310-279940-3	MW-8	Total/NA	Groundwater	5220D LL	
310-279940-4	MW-12	Total/NA	Groundwater	5220D LL	
310-279940-5	MW-14	Total/NA	Groundwater	5220D LL	
310-279940-6	MW-15	Total/NA	Groundwater	5220D LL	
310-279940-7	MW-16	Total/NA	Groundwater	5220D LL	
310-279940-8	Pond	Total/NA	Wastewater	5220D LL	
MB 310-420629/32	Method Blank	Total/NA	Water	5220D LL	
MB 310-420629/90	Method Blank	Total/NA	Water	5220D LL	
LCS 310-420629/33	Lab Control Sample	Total/NA	Water	5220D LL	
LCS 310-420629/91	Lab Control Sample	Total/NA	Water	5220D LL	

Prep Batch: 420841

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-8	Pond	Total/NA	Wastewater	Distill/Ammonia	
MB 310-420841/1-A	Method Blank	Total/NA	Water	Distill/Ammonia	
LCS 310-420841/2-A	Lab Control Sample	Total/NA	Water	Distill/Ammonia	

Analysis Batch: 420895

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-8	Pond	Total/NA	Wastewater	350.1	420841
MB 310-420841/1-A	Method Blank	Total/NA	Water	350.1	420841
LCS 310-420841/2-A	Lab Control Sample	Total/NA	Water	350.1	420841

Prep Batch: 766127

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-1	MW-5	Total/NA	Groundwater	9030B	
310-279940-2	MW-7	Total/NA	Groundwater	9030B	
310-279940-3	MW-8	Total/NA	Groundwater	9030B	
310-279940-4	MW-12	Total/NA	Groundwater	9030B	
310-279940-5	MW-14	Total/NA	Groundwater	9030B	
310-279940-6	MW-15	Total/NA	Groundwater	9030B	
310-279940-7	MW-16	Total/NA	Groundwater	9030B	
MB 500-766127/1-A	Method Blank	Total/NA	Water	9030B	
LCS 500-766127/2-A	Lab Control Sample	Total/NA	Water	9030B	

Analysis Batch: 766128

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-279940-1	MW-5	Total/NA	Groundwater	9034	766127
310-279940-2	MW-7	Total/NA	Groundwater	9034	766127
310-279940-3	MW-8	Total/NA	Groundwater	9034	766127
310-279940-4	MW-12	Total/NA	Groundwater	9034	766127
310-279940-5	MW-14	Total/NA	Groundwater	9034	766127
310-279940-6	MW-15	Total/NA	Groundwater	9034	766127
310-279940-7	MW-16	Total/NA	Groundwater	9034	766127
MB 500-766127/1-A	Method Blank	Total/NA	Water	9034	766127

General Chemistry (Continued)

Analysis Batch: 766128 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 500-766127/2-A	Lab Control Sample	Total/NA	Water	9034	766127

Lab Chronicle

Client: Glencore Ltd
Job ID: 310-279940-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-5
Lab Sample ID: 310-279940-1
Date Collected: 04/25/24 00:00
Matrix: Groundwater
Date Received: 04/26/24 14:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	420878	QTZ5	EET CF	05/03/24 20:32
Total/NA	Prep	3005A			420154	QTZ5	EET CF	04/30/24 09:00
Total/NA	Analysis	6020B		1	420438	NFT2	EET CF	05/01/24 17:04
Total/NA	Prep	3005A			420154	QTZ5	EET CF	04/30/24 09:00
Total/NA	Analysis	6020B		1	420833	NFT2	EET CF	05/06/24 17:28
Total/NA	Analysis	350.1		1	420286	ZJX4	EET CF	04/30/24 20:17
Total/NA	Analysis	5220D LL		1	420629	HE7K	EET CF	05/03/24 11:57
Total/NA	Prep	9030B			766127	CLB	EET CHI	05/02/24 18:06 - 05/02/24 18:10 [1]
Total/NA	Analysis	9034		1	766128	CLB	EET CHI	05/02/24 22:26 - 05/02/24 22:36 [1]

Client Sample ID: MW-7
Lab Sample ID: 310-279940-2
Date Collected: 04/25/24 00:00
Matrix: Groundwater
Date Received: 04/26/24 14:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	420878	QTZ5	EET CF	05/03/24 20:45
Total/NA	Prep	3005A			420154	QTZ5	EET CF	04/30/24 09:00
Total/NA	Analysis	6020B		1	420438	NFT2	EET CF	05/01/24 17:06
Total/NA	Prep	3005A			420154	QTZ5	EET CF	04/30/24 09:00
Total/NA	Analysis	6020B		1	420833	NFT2	EET CF	05/06/24 17:31
Total/NA	Analysis	350.1		1	420286	ZJX4	EET CF	04/30/24 20:18
Total/NA	Analysis	5220D LL		1	420629	HE7K	EET CF	05/03/24 11:57
Total/NA	Prep	9030B			766127	CLB	EET CHI	05/02/24 18:10 - 05/02/24 18:13 [1]
Total/NA	Analysis	9034		1	766128	CLB	EET CHI	05/02/24 22:36 - 05/02/24 22:46 [1]

Client Sample ID: MW-8
Lab Sample ID: 310-279940-3
Date Collected: 04/25/24 00:00
Matrix: Groundwater
Date Received: 04/26/24 14:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	420878	QTZ5	EET CF	05/03/24 20:57
Total/NA	Analysis	9056A		20	420878	QTZ5	EET CF	05/06/24 10:26
Total/NA	Prep	3005A			420154	QTZ5	EET CF	04/30/24 09:00
Total/NA	Analysis	6020B		1	420438	NFT2	EET CF	05/01/24 17:08
Total/NA	Prep	3005A			420154	QTZ5	EET CF	04/30/24 09:00
Total/NA	Analysis	6020B		1	420833	NFT2	EET CF	05/06/24 17:33
Total/NA	Analysis	350.1		1	420286	ZJX4	EET CF	04/30/24 20:19
Total/NA	Analysis	5220D LL		1	420629	HE7K	EET CF	05/03/24 11:57
Total/NA	Prep	9030B			766127	CLB	EET CHI	05/02/24 18:13 - 05/02/24 18:16 [1]
Total/NA	Analysis	9034		1	766128	CLB	EET CHI	05/02/24 22:46 - 05/02/24 22:55 [1]

Lab Chronicle

Client: Glencore Ltd
Job ID: 310-279940-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-12
Lab Sample ID: 310-279940-4
Date Collected: 04/25/24 00:00
Matrix: Groundwater
Date Received: 04/26/24 14:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	420878	QTZ5	EET CF	05/03/24 21:09
Total/NA	Prep	3005A			420154	QTZ5	EET CF	04/30/24 09:00
Total/NA	Analysis	6020B		1	420438	NFT2	EET CF	05/01/24 17:11
Total/NA	Prep	3005A			420154	QTZ5	EET CF	04/30/24 09:00
Total/NA	Analysis	6020B		1	420833	NFT2	EET CF	05/06/24 17:35
Total/NA	Analysis	350.1		1	420286	ZJX4	EET CF	04/30/24 20:20
Total/NA	Analysis	5220D LL		1	420629	HE7K	EET CF	05/03/24 11:57
Total/NA	Prep	9030B			766127	CLB	EET CHI	05/02/24 18:16 - 05/02/24 18:20 [1]
Total/NA	Analysis	9034		1	766128	CLB	EET CHI	05/02/24 22:55 - 05/02/24 23:05 [1]

Client Sample ID: MW-14
Lab Sample ID: 310-279940-5
Date Collected: 04/25/24 00:00
Matrix: Groundwater
Date Received: 04/26/24 14:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	420878	QTZ5	EET CF	05/03/24 21:21
Total/NA	Analysis	9056A		20	420878	QTZ5	EET CF	05/06/24 10:38
Total/NA	Prep	3005A			420154	QTZ5	EET CF	04/30/24 09:00
Total/NA	Analysis	6020B		4	421121	NFT2	EET CF	05/08/24 16:19
Total/NA	Prep	3005A			420154	QTZ5	EET CF	04/30/24 09:00
Total/NA	Analysis	6020B		1	420438	NFT2	EET CF	05/01/24 17:13
Total/NA	Analysis	350.1		1	420286	ZJX4	EET CF	04/30/24 20:22
Total/NA	Analysis	5220D LL		1	420629	HE7K	EET CF	05/03/24 11:57
Total/NA	Prep	9030B			766127	CLB	EET CHI	05/02/24 18:20 - 05/02/24 18:23 [1]
Total/NA	Analysis	9034		1	766128	CLB	EET CHI	05/02/24 23:05 - 05/02/24 23:15 [1]

Client Sample ID: MW-15
Lab Sample ID: 310-279940-6
Date Collected: 04/25/24 00:00
Matrix: Groundwater
Date Received: 04/26/24 14:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	420878	QTZ5	EET CF	05/03/24 21:33
Total/NA	Analysis	9056A		20	420878	QTZ5	EET CF	05/06/24 10:50
Total/NA	Prep	3005A			420154	QTZ5	EET CF	04/30/24 09:00
Total/NA	Analysis	6020B		1	420438	NFT2	EET CF	05/01/24 17:15
Total/NA	Prep	3005A			420154	QTZ5	EET CF	04/30/24 09:00
Total/NA	Analysis	6020B		1	420833	NFT2	EET CF	05/06/24 17:39
Total/NA	Analysis	350.1		1	420286	ZJX4	EET CF	04/30/24 20:22
Total/NA	Analysis	5220D LL		1	420629	HE7K	EET CF	05/03/24 11:57
Total/NA	Prep	9030B			766127	CLB	EET CHI	05/02/24 18:23 - 05/02/24 18:26 [1]
Total/NA	Analysis	9034		1	766128	CLB	EET CHI	05/02/24 23:15 - 05/02/24 23:25 [1]

Lab Chronicle

Client: Glencore Ltd
Job ID: 310-279940-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-16
Lab Sample ID: 310-279940-7

Date Collected: 04/25/24 00:00
Matrix: Groundwater
Date Received: 04/26/24 14:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	420878	QTZ5	EET CF	05/03/24 21:45
Total/NA	Analysis	9056A		50	420878	QTZ5	EET CF	05/06/24 12:50
Total/NA	Prep	3005A			420154	QTZ5	EET CF	04/30/24 09:00
Total/NA	Analysis	6020B		4	421121	NFT2	EET CF	05/08/24 16:22
Total/NA	Prep	3005A			420154	QTZ5	EET CF	04/30/24 09:00
Total/NA	Analysis	6020B		1	420438	NFT2	EET CF	05/01/24 17:17
Total/NA	Analysis	350.1		1	420286	ZJX4	EET CF	04/30/24 20:24
Total/NA	Analysis	5220D LL		1	420629	HE7K	EET CF	05/03/24 11:57
Total/NA	Prep	9030B			766127	CLB	EET CHI	05/02/24 18:26 - 05/02/24 18:30 [1]
Total/NA	Analysis	9034		1	766128	CLB	EET CHI	05/02/24 23:25 - 05/02/24 23:35 [1]

Client Sample ID: Pond
Lab Sample ID: 310-279940-8

Date Collected: 04/25/24 00:00
Matrix: Wastewater
Date Received: 04/26/24 14:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	300.0		1	420136	QTZ5	EET CF	04/26/24 16:35
Total/NA	Analysis	300.0		20	420136	QTZ5	EET CF	04/29/24 09:32
Total/NA	Prep	200.8			420157	QTZ5	EET CF	04/30/24 09:00
Total/NA	Analysis	200.8		1	420438	NFT2	EET CF	05/01/24 18:33
Total/NA	Prep	200.8			420157	QTZ5	EET CF	04/30/24 09:00
Total/NA	Analysis	200.8		1	420833	NFT2	EET CF	05/06/24 18:09
Total/NA	Prep	245.1			420542	A6US	EET CF	05/02/24 15:09
Total/NA	Analysis	245.2		1	420788	A6US	EET CF	05/06/24 13:29
Total/NA	Prep	1664A			420165	A3GU	EET CF	04/30/24 08:00
Total/NA	Analysis	1664A		1	420256	A3GU	EET CF	04/30/24 08:00
Total/NA	Prep	Distill/CN			420220	ENB7	EET CF	04/30/24 08:30
Total/NA	Analysis	335.4		1	420553	ZJX4	EET CF	05/02/24 17:26
Total/NA	Prep	Distill/Ammonia			420841	MQ8M	EET CF	05/07/24 09:19
Total/NA	Analysis	350.1		1	420895	ENB7	EET CF	05/07/24 14:01
Total/NA	Prep	351.2			420170	W9YR	EET CF	04/30/24 05:04
Total/NA	Analysis	351.2		1	420280	ZJX4	EET CF	04/30/24 16:33
Total/NA	Prep	365.1			420462	HE7K	EET CF	05/02/24 09:41
Total/NA	Analysis	365.1		1	420563	ZJX4	EET CF	05/02/24 21:49
Total/NA	Analysis	5220D LL		1	420629	HE7K	EET CF	05/03/24 11:57
Total/NA	Analysis	I-3765-85		1	420238	DGU1	EET CF	04/30/24 11:52
Total/NA	Analysis	Total Nitrogen		1	420126	HE7K	EET CF	04/30/24 16:33

[1] This procedure uses a method stipulated length of time for the process. Both start and end times are displayed.

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

EET CHI = Eurofins Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

Accreditation/Certification Summary

Client: Glencore Ltd
Job ID: 310-279940-1
Project/Site: Keokuk Ferro-Sil Landfill

Laboratory: Eurofins Cedar Falls

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-25

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
200.8	200.8	Wastewater	Lithium
200.8	200.8	Wastewater	Strontium
6020B	3005A	Groundwater	Lithium
Total Nitrogen		Wastewater	Nitrogen, Total

Laboratory: Eurofins Chicago

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Georgia	State	N/A	04-29-24 *
Georgia (DW)	State	939	04-29-24 *
Hawaii	State	NA	04-29-24 *
Illinois	NELAP	IL00035	05-31-25
Indiana	State	C-IL-02	04-29-24 *
Iowa	State	082	05-01-24 *
Kansas	NELAP	E-10161	10-31-24
Kentucky (UST)	State	AI # 108083	05-31-25
Kentucky (WW)	State	KY90023	12-31-24
Louisiana (All)	NELAP	02046	06-30-24
Mississippi	State	NA	04-29-24 *
North Carolina (WW/SW)	State	291	12-31-24
North Dakota	State	R-194	04-29-24 *
Oklahoma	State	8908	08-31-24
South Carolina	State	77001003	04-29-24 *
USDA	US Federal Programs	P330-18-00018	03-30-26
Wisconsin	State	999580010	08-31-24

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Glencore Ltd
Job ID: 310-279940-1
Project/Site: Keokuk Ferro-Sil Landfill

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	EPA	EET CF
9056A	Anions, Ion Chromatography	SW846	EET CF
200.8	Metals (ICP/MS)	EPA	EET CF
245.2	Mercury (CVAA)	EPA	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
1664A	HEM and SGT-HEM by Extraction and Gravimetry	40CFR136A	EET CF
335.4	Cyanide, Total	EPA	EET CF
350.1	Nitrogen, Ammonia	EPA	EET CF
351.2	Nitrogen, Total Kjeldahl	EPA	EET CF
365.1	Phosphorus, Total	EPA	EET CF
5220D LL	COD	SM	EET CF
9034	Sulfide, Acid soluble and Insoluble (Titrimetric)	SW846	EET CHI
I-3765-85	Residue, Non-filterable (TSS)	USGS	EET CF
Total Nitrogen	Nitrogen, Total	EPA	EET CF
1664A	HEM and SGT-HEM (SPE)	1664A	EET CF
200.8	Preparation, Total Metals	EPA	EET CF
245.1	Preparation, Mercury	EPA	EET CF
3005A	Preparation, Total Metals	SW846	EET CF
351.2	Nitrogen, Total Kjeldahl	EPA	EET CF
365.1	Sample Digestion for Total Phosphorus	MCAWW	EET CF
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	SW846	EET CHI
Distill/Ammonia	Distillation, Ammonia	None	EET CF
Distill/CN	Distillation, Cyanide	None	EET CF

Protocol References:

1664A = EPA-821-98-002

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater ", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

None = None

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

USGS = "Methods For Analysis Of Water And Fluvial Sediments", USGS, 1989

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

EET CHI = Eurofins Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

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310-279940 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information			
Client: Twin Rivers Holding			
City/State: CITY		STATE	Project:
Receipt Information			
Date/Time Received:	DATE 4/26/25	TIME 1445	Received By: BP

Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee
☑ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers			
Sample(s) received in Cooler?	☑ Yes	☐ No	*If yes:* Cooler ID:
Multiple Coolers?	☐ Yes	☑ No	*If yes:* Cooler # _____ of _____
Cooler Custody Seals Present?	☑ Yes	☐ No	*If yes:* Cooler custody seals intact? ☑ Yes ☐ No
Sample Custody Seals Present?	☐ Yes	☑ No	*If yes:* Sample custody seals intact? ☐ Yes ☐ No
Trip Blank Present?	☐ Yes	☑ No	*If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☑ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: Y	Correction Factor (°C): 0

• **Temp Blank Temperature** – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C):	Corrected Temp (°C):

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:	250 mL pl ⟷	
Uncorrected Temp (°C):	8.8	9.8
Corrected Temp (°C):	↓	↓

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

Chain of Custody Record

652064

eurofins | Environment Testing America

Address _____

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☑ Other

TAL-8210

Client Contact	Project Manager: Carol Wilson	Site Contact:	Date: 4-25-2024	COC No 001
Company Name Twin Rivers Holding	Tel/Email: chemeco@netins.net	Lab Contact:	Carrier:	1 of 1 COCs
Address c/o Glencore, Ltd	Analysis Turnaround Time			Sampler:
City/State/Zip Manhattan NY	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone	TAT if different from Below _____			Walk-in Client:
Fax.	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day			Lab Sampling
Project Name 13-024				Job / SDG No
Site Keokuk Ferro Si Landfill				
P O #				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Chloride	Fluoride	COD	Ammonia nitrogen	Sulfate	Sulfide	Al, Ba, B, Fe, Li, Na, Si	TSS	Total nitrogen	Total phosphorus	O&G HEM	d&G SGT HEM	Total cyanide	Metals list *				Sample Specific Notes
MW-5	4.25.24		G	GW	4	N	N	✓	✓	✓	✓	✓	✓	✓											
MW-7					4			✓	✓	✓	✓	✓	✓	✓											
MW-8					4			✓	✓	✓	✓	✓	✓	✓											
MW-12					4			✓	✓	✓	✓	✓	✓	✓											
MW-14					4			✓	✓	✓	✓	✓	✓	✓											
MW-15					4			✓	✓	✓	✓	✓	✓	✓											
MW-16					4			✓	✓	✓	✓	✓	✓	✓											
Pond				WW	7			✓	✓	✓	✓	✓	✓	[redacted]	✓	✓	✓	✓	✓	✓	✓				Cl, F, [redacted] NH_3-N if Sulfate, Sulfide not ordered for pond sample but need to add if possible

Preservation Used: 1= Ice, 2= HCl; 3= H_2SO_4; 4=HNO_3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

*Pond metals: As, Al, Ba, B, Cd, Cr, Cu, Fe, Pb, Li, Hg, Mo, Ni, Se, Ag, Na, Sr, Zn

No temperature blank was sent in cooler

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No | Cooler Temp (°C) Obs'd _____ Corr'd _____ Therm ID No _____

Relinquished by	Company	Date/Time	Received by	Company	Date/Time
Carol E Wilson	CHEM-ECO	4/26/24			
Relinquished by	Company	Date/Time	Received by	Company	Date/Time
Relinquished by	Company	Date/Time	Received in Laboratory by	Company	Date/Time.
			SB	Eurofins	4/26/24 1445

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5/9/2024

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls, IA 50613
Phone 319-277-2401 Fax 319-277-2425

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Dietz, Hannah E	Carrier Tracking No(s):	COC No: 310-71762 1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Hannah Dietz@et.eurofinsus.com	State of Origin: Iowa	Page: Page 1 of 1
Company: Eurofins Environment Testing North Centr		Accreditations Required (See note): State Program - Iowa		Job #: 310-279940-1
Address: 2417 Bond Street, ,	Due Date Requested: 5/9/2024			
City: University Park	TAT Requested (days):			
State, Zip: IL, 60484				
Phone: 708-534-5200(Tel) 708-534-5211(Fax)	PO #:			
Email:	WO #:			
Project Name: Keokuk Ferro-Sil Landfill	Project #: 31006401			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
-

310-279940 COC

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9034_Calc/9030B Sulfide	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
MW-5 (310-279940-1)	4/25/24	Central		Water			X	1	
MW-7 (310-279940-2)	4/25/24	Central		Water			X	1	
MW-8 (310-279940-3)	4/25/24	Central		Water			X	1	
MW-12 (310-279940-4)	4/25/24	Central		Water			X	1	
MW-14 (310-279940-5)	4/25/24	Central		Water			X	1	
MW-15 (310-279940-6)	4/25/24	Central		Water			X	1	
MW-16 (310-279940-7)	4/25/24	Central		Water			X	1	

Note: Since laboratory accreditations are subject to change Eurofins Environment Testing North Central LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed the samples must be shipped back to the Eurofins Environment Testing North Central, LLC laboratory or other instructions will be provided Any changes to accreditation status should be brought to Eurofins Environment Testing North Central LLC attention immediately If all requested accreditations are current to date return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central, LLC.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested I, II, III, IV, Other (specify) Primary Deliverable Rank. 2	Special Instructions/QC Requirements

Empty Kit Relinquished by	Date:	Time	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time	Company
	4/29/24 1150		Stephanie Hernandez	4/30/24 0930	EEN
Relinquished by:	Date/Time:	Company	Received by:	Date/Time	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks: 4.4 + 4.0

Login Sample Receipt Checklist

Client: Glencore Ltd

Job Number: 310-279940-1

Login Number: 279940

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Bennett, Samantha

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	Cooler temperature outside required temperature criteria.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Glencore Ltd

Job Number: 310-279940-1

Login Number: 279940
List Number: 2
Creator: Hernandez, Stephanie

List Source: Eurofins Chicago
List Creation: 04/30/24 01:19 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	4.0
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Steven Demasi
Glencore Ltd
Three Stamford Plaza
301 Trersser Blvd
Stamford, Connecticut 06901

Generated 11/5/2024 12:58:15 PM

JOB DESCRIPTION

Keokuk Ferro-Sil Landfill

JOB NUMBER

310-293218-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization

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Authorized for release by
Hannah Dietz, Project Manager I
Hannah.Dietz@et.eurofinsus.com
(319)277-2401

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Job ID: 310-293218-1 — Eurofins Cedar Falls

Job Narrative
310-293218-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 10/18/2024 12:00 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 4.9°C and 8.9°C.

Receipt Exceptions
The following samples were received at the laboratory outside the required temperature criteria: MW-5 (310-293218-1), MW-7 (310-293218-2), MW-8 (310-293218-3), MW-12 (310-293218-4), MW-14 (310-293218-5), MW-15 (310-293218-6), MW-16 (310-293218-7) and Pond (310-293218-8).

HPLC/IC
Method 9056A_ORGFM_28D: The following samples were diluted due to the nature of the sample matrix: MW-8 (310-293218-3), MW-12 (310-293218-4), MW-14 (310-293218-5) and MW-15 (310-293218-6). Elevated reporting limits (RLs) are provided.

Method 9056A_ORGFM_28D: The following sample was diluted due to the nature of the sample matrix: MW-16 (310-293218-7). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Metals
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry
Method 5220D_LL: The following sample was analyzed at a dilution due to the chloride pre-screening results: MW-12 (310-293218-4). Elevated reporting limits are provided.

Method 9034_Calc: The method blank for preparation batch 500-791690 and analytical batch 500-791692 contained Sulfide above the method detection limit. This target analyte concentration was less than the reporting limit (RL) in the method blank; therefore, re-extraction and/or re-analysis of samples was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Sample Summary

Client: Glencore Ltd
Job ID: 310-293218-1
Project/Site: Keokuk Ferro-Sil Landfill

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-293218-1	MW-5	Water	10/17/24 00:00	10/18/24 12:00
310-293218-2	MW-7	Water	10/17/24 00:00	10/18/24 12:00
310-293218-3	MW-8	Water	10/17/24 00:00	10/18/24 12:00
310-293218-4	MW-12	Water	10/17/24 00:00	10/18/24 12:00
310-293218-5	MW-14	Water	10/17/24 00:00	10/18/24 12:00
310-293218-6	MW-15	Water	10/17/24 00:00	10/18/24 12:00
310-293218-7	MW-16	Water	10/17/24 00:00	10/18/24 12:00
310-293218-8	Pond	Water	10/17/24 00:00	10/18/24 12:00

Detection Summary

Client: Glencore Ltd
Project/Site: Keokuk Ferro-Sil Landfill

Job ID: 310-293218-1

Client Sample ID: MW-5 — Lab Sample ID: 310-293218-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	132		5.00	2.25	mg/L	5		9056A	Total/NA
Fluoride	0.467	J	1.00	0.375	mg/L	5		9056A	Total/NA
Sulfate	462		5.00	2.10	mg/L	5		9056A	Total/NA
Barium	0.0137		0.00200	0.000660	mg/L	1		6020B	Total/NA
Iron	0.866		0.100	0.0360	mg/L	1		6020B	Total/NA
Lithium	0.115		0.0100	0.00250	mg/L	1		6020B	Total/NA
Sodium	154		1.00	0.480	mg/L	1		6020B	Total/NA
Strontium	1.14		0.00100	0.000530	mg/L	1		6020B	Total/NA
Chemical Oxygen Demand	11.4		10.0	9.60	mg/L	2		5220D LL	Total/NA
Sulfide	0.432	J B	1.00	0.231	mg/L	1		9034	Total/NA

Client Sample ID: MW-7 — Lab Sample ID: 310-293218-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	24.8		5.00	2.25	mg/L	5		9056A	Total/NA
Fluoride	0.443	J	1.00	0.375	mg/L	5		9056A	Total/NA
Sulfate	323		5.00	2.10	mg/L	5		9056A	Total/NA
Barium	0.112		0.00200	0.000660	mg/L	1		6020B	Total/NA
Boron	0.201		0.100	0.0760	mg/L	1		6020B	Total/NA
Iron	0.600		0.100	0.0360	mg/L	1		6020B	Total/NA
Lithium	0.0827		0.0100	0.00250	mg/L	1		6020B	Total/NA
Sodium	79.7		1.00	0.480	mg/L	1		6020B	Total/NA
Strontium	1.03		0.00100	0.000530	mg/L	1		6020B	Total/NA
Ammonia as N	1.01		0.200	0.100	mg/L	1		350.1	Total/NA
Chemical Oxygen Demand	6.03		5.00	4.80	mg/L	1		5220D LL	Total/NA

Client Sample ID: MW-8 — Lab Sample ID: 310-293218-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	21.7		5.00	2.25	mg/L	5		9056A	Total/NA
Sulfate	833		50.0	21.0	mg/L	50		9056A	Total/NA
Barium	0.0529		0.00200	0.000660	mg/L	1		6020B	Total/NA
Boron	0.171		0.100	0.0760	mg/L	1		6020B	Total/NA
Iron	0.337		0.100	0.0360	mg/L	1		6020B	Total/NA
Lithium	0.0176		0.0100	0.00250	mg/L	1		6020B	Total/NA
Sodium	112		1.00	0.480	mg/L	1		6020B	Total/NA
Strontium	2.28		0.00400	0.00212	mg/L	4		6020B	Total/NA
Ammonia as N	3.15		0.200	0.100	mg/L	1		350.1	Total/NA
Chemical Oxygen Demand	14.1		10.0	9.60	mg/L	2		5220D LL	Total/NA

Client Sample ID: MW-12 — Lab Sample ID: 310-293218-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	15.4		5.00	2.25	mg/L	5		9056A	Total/NA
Sulfate	276		5.00	2.10	mg/L	5		9056A	Total/NA
Barium	0.0368		0.00200	0.000660	mg/L	1		6020B	Total/NA
Iron	0.0526	J	0.100	0.0360	mg/L	1		6020B	Total/NA
Lithium	0.0568		0.0100	0.00250	mg/L	1		6020B	Total/NA
Sodium	64.5		1.00	0.480	mg/L	1		6020B	Total/NA
Strontium	0.670		0.00100	0.000530	mg/L	1		6020B	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Glencore Ltd
Project/Site: Keokuk Ferro-Sil Landfill

Job ID: 310-293218-1

Client Sample ID: MW-14 — Lab Sample ID: 310-293218-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	12.4		5.00	2.25	mg/L	5		9056A	Total/NA
Sulfate	1260		50.0	21.0	mg/L	50		9056A	Total/NA
Barium	0.0244		0.00200	0.000660	mg/L	1		6020B	Total/NA
Boron	0.266		0.100	0.0760	mg/L	1		6020B	Total/NA
Iron	1.77		0.100	0.0360	mg/L	1		6020B	Total/NA
Lithium	0.0193		0.0100	0.00250	mg/L	1		6020B	Total/NA
Sodium	109		1.00	0.480	mg/L	1		6020B	Total/NA
Strontium	2.41		0.00400	0.00212	mg/L	4		6020B	Total/NA
Ammonia as N	3.71		0.200	0.100	mg/L	1		350.1	Total/NA
Chemical Oxygen Demand	9.83		5.00	4.80	mg/L	1		5220D LL	Total/NA

Client Sample ID: MW-15 — Lab Sample ID: 310-293218-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	56.2		5.00	2.25	mg/L	5		9056A	Total/NA
Sulfate	652		50.0	21.0	mg/L	50		9056A	Total/NA
Barium	0.0264		0.00200	0.000660	mg/L	1		6020B	Total/NA
Iron	0.126		0.100	0.0360	mg/L	1		6020B	Total/NA
Lithium	0.251		0.0100	0.00250	mg/L	1		6020B	Total/NA
Sodium	103		1.00	0.480	mg/L	1		6020B	Total/NA
Strontium	1.79		0.00100	0.000530	mg/L	1		6020B	Total/NA
Chemical Oxygen Demand	23.1		10.0	9.60	mg/L	2		5220D LL	Total/NA
Sulfide	0.288	J B	1.00	0.231	mg/L	1		9034	Total/NA

Client Sample ID: MW-16 — Lab Sample ID: 310-293218-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	195		5.00	2.25	mg/L	5		9056A	Total/NA
Sulfate	2020		50.0	21.0	mg/L	50		9056A	Total/NA
Aluminum	0.0351	J	0.0500	0.0210	mg/L	1		6020B	Total/NA
Barium	0.0140		0.00200	0.000660	mg/L	1		6020B	Total/NA
Iron	0.949		0.100	0.0360	mg/L	1		6020B	Total/NA
Lithium	0.315		0.0100	0.00250	mg/L	1		6020B	Total/NA
Sodium	235		1.00	0.480	mg/L	1		6020B	Total/NA
Strontium	3.35		0.00400	0.00212	mg/L	4		6020B	Total/NA
Ammonia as N	0.435		0.200	0.100	mg/L	1		350.1	Total/NA
Chemical Oxygen Demand	20.3		10.0	9.60	mg/L	2		5220D LL	Total/NA

Client Sample ID: Pond — Lab Sample ID: 310-293218-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	255		5.00	2.25	mg/L	5		300.0	Total/NA
Fluoride	1.55		1.00	0.375	mg/L	5		300.0	Total/NA
Sulfate	241		5.00	2.10	mg/L	5		300.0	Total/NA
Aluminum	0.0322	J	0.0500	0.0210	mg/L	1		200.8	Total/NA
Arsenic	0.00243		0.00200	0.000530	mg/L	1		200.8	Total/NA
Barium	0.107		0.00200	0.000660	mg/L	1		200.8	Total/NA
Boron	0.311		0.100	0.0760	mg/L	1		200.8	Total/NA
Iron	0.111		0.100	0.0360	mg/L	1		200.8	Total/NA
Lithium	0.410		0.0100	0.00250	mg/L	1		200.8	Total/NA
Molybdenum	0.00312		0.00200	0.00130	mg/L	1		200.8	Total/NA
Nickel	0.00316	J	0.00500	0.00210	mg/L	1		200.8	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: Pond (Continued)

Lab Sample ID: 310-293218-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Sodium	107		1.00	0.480	mg/L	1		200.8	Total/NA
Strontium	1.59		0.00100	0.000530	mg/L	1		200.8	Total/NA
Total Kjeldahl Nitrogen	0.665	J	1.00	0.570	mg/L	1		351.2	Total/NA
Chemical Oxygen Demand	35.0		5.00	4.80	mg/L	1		5220D LL	Total/NA
Sulfide	0.384	J B	1.00	0.231	mg/L	1		9034	Total/NA
Nitrogen, Total	0.665	J	1.00	0.570	mg/L	1		Total Nitrogen	Total/NA

This Detection Summary does not include radiochemical test results.

Client: Glencore Ltd
Job ID: 310-293218-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-5
Lab Sample ID: 310-293218-1

Date Collected: 10/17/24 00:00
Matrix: Water
Date Received: 10/18/24 12:00

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**132**		5.00	2.25	mg/L			10/31/24 14:13	5
Fluoride	**0.467**	**J**	1.00	0.375	mg/L			10/31/24 14:13	5
Sulfate	**462**		5.00	2.10	mg/L			10/31/24 14:13	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0210		0.0500	0.0210	mg/L		10/23/24 09:30	11/01/24 15:35	1
Barium	**0.0137**		0.00200	0.000660	mg/L		10/23/24 09:30	11/01/24 15:35	1
Boron	<0.0760		0.100	0.0760	mg/L		10/23/24 09:30	11/01/24 15:35	1
Iron	**0.866**		0.100	0.0360	mg/L		10/23/24 09:30	11/01/24 15:35	1
Lithium	**0.115**		0.0100	0.00250	mg/L		10/23/24 09:30	11/01/24 15:35	1
Sodium	**154**		1.00	0.480	mg/L		10/23/24 09:30	11/01/24 15:35	1
Strontium	**1.14**		0.00100	0.000530	mg/L		10/23/24 09:30	11/01/24 15:35	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N (EPA 350.1)	<0.100		0.200	0.100	mg/L			10/23/24 00:40	1
Chemical Oxygen Demand (SM 5220D LL)	**11.4**		10.0	9.60	mg/L			10/28/24 09:56	2
Sulfide (SW846 9034)	**0.432**	**J B**	1.00	0.231	mg/L		10/21/24 13:22	10/21/24 14:23	1

Client: Glencore Ltd
Job ID: 310-293218-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-7
Lab Sample ID: 310-293218-2

Date Collected: 10/17/24 00:00
Matrix: Water
Date Received: 10/18/24 12:00

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**24.8**		5.00	2.25	mg/L			10/31/24 15:00	5
Fluoride	**0.443**	**J**	1.00	0.375	mg/L			10/31/24 15:00	5
Sulfate	**323**		5.00	2.10	mg/L			10/31/24 15:00	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0210		0.0500	0.0210	mg/L		10/23/24 09:30	11/01/24 15:37	1
Barium	**0.112**		0.00200	0.000660	mg/L		10/23/24 09:30	11/01/24 15:37	1
Boron	**0.201**		0.100	0.0760	mg/L		10/23/24 09:30	11/01/24 15:37	1
Iron	**0.600**		0.100	0.0360	mg/L		10/23/24 09:30	11/01/24 15:37	1
Lithium	**0.0827**		0.0100	0.00250	mg/L		10/23/24 09:30	11/01/24 15:37	1
Sodium	**79.7**		1.00	0.480	mg/L		10/23/24 09:30	11/01/24 15:37	1
Strontium	**1.03**		0.00100	0.000530	mg/L		10/23/24 09:30	11/01/24 15:37	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N (EPA 350.1)	**1.01**		0.200	0.100	mg/L			10/23/24 00:41	1
Chemical Oxygen Demand (SM 5220D LL)	**6.03**		5.00	4.80	mg/L			10/28/24 09:56	1
Sulfide (SW846 9034)	<0.231		1.00	0.231	mg/L		10/21/24 13:24	10/21/24 14:26	1

Client: Glencore Ltd
Job ID: 310-293218-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-8
Lab Sample ID: 310-293218-3

Date Collected: 10/17/24 00:00
Matrix: Water
Date Received: 10/18/24 12:00

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**21.7**		5.00	2.25	mg/L			10/31/24 15:15	5
Fluoride	<0.375		1.00	0.375	mg/L			10/31/24 15:15	5
Sulfate	**833**		50.0	21.0	mg/L			10/31/24 15:31	50

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0210		0.0500	0.0210	mg/L		10/23/24 09:30	11/01/24 15:39	1
Barium	**0.0529**		0.00200	0.000660	mg/L		10/23/24 09:30	11/01/24 15:39	1
Boron	**0.171**		0.100	0.0760	mg/L		10/23/24 09:30	11/01/24 15:39	1
Iron	**0.337**		0.100	0.0360	mg/L		10/23/24 09:30	11/01/24 15:39	1
Lithium	**0.0176**		0.0100	0.00250	mg/L		10/23/24 09:30	11/01/24 15:39	1
Sodium	**112**		1.00	0.480	mg/L		10/23/24 09:30	11/01/24 15:39	1
Strontium	**2.28**		0.00400	0.00212	mg/L		10/23/24 09:30	11/04/24 13:49	4

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N (EPA 350.1)	**3.15**		0.200	0.100	mg/L			10/23/24 00:42	1
Chemical Oxygen Demand (SM 5220D LL)	**14.1**		10.0	9.60	mg/L			10/28/24 09:56	2
Sulfide (SW846 9034)	<0.231		1.00	0.231	mg/L		10/21/24 13:27	10/21/24 14:29	1

Client: Glencore Ltd
Job ID: 310-293218-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-12
Lab Sample ID: 310-293218-4
Date Collected: 10/17/24 00:00
Matrix: Water
Date Received: 10/18/24 12:00

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**15.4**		5.00	2.25	mg/L			10/31/24 15:46	5
Fluoride	<0.375		1.00	0.375	mg/L			10/31/24 15:46	5
Sulfate	**276**		5.00	2.10	mg/L			10/31/24 15:46	5

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0210		0.0500	0.0210	mg/L		10/23/24 09:30	11/01/24 15:41	1
Barium	**0.0368**		0.00200	0.000660	mg/L		10/23/24 09:30	11/01/24 15:41	1
Boron	<0.0760		0.100	0.0760	mg/L		10/23/24 09:30	11/01/24 15:41	1
Iron	**0.0526**	**J**	0.100	0.0360	mg/L		10/23/24 09:30	11/01/24 15:41	1
Lithium	**0.0568**		0.0100	0.00250	mg/L		10/23/24 09:30	11/01/24 15:41	1
Sodium	**64.5**		1.00	0.480	mg/L		10/23/24 09:30	11/01/24 15:41	1
Strontium	**0.670**		0.00100	0.000530	mg/L		10/23/24 09:30	11/01/24 15:41	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N (EPA 350.1)	<0.100		0.200	0.100	mg/L			10/23/24 00:43	1
Chemical Oxygen Demand (SM 5220D LL)	<9.60		10.0	9.60	mg/L			10/28/24 09:56	2
Sulfide (SW846 9034)	<0.231		1.00	0.231	mg/L		10/21/24 13:30	10/21/24 14:32	1

Client: Glencore Ltd
Job ID: 310-293218-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-14
Lab Sample ID: 310-293218-5

Date Collected: 10/17/24 00:00
Matrix: Water
Date Received: 10/18/24 12:00

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**12.4**		5.00	2.25	mg/L			10/31/24 16:02	5
Fluoride	<0.375		1.00	0.375	mg/L			10/31/24 16:02	5
Sulfate	**1260**		50.0	21.0	mg/L			10/31/24 16:17	50

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0210		0.0500	0.0210	mg/L		10/23/24 09:30	11/01/24 15:52	1
Barium	**0.0244**		0.00200	0.000660	mg/L		10/23/24 09:30	11/01/24 15:52	1
Boron	**0.266**		0.100	0.0760	mg/L		10/23/24 09:30	11/01/24 15:52	1
Iron	**1.77**		0.100	0.0360	mg/L		10/23/24 09:30	11/01/24 15:52	1
Lithium	**0.0193**		0.0100	0.00250	mg/L		10/23/24 09:30	11/01/24 15:52	1
Sodium	**109**		1.00	0.480	mg/L		10/23/24 09:30	11/01/24 15:52	1
Strontium	**2.41**		0.00400	0.00212	mg/L		10/23/24 09:30	11/04/24 14:00	4

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N (EPA 350.1)	**3.71**		0.200	0.100	mg/L			10/23/24 00:43	1
Chemical Oxygen Demand (SM 5220D LL)	**9.83**		5.00	4.80	mg/L			10/28/24 09:56	1
Sulfide (SW846 9034)	<0.231		1.00	0.231	mg/L		10/21/24 13:32	10/21/24 14:35	1

Client: Glencore Ltd
Job ID: 310-293218-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-15
Lab Sample ID: 310-293218-6
Date Collected: 10/17/24 00:00
Matrix: Water
Date Received: 10/18/24 12:00

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**56.2**		5.00	2.25	mg/L			10/31/24 16:33	5
Fluoride	<0.375		1.00	0.375	mg/L			10/31/24 16:33	5
Sulfate	**652**		50.0	21.0	mg/L			10/31/24 17:20	50

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0210		0.0500	0.0210	mg/L		10/23/24 09:30	11/01/24 15:55	1
Barium	**0.0264**		0.00200	0.000660	mg/L		10/23/24 09:30	11/01/24 15:55	1
Boron	<0.0760		0.100	0.0760	mg/L		10/23/24 09:30	11/01/24 15:55	1
Iron	**0.126**		0.100	0.0360	mg/L		10/23/24 09:30	11/01/24 15:55	1
Lithium	**0.251**		0.0100	0.00250	mg/L		10/23/24 09:30	11/01/24 15:55	1
Sodium	**103**		1.00	0.480	mg/L		10/23/24 09:30	11/01/24 15:55	1
Strontium	**1.79**		0.00100	0.000530	mg/L		10/23/24 09:30	11/01/24 15:55	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N (EPA 350.1)	<0.100		0.200	0.100	mg/L			10/23/24 00:45	1
Chemical Oxygen Demand (SM 5220D LL)	**23.1**		10.0	9.60	mg/L			10/28/24 09:56	2
Sulfide (SW846 9034)	**0.288**	**J B**	1.00	0.231	mg/L		10/21/24 13:35	10/21/24 14:38	1

Client: Glencore Ltd
Job ID: 310-293218-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-16
Lab Sample ID: 310-293218-7
Date Collected: 10/17/24 00:00
Matrix: Water
Date Received: 10/18/24 12:00

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**195**		5.00	2.25	mg/L			10/31/24 12:09	5
Fluoride	<0.375		1.00	0.375	mg/L			10/31/24 12:09	5
Sulfate	**2020**		50.0	21.0	mg/L			10/31/24 12:21	50

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0351**	**J**	0.0500	0.0210	mg/L		10/23/24 09:30	11/01/24 15:57	1
Barium	**0.0140**		0.00200	0.000660	mg/L		10/23/24 09:30	11/01/24 15:57	1
Boron	<0.0760		0.100	0.0760	mg/L		10/23/24 09:30	11/01/24 15:57	1
Iron	**0.949**		0.100	0.0360	mg/L		10/23/24 09:30	11/01/24 15:57	1
Lithium	**0.315**		0.0100	0.00250	mg/L		10/23/24 09:30	11/01/24 15:57	1
Sodium	**235**		1.00	0.480	mg/L		10/23/24 09:30	11/01/24 15:57	1
Strontium	**3.35**		0.00400	0.00212	mg/L		10/23/24 09:30	11/04/24 14:02	4

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N (EPA 350.1)	**0.435**		0.200	0.100	mg/L			10/23/24 00:45	1
Chemical Oxygen Demand (SM 5220D LL)	**20.3**		10.0	9.60	mg/L			10/28/24 09:56	2
Sulfide (SW846 9034)	<0.231		1.00	0.231	mg/L		10/21/24 13:38	10/21/24 14:41	1

Client Sample ID: Pond

Date Collected: 10/17/24 00:00
Date Received: 10/18/24 12:00

Lab Sample ID: 310-293218-8
Matrix: Water

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**255**		5.00	2.25	mg/L			10/31/24 12:33	5
Fluoride	**1.55**		1.00	0.375	mg/L			10/31/24 12:33	5
Sulfate	**241**		5.00	2.10	mg/L			10/31/24 12:33	5

Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**0.0322**	**J**	0.0500	0.0210	mg/L		10/23/24 09:30	11/01/24 17:18	1
Arsenic	**0.00243**		0.00200	0.000530	mg/L		10/23/24 09:30	11/01/24 17:18	1
Barium	**0.107**		0.00200	0.000660	mg/L		10/23/24 09:30	11/01/24 17:18	1
Boron	**0.311**		0.100	0.0760	mg/L		10/23/24 09:30	11/01/24 17:18	1
Cadmium	<0.000100		0.000200	0.000100	mg/L		10/23/24 09:30	11/01/24 17:18	1
Chromium	<0.00120		0.00500	0.00120	mg/L		10/23/24 09:30	11/01/24 17:18	1
Copper	<0.00180		0.00500	0.00180	mg/L		10/23/24 09:30	11/01/24 17:18	1
Iron	**0.111**		0.100	0.0360	mg/L		10/23/24 09:30	11/01/24 17:18	1
Lead	<0.000260		0.000500	0.000260	mg/L		10/23/24 09:30	11/01/24 17:18	1
Lithium	**0.410**		0.0100	0.00250	mg/L		10/23/24 09:30	11/01/24 17:18	1
Molybdenum	**0.00312**		0.00200	0.00130	mg/L		10/23/24 09:30	11/01/24 17:18	1
Nickel	**0.00316**	**J**	0.00500	0.00210	mg/L		10/23/24 09:30	11/01/24 17:18	1
Selenium	<0.00140		0.00500	0.00140	mg/L		10/23/24 09:30	11/01/24 17:18	1
Silver	<0.000500		0.00100	0.000500	mg/L		10/23/24 09:30	11/01/24 17:18	1
Sodium	**107**		1.00	0.480	mg/L		10/23/24 09:30	11/01/24 17:18	1
Strontium	**1.59**		0.00100	0.000530	mg/L		10/23/24 09:30	11/01/24 17:18	1
Zinc	<0.00970		0.0200	0.00970	mg/L		10/23/24 09:30	11/01/24 17:18	1

Method: EPA 245.2 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000110		0.000200	0.000110	mg/L		10/28/24 14:30	10/29/24 13:57	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM (Oil and Grease) (40CFR136A 1664A)	<4.5	F1	5.0	4.5	mg/L		10/22/24 08:30	10/22/24 08:30	1
SGT-HEM (Oil and Grease - Nonpolar) (40CFR136A 1664A)	<4.5		5.0	4.5	mg/L		10/22/24 08:30	10/22/24 08:30	1
Cyanide, Total (EPA 335.4)	<0.00350		0.0100	0.00350	mg/L		10/23/24 10:45	10/25/24 18:30	1
Ammonia as N (EPA 350.1)	<0.210		0.500	0.210	mg/L		10/29/24 11:20	10/30/24 00:23	1
Total Kjeldahl Nitrogen (EPA 351.2)	**0.665**	**J**	1.00	0.570	mg/L		10/21/24 05:29	10/21/24 19:28	1
Nitrate Nitrite as N (EPA 353.2)	<0.0800		0.100	0.0800	mg/L			10/29/24 12:31	1
Total Phosphorus as P (EPA 365.1)	<0.0670		0.100	0.0670	mg/L		10/23/24 09:26	10/23/24 19:53	1
Phosphorus as PO4 (EPA 365.1)	<0.210		0.310	0.210	mg/L		10/23/24 09:26	10/23/24 19:53	1
Chemical Oxygen Demand (SM 5220D LL)	**35.0**		5.00	4.80	mg/L			10/28/24 09:56	1
Sulfide (SW846 9034)	**0.384**	**J B**	1.00	0.231	mg/L		10/21/24 13:40	10/21/24 14:44	1
Total Suspended Solids (USGS I-3765-85)	<3.70		5.00	3.70	mg/L			10/21/24 13:39	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Total (EPA Total Nitrogen)	**0.665**	**J**	1.00	0.570	mg/L			10/29/24 12:31	1

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is greater than 4 times the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
F1	MS and/or MSD recovery exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-438491/3
Matrix: Water
Analysis Batch: 438491

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.450		1.00	0.450	mg/L			10/31/24 11:06	1
Fluoride	<0.0750		0.200	0.0750	mg/L			10/31/24 11:06	1
Sulfate	<0.420		1.00	0.420	mg/L			10/31/24 11:06	1

Lab Sample ID: LCS 310-438491/4
Matrix: Water
Analysis Batch: 438491

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Chloride			10.0	9.256		mg/L		93	90 - 110		
Fluoride			2.00	1.957		mg/L		98	90 - 110		
Sulfate			10.0	9.798		mg/L		98	90 - 110		

Lab Sample ID: 310-293218-1 MS
Matrix: Water
Analysis Batch: 438491

Client Sample ID: MW-5
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Chloride	132		25.0	154.5	4	mg/L		92	80 - 120		
Fluoride	0.467	J	5.00	5.400		mg/L		99	80 - 120		
Sulfate	462		25.0	482.2	4	mg/L		80	80 - 120		

Lab Sample ID: 310-293218-1 MSD
Matrix: Water
Analysis Batch: 438491

Client Sample ID: MW-5
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	132		25.0	152.5	4	mg/L		84	80 - 120	1	15
Fluoride	0.467	J	5.00	5.365		mg/L		98	80 - 120	1	15
Sulfate	462		25.0	476.8	4	mg/L		58	80 - 120	1	15

Lab Sample ID: MB 310-438504/3
Matrix: Water
Analysis Batch: 438504

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.450		1.00	0.450	mg/L			10/31/24 11:46	1
Fluoride	<0.0750		0.200	0.0750	mg/L			10/31/24 11:46	1
Sulfate	<0.420		1.00	0.420	mg/L			10/31/24 11:46	1

Lab Sample ID: LCS 310-438504/4
Matrix: Water
Analysis Batch: 438504

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Chloride			10.0	9.187		mg/L		92	90 - 110		
Fluoride			2.00	1.899		mg/L		95	90 - 110		
Sulfate			10.0	9.397		mg/L		94	90 - 110		

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 310-437138/1-A
Matrix: Water
Analysis Batch: 438523

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 437138

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0210		0.0500	0.0210	mg/L		10/23/24 09:30	11/01/24 17:12	1
Arsenic	<0.000530		0.00200	0.000530	mg/L		10/23/24 09:30	11/01/24 17:12	1
Barium	<0.000660		0.00200	0.000660	mg/L		10/23/24 09:30	11/01/24 17:12	1
Boron	<0.0760		0.100	0.0760	mg/L		10/23/24 09:30	11/01/24 17:12	1
Cadmium	<0.000100		0.000200	0.000100	mg/L		10/23/24 09:30	11/01/24 17:12	1
Chromium	<0.00120		0.00500	0.00120	mg/L		10/23/24 09:30	11/01/24 17:12	1
Copper	<0.00180		0.00500	0.00180	mg/L		10/23/24 09:30	11/01/24 17:12	1
Iron	<0.0360		0.100	0.0360	mg/L		10/23/24 09:30	11/01/24 17:12	1
Lead	<0.000260		0.000500	0.000260	mg/L		10/23/24 09:30	11/01/24 17:12	1
Lithium	<0.00250		0.0100	0.00250	mg/L		10/23/24 09:30	11/01/24 17:12	1
Molybdenum	<0.00130		0.00200	0.00130	mg/L		10/23/24 09:30	11/01/24 17:12	1
Nickel	<0.00210		0.00500	0.00210	mg/L		10/23/24 09:30	11/01/24 17:12	1
Selenium	<0.00140		0.00500	0.00140	mg/L		10/23/24 09:30	11/01/24 17:12	1
Silver	<0.000500		0.00100	0.000500	mg/L		10/23/24 09:30	11/01/24 17:12	1
Sodium	<0.480		1.00	0.480	mg/L		10/23/24 09:30	11/01/24 17:12	1
Strontium	<0.000530		0.00100	0.000530	mg/L		10/23/24 09:30	11/01/24 17:12	1
Zinc	<0.00970		0.0200	0.00970	mg/L		10/23/24 09:30	11/01/24 17:12	1

Lab Sample ID: LCS 310-437138/2-A
Matrix: Water
Analysis Batch: 438523

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 437138

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Aluminum	0.200	0.2007		mg/L		100	85 - 115
Arsenic	0.200	0.1879		mg/L		94	85 - 115
Barium	0.100	0.1019		mg/L		102	85 - 115
Boron	0.200	0.1960		mg/L		98	85 - 115
Cadmium	0.100	0.09792		mg/L		98	85 - 115
Chromium	0.100	0.1004		mg/L		100	85 - 115
Copper	0.200	0.2103		mg/L		105	85 - 115
Iron	0.200	0.1972		mg/L		99	85 - 115
Lead	0.200	0.1978		mg/L		99	85 - 115
Lithium	0.200	0.1974		mg/L		99	85 - 115
Molybdenum	0.200	0.1898		mg/L		95	85 - 115
Nickel	0.200	0.2017		mg/L		101	85 - 115
Selenium	0.400	0.4008		mg/L		100	85 - 115
Silver	0.100	0.1132		mg/L		113	85 - 115
Sodium	2.00	1.992		mg/L		100	85 - 115
Strontium	0.200	0.1965		mg/L		98	85 - 115
Zinc	0.200	0.1828		mg/L		91	85 - 115

Lab Sample ID: 310-293218-8 MS
Matrix: Water
Analysis Batch: 438523

Client Sample ID: Pond
Prep Type: Total/NA
Prep Batch: 437138

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Aluminum	0.0322	J	0.200	0.2330		mg/L		100	70 - 130
Arsenic	0.00243		0.200	0.2066		mg/L		102	70 - 130
Barium	0.107		0.100	0.2143		mg/L		108	70 - 130

Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: 310-293218-8 MS
Matrix: Water
Analysis Batch: 438523

Client Sample ID: Pond
Prep Type: Total/NA
Prep Batch: 437138

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Boron	0.311		0.200	0.5068		mg/L		98	70 - 130
Cadmium	<0.000100		0.100	0.1000		mg/L		100	70 - 130
Chromium	<0.00120		0.100	0.09854		mg/L		99	70 - 130
Copper	<0.00180		0.200	0.1980		mg/L		99	70 - 130
Iron	0.111		0.200	0.3311		mg/L		110	70 - 130
Lead	<0.000260		0.200	0.2041		mg/L		102	70 - 130
Lithium	0.410		0.200	0.6009		mg/L		96	70 - 130
Molybdenum	0.00312		0.200	0.2052		mg/L		101	70 - 130
Nickel	0.00316	J	0.200	0.1917		mg/L		94	70 - 130
Selenium	<0.00140		0.400	0.4035		mg/L		101	70 - 130
Silver	<0.000500		0.100	0.1027		mg/L		103	70 - 130
Sodium	107		2.00	107.8	4	mg/L		29	70 - 130
Strontium	1.59		0.200	1.802	4	mg/L		107	70 - 130
Zinc	<0.00970		0.200	0.1941		mg/L		97	70 - 130

Lab Sample ID: 310-293218-8 MSD
Matrix: Water
Analysis Batch: 438523

Client Sample ID: Pond
Prep Type: Total/NA
Prep Batch: 437138

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Aluminum	0.0322	J	0.200	0.2382		mg/L		103	70 - 130	2	20
Arsenic	0.00243		0.200	0.2080		mg/L		103	70 - 130	1	20
Barium	0.107		0.100	0.2179		mg/L		111	70 - 130	2	20
Boron	0.311		0.200	0.5120		mg/L		100	70 - 130	1	20
Cadmium	<0.000100		0.100	0.1012		mg/L		101	70 - 130	1	20
Chromium	<0.00120		0.100	0.1005		mg/L		101	70 - 130	2	20
Copper	<0.00180		0.200	0.1977		mg/L		99	70 - 130	0	20
Iron	0.111		0.200	0.3316		mg/L		111	70 - 130	0	20
Lead	<0.000260		0.200	0.2097		mg/L		105	70 - 130	3	20
Lithium	0.410		0.200	0.6108		mg/L		101	70 - 130	2	20
Molybdenum	0.00312		0.200	0.2074		mg/L		102	70 - 130	1	20
Nickel	0.00316	J	0.200	0.1917		mg/L		94	70 - 130	0	20
Selenium	<0.00140		0.400	0.4109		mg/L		103	70 - 130	2	20
Silver	<0.000500		0.100	0.1032		mg/L		103	70 - 130	1	20
Sodium	107		2.00	109.2	4	mg/L		99	70 - 130	1	20
Strontium	1.59		0.200	1.820	4	mg/L		115	70 - 130	1	20
Zinc	<0.00970		0.200	0.1963		mg/L		98	70 - 130	1	20

Method: 245.2 - Mercury (CVAA)

Lab Sample ID: MB 310-437622/1-A
Matrix: Water
Analysis Batch: 437963

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 437622

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000110		0.000200	0.000110	mg/L		10/28/24 14:30	10/29/24 13:42	1

Method: 245.2 - Mercury (CVAA) (Continued)

Lab Sample ID: LCS 310-437622/2-A
Matrix: Water
Analysis Batch: 437963

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 437622

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001649		mg/L		99	85 - 115

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-437135/1-A
Matrix: Water
Analysis Batch: 438520

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 437135

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	<0.0210		0.0500	0.0210	mg/L		10/23/24 09:30	11/01/24 14:38	1
Barium	<0.000660		0.00200	0.000660	mg/L		10/23/24 09:30	11/01/24 14:38	1
Boron	<0.0760		0.100	0.0760	mg/L		10/23/24 09:30	11/01/24 14:38	1
Iron	<0.0360		0.100	0.0360	mg/L		10/23/24 09:30	11/01/24 14:38	1
Lithium	<0.00250		0.0100	0.00250	mg/L		10/23/24 09:30	11/01/24 14:38	1
Sodium	<0.480		1.00	0.480	mg/L		10/23/24 09:30	11/01/24 14:38	1
Strontium	<0.000530		0.00100	0.000530	mg/L		10/23/24 09:30	11/01/24 14:38	1

Lab Sample ID: LCS 310-437135/2-A
Matrix: Water
Analysis Batch: 438520

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 437135

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Aluminum	0.200	0.2099		mg/L		105	80 - 120
Barium	0.100	0.1065		mg/L		107	80 - 120
Boron	0.200	0.1899		mg/L		95	80 - 120
Iron	0.200	0.2176		mg/L		109	80 - 120
Lithium	0.200	0.2206		mg/L		110	80 - 120
Sodium	2.00	2.408		mg/L		120	80 - 120
Strontium	0.200	0.2147		mg/L		107	80 - 120

Method: 1664A - HEM and SGT-HEM by Extraction and Gravimetry

Lab Sample ID: MB 310-437020/1-A
Matrix: Water
Analysis Batch: 437125

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 437020

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM (Oil and Grease)	<4.5		5.0	4.5	mg/L		10/22/24 08:30	10/22/24 08:30	1
SGT-HEM (Oil and Grease - Nonpolar)	<4.5		5.0	4.5	mg/L		10/22/24 08:30	10/22/24 08:30	1

Lab Sample ID: LCS 310-437020/2-A
Matrix: Water
Analysis Batch: 437125

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 437020

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
HEM (Oil and Grease)	40.0	33.70		mg/L		84	78 - 114
SGT-HEM (Oil and Grease - Nonpolar)	20.0	16.60		mg/L		83	64 - 132

Method: 1664A - HEM and SGT-HEM by Extraction and Gravimetry (Continued)

Lab Sample ID: 310-293218-8 MS — **Client Sample ID: Pond**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 437125 — **Prep Batch: 437020**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
HEM (Oil and Grease)	<4.5	F1	40.0	25.10	F1	mg/L		63	78 - 114
SGT-HEM (Oil and Grease - Nonpolar)	<4.5		20.0	14.70		mg/L		74	64 - 132

Method: 335.4 - Cyanide, Total

Lab Sample ID: MB 310-437222/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 437639 — **Prep Batch: 437222**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.00350		0.0100	0.00350	mg/L		10/23/24 10:45	10/25/24 18:21	1

Lab Sample ID: LCS 310-437222/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 437639 — **Prep Batch: 437222**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cyanide, Total	0.200	0.1948		mg/L		97	90 - 110

Method: 350.1 - Nitrogen, Ammonia

Lab Sample ID: MB 310-437150/164 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 437150

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N	<0.100		0.200	0.100	mg/L			10/23/24 00:31	1

Lab Sample ID: LCS 310-437150/165 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 437150

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ammonia as N	8.55	8.811		mg/L		103	90 - 110

Lab Sample ID: MB 310-437902/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 437989 — **Prep Batch: 437902**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia as N	<0.210		0.500	0.210	mg/L		10/29/24 11:20	10/30/24 00:18	1

Lab Sample ID: LCS 310-437902/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 437989 — **Prep Batch: 437902**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Ammonia as N	4.00	3.989		mg/L		100	90 - 110

Method: 351.2 - Nitrogen, Total Kjeldahl

Lab Sample ID: MB 310-436871/1-A
Matrix: Water
Analysis Batch: 437016

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 436871

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Kjeldahl Nitrogen	<0.570		1.00	0.570	mg/L		10/21/24 05:29	10/21/24 19:20	1

Lab Sample ID: LCS 310-436871/2-A
Matrix: Water
Analysis Batch: 437016

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 436871

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Kjeldahl Nitrogen	4.01	4.381		mg/L		109	90 - 110

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 310-437940/48
Matrix: Water
Analysis Batch: 437940

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	<0.0800		0.100	0.0800	mg/L			10/29/24 12:14	1

Lab Sample ID: LCS 310-437940/49
Matrix: Water
Analysis Batch: 437940

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrate Nitrite as N	2.07	2.132		mg/L		103	90 - 110

Method: 365.1 - Phosphorus, Total

Lab Sample ID: MB 310-437196/1-A
Matrix: Water
Analysis Batch: 437311

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 437196

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P	<0.0670		0.100	0.0670	mg/L		10/23/24 09:26	10/23/24 19:49	1
Phosphorus as PO4	<0.210		0.310	0.210	mg/L		10/23/24 09:26	10/23/24 19:49	1

Lab Sample ID: LCS 310-437196/2-A
Matrix: Water
Analysis Batch: 437311

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 437196

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Phosphorus as P	1.00	0.9234		mg/L		92	90 - 110

Method: 5220D LL - COD

Lab Sample ID: MB 310-437745/32
Matrix: Water
Analysis Batch: 437745

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	<4.80		5.00	4.80	mg/L			10/28/24 09:56	1

Method: 5220D LL - COD (Continued)

Lab Sample ID: MB 310-437745/5
Matrix: Water
Analysis Batch: 437745

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	<4.80		5.00	4.80	mg/L			10/28/24 09:56	1

Lab Sample ID: LCS 310-437745/3
Matrix: Water
Analysis Batch: 437745

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	125	132.3		mg/L		106	85 - 110

Lab Sample ID: 310-293218-7 MS
Matrix: Water
Analysis Batch: 437745

Client Sample ID: MW-16
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	20.3		100	135.6		mg/L		115	83 - 146

Lab Sample ID: 310-293218-7 MSD
Matrix: Water
Analysis Batch: 437745

Client Sample ID: MW-16
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chemical Oxygen Demand	20.3		100	136.3		mg/L		116	83 - 146	1	18

Method: 9034 - Sulfide, Acid soluble and Insoluble (Titrimetric)

Lab Sample ID: MB 500-791690/1-A
Matrix: Water
Analysis Batch: 791692

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 791690

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	0.3999	J	1.00	0.231	mg/L		10/21/24 13:01	10/21/24 13:59	1

Lab Sample ID: LCS 500-791690/2-A
Matrix: Water
Analysis Batch: 791692

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 791690

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Sulfide	3.76	4.017		mg/L		107	80 - 120

Method: I-3765-85 - Residue, Non-filterable (TSS)

Lab Sample ID: MB 310-436970/1
Matrix: Water
Analysis Batch: 436970

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	<3.70		5.00	3.70	mg/L			10/21/24 13:39	1

Method: I-3765-85 - Residue, Non-filterable (TSS) (Continued)

Lab Sample ID: LCS 310-436970/2
Client Sample ID: Lab Control Sample
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 436970

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Total Suspended Solids			100	94.00		mg/L		94	81 - 116		

HPLC/IC

Analysis Batch: 438491

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-1	MW-5	Total/NA	Water	9056A	
310-293218-2	MW-7	Total/NA	Water	9056A	
310-293218-3	MW-8	Total/NA	Water	9056A	
310-293218-3	MW-8	Total/NA	Water	9056A	
310-293218-4	MW-12	Total/NA	Water	9056A	
310-293218-5	MW-14	Total/NA	Water	9056A	
310-293218-5	MW-14	Total/NA	Water	9056A	
310-293218-6	MW-15	Total/NA	Water	9056A	
310-293218-6	MW-15	Total/NA	Water	9056A	
MB 310-438491/3	Method Blank	Total/NA	Water	9056A	
LCS 310-438491/4	Lab Control Sample	Total/NA	Water	9056A	
310-293218-1 MS	MW-5	Total/NA	Water	9056A	
310-293218-1 MSD	MW-5	Total/NA	Water	9056A	

Analysis Batch: 438504

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-7	MW-16	Total/NA	Water	9056A	
310-293218-7	MW-16	Total/NA	Water	9056A	
310-293218-8	Pond	Total/NA	Water	300.0	
MB 310-438504/3	Method Blank	Total/NA	Water	9056A	
LCS 310-438504/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 437135

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-1	MW-5	Total/NA	Water	3005A	
310-293218-2	MW-7	Total/NA	Water	3005A	
310-293218-3	MW-8	Total/NA	Water	3005A	
310-293218-4	MW-12	Total/NA	Water	3005A	
310-293218-5	MW-14	Total/NA	Water	3005A	
310-293218-6	MW-15	Total/NA	Water	3005A	
310-293218-7	MW-16	Total/NA	Water	3005A	
MB 310-437135/1-A	Method Blank	Total/NA	Water	200.8	
LCS 310-437135/2-A	Lab Control Sample	Total/NA	Water	200.8	

Prep Batch: 437138

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-8	Pond	Total/NA	Water	200.8	
MB 310-437138/1-A	Method Blank	Total/NA	Water	200.8	
LCS 310-437138/2-A	Lab Control Sample	Total/NA	Water	200.8	
310-293218-8 MS	Pond	Total/NA	Water	200.8	
310-293218-8 MSD	Pond	Total/NA	Water	200.8	

Prep Batch: 437622

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-8	Pond	Total/NA	Water	245.1	
MB 310-437622/1-A	Method Blank	Total/NA	Water	245.1	
LCS 310-437622/2-A	Lab Control Sample	Total/NA	Water	245.1	

Metals

Analysis Batch: 437963

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-8	Pond	Total/NA	Water	245.2	437622
MB 310-437622/1-A	Method Blank	Total/NA	Water	245.2	437622
LCS 310-437622/2-A	Lab Control Sample	Total/NA	Water	245.2	437622

Analysis Batch: 438520

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-1	MW-5	Total/NA	Water	6020B	437135
310-293218-2	MW-7	Total/NA	Water	6020B	437135
310-293218-3	MW-8	Total/NA	Water	6020B	437135
310-293218-4	MW-12	Total/NA	Water	6020B	437135
310-293218-5	MW-14	Total/NA	Water	6020B	437135
310-293218-6	MW-15	Total/NA	Water	6020B	437135
310-293218-7	MW-16	Total/NA	Water	6020B	437135
MB 310-437135/1-A	Method Blank	Total/NA	Water	6020B	437135
LCS 310-437135/2-A	Lab Control Sample	Total/NA	Water	6020B	437135

Analysis Batch: 438523

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-8	Pond	Total/NA	Water	200.8	437138
MB 310-437138/1-A	Method Blank	Total/NA	Water	200.8	437138
LCS 310-437138/2-A	Lab Control Sample	Total/NA	Water	200.8	437138
310-293218-8 MS	Pond	Total/NA	Water	200.8	437138
310-293218-8 MSD	Pond	Total/NA	Water	200.8	437138

Analysis Batch: 438660

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-3	MW-8	Total/NA	Water	6020B	437135
310-293218-5	MW-14	Total/NA	Water	6020B	437135
310-293218-7	MW-16	Total/NA	Water	6020B	437135

General Chemistry

Prep Batch: 436871

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-8	Pond	Total/NA	Water	351.2	
MB 310-436871/1-A	Method Blank	Total/NA	Water	351.2	
LCS 310-436871/2-A	Lab Control Sample	Total/NA	Water	351.2	

Analysis Batch: 436970

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-8	Pond	Total/NA	Water	I-3765-85	
MB 310-436970/1	Method Blank	Total/NA	Water	I-3765-85	
LCS 310-436970/2	Lab Control Sample	Total/NA	Water	I-3765-85	

Analysis Batch: 436998

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-8	Pond	Total/NA	Water	Total Nitrogen	

Analysis Batch: 437016

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-8	Pond	Total/NA	Water	351.2	436871

General Chemistry (Continued)

Analysis Batch: 437016 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-436871/1-A	Method Blank	Total/NA	Water	351.2	436871
LCS 310-436871/2-A	Lab Control Sample	Total/NA	Water	351.2	436871

Prep Batch: 437020

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-8	Pond	Total/NA	Water	1664A	
MB 310-437020/1-A	Method Blank	Total/NA	Water	1664A	
LCS 310-437020/2-A	Lab Control Sample	Total/NA	Water	1664A	
310-293218-8 MS	Pond	Total/NA	Water	1664A	

Analysis Batch: 437125

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-8	Pond	Total/NA	Water	1664A	437020
MB 310-437020/1-A	Method Blank	Total/NA	Water	1664A	437020
LCS 310-437020/2-A	Lab Control Sample	Total/NA	Water	1664A	437020
310-293218-8 MS	Pond	Total/NA	Water	1664A	437020

Analysis Batch: 437150

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-1	MW-5	Total/NA	Water	350.1	
310-293218-2	MW-7	Total/NA	Water	350.1	
310-293218-3	MW-8	Total/NA	Water	350.1	
310-293218-4	MW-12	Total/NA	Water	350.1	
310-293218-5	MW-14	Total/NA	Water	350.1	
310-293218-6	MW-15	Total/NA	Water	350.1	
310-293218-7	MW-16	Total/NA	Water	350.1	
MB 310-437150/164	Method Blank	Total/NA	Water	350.1	
LCS 310-437150/165	Lab Control Sample	Total/NA	Water	350.1	

Prep Batch: 437196

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-8	Pond	Total/NA	Water	365.1	
MB 310-437196/1-A	Method Blank	Total/NA	Water	365.1	
LCS 310-437196/2-A	Lab Control Sample	Total/NA	Water	365.1	

Prep Batch: 437222

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-8	Pond	Total/NA	Water	Distill/CN	
MB 310-437222/1-A	Method Blank	Total/NA	Water	Distill/CN	
LCS 310-437222/2-A	Lab Control Sample	Total/NA	Water	Distill/CN	

Analysis Batch: 437311

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-8	Pond	Total/NA	Water	365.1	437196
MB 310-437196/1-A	Method Blank	Total/NA	Water	365.1	437196
LCS 310-437196/2-A	Lab Control Sample	Total/NA	Water	365.1	437196

Analysis Batch: 437639

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-8	Pond	Total/NA	Water	335.4	437222
MB 310-437222/1-A	Method Blank	Total/NA	Water	335.4	437222

General Chemistry (Continued)

Analysis Batch: 437639 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 310-437222/2-A	Lab Control Sample	Total/NA	Water	335.4	437222

Analysis Batch: 437745

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-1	MW-5	Total/NA	Water	5220D LL	
310-293218-2	MW-7	Total/NA	Water	5220D LL	
310-293218-3	MW-8	Total/NA	Water	5220D LL	
310-293218-4	MW-12	Total/NA	Water	5220D LL	
310-293218-5	MW-14	Total/NA	Water	5220D LL	
310-293218-6	MW-15	Total/NA	Water	5220D LL	
310-293218-7	MW-16	Total/NA	Water	5220D LL	
310-293218-8	Pond	Total/NA	Water	5220D LL	
MB 310-437745/32	Method Blank	Total/NA	Water	5220D LL	
MB 310-437745/5	Method Blank	Total/NA	Water	5220D LL	
LCS 310-437745/3	Lab Control Sample	Total/NA	Water	5220D LL	
310-293218-7 MS	MW-16	Total/NA	Water	5220D LL	
310-293218-7 MSD	MW-16	Total/NA	Water	5220D LL	

Prep Batch: 437902

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-8	Pond	Total/NA	Water	Distill/Ammonia	
MB 310-437902/1-A	Method Blank	Total/NA	Water	Distill/Ammonia	
LCS 310-437902/2-A	Lab Control Sample	Total/NA	Water	Distill/Ammonia	

Analysis Batch: 437940

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-8	Pond	Total/NA	Water	353.2	
MB 310-437940/48	Method Blank	Total/NA	Water	353.2	
LCS 310-437940/49	Lab Control Sample	Total/NA	Water	353.2	

Analysis Batch: 437989

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-8	Pond	Total/NA	Water	350.1	437902
MB 310-437902/1-A	Method Blank	Total/NA	Water	350.1	437902
LCS 310-437902/2-A	Lab Control Sample	Total/NA	Water	350.1	437902

Prep Batch: 791690

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-1	MW-5	Total/NA	Water	9030B	
310-293218-2	MW-7	Total/NA	Water	9030B	
310-293218-3	MW-8	Total/NA	Water	9030B	
310-293218-4	MW-12	Total/NA	Water	9030B	
310-293218-5	MW-14	Total/NA	Water	9030B	
310-293218-6	MW-15	Total/NA	Water	9030B	
310-293218-7	MW-16	Total/NA	Water	9030B	
310-293218-8	Pond	Total/NA	Water	9030B	
MB 500-791690/1-A	Method Blank	Total/NA	Water	9030B	
LCS 500-791690/2-A	Lab Control Sample	Total/NA	Water	9030B	

QC Association Summary

Client: Glencore Ltd
Job ID: 310-293218-1
Project/Site: Keokuk Ferro-Sil Landfill

General Chemistry

Analysis Batch: 791692

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-293218-1	MW-5	Total/NA	Water	9034	791690
310-293218-2	MW-7	Total/NA	Water	9034	791690
310-293218-3	MW-8	Total/NA	Water	9034	791690
310-293218-4	MW-12	Total/NA	Water	9034	791690
310-293218-5	MW-14	Total/NA	Water	9034	791690
310-293218-6	MW-15	Total/NA	Water	9034	791690
310-293218-7	MW-16	Total/NA	Water	9034	791690
310-293218-8	Pond	Total/NA	Water	9034	791690
MB 500-791690/1-A	Method Blank	Total/NA	Water	9034	791690
LCS 500-791690/2-A	Lab Control Sample	Total/NA	Water	9034	791690

Lab Chronicle

Client: Glencore Ltd
Job ID: 310-293218-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-5
Lab Sample ID: 310-293218-1
Date Collected: 10/17/24 00:00
Matrix: Water
Date Received: 10/18/24 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	438491	WZC8	EET CF	10/31/24 14:13
Total/NA	Prep	3005A			437135	F5MW	EET CF	10/23/24 09:30
Total/NA	Analysis	6020B		1	438520	NFT2	EET CF	11/01/24 15:35
Total/NA	Analysis	350.1		1	437150	ZJX4	EET CF	10/23/24 00:40
Total/NA	Analysis	5220D LL		2	437745	HE7K	EET CF	10/28/24 09:56
Total/NA	Prep	9030B			791690	TR	EET CHI	10/21/24 13:22 - 10/21/24 13:24 [1]
Total/NA	Analysis	9034		1	791692	TR	EET CHI	10/21/24 14:23 - 10/21/24 14:26 [1]

Client Sample ID: MW-7
Lab Sample ID: 310-293218-2
Date Collected: 10/17/24 00:00
Matrix: Water
Date Received: 10/18/24 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	438491	WZC8	EET CF	10/31/24 15:00
Total/NA	Prep	3005A			437135	F5MW	EET CF	10/23/24 09:30
Total/NA	Analysis	6020B		1	438520	NFT2	EET CF	11/01/24 15:37
Total/NA	Analysis	350.1		1	437150	ZJX4	EET CF	10/23/24 00:41
Total/NA	Analysis	5220D LL		1	437745	HE7K	EET CF	10/28/24 09:56
Total/NA	Prep	9030B			791690	TR	EET CHI	10/21/24 13:24 - 10/21/24 13:27 [1]
Total/NA	Analysis	9034		1	791692	TR	EET CHI	10/21/24 14:26 - 10/21/24 14:29 [1]

Client Sample ID: MW-8
Lab Sample ID: 310-293218-3
Date Collected: 10/17/24 00:00
Matrix: Water
Date Received: 10/18/24 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	438491	WZC8	EET CF	10/31/24 15:15
Total/NA	Analysis	9056A		50	438491	WZC8	EET CF	10/31/24 15:31
Total/NA	Prep	3005A			437135	F5MW	EET CF	10/23/24 09:30
Total/NA	Analysis	6020B		1	438520	NFT2	EET CF	11/01/24 15:39
Total/NA	Prep	3005A			437135	F5MW	EET CF	10/23/24 09:30
Total/NA	Analysis	6020B		4	438660	NFT2	EET CF	11/04/24 13:49
Total/NA	Analysis	350.1		1	437150	ZJX4	EET CF	10/23/24 00:42
Total/NA	Analysis	5220D LL		2	437745	HE7K	EET CF	10/28/24 09:56
Total/NA	Prep	9030B			791690	TR	EET CHI	10/21/24 13:27 - 10/21/24 13:30 [1]
Total/NA	Analysis	9034		1	791692	TR	EET CHI	10/21/24 14:29 - 10/21/24 14:32 [1]

Client Sample ID: MW-12
Lab Sample ID: 310-293218-4
Date Collected: 10/17/24 00:00
Matrix: Water
Date Received: 10/18/24 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	438491	WZC8	EET CF	10/31/24 15:46

Client Sample ID: MW-12
Lab Sample ID: 310-293218-4

Date Collected: 10/17/24 00:00
Matrix: Water
Date Received: 10/18/24 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3005A			437135	F5MW	EET CF	10/23/24 09:30
Total/NA	Analysis	6020B		1	438520	NFT2	EET CF	11/01/24 15:41
Total/NA	Analysis	350.1		1	437150	ZJX4	EET CF	10/23/24 00:43
Total/NA	Analysis	5220D LL		2	437745	HE7K	EET CF	10/28/24 09:56
Total/NA	Prep	9030B			791690	TR	EET CHI	10/21/24 13:30 - 10/21/24 13:32 [1]
Total/NA	Analysis	9034		1	791692	TR	EET CHI	10/21/24 14:32 - 10/21/24 14:35 [1]

Client Sample ID: MW-14
Lab Sample ID: 310-293218-5

Date Collected: 10/17/24 00:00
Matrix: Water
Date Received: 10/18/24 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	438491	WZC8	EET CF	10/31/24 16:02
Total/NA	Analysis	9056A		50	438491	WZC8	EET CF	10/31/24 16:17
Total/NA	Prep	3005A			437135	F5MW	EET CF	10/23/24 09:30
Total/NA	Analysis	6020B		1	438520	NFT2	EET CF	11/01/24 15:52
Total/NA	Prep	3005A			437135	F5MW	EET CF	10/23/24 09:30
Total/NA	Analysis	6020B		4	438660	NFT2	EET CF	11/04/24 14:00
Total/NA	Analysis	350.1		1	437150	ZJX4	EET CF	10/23/24 00:43
Total/NA	Analysis	5220D LL		1	437745	HE7K	EET CF	10/28/24 09:56
Total/NA	Prep	9030B			791690	TR	EET CHI	10/21/24 13:32 - 10/21/24 13:35 [1]
Total/NA	Analysis	9034		1	791692	TR	EET CHI	10/21/24 14:35 - 10/21/24 14:38 [1]

Client Sample ID: MW-15
Lab Sample ID: 310-293218-6

Date Collected: 10/17/24 00:00
Matrix: Water
Date Received: 10/18/24 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	438491	WZC8	EET CF	10/31/24 16:33
Total/NA	Analysis	9056A		50	438491	WZC8	EET CF	10/31/24 17:20
Total/NA	Prep	3005A			437135	F5MW	EET CF	10/23/24 09:30
Total/NA	Analysis	6020B		1	438520	NFT2	EET CF	11/01/24 15:55
Total/NA	Analysis	350.1		1	437150	ZJX4	EET CF	10/23/24 00:45
Total/NA	Analysis	5220D LL		2	437745	HE7K	EET CF	10/28/24 09:56
Total/NA	Prep	9030B			791690	TR	EET CHI	10/21/24 13:35 - 10/21/24 13:38 [1]
Total/NA	Analysis	9034		1	791692	TR	EET CHI	10/21/24 14:38 - 10/21/24 14:41 [1]

Client Sample ID: MW-16
Lab Sample ID: 310-293218-7

Date Collected: 10/17/24 00:00
Matrix: Water
Date Received: 10/18/24 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	438504	WZC8	EET CF	10/31/24 12:09
Total/NA	Analysis	9056A		50	438504	WZC8	EET CF	10/31/24 12:21

Lab Chronicle

Client: Glencore Ltd
Job ID: 310-293218-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-16
Lab Sample ID: 310-293218-7
Date Collected: 10/17/24 00:00
Matrix: Water
Date Received: 10/18/24 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3005A			437135	F5MW	EET CF	10/23/24 09:30
Total/NA	Analysis	6020B		1	438520	NFT2	EET CF	11/01/24 15:57
Total/NA	Prep	3005A			437135	F5MW	EET CF	10/23/24 09:30
Total/NA	Analysis	6020B		4	438660	NFT2	EET CF	11/04/24 14:02
Total/NA	Analysis	350.1		1	437150	ZJX4	EET CF	10/23/24 00:45
Total/NA	Analysis	5220D LL		2	437745	HE7K	EET CF	10/28/24 09:56
Total/NA	Prep	9030B			791690	TR	EET CHI	10/21/24 13:38 - 10/21/24 13:40 [1]
Total/NA	Analysis	9034		1	791692	TR	EET CHI	10/21/24 14:41 - 10/21/24 14:44 [1]

Client Sample ID: Pond
Lab Sample ID: 310-293218-8
Date Collected: 10/17/24 00:00
Matrix: Water
Date Received: 10/18/24 12:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	300.0		5	438504	WZC8	EET CF	10/31/24 12:33
Total/NA	Prep	200.8			437138	F5MW	EET CF	10/23/24 09:30
Total/NA	Analysis	200.8		1	438523	A6US	EET CF	11/01/24 17:18
Total/NA	Prep	245.1			437622	QTZ5	EET CF	10/28/24 14:30
Total/NA	Analysis	245.2		1	437963	QTZ5	EET CF	10/29/24 13:57
Total/NA	Prep	1664A			437020	A3GU	EET CF	10/22/24 08:30
Total/NA	Analysis	1664A		1	437125	A3GU	EET CF	10/22/24 08:30
Total/NA	Prep	Distill/CN			437222	ENB7	EET CF	10/23/24 10:45
Total/NA	Analysis	335.4		1	437639	ZJX4	EET CF	10/25/24 18:30
Total/NA	Prep	Distill/Ammonia			437902	MQ8M	EET CF	10/29/24 11:20
Total/NA	Analysis	350.1		1	437989	ZJX4	EET CF	10/30/24 00:23
Total/NA	Prep	351.2			436871	W9YR	EET CF	10/21/24 05:29
Total/NA	Analysis	351.2		1	437016	ZJX4	EET CF	10/21/24 19:28
Total/NA	Analysis	353.2		1	437940	ENB7	EET CF	10/29/24 12:31
Total/NA	Prep	365.1			437196	HE7K	EET CF	10/23/24 09:26
Total/NA	Analysis	365.1		1	437311	ZJX4	EET CF	10/23/24 19:53
Total/NA	Analysis	5220D LL		1	437745	HE7K	EET CF	10/28/24 09:56
Total/NA	Prep	9030B			791690	TR	EET CHI	10/21/24 13:40 - 10/21/24 13:43 [1]
Total/NA	Analysis	9034		1	791692	TR	EET CHI	10/21/24 14:44 - 10/21/24 14:47 [1]
Total/NA	Analysis	I-3765-85		1	436970	DGU1	EET CF	10/21/24 13:39
Total/NA	Analysis	Total Nitrogen		1	436998	HE7K	EET CF	10/29/24 12:31

[1] This procedure uses a method stipulated length of time for the process. Both start and end times are displayed.

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

EET CHI = Eurofins Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

Accreditation/Certification Summary

Client: Glencore Ltd
Job ID: 310-293218-1
Project/Site: Keokuk Ferro-Sil Landfill

Laboratory: Eurofins Cedar Falls

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-25

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
1664A	1664A	Water	HEM (Oil and Grease)
1664A	1664A	Water	SGT-HEM (Oil and Grease - Nonpolar)
200.8	200.8	Water	Aluminum
200.8	200.8	Water	Arsenic
200.8	200.8	Water	Barium
200.8	200.8	Water	Boron
200.8	200.8	Water	Cadmium
200.8	200.8	Water	Chromium
200.8	200.8	Water	Copper
200.8	200.8	Water	Iron
200.8	200.8	Water	Lead
200.8	200.8	Water	Lithium
200.8	200.8	Water	Molybdenum
200.8	200.8	Water	Nickel
200.8	200.8	Water	Selenium
200.8	200.8	Water	Silver
200.8	200.8	Water	Sodium
200.8	200.8	Water	Strontium
200.8	200.8	Water	Zinc
245.2	245.1	Water	Mercury
300.0		Water	Chloride
300.0		Water	Fluoride
300.0		Water	Sulfate
335.4	Distill/CN	Water	Cyanide, Total
350.1	Distill/Ammonia	Water	Ammonia as N
351.2	351.2	Water	Total Kjeldahl Nitrogen
353.2		Water	Nitrate Nitrite as N
365.1	365.1	Water	Phosphorus as PO4
365.1	365.1	Water	Total Phosphorus as P
6020B	3005A	Water	Lithium
I-3765-85		Water	Total Suspended Solids
Total Nitrogen		Water	Nitrogen, Total

Laboratory: Eurofins Chicago

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Georgia	State	N/A	05-31-25
Georgia (DW)	State	939	05-31-25
Hawaii	State	NA	05-31-25
Illinois	NELAP	IL00035	05-31-25
Indiana	State	C-IL-02	05-31-25
Iowa	State	082	05-01-26
Kansas	NELAP	E-10161	10-31-24
Kentucky (UST)	State	AI # 108083	05-31-25
Kentucky (WW)	State	KY90023	12-31-24

Accreditation/Certification Summary

Client: Glencore Ltd
Job ID: 310-293218-1
Project/Site: Keokuk Ferro-Sil Landfill

Laboratory: Eurofins Chicago (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Louisiana (All)	NELAP	02046	06-30-25
Mississippi	State	NA	05-31-25
North Carolina (WW/SW)	State	291	12-31-24
North Dakota	State	R-194	04-29-24 *
Oklahoma	State	8908	08-31-24 *
South Carolina	State	77001003	05-31-25
USDA	US Federal Programs	P330-18-00018	03-30-26
Wisconsin	State	999580010	08-31-25
Wyoming	State	8TMS-Q	05-31-25

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Method Summary

Client: Glencore Ltd
Job ID: 310-293218-1
Project/Site: Keokuk Ferro-Sil Landfill

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	EPA	EET CF
9056A	Anions, Ion Chromatography	SW846	EET CF
200.8	Metals (ICP/MS)	EPA	EET CF
245.2	Mercury (CVAA)	EPA	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
1664A	HEM and SGT-HEM by Extraction and Gravimetry	40CFR136A	EET CF
335.4	Cyanide, Total	EPA	EET CF
350.1	Nitrogen, Ammonia	EPA	EET CF
351.2	Nitrogen, Total Kjeldahl	EPA	EET CF
353.2	Nitrogen, Nitrate-Nitrite	EPA	EET CF
365.1	Phosphorus, Total	EPA	EET CF
5220D LL	COD	SM	EET CF
9034	Sulfide, Acid soluble and Insoluble (Titrimetric)	SW846	EET CHI
I-3765-85	Residue, Non-filterable (TSS)	USGS	EET CF
Total Nitrogen	Nitrogen, Total	EPA	EET CF
1664A	HEM and SGT-HEM (SPE)	1664A	EET CF
200.8	Preparation, Total Metals	EPA	EET CF
245.1	Preparation, Mercury	EPA	EET CF
3005A	Preparation, Total Metals	SW846	EET CF
351.2	Nitrogen, Total Kjeldahl	EPA	EET CF
365.1	Sample Digestion for Total Phosphorus	MCAWW	EET CF
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	SW846	EET CHI
Distill/Ammonia	Distillation, Ammonia	None	EET CF
Distill/CN	Distillation, Cyanide	None	EET CF

Protocol References:

1664A = EPA-821-98-002

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

None = None

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

USGS = "Methods For Analysis Of Water And Fluvial Sediments", USGS, 1989

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

EET CHI = Eurofins Chicago, 2417 Bond Street, University Park, IL 60484, TEL (708)534-5200

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310-293218 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: Twin Rivers

City/State: CITY | STATE | Project:

Receipt Information

Date/Time Received: DATE 10/18/24 | TIME 1200 | Received By: PH

Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee
☒ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler? ☒ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☒ Yes ☐ No *If yes:* Cooler # 1 of 2

Cooler Custody Seals Present? ☒ Yes ☐ No *If yes:* Cooler custody seals intact? ☐ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☒ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☐ Yes ☐ No *If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: R | Correction Factor (°C): 0

• **Temp Blank Temperature** – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 4.9 | Corrected Temp (°C): 4.9

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:		
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE: If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

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Place COC scanning label here

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client:

City/State: CITY Twin Rivers | STATE | Project:

Receipt Information

Date/Time Received: DATE 10/19/24 | TIME 1200 | Received By: PH

Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee
☒ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler? ☒ Yes ☐ No *If yes:* Cooler ID:

Multiple Coolers? ☒ Yes ☐ No *If yes:* Cooler # 2 of 2

Cooler Custody Seals Present? ☒ Yes ☐ No *If yes:* Cooler custody seals intact? ☐ Yes ☐ No

Sample Custody Seals Present? ☐ Yes ☒ No *If yes:* Sample custody seals intact? ☐ Yes ☐ No

Trip Blank Present? ☐ Yes ☒ No *If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: R | Correction Factor (°C): 0

• **Temp Blank Temperature** – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 6.5 | Corrected Temp (°C): 6.5

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:	PL 250	PL 500
Uncorrected Temp (°C):	8.9	10.8
Corrected Temp (°C):	8.9	10.8

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☒ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE: If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

Cooler 1 of 2

Chain of Custody Record

652770

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Address _____

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☑ Other

TAL-8210

Client Contact	Project Manager: Carol Wilson	Site Contact: @ 319 484 2618	Date: 10/16/2024	COC No
Company Name: Twin Rivers Holding LLC	Tel/Email:	Lab Contact:	Carrier:	1 of 1 COCs
Address: c/o Glencore, Ltd	Analysis Turnaround Time: ☐ CALENDAR DAYS ☐ WORKING DAYS			Sampler: Carol Wilson
City/State/Zip:	TAT if different from Below: ☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day			For Lab Use Only: Walk-in Client: Lab Sampling
Phone				
Fax:				
Project Name: Keokuk Ferro-S.I Land Fill				Job / SDG No
Site: 13-024				
P O #				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Chloride	Sulfate	Fluoride	Total metals *	Total metals **	COD	Ammonia nitrogen	Sulfide	TKN, Total	TSS	Oil & Grease HEM	Cyanide	Oil & Grease SGT-HEM	Total phosphorus	Sample Specific Notes
MW-5	10/16/24		G	GW	4	N	N	✓			✓		✓	✓	✓							
MW-7					4			✓			✓		✓	✓	✓							
MW-8					4			✓			✓		✓	✓	✓							
MW-12					4			✓			✓		✓	✓	✓							
MW-14					4			✓			✓		✓	✓	✓							
MW-15					4			✓			✓		✓	✓	✓							
MW-16					4			✓			✓		✓	✓	✓							
Pond					8	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

* metals = Fe, Li, Na, Sr, Ba, Al, B ** metals = Al, As, Ba, Be, B, Fe, Pb, Li, Mo, Ni, Se, Ag, Na, Sr, Zn + Hg, Cd, Cr, Cu

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No	Cooler Temp (°C) Obs'd _____ Corr'd _____	Therm ID No _____

Relinquished by	Company	Date/Time	Received by	Company	Date/Time
Carol E Wilson	CHEMTECO	10/17/24 11:00 am			
Relinquished by	Company	Date/Time	Received by	Company	Date/Time
Relinquished by	Company	Date/Time	Received in Laboratory by	Company	Date/Time
			VA		10/18/24 1200

11/5/2024

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls, IA 50613
Phone 319-277-2401 Fax 319-277-2425

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler:	Lab PM: Dietz, Hannah E	Carrier Tracking No(s):	COC No: 310-77514 1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Hannah Dietz@et eurofinsus com	State of Origin: Iowa	Page: Page 1 of 1
Company: Eurofins Environment Testing North Centr		Accreditations Required (See note): State Program - Iowa		Job #: 310-293218-1
Address: 2417 Bond Street, ,	Due Date Requested: 10/31/2024			
City: University Park	TAT Requested (days):			
State Zip: IL, 60484				
Phone: 708-534-5200(Tel) 708-534-5211(Fax)	PO #:			
Email:	WO #:			
Project Name: Keokuk Ferro-Sil Landfill	Project #: 31006401			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

310-293218 COC

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	9034_Calc/9030B Sulfide	Total Number of containers	Special Instructions/Note:
			Preservation Code:						
MW-5 (310-293218-1)	10/16/24	Central	G	Water			X	1	
MW-7 (310-293218-2)	10/16/24	Central	G	Water			X	1	
MW-8 (310-293218-3)	10/16/24	Central	G	Water			X	1	
MW-12 (310-293218-4)	10/16/24	Central	G	Water			X	1	
MW-14 (310-293218-5)	10/16/24	Central	G	Water			X	1	
MW-15 (310-293218-6)	10/16/24	Central	G	Water			X	1	
MW-16 (310-293218-7)	10/16/24	Central	G	Water			X	1	
Pond (310-293218-8)	10/16/24	Central	G	Water			X	1	

Note Since laboratory accreditations are subject to change Eurofins Environment Testing North Central, LLC places the ownership of method analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed the samples must be shipped back to the Eurofins Environment Testing North Central, LLC laboratory or other instructions will be provided Any changes to accreditation status should be brought to Eurofins Environment Testing North Central LLC attention immediately If all requested accreditations are current to date return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing North Central LLC.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested I, II, III, IV, Other (specify) Primary Deliverable Rank 2	Special Instructions/QC Requirements

Empty Kit Relinquished by	Date	Time	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[signature]	10/18/24 1603		Stephanie Hernandez	10/19/24 0930	EEIA
Relinquished by:	Date/Time	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time	Company	Received by:	Date/Time	Company

Custody Seals Intact. Δ Yes Δ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks
		2.5+2.3

Login Sample Receipt Checklist

Client: Glencore Ltd

Job Number: 310-293218-1

Login Number: 293218

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Hirsch, Preston

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	Cooler temperature outside required temperature criteria.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Glencore Ltd

Job Number: 310-293218-1

Login Number: 293218
List Number: 2
Creator: Hernandez, Stephanie

List Source: Eurofins Chicago
List Creation: 10/19/24 12:39 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	2.3
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Steven Demasi
Glencore Ltd
Three Stamford Plaza
301 Trersser Blvd
Stamford, Connecticut 06901

Generated 4/11/2024 4:23:38 PM

JOB DESCRIPTION

Keokuk Ferro-Sil

JOB NUMBER

310-277813-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization

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Authorized for release by
Hannah Dietz, Project Management Assistant I
Hannah.Dietz@et.eurofinsus.com
(319)277-2401

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Job Narrative
310-277813-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers are applied to indicate exceptions. Noncompliant quality control (QC) is further explained in narrative comments.

- Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 3/29/2024 2:40 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 4.5°C.

HPLC/IC
Method 300_ORGFMS: The following sample was received with less than 2 days remaining on the holding time or less than one shift (8 hours) remaining on a test with a holding time of 48 hours or less. As such, the laboratory had insufficient time remaining to perform the analysis within holding time: Pond (310-277813-2).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Metals
Method 6020B: The reference method requires samples to be preserved to a pH of <2. The following sample was received with insufficient preservation at a pH of >2: MW-16 (310-277813-1). The sample was preserved to the appropriate pH in the laboratory.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Sample Summary

Client: Glencore Ltd
Project/Site: Keokuk Ferro-Sil

Job ID: 310-277813-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-277813-1	MW-16	Ground Water	03/28/24 00:00	03/29/24 14:40
310-277813-2	Pond	Ground Water	03/28/24 00:00	03/29/24 14:40

Detection Summary

Client: Glencore Ltd
Project/Site: Keokuk Ferro-Sil

Job ID: 310-277813-1

Client Sample ID: MW-16 — Lab Sample ID: 310-277813-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	183		5.00	2.25	mg/L	5		9056A	Total/NA
Sulfate	1870		20.0	8.40	mg/L	20		9056A	Total/NA
Iron	1.75		0.100	0.0360	mg/L	1		6020B	Total/NA
Lithium	0.240		0.0100	0.00250	mg/L	1		6020B	Total/NA
Sodium	176		1.00	0.460	mg/L	1		6020B	Total/NA
Strontium	2.77		0.00400	0.00212	mg/L	4		6020B	Total/NA

Client Sample ID: Pond — Lab Sample ID: 310-277813-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	0.222	H	0.200	0.0780	mg/L	1		300.0	Total/NA
Arsenic	0.00164	J	0.00200	0.000530	mg/L	1		200.8	Total/NA
Copper	0.00199	J	0.00500	0.00180	mg/L	1		200.8	Total/NA
Iron	0.397		0.100	0.0360	mg/L	1		200.8	Total/NA
Lead	0.000327	J	0.000500	0.000240	mg/L	1		200.8	Total/NA
Lithium	0.274		0.0100	0.00250	mg/L	1		200.8	Total/NA
Molybdenum	0.00228		0.00200	0.000910	mg/L	1		200.8	Total/NA
Nickel	0.00323	J	0.00500	0.00190	mg/L	1		200.8	Total/NA
Sodium	86.5		1.00	0.460	mg/L	1		200.8	Total/NA
Strontium	0.886		0.00100	0.000530	mg/L	1		200.8	Total/NA
Zinc	0.0124	J	0.0200	0.00640	mg/L	1		200.8	Total/NA
Cyanide, Total	0.00831	J	0.0100	0.00430	mg/L	1		335.4	Total/NA
Total Kjeldahl Nitrogen	3.88		1.00	0.550	mg/L	1		351.2	Total/NA
Total Phosphorus as P	0.359		0.100	0.0620	mg/L	1		365.1	Total/NA
Phosphorus as PO4	1.10		0.310	0.190	mg/L	1		365.1	Total/NA
Chemical Oxygen Demand	40.9		5.00	4.80	mg/L	1		5220D LL	Total/NA
Total Suspended Solids	7.00		5.00	1.70	mg/L	1		I-3765-85	Total/NA
Nitrogen, Total	4.10		1.00	0.550	mg/L	1		Total Nitrogen	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Glencore Ltd
Project/Site: Keokuk Ferro-Sil

Job ID: 310-277813-1

Client Sample ID: MW-16

Date Collected: 03/28/24 00:00
Date Received: 03/29/24 14:40

Lab Sample ID: 310-277813-1

Matrix: Ground Water

Method: SW846 9056A - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	183		5.00	2.25	mg/L			04/04/24 10:31	5
Sulfate	1870		20.0	8.40	mg/L			04/04/24 17:59	20

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	1.75		0.100	0.0360	mg/L		04/02/24 09:00	04/02/24 22:26	1
Lithium	0.240		0.0100	0.00250	mg/L		04/02/24 09:00	04/02/24 22:26	1
Sodium	176		1.00	0.460	mg/L		04/02/24 09:00	04/02/24 22:26	1
Strontium	2.77		0.00400	0.00212	mg/L		04/02/24 09:00	04/04/24 14:18	4

Client: Glencore Ltd
Project/Site: Keokuk Ferro-Sil

Job ID: 310-277813-1

Client Sample ID: Pond
Date Collected: 03/28/24 00:00
Date Received: 03/29/24 14:40

Lab Sample ID: 310-277813-2
Matrix: Ground Water

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	**0.222**	**H**	0.200	0.0780	mg/L			04/01/24 14:15	1
Nitrite as N	<0.0430	H	0.200	0.0430	mg/L			04/01/24 14:15	1

Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.00164**	**J**	0.00200	0.000530	mg/L		04/03/24 09:30	04/04/24 15:35	1
Cadmium	<0.000100		0.000200	0.000100	mg/L		04/03/24 09:30	04/04/24 15:35	1
Chromium	<0.00110		0.00500	0.00110	mg/L		04/03/24 09:30	04/04/24 15:35	1
Copper	**0.00199**	**J**	0.00500	0.00180	mg/L		04/03/24 09:30	04/04/24 15:35	1
Iron	**0.397**		0.100	0.0360	mg/L		04/03/24 09:30	04/04/24 15:35	1
Lead	**0.000327**	**J**	0.000500	0.000240	mg/L		04/03/24 09:30	04/04/24 15:35	1
Lithium	**0.274**		0.0100	0.00250	mg/L		04/03/24 09:30	04/05/24 17:06	1
Molybdenum	**0.00228**		0.00200	0.000910	mg/L		04/03/24 09:30	04/05/24 17:06	1
Nickel	**0.00323**	**J**	0.00500	0.00190	mg/L		04/03/24 09:30	04/04/24 15:35	1
Selenium	<0.00140		0.00500	0.00140	mg/L		04/03/24 09:30	04/04/24 15:35	1
Silver	<0.000500		0.00100	0.000500	mg/L		04/03/24 09:30	04/04/24 15:35	1
Sodium	**86.5**		1.00	0.460	mg/L		04/03/24 09:30	04/04/24 15:35	1
Strontium	**0.886**		0.00100	0.000530	mg/L		04/03/24 09:30	04/04/24 15:35	1
Zinc	**0.0124**	**J**	0.0200	0.00640	mg/L		04/03/24 09:30	04/04/24 15:35	1

Method: EPA 245.2 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000140		0.000200	0.000140	mg/L		04/05/24 14:06	04/08/24 14:17	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM (Oil and Grease) (40CFR136A 1664A)	<4.2		4.7	4.2	mg/L		04/01/24 07:00	04/01/24 07:00	1
SGT-HEM (Oil and Grease - Nonpolar) (40CFR136A 1664A)	<4.2		4.7	4.2	mg/L		04/01/24 07:00	04/01/24 07:00	1
Cyanide, Total (EPA 335.4)	**0.00831**	**J**	0.0100	0.00430	mg/L		04/02/24 08:50	04/03/24 21:15	1
Total Kjeldahl Nitrogen (EPA 351.2)	**3.88**		1.00	0.550	mg/L		04/02/24 05:05	04/02/24 16:13	1
Total Phosphorus as P (EPA 365.1)	**0.359**		0.100	0.0620	mg/L		04/05/24 08:42	04/05/24 19:45	1
Phosphorus as PO4 (EPA 365.1)	**1.10**		0.310	0.190	mg/L		04/05/24 08:42	04/05/24 19:45	1
Chemical Oxygen Demand (SM 5220D LL)	**40.9**		5.00	4.80	mg/L			04/01/24 11:46	1
Total Suspended Solids (USGS I-3765-85)	**7.00**		5.00	1.70	mg/L			04/02/24 10:39	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Total (EPA Total Nitrogen)	**4.10**		1.00	0.550	mg/L			04/02/24 16:13	1

Definitions/Glossary

Client: Glencore Ltd
Job ID: 310-277813-1
Project/Site: Keokuk Ferro-Sil

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time. This does not meet regulatory requirements.

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 310-417561/3
Matrix: Water
Analysis Batch: 417561

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	<0.0780		0.200	0.0780	mg/L			04/01/24 13:12	1
Nitrite as N	<0.0430		0.200	0.0430	mg/L			04/01/24 13:12	1

Lab Sample ID: LCS 310-417561/4
Matrix: Water
Analysis Batch: 417561

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrate as N	2.00	2.167		mg/L		108	90 - 110
Nitrite as N	2.00	2.130		mg/L		106	90 - 110

Method: 9056A - Anions, Ion Chromatography

Lab Sample ID: MB 310-418009/3
Matrix: Water
Analysis Batch: 418009

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.450		1.00	0.450	mg/L			04/04/24 09:21	1
Sulfate	<0.420		1.00	0.420	mg/L			04/04/24 09:21	1

Lab Sample ID: LCS 310-418009/4
Matrix: Water
Analysis Batch: 418009

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	9.893		mg/L		99	90 - 110
Sulfate	10.0	10.57		mg/L		106	90 - 110

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 310-417631/1-A
Matrix: Water
Analysis Batch: 417890

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 417631

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.000530		0.00200	0.000530	mg/L		04/03/24 09:30	04/04/24 14:24	1
Cadmium	<0.000100		0.000200	0.000100	mg/L		04/03/24 09:30	04/04/24 14:24	1
Chromium	<0.00110		0.00500	0.00110	mg/L		04/03/24 09:30	04/04/24 14:24	1
Copper	<0.00180		0.00500	0.00180	mg/L		04/03/24 09:30	04/04/24 14:24	1
Iron	<0.0360		0.100	0.0360	mg/L		04/03/24 09:30	04/04/24 14:24	1
Lead	<0.000240		0.000500	0.000240	mg/L		04/03/24 09:30	04/04/24 14:24	1
Lithium	<0.00250		0.0100	0.00250	mg/L		04/03/24 09:30	04/04/24 14:24	1
Molybdenum	0.003478		0.00200	0.000910	mg/L		04/03/24 09:30	04/04/24 14:24	1
Nickel	<0.00190		0.00500	0.00190	mg/L		04/03/24 09:30	04/04/24 14:24	1
Selenium	<0.00140		0.00500	0.00140	mg/L		04/03/24 09:30	04/04/24 14:24	1
Silver	<0.000500		0.00100	0.000500	mg/L		04/03/24 09:30	04/04/24 14:24	1
Sodium	<0.460		1.00	0.460	mg/L		04/03/24 09:30	04/04/24 14:24	1
Strontium	<0.000530		0.00100	0.000530	mg/L		04/03/24 09:30	04/04/24 14:24	1
Zinc	<0.00640		0.0200	0.00640	mg/L		04/03/24 09:30	04/04/24 14:24	1

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: LCS 310-417631/2-A
Matrix: Water
Analysis Batch: 417890

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 417631

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	0.200	0.1983		mg/L		99	85 - 115
Cadmium	0.100	0.09434		mg/L		94	85 - 115
Chromium	0.100	0.1029		mg/L		103	85 - 115
Copper	0.200	0.2017		mg/L		101	85 - 115
Iron	0.200	0.2062		mg/L		103	85 - 115
Lead	0.200	0.1936		mg/L		97	85 - 115
Lithium	0.200	0.2259		mg/L		113	85 - 115
Molybdenum	0.200	0.2007		mg/L		100	85 - 115
Nickel	0.200	0.2069		mg/L		103	85 - 115
Selenium	0.400	0.3604		mg/L		90	85 - 115
Silver	0.100	0.1042		mg/L		104	85 - 115
Sodium	2.00	2.073		mg/L		104	85 - 115
Strontium	0.200	0.1865		mg/L		93	85 - 115
Zinc	0.200	0.1884		mg/L		94	85 - 115

Method: 245.2 - Mercury (CVAA)

Lab Sample ID: MB 310-418012/1-A
Matrix: Water
Analysis Batch: 418170

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 418012

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000140		0.000200	0.000140	mg/L		04/05/24 14:06	04/08/24 13:43	1

Lab Sample ID: LCS 310-418012/2-A
Matrix: Water
Analysis Batch: 418170

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 418012

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001780		mg/L		107	85 - 115

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-417544/1-A
Matrix: Water
Analysis Batch: 417680

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 417544

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<0.0360		0.100	0.0360	mg/L		04/02/24 09:00	04/02/24 21:10	1
Lithium	<0.00250		0.0100	0.00250	mg/L		04/02/24 09:00	04/02/24 21:10	1
Sodium	<0.460		1.00	0.460	mg/L		04/02/24 09:00	04/02/24 21:10	1
Strontium	<0.000530		0.00100	0.000530	mg/L		04/02/24 09:00	04/02/24 21:10	1

Lab Sample ID: LCS 310-417544/2-A
Matrix: Water
Analysis Batch: 417680

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 417544

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	0.200	0.1935		mg/L		97	80 - 120
Lithium	0.200	0.2072		mg/L		104	80 - 120

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 310-417544/2-A
Matrix: Water
Analysis Batch: 417680

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 417544

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Sodium	2.00	2.064		mg/L		103	80 - 120
Strontium	0.200	0.1934		mg/L		97	80 - 120

Method: 335.4 - Cyanide, Total

Lab Sample ID: MB 310-417556/1-A
Matrix: Water
Analysis Batch: 417784

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 417556

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.00430		0.0100	0.00430	mg/L		04/02/24 08:50	04/03/24 20:58	1

Lab Sample ID: LCS 310-417556/2-A
Matrix: Water
Analysis Batch: 417784

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 417556

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cyanide, Total	0.200	0.1847		mg/L		92	90 - 110

Method: 351.2 - Nitrogen, Total Kjeldahl

Lab Sample ID: MB 310-417524/1-A
Matrix: Water
Analysis Batch: 417679

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 417524

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Kjeldahl Nitrogen	<0.550		1.00	0.550	mg/L		04/02/24 05:05	04/02/24 16:09	1

Lab Sample ID: LCS 310-417524/2-A
Matrix: Water
Analysis Batch: 417679

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 417524

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Kjeldahl Nitrogen	4.01	4.293		mg/L		107	90 - 110

Method: 365.1 - Phosphorus, Total

Lab Sample ID: MB 310-417942/1-A
Matrix: Water
Analysis Batch: 418052

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 417942

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Phosphorus as P	<0.0620		0.100	0.0620	mg/L		04/05/24 08:42	04/05/24 19:40	1
Phosphorus as PO4	<0.190		0.310	0.190	mg/L		04/05/24 08:42	04/05/24 19:40	1

Lab Sample ID: LCS 310-417942/2-A
Matrix: Water
Analysis Batch: 418052

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 417942

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Phosphorus as P	1.00	0.9792		mg/L		98	90 - 110

Client: Glencore Ltd
Project/Site: Keokuk Ferro-Sil

Job ID: 310-277813-1

Method: 5220D LL - COD

Lab Sample ID: MB 310-417490/5
Matrix: Water
Analysis Batch: 417490

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	<4.80		5.00	4.80	mg/L			04/01/24 11:46	1

Lab Sample ID: LCS 310-417490/3
Matrix: Water
Analysis Batch: 417490

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	125	120.3		mg/L		96	85 - 115

Method: I-3765-85 - Residue, Non-filterable (TSS)

Lab Sample ID: MB 310-417592/1
Matrix: Water
Analysis Batch: 417592

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	<1.70		5.00	1.70	mg/L			04/02/24 10:39	1

Lab Sample ID: LCS 310-417592/2
Matrix: Water
Analysis Batch: 417592

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Suspended Solids	100	105.0		mg/L		105	75 - 116

QC Association Summary

Client: Glencore Ltd
Project/Site: Keokuk Ferro-Sil

Job ID: 310-277813-1

HPLC/IC

Analysis Batch: 417561

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-2	Pond	Total/NA	Ground Water	300.0	
MB 310-417561/3	Method Blank	Total/NA	Water	300.0	
LCS 310-417561/4	Lab Control Sample	Total/NA	Water	300.0	

Analysis Batch: 418009

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-1	MW-16	Total/NA	Ground Water	9056A	
310-277813-1	MW-16	Total/NA	Ground Water	9056A	
MB 310-418009/3	Method Blank	Total/NA	Water	9056A	
LCS 310-418009/4	Lab Control Sample	Total/NA	Water	9056A	

Metals

Prep Batch: 417544

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-1	MW-16	Total/NA	Ground Water	3005A	
MB 310-417544/1-A	Method Blank	Total/NA	Water	3005A	
LCS 310-417544/2-A	Lab Control Sample	Total/NA	Water	3005A	

Prep Batch: 417631

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-2	Pond	Total/NA	Ground Water	200.8	
MB 310-417631/1-A	Method Blank	Total/NA	Water	200.8	
LCS 310-417631/2-A	Lab Control Sample	Total/NA	Water	200.8	

Analysis Batch: 417680

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-1	MW-16	Total/NA	Ground Water	6020B	417544
MB 310-417544/1-A	Method Blank	Total/NA	Water	6020B	417544
LCS 310-417544/2-A	Lab Control Sample	Total/NA	Water	6020B	417544

Analysis Batch: 417890

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-1	MW-16	Total/NA	Ground Water	6020B	417544
MB 310-417631/1-A	Method Blank	Total/NA	Water	200.8	417631
LCS 310-417631/2-A	Lab Control Sample	Total/NA	Water	200.8	417631

Analysis Batch: 417969

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-2	Pond	Total/NA	Ground Water	200.8	417631

Prep Batch: 418012

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-2	Pond	Total/NA	Ground Water	245.1	
MB 310-418012/1-A	Method Blank	Total/NA	Water	245.1	
LCS 310-418012/2-A	Lab Control Sample	Total/NA	Water	245.1	

Analysis Batch: 418086

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-2	Pond	Total/NA	Ground Water	200.8	417631

Metals

Analysis Batch: 418170

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-2	Pond	Total/NA	Ground Water	245.2	418012
MB 310-418012/1-A	Method Blank	Total/NA	Water	245.2	418012
LCS 310-418012/2-A	Lab Control Sample	Total/NA	Water	245.2	418012

General Chemistry

Analysis Batch: 417377

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-2	Pond	Total/NA	Ground Water	Total Nitrogen	

Prep Batch: 417408

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-2	Pond	Total/NA	Ground Water	1664A	

Analysis Batch: 417489

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-2	Pond	Total/NA	Ground Water	1664A	417408

Analysis Batch: 417490

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-2	Pond	Total/NA	Ground Water	5220D LL	
MB 310-417490/5	Method Blank	Total/NA	Water	5220D LL	
LCS 310-417490/3	Lab Control Sample	Total/NA	Water	5220D LL	

Prep Batch: 417524

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-2	Pond	Total/NA	Ground Water	351.2	
MB 310-417524/1-A	Method Blank	Total/NA	Water	351.2	
LCS 310-417524/2-A	Lab Control Sample	Total/NA	Water	351.2	

Prep Batch: 417556

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-2	Pond	Total/NA	Ground Water	Distill/CN	
MB 310-417556/1-A	Method Blank	Total/NA	Water	Distill/CN	
LCS 310-417556/2-A	Lab Control Sample	Total/NA	Water	Distill/CN	

Analysis Batch: 417592

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-2	Pond	Total/NA	Ground Water	I-3765-85	
MB 310-417592/1	Method Blank	Total/NA	Water	I-3765-85	
LCS 310-417592/2	Lab Control Sample	Total/NA	Water	I-3765-85	

Analysis Batch: 417679

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-2	Pond	Total/NA	Ground Water	351.2	417524
MB 310-417524/1-A	Method Blank	Total/NA	Water	351.2	417524
LCS 310-417524/2-A	Lab Control Sample	Total/NA	Water	351.2	417524

Analysis Batch: 417784

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-2	Pond	Total/NA	Ground Water	335.4	417556

General Chemistry (Continued)

Analysis Batch: 417784 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 310-417556/1-A	Method Blank	Total/NA	Water	335.4	417556
LCS 310-417556/2-A	Lab Control Sample	Total/NA	Water	335.4	417556

Prep Batch: 417942

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-2	Pond	Total/NA	Ground Water	365.1	
MB 310-417942/1-A	Method Blank	Total/NA	Water	365.1	
LCS 310-417942/2-A	Lab Control Sample	Total/NA	Water	365.1	

Analysis Batch: 418052

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-277813-2	Pond	Total/NA	Ground Water	365.1	417942
MB 310-417942/1-A	Method Blank	Total/NA	Water	365.1	417942
LCS 310-417942/2-A	Lab Control Sample	Total/NA	Water	365.1	417942

Lab Chronicle

Client: Glencore Ltd
Project/Site: Keokuk Ferro-Sil

Job ID: 310-277813-1

Client Sample ID: MW-16

Lab Sample ID: 310-277813-1

Date Collected: 03/28/24 00:00
Date Received: 03/29/24 14:40

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	9056A		5	418009	QTZ5	EET CF	04/04/24 10:31
Total/NA	Analysis	9056A		20	418009	QTZ5	EET CF	04/04/24 17:59
Total/NA	Prep	3005A			417544	QTZ5	EET CF	04/02/24 09:00
Total/NA	Analysis	6020B		4	417890	DHM5	EET CF	04/04/24 14:18
Total/NA	Prep	3005A			417544	QTZ5	EET CF	04/02/24 09:00
Total/NA	Analysis	6020B		1	417680	NFT2	EET CF	04/02/24 22:26

Client Sample ID: Pond

Lab Sample ID: 310-277813-2

Date Collected: 03/28/24 00:00
Date Received: 03/29/24 14:40

Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	300.0		1	417561	QTZ5	EET CF	04/01/24 14:15
Total/NA	Prep	200.8			417631	QTZ5	EET CF	04/03/24 09:30
Total/NA	Analysis	200.8		1	417969	DHM5	EET CF	04/04/24 15:35
Total/NA	Prep	200.8			417631	QTZ5	EET CF	04/03/24 09:30
Total/NA	Analysis	200.8		1	418086	NFT2	EET CF	04/05/24 17:06
Total/NA	Prep	245.1			418012	A6US	EET CF	04/05/24 14:06
Total/NA	Analysis	245.2		1	418170	DHM5	EET CF	04/08/24 14:17
Total/NA	Prep	1664A			417408	DGU1	EET CF	04/01/24 07:00
Total/NA	Analysis	1664A		1	417489	DGU1	EET CF	04/01/24 07:00
Total/NA	Prep	Distill/CN			417556	WZC8	EET CF	04/02/24 08:50
Total/NA	Analysis	335.4		1	417784	ZJX4	EET CF	04/03/24 21:15
Total/NA	Prep	351.2			417524	W9YR	EET CF	04/02/24 05:05
Total/NA	Analysis	351.2		1	417679	ENB7	EET CF	04/02/24 16:13
Total/NA	Prep	365.1			417942	MAQ3	EET CF	04/05/24 08:42
Total/NA	Analysis	365.1		1	418052	ZJX4	EET CF	04/05/24 19:45
Total/NA	Analysis	5220D LL		1	417490	ENB7	EET CF	04/01/24 11:46
Total/NA	Analysis	I-3765-85		1	417592	DGU1	EET CF	04/02/24 10:39
Total/NA	Analysis	Total Nitrogen		1	417377	WZC8	EET CF	04/02/24 16:13

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Accreditation/Certification Summary

Client: Glencore Ltd
Job ID: 310-277813-1
Project/Site: Keokuk Ferro-Sil

Laboratory: Eurofins Cedar Falls

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-25

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
200.8	200.8	Ground Water	Lithium
200.8	200.8	Ground Water	Strontium
365.1	365.1	Ground Water	Phosphorus as PO4
6020B	3005A	Ground Water	Lithium
Total Nitrogen		Ground Water	Nitrogen, Total

Method Summary

Client: Glencore Ltd
Job ID: 310-277813-1
Project/Site: Keokuk Ferro-Sil

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	EPA	EET CF
9056A	Anions, Ion Chromatography	SW846	EET CF
200.8	Metals (ICP/MS)	EPA	EET CF
245.2	Mercury (CVAA)	EPA	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
1664A	HEM and SGT-HEM by Extraction and Gravimetry	40CFR136A	EET CF
335.4	Cyanide, Total	EPA	EET CF
351.2	Nitrogen, Total Kjeldahl	EPA	EET CF
365.1	Phosphorus, Total	EPA	EET CF
5220D LL	COD	SM	EET CF
I-3765-85	Residue, Non-filterable (TSS)	USGS	EET CF
Total Nitrogen	Nitrogen, Total	EPA	EET CF
1664A	HEM and SGT-HEM (SPE)	1664A	EET CF
200.8	Preparation, Total Metals	EPA	EET CF
245.1	Preparation, Mercury	EPA	EET CF
3005A	Preparation, Total Metals	SW846	EET CF
351.2	Nitrogen, Total Kjeldahl	EPA	EET CF
365.1	Sample Digestion for Total Phosphorus	MCAWW	EET CF
Distill/CN	Distillation, Cyanide	None	EET CF

Protocol References:

1664A = EPA-821-98-002

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater ", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

None = None

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

USGS = "Methods For Analysis Of Water And Fluvial Sediments", USGS, 1989

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

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310-277813 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: TwinRivers Holding // Glencore Ltd

City/State: CITY Manhatten | STATE NY | Project:

Receipt Information

Date/Time Received: DATE 3/29/2024 | TIME 1440 | Received By: SB

Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee
☑ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler?	☑ Yes	☐ No	*If yes:* Cooler ID:
Multiple Coolers?	☐ Yes	☑ No	*If yes:* Cooler # _____ of _____
Cooler Custody Seals Present? No	☑ Yes	☐ No	*If yes:* Cooler custody seals intact? ☑ Yes ☐
Sample Custody Seals Present? No	☐ Yes	☑ No	*If yes:* Sample custody seals intact? ☐ Yes ☐
Trip Blank Present?	☐ Yes	☑ No	*If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☑ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: P | Correction Factor (°C): 0

• **Temp Blank Temperature** – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 4.5 | Corrected Temp (°C): 4.5

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:		
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE: If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

Chain of Custody Record

651895

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Address _____

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☑ Other

TAL-8210

Client Contact	Project Manager: Carol Wilson	Site Contact: Carol Wilson	Date: 3/29/2024	COC No
Company Name: Twin Rivers Holding c/o Glenwood Ctd	Tel/Email: chemecoanetins.net	Lab Contact:	Carrier:	1 of 1 COCs
Address:	Analysis Turnaround Time			Sampler:
City/State/Zip: Manhattan NY	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone:	TAT if different from Below _____			Walk-in Client:
Fax:	☐ 2 weeks			Lab Sampling
Project Name: Kodak Ferro Sil	☐ 1 week			Job / SDG No
Site: 13-024	☐ 2 days			
PO#:	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Chloride	Sulfate	Total Fe Li Na Sr	COD	TSS	Total nitrogen	Total phosphorus	Cultivase HEM	Cr6 Cause Sort HEM	Total cyanide	Total metals List *	Sample Specific Notes
MW-16	3-28-24		G	GW	2	N	Y	✓	✓	✓									
Pond	3-28-24		G	GW	7	N	N				✓	✓	✓	✓	✓	✓	✓	✓	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:

Total metals for Pond = As Cd Cr Cu Fe Pb Li Hg Mo Ni Se Ag Na Sr Zn

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No | Cooler Temp (°C) Obs'd _____ Corr'd _____ Therm ID No _____

Relinquished by	Company	Date/Time	Received by	Company	Date/Time
Carol E Wilson	CHEM-ECO	3.29.24			
Relinquished by	Company	Date/Time	Received by	Company	Date/Time
Relinquished by	Company	Date/Time	Received in Laboratory by: SS	Company: EnvRes	Date/Time: 3/29/2024 1440

4/8/2024

Login Sample Receipt Checklist

Client: Glencore Ltd

Job Number: 310-277813-1

Login Number: 277813

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Bennett, Samantha

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Steven Demasi
Glencore Ltd
Three Stamford Plaza
301 Trersser Blvd
Stamford, Connecticut 06901

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JOB DESCRIPTION

Keokuk Ferro-Sil Landfill

JOB NUMBER

310-289451-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

myEOL

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization

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Authorized for release by
Hannah Dietz, Project Manager I
Hannah.Dietz@et.eurofinsus.com
(319)277-2401

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Job Narrative
310-289451-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 8/30/2024 2:20 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 11.7°C.

Receipt Exceptions
The following samples were received at the laboratory outside the required temperature criteria: MW-16 (310-289451-1) and Pond (310-289451-2). This does not meet regulatory requirements.

HPLC/IC
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Metals
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Sample Summary

Client: Glencore Ltd
Job ID: 310-289451-1
Project/Site: Keokuk Ferro-Sil Landfill

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-289451-1	MW-16	Water	08/29/24 11:40	08/30/24 14:20
310-289451-2	Pond	Water	08/29/24 01:15	08/30/24 14:20

Detection Summary

Client: Glencore Ltd
Project/Site: Keokuk Ferro-Sil Landfill

Job ID: 310-289451-1

Client Sample ID: MW-16 — Lab Sample ID: 310-289451-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Iron	2.81		0.100	0.0360	mg/L	1		6020B	Total/NA
Lithium	0.281		0.0100	0.00250	mg/L	1		6020B	Total/NA
Sodium	230		1.00	0.480	mg/L	1		6020B	Total/NA
Strontium	3.36		0.00400	0.00212	mg/L	4		6020B	Total/NA

Client Sample ID: Pond — Lab Sample ID: 310-289451-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	129		5.00	2.25	mg/L	5		300.0	Total/NA
Fluoride	0.926	J	1.00	0.375	mg/L	5		300.0	Total/NA
Sulfate	185		5.00	2.10	mg/L	5		300.0	Total/NA
Arsenic	0.00234		0.00200	0.000530	mg/L	1		200.8	Total/NA
Iron	0.321		0.100	0.0360	mg/L	1		200.8	Total/NA
Molybdenum	0.00370		0.00200	0.00130	mg/L	1		200.8	Total/NA
Nickel	0.00395	J	0.00500	0.00210	mg/L	1		200.8	Total/NA
Lithium	0.353		0.0100	0.00250	mg/L	1		200.8	Total/NA
Strontium	1.21		0.00100	0.000530	mg/L	1		200.8	Total/NA
Sodium	77.7		1.00	0.480	mg/L	1		200.8	Total/NA
Total Kjeldahl Nitrogen	1.09		1.00	0.570	mg/L	1		351.2	Total/NA
Nitrate Nitrite as N	0.0933	J F1	0.100	0.0800	mg/L	1		353.2	Total/NA
Chemical Oxygen Demand	32.8		5.00	4.80	mg/L	1		5220D LL	Total/NA
Total Suspended Solids	14.0		5.00	3.70	mg/L	1		I-3765-85	Total/NA
Nitrogen, Total	1.18		1.00	0.570	mg/L	1		Total Nitrogen	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Glencore Ltd
Job ID: 310-289451-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-16
Lab Sample ID: 310-289451-1
Date Collected: 08/29/24 11:40
Matrix: Water
Date Received: 08/30/24 14:20

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	2.81		0.100	0.0360	mg/L		09/04/24 09:00	09/05/24 16:59	1
Lithium	0.281		0.0100	0.00250	mg/L		09/04/24 09:00	09/05/24 16:59	1
Sodium	230		1.00	0.480	mg/L		09/04/24 09:00	09/05/24 16:59	1
Strontium	3.36		0.00400	0.00212	mg/L		09/04/24 09:00	09/06/24 14:33	4

Client: Glencore Ltd
Job ID: 310-289451-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: Pond
Lab Sample ID: 310-289451-2
Date Collected: 08/29/24 01:15
Matrix: Water
Date Received: 08/30/24 14:20

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**129**		5.00	2.25	mg/L			09/10/24 13:07	5
Fluoride	**0.926**	**J**	1.00	0.375	mg/L			09/10/24 13:07	5
Sulfate	**185**		5.00	2.10	mg/L			09/10/24 13:07	5

Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	**0.00234**		0.00200	0.000530	mg/L		09/04/24 09:00	09/04/24 17:25	1
Cadmium	<0.000100		0.000200	0.000100	mg/L		09/04/24 09:00	09/04/24 17:25	1
Chromium	<0.00120		0.00500	0.00120	mg/L		09/04/24 09:00	09/04/24 17:25	1
Copper	<0.00180		0.00500	0.00180	mg/L		09/04/24 09:00	09/04/24 17:25	1
Iron	**0.321**		0.100	0.0360	mg/L		09/04/24 09:00	09/04/24 17:25	1
Lead	<0.000260		0.000500	0.000260	mg/L		09/04/24 09:00	09/04/24 17:25	1
Molybdenum	**0.00370**		0.00200	0.00130	mg/L		09/04/24 09:00	09/04/24 17:25	1
Nickel	**0.00395**	**J**	0.00500	0.00210	mg/L		09/04/24 09:00	09/04/24 17:25	1
Selenium	<0.00140		0.00500	0.00140	mg/L		09/04/24 09:00	09/04/24 17:25	1
Lithium	**0.353**		0.0100	0.00250	mg/L		09/04/24 09:00	09/05/24 13:53	1
Silver	<0.000500		0.00100	0.000500	mg/L		09/04/24 09:00	09/04/24 17:25	1
Strontium	**1.21**		0.00100	0.000530	mg/L		09/04/24 09:00	09/04/24 17:25	1
Sodium	**77.7**		1.00	0.480	mg/L		09/04/24 09:00	09/04/24 17:25	1
Zinc	<0.00970		0.0200	0.00970	mg/L		09/04/24 09:00	09/04/24 17:25	1

Method: EPA 245.2 - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000110	F1	0.000200	0.000110	mg/L		09/06/24 13:30	09/09/24 10:51	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM (Oil and Grease) (40CFR136A 1664A)	<4.5		5.0	4.5	mg/L		09/04/24 08:30	09/04/24 08:30	1
SGT-HEM (Oil and Grease - Nonpolar) (40CFR136A 1664A)	<4.5		5.0	4.5	mg/L		09/04/24 08:30	09/04/24 08:30	1
Cyanide, Total (EPA 335.4)	<0.00350		0.0100	0.00350	mg/L		09/05/24 10:40	09/06/24 16:54	1
Total Kjeldahl Nitrogen (EPA 351.2)	**1.09**		1.00	0.570	mg/L		09/04/24 05:22	09/04/24 18:06	1
Nitrate Nitrite as N (EPA 353.2)	**0.0933**	**J F1**	0.100	0.0800	mg/L			09/10/24 11:14	1
Phosphorus, Total (EPA 365.1)	<0.0670		0.100	0.0670	mg/L		09/03/24 13:17	09/03/24 19:19	1
Chemical Oxygen Demand (SM 5220D LL)	**32.8**		5.00	4.80	mg/L			09/05/24 08:29	1
Total Suspended Solids (USGS I-3765-85)	**14.0**		5.00	3.70	mg/L			09/03/24 10:13	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Total (EPA Total Nitrogen)	**1.18**		1.00	0.570	mg/L			09/10/24 11:14	1

Definitions/Glossary

Client: Glencore Ltd
Job ID: 310-289451-1
Project/Site: Keokuk Ferro-Sil Landfill

Qualifiers

HPLC/IC

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 310-432849/3
Matrix: Water
Analysis Batch: 432849

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.450		1.00	0.450	mg/L			09/10/24 10:48	1
Fluoride	<0.0750		0.200	0.0750	mg/L			09/10/24 10:48	1
Sulfate	<0.420		1.00	0.420	mg/L			09/10/24 10:48	1

Lab Sample ID: LCS 310-432849/4
Matrix: Water
Analysis Batch: 432849

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	10.11		mg/L		101	90 - 110
Fluoride	2.00	2.060		mg/L		103	90 - 110
Sulfate	10.0	10.23		mg/L		102	90 - 110

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 310-432114/1-A
Matrix: Water
Analysis Batch: 432272

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 432114

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	<0.000530		0.00200	0.000530	mg/L		09/04/24 09:00	09/04/24 15:37	1
Cadmium	<0.000100		0.000200	0.000100	mg/L		09/04/24 09:00	09/04/24 15:37	1
Chromium	<0.00120		0.00500	0.00120	mg/L		09/04/24 09:00	09/04/24 15:37	1
Copper	<0.00180		0.00500	0.00180	mg/L		09/04/24 09:00	09/04/24 15:37	1
Iron	<0.0360		0.100	0.0360	mg/L		09/04/24 09:00	09/04/24 15:37	1
Lead	<0.000260		0.000500	0.000260	mg/L		09/04/24 09:00	09/04/24 15:37	1
Molybdenum	<0.00130		0.00200	0.00130	mg/L		09/04/24 09:00	09/04/24 15:37	1
Nickel	<0.00210		0.00500	0.00210	mg/L		09/04/24 09:00	09/04/24 15:37	1
Selenium	<0.00140		0.00500	0.00140	mg/L		09/04/24 09:00	09/04/24 15:37	1
Lithium	<0.00250		0.0100	0.00250	mg/L		09/04/24 09:00	09/04/24 15:37	1
Silver	<0.000500		0.00100	0.000500	mg/L		09/04/24 09:00	09/04/24 15:37	1
Strontium	<0.000530		0.00100	0.000530	mg/L		09/04/24 09:00	09/04/24 15:37	1
Sodium	<0.480		1.00	0.480	mg/L		09/04/24 09:00	09/04/24 15:37	1
Zinc	<0.00970		0.0200	0.00970	mg/L		09/04/24 09:00	09/04/24 15:37	1

Lab Sample ID: LCS 310-432114/2-A
Matrix: Water
Analysis Batch: 432272

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 432114

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	0.200	0.2036		mg/L		102	85 - 115
Cadmium	0.100	0.09334		mg/L		93	85 - 115
Chromium	0.100	0.1004		mg/L		100	85 - 115
Copper	0.200	0.1954		mg/L		98	85 - 115
Iron	0.200	0.2064		mg/L		103	85 - 115
Lead	0.200	0.1972		mg/L		99	85 - 115
Molybdenum	0.200	0.1973		mg/L		99	85 - 115
Nickel	0.200	0.1937		mg/L		97	85 - 115
Selenium	0.400	0.3632		mg/L		91	85 - 115

Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 310-432114/2-A
Client Sample ID: Lab Control Sample
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 432272
Prep Batch: 432114

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Lithium	0.200	0.1952		mg/L		98	85 - 115
Silver	0.100	0.1074		mg/L		107	85 - 115
Strontium	0.200	0.2081		mg/L		104	85 - 115
Sodium	2.00	2.077		mg/L		104	85 - 115
Zinc	0.200	0.1824		mg/L		91	85 - 115

Method: 245.2 - Mercury (CVAA)

Lab Sample ID: MB 310-432482/1-A
Client Sample ID: Method Blank
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 432640
Prep Batch: 432482

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	<0.000110		0.000200	0.000110	mg/L		09/06/24 13:30	09/09/24 10:42	1

Lab Sample ID: LCS 310-432482/2-A
Client Sample ID: Lab Control Sample
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 432640
Prep Batch: 432482

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.00167	0.001635		mg/L		98	85 - 115

Lab Sample ID: 310-289451-2 MS
Client Sample ID: Pond
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 432640
Prep Batch: 432482

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	<0.000110	F1	0.00167	0.001048	F1	mg/L		63	70 - 130

Lab Sample ID: 310-289451-2 MSD
Client Sample ID: Pond
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 432640
Prep Batch: 432482

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	<0.000110	F1	0.00167	0.001069	F1	mg/L		64	70 - 130	2	20

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-432115/1-A
Client Sample ID: Method Blank
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 432421
Prep Batch: 432115

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<0.0360		0.100	0.0360	mg/L		09/04/24 09:00	09/05/24 14:59	1
Lithium	<0.00250		0.0100	0.00250	mg/L		09/04/24 09:00	09/05/24 14:59	1
Sodium	<0.480		1.00	0.480	mg/L		09/04/24 09:00	09/05/24 14:59	1
Strontium	<0.000530		0.00100	0.000530	mg/L		09/04/24 09:00	09/05/24 14:59	1

Method: 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 310-432115/2-A
Client Sample ID: Lab Control Sample
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 432421
Prep Batch: 432115

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	0.200	0.2112		mg/L		106	80 - 120
Lithium	0.200	0.2172		mg/L		109	80 - 120
Sodium	2.00	2.171		mg/L		109	80 - 120
Strontium	0.200	0.2076		mg/L		104	80 - 120

Method: 1664A - HEM and SGT-HEM by Extraction and Gravimetry

Lab Sample ID: MB 310-432073/1-A
Client Sample ID: Method Blank
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 432211
Prep Batch: 432073

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
HEM (Oil and Grease)	<4.5		5.0	4.5	mg/L		09/04/24 08:30	09/04/24 08:30	1
SGT-HEM (Oil and Grease - Nonpolar)	<4.5		5.0	4.5	mg/L		09/04/24 08:30	09/04/24 08:30	1

Lab Sample ID: LCS 310-432073/2-A
Client Sample ID: Lab Control Sample
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 432211
Prep Batch: 432073

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
HEM (Oil and Grease)	40.0	35.50		mg/L		89	78 - 114
SGT-HEM (Oil and Grease - Nonpolar)	20.0	21.20		mg/L		106	64 - 132

Method: 335.4 - Cyanide, Total

Lab Sample ID: MB 310-432309/1-A
Client Sample ID: Method Blank
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 432519
Prep Batch: 432309

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	<0.00350		0.0100	0.00350	mg/L		09/05/24 10:40	09/06/24 16:41	1

Lab Sample ID: LCS 310-432309/2-A
Client Sample ID: Lab Control Sample
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 432519
Prep Batch: 432309

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Cyanide, Total	0.200	0.2080		mg/L		104	90 - 110

Method: 351.2 - Nitrogen, Total Kjeldahl

Lab Sample ID: MB 310-432127/1-A
Client Sample ID: Method Blank
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 432236
Prep Batch: 432127

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Kjeldahl Nitrogen	<0.570		1.00	0.570	mg/L		09/04/24 05:22	09/04/24 17:58	1

Method: 351.2 - Nitrogen, Total Kjeldahl (Continued)

Lab Sample ID: LCS 310-432127/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 432236 — **Prep Batch: 432127**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Kjeldahl Nitrogen	4.01	3.825		mg/L		95	90 - 110

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 310-432718/16 — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 432718

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	<0.0800		0.100	0.0800	mg/L			09/10/24 10:25	1

Lab Sample ID: LCS 310-432718/17 — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 432718

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrate Nitrite as N	2.07	1.964		mg/L		95	90 - 110

Lab Sample ID: 310-289451-2 MS — **Client Sample ID: Pond**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 432718

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrate Nitrite as N	0.0933	J F1	1.00	0.9362	F1	mg/L		84	90 - 110

Lab Sample ID: 310-289451-2 MSD — **Client Sample ID: Pond**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 432718

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Nitrate Nitrite as N	0.0933	J F1	1.00	1.020		mg/L		93	90 - 110	9	19

Method: 365.1 - Phosphorus, Total

Lab Sample ID: MB 310-432081/1-A — **Client Sample ID: Method Blank**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 432123 — **Prep Batch: 432081**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	<0.0670		0.100	0.0670	mg/L		09/03/24 13:17	09/03/24 19:12	1

Lab Sample ID: LCS 310-432081/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Water — **Prep Type: Total/NA**
Analysis Batch: 432123 — **Prep Batch: 432081**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Phosphorus, Total	1.00	0.9632		mg/L		96	90 - 110

Client: Glencore Ltd
Job ID: 310-289451-1
Project/Site: Keokuk Ferro-Sil Landfill

Method: 5220D LL - COD

Lab Sample ID: MB 310-432276/5
Matrix: Water
Analysis Batch: 432276

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	<4.80		5.00	4.80	mg/L			09/05/24 08:29	1

Lab Sample ID: LCS 310-432276/3
Matrix: Water
Analysis Batch: 432276

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	125	121.3		mg/L		97	85 - 110

Method: I-3765-85 - Residue, Non-filterable (TSS)

Lab Sample ID: MB 310-432042/1
Matrix: Water
Analysis Batch: 432042

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	<3.70		5.00	3.70	mg/L			09/03/24 10:13	1

Lab Sample ID: LCS 310-432042/2
Matrix: Water
Analysis Batch: 432042

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Suspended Solids	100	97.00		mg/L		97	81 - 116

HPLC/IC

Analysis Batch: 432849

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2	Pond	Total/NA	Water	300.0	
MB 310-432849/3	Method Blank	Total/NA	Water	300.0	
LCS 310-432849/4	Lab Control Sample	Total/NA	Water	300.0	

Metals

Prep Batch: 432114

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2	Pond	Total/NA	Water	200.8	
MB 310-432114/1-A	Method Blank	Total/NA	Water	200.8	
LCS 310-432114/2-A	Lab Control Sample	Total/NA	Water	200.8	

Prep Batch: 432115

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-1	MW-16	Total/NA	Water	3005A	
MB 310-432115/1-A	Method Blank	Total/NA	Water	200.8	
LCS 310-432115/2-A	Lab Control Sample	Total/NA	Water	200.8	

Analysis Batch: 432272

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2	Pond	Total/NA	Water	200.8	432114
MB 310-432114/1-A	Method Blank	Total/NA	Water	200.8	432114
LCS 310-432114/2-A	Lab Control Sample	Total/NA	Water	200.8	432114

Analysis Batch: 432365

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2	Pond	Total/NA	Water	200.8	432114

Analysis Batch: 432421

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-1	MW-16	Total/NA	Water	6020B	432115
MB 310-432115/1-A	Method Blank	Total/NA	Water	6020B	432115
LCS 310-432115/2-A	Lab Control Sample	Total/NA	Water	6020B	432115

Prep Batch: 432482

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2	Pond	Total/NA	Water	245.1	
MB 310-432482/1-A	Method Blank	Total/NA	Water	245.1	
LCS 310-432482/2-A	Lab Control Sample	Total/NA	Water	245.1	
310-289451-2 MS	Pond	Total/NA	Water	245.1	
310-289451-2 MSD	Pond	Total/NA	Water	245.1	

Analysis Batch: 432557

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-1	MW-16	Total/NA	Water	6020B	432115

Analysis Batch: 432640

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2	Pond	Total/NA	Water	245.2	432482
MB 310-432482/1-A	Method Blank	Total/NA	Water	245.2	432482
LCS 310-432482/2-A	Lab Control Sample	Total/NA	Water	245.2	432482

Metals (Continued)

Analysis Batch: 432640 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2 MS	Pond	Total/NA	Water	245.2	432482
310-289451-2 MSD	Pond	Total/NA	Water	245.2	432482

General Chemistry

Analysis Batch: 432038

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2	Pond	Total/NA	Water	Total Nitrogen	

Analysis Batch: 432042

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2	Pond	Total/NA	Water	I-3765-85	
MB 310-432042/1	Method Blank	Total/NA	Water	I-3765-85	
LCS 310-432042/2	Lab Control Sample	Total/NA	Water	I-3765-85	

Prep Batch: 432073

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2	Pond	Total/NA	Water	1664A	
MB 310-432073/1-A	Method Blank	Total/NA	Water	1664A	
LCS 310-432073/2-A	Lab Control Sample	Total/NA	Water	1664A	

Prep Batch: 432081

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2	Pond	Total/NA	Water	365.1	
MB 310-432081/1-A	Method Blank	Total/NA	Water	365.1	
LCS 310-432081/2-A	Lab Control Sample	Total/NA	Water	365.1	

Analysis Batch: 432123

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2	Pond	Total/NA	Water	365.1	432081
MB 310-432081/1-A	Method Blank	Total/NA	Water	365.1	432081
LCS 310-432081/2-A	Lab Control Sample	Total/NA	Water	365.1	432081

Prep Batch: 432127

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2	Pond	Total/NA	Water	351.2	
MB 310-432127/1-A	Method Blank	Total/NA	Water	351.2	
LCS 310-432127/2-A	Lab Control Sample	Total/NA	Water	351.2	

Analysis Batch: 432211

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2	Pond	Total/NA	Water	1664A	432073
MB 310-432073/1-A	Method Blank	Total/NA	Water	1664A	432073
LCS 310-432073/2-A	Lab Control Sample	Total/NA	Water	1664A	432073

Analysis Batch: 432236

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2	Pond	Total/NA	Water	351.2	432127
MB 310-432127/1-A	Method Blank	Total/NA	Water	351.2	432127
LCS 310-432127/2-A	Lab Control Sample	Total/NA	Water	351.2	432127

QC Association Summary

Client: Glencore Ltd
Job ID: 310-289451-1
Project/Site: Keokuk Ferro-Sil Landfill

General Chemistry

Analysis Batch: 432276

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2	Pond	Total/NA	Water	5220D LL	
MB 310-432276/5	Method Blank	Total/NA	Water	5220D LL	
LCS 310-432276/3	Lab Control Sample	Total/NA	Water	5220D LL	

Prep Batch: 432309

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2	Pond	Total/NA	Water	Distill/CN	
MB 310-432309/1-A	Method Blank	Total/NA	Water	Distill/CN	
LCS 310-432309/2-A	Lab Control Sample	Total/NA	Water	Distill/CN	

Analysis Batch: 432519

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2	Pond	Total/NA	Water	335.4	432309
MB 310-432309/1-A	Method Blank	Total/NA	Water	335.4	432309
LCS 310-432309/2-A	Lab Control Sample	Total/NA	Water	335.4	432309

Analysis Batch: 432718

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-289451-2	Pond	Total/NA	Water	353.2	
MB 310-432718/16	Method Blank	Total/NA	Water	353.2	
LCS 310-432718/17	Lab Control Sample	Total/NA	Water	353.2	
310-289451-2 MS	Pond	Total/NA	Water	353.2	
310-289451-2 MSD	Pond	Total/NA	Water	353.2	

Lab Chronicle

Client: Glencore Ltd
Job ID: 310-289451-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-16
Lab Sample ID: 310-289451-1
Date Collected: 08/29/24 11:40
Matrix: Water
Date Received: 08/30/24 14:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Prep	3005A			432115	QTZ5	EET CF	09/04/24 09:00
Total/NA	Analysis	6020B		1	432421	NFT2	EET CF	09/05/24 16:59
Total/NA	Prep	3005A			432115	QTZ5	EET CF	09/04/24 09:00
Total/NA	Analysis	6020B		4	432557	NFT2	EET CF	09/06/24 14:33

Client Sample ID: Pond
Lab Sample ID: 310-289451-2
Date Collected: 08/29/24 01:15
Matrix: Water
Date Received: 08/30/24 14:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	300.0		5	432849	QTZ5	EET CF	09/10/24 13:07
Total/NA	Prep	200.8			432114	QTZ5	EET CF	09/04/24 09:00
Total/NA	Analysis	200.8		1	432272	NFT2	EET CF	09/04/24 17:25
Total/NA	Prep	200.8			432114	QTZ5	EET CF	09/04/24 09:00
Total/NA	Analysis	200.8		1	432365	NFT2	EET CF	09/05/24 13:53
Total/NA	Prep	245.1			432482	DHM5	EET CF	09/06/24 13:30
Total/NA	Analysis	245.2		1	432640	DHM5	EET CF	09/09/24 10:51
Total/NA	Prep	1664A			432073	A3GU	EET CF	09/04/24 08:30
Total/NA	Analysis	1664A		1	432211	A3GU	EET CF	09/04/24 08:30
Total/NA	Prep	Distill/CN			432309	WZC8	EET CF	09/05/24 10:40
Total/NA	Analysis	335.4		1	432519	ZJX4	EET CF	09/06/24 16:54
Total/NA	Prep	351.2			432127	W9YR	EET CF	09/04/24 05:22
Total/NA	Analysis	351.2		1	432236	ZJX4	EET CF	09/04/24 18:06
Total/NA	Analysis	353.2		1	432718	ENB7	EET CF	09/10/24 11:14
Total/NA	Prep	365.1			432081	T5AC	EET CF	09/03/24 13:17
Total/NA	Analysis	365.1		1	432123	ZJX4	EET CF	09/03/24 19:19
Total/NA	Analysis	5220D LL		1	432276	ENB7	EET CF	09/05/24 08:29
Total/NA	Analysis	I-3765-85		1	432042	HE7K	EET CF	09/03/24 10:13
Total/NA	Analysis	Total Nitrogen		1	432038	HE7K	EET CF	09/10/24 11:14

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Accreditation/Certification Summary

Client: Glencore Ltd
Job ID: 310-289451-1
Project/Site: Keokuk Ferro-Sil Landfill

Laboratory: Eurofins Cedar Falls

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-25

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
1664A	1664A	Water	SGT-HEM (Oil and Grease - Nonpolar)
200.8	200.8	Water	Lithium
200.8	200.8	Water	Strontium
6020B	3005A	Water	Lithium
Total Nitrogen		Water	Nitrogen, Total

Method Summary

Client: Glencore Ltd
Job ID: 310-289451-1
Project/Site: Keokuk Ferro-Sil Landfill

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	EPA	EET CF
200.8	Metals (ICP/MS)	EPA	EET CF
245.2	Mercury (CVAA)	EPA	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
1664A	HEM and SGT-HEM by Extraction and Gravimetry	40CFR136A	EET CF
335.4	Cyanide, Total	EPA	EET CF
351.2	Nitrogen, Total Kjeldahl	EPA	EET CF
353.2	Nitrogen, Nitrate-Nitrite	EPA	EET CF
365.1	Phosphorus, Total	EPA	EET CF
5220D LL	COD	SM	EET CF
I-3765-85	Residue, Non-filterable (TSS)	USGS	EET CF
Total Nitrogen	Nitrogen, Total	EPA	EET CF
1664A	HEM and SGT-HEM (SPE)	1664A	EET CF
200.8	Preparation, Total Metals	EPA	EET CF
245.1	Preparation, Mercury	EPA	EET CF
3005A	Preparation, Total Metals	SW846	EET CF
351.2	Nitrogen, Total Kjeldahl	EPA	EET CF
365.1	Sample Digestion for Total Phosphorus	MCAWW	EET CF
Distill/CN	Distillation, Cyanide	None	EET CF

Protocol References:

1664A = EPA-821-98-002

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater ", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

None = None

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

USGS = "Methods For Analysis Of Water And Fluvial Sediments", USGS, 1989

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

eurofins | Environment Testing America

310-289451 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: Glencore Ltd

City/State: CITY | STATE | Project:

Receipt Information

Date/Time Received: DATE 8-30-24 | TIME 1420 | Received By: MY

Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee
☒ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler?	☒ Yes	☐ No	*If yes:* Cooler ID:
Multiple Coolers?	☐ Yes	☒ No	*If yes:* Cooler # _____ of _____
Cooler Custody Seals Present? No	☒ Yes	☐ No	*If yes:* Cooler custody seals intact? ☒ Yes ☐
Sample Custody Seals Present? No	☐ Yes	☒ No	*If yes:* Sample custody seals intact? ☐ Yes ☐
Trip Blank Present?	☐ Yes	☒ No	*If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: R | Correction Factor (°C): 0

• **Temp Blank Temperature** – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 11.7 | Corrected Temp (°C): 11.7

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:	Plastic 250 NT	
Uncorrected Temp (°C):	16.1	
Corrected Temp (°C):	16.1	

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☒ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE If yes, contact PM before proceeding If no, proceed with login

Additional Comments

Ice frozen in one brick sitting on top of samples.

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls, IA 50613
Phone. 319-277-2401 Fax: 319-277-2425

Chain of Custody Record

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Client Information	Sampler: Carol Wilson	Lab PM: Dietz, Hannah E	Carrier Tracking No(s):	COC No: 310-93562-23195.1
Client Contact: Steven Demasi	Phone: 319 484 2618	E-Mail: Hannah.Dietz@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Company: Glencore Ltd	PWSID:			Job #:
Address: Three Stamford Plaza 301 Trersser Blvd	Due Date Requested:			
City: Stamford	TAT Requested (days):			
State, Zip: CT, 06901	Compliance Project: Δ Yes Δ No			
Phone:	PO #: Project Number 13-024			
Email: steven.demasi@glencore-us.com	WO #:			
Project Name: Keokuk Ferro-Sil Landfill	Project #: 31006401			
Site: 13-024	SSOW#:			

Analysis Requested

Preservation Codes:
N - None
D - HNO3
S - H2SO4
B - NaOH
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300_ORGFM_28D - (MOD) Any three anions	200.8_CWA - (MOD) - ICPMS	1664A - (MOD) Oil and Grease (HEM)	351.2, 365.1, 5220D_LL	L_3765_85 - Residue, Non-filterable (TSS)	335.4 - Cyanide, Total	Nitrogen,Total	300_ORGFMS - (MOD) Any two anions	200.8_CWA, 245.2					Total Number of containers	Special Instructions/Note:
Preservation Code:					X	X	N	D	S	S	N	B	N	N	D					X	
MW-16	8/29/24	11:40	G	Water	N	N								✓	✓						Metals: Fe, Li, Na, Sr — MW16
Pond	8/29/24	1:15	G	Water	N	N	✓	✓	✓	✓	✓	✓	✓								Pond metals. As, Cd, Cr, Cu, Fe, Pb, Hg, Mo, Ni, Se, Li, Ag, Sr, Na, Zn

Possible Hazard Identification
☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☑ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Carol E Wilson	8/30/24 11.00 am	CHEM-ECO			
Relinquished by	Date/Time:	Company	Received by	Date/Time:	Company
Relinquished by	Date/Time:	Company	Received by	Date/Time: 8/30/24 1420	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No

Cooler Temperature(s) °C and Other Remarks:

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: Glencore Ltd

Job Number: 310-289451-1

Login Number: 289451

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Bunker, Xavier M

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	False	Cooler temperature outside required temperature criteria.
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	False	Did not receive all required containers.
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

PREPARED FOR

Attn: Steven Demasi
Glencore Ltd
Three Stamford Plaza
301 Trersser Blvd
Stamford, Connecticut 06901

Generated 10/8/2024 12:55:38 PM

JOB DESCRIPTION

Keokuk Ferro-Sil Landfill

JOB NUMBER

310-291589-1

Eurofins Cedar Falls
3019 Venture Way
Cedar Falls IA 50613

See page two for job notes and contact information.

myEOL

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing North Central, LLC Project Manager.

Authorization

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Authorized for release by
Hannah Dietz, Project Manager I
Hannah.Dietz@et.eurofinsus.com
(319)277-2401

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Job Narrative
310-291589-1

Analytical test results meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page unless otherwise noted under the individual analysis. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable.

- Matrix QC may not be reported if insufficient sample is provided or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD may be performed, unless otherwise specified in the method.
- Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.

Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Receipt
The samples were received on 9/27/2024 2:40 PM. Unless otherwise noted below, the samples arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 4.1°C.

HPLC/IC
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Metals
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

General Chemistry
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Sample Summary

Client: Glencore Ltd
Job ID: 310-291589-1
Project/Site: Keokuk Ferro-Sil Landfill

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
310-291589-1	MW-16	Groundwater	09/26/24 12:00	09/27/24 14:40
310-291589-2	Pond	Water	09/26/24 11:00	09/27/24 14:40

Detection Summary

Client: Glencore Ltd
Job ID: 310-291589-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-16 — Lab Sample ID: 310-291589-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	212		5.00	2.25	mg/L	5		300.0	Total/NA
Sulfate	2210		50.0	21.0	mg/L	50		300.0	Total/NA
Iron	2.33		0.100	0.0360	mg/L	1		6020B	Total/NA
Lithium	0.269		0.0100	0.00250	mg/L	1		6020B	Total/NA
Sodium	223		1.00	0.480	mg/L	1		6020B	Total/NA
Strontium	3.38		0.00400	0.00212	mg/L	4		6020B	Total/NA

Client Sample ID: Pond — Lab Sample ID: 310-291589-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chloride	239		5.00	2.25	mg/L	5		300.0	Total/NA
Sulfate	268		5.00	2.10	mg/L	5		300.0	Total/NA
Iron	0.483		0.100	0.0360	mg/L	1		200.8	Total/NA
Lithium	0.364		0.0100	0.00250	mg/L	1		200.8	Total/NA
Sodium	91.8		1.00	0.480	mg/L	1		200.8	Total/NA
Strontium	1.36		0.00100	0.000530	mg/L	1		200.8	Total/NA
Total Kjeldahl Nitrogen	0.826	J	1.00	0.570	mg/L	1		351.2	Total/NA
Phosphorus, Total	0.0744	J	0.100	0.0670	mg/L	1		365.1	Total/NA
Chemical Oxygen Demand	42.0		5.00	4.80	mg/L	1		5220D LL	Total/NA
Total Suspended Solids	4.00	J	5.00	3.70	mg/L	1		I-3765-85	Total/NA
Nitrogen, Total	0.826	J	1.00	0.570	mg/L	1		Total Nitrogen	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: Glencore Ltd
Job ID: 310-291589-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-16
Lab Sample ID: 310-291589-1
Date Collected: 09/26/24 12:00
Matrix: Groundwater
Date Received: 09/27/24 14:40

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	212		5.00	2.25	mg/L			10/02/24 13:30	5
Sulfate	2210		50.0	21.0	mg/L			10/02/24 09:27	50

Method: SW846 6020B - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	2.33		0.100	0.0360	mg/L		10/01/24 09:30	10/04/24 16:51	1
Lithium	0.269		0.0100	0.00250	mg/L		10/01/24 09:30	10/04/24 16:51	1
Sodium	223		1.00	0.480	mg/L		10/01/24 09:30	10/04/24 16:51	1
Strontium	3.38		0.00400	0.00212	mg/L		10/01/24 09:30	10/07/24 17:16	4

Client: Glencore Ltd
Job ID: 310-291589-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: Pond
Lab Sample ID: 310-291589-2
Date Collected: 09/26/24 11:00
Matrix: Water
Date Received: 09/27/24 14:40

Method: EPA 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	239		5.00	2.25	mg/L			10/02/24 13:42	5
Sulfate	268		5.00	2.10	mg/L			10/02/24 13:42	5

Method: EPA 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	0.483		0.100	0.0360	mg/L		10/01/24 09:30	10/04/24 16:55	1
Lithium	0.364		0.0100	0.00250	mg/L		10/01/24 09:30	10/04/24 16:55	1
Sodium	91.8		1.00	0.480	mg/L		10/01/24 09:30	10/04/24 16:55	1
Strontium	1.36		0.00100	0.000530	mg/L		10/01/24 09:30	10/04/24 16:55	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Kjeldahl Nitrogen (EPA 351.2)	0.826	J	1.00	0.570	mg/L		10/01/24 05:29	10/02/24 09:40	1
Nitrate Nitrite as N (EPA 353.2)	<0.0800		0.100	0.0800	mg/L			10/02/24 22:45	1
Phosphorus, Total (EPA 365.1)	0.0744	J	0.100	0.0670	mg/L		10/01/24 15:18	10/01/24 20:34	1
Chemical Oxygen Demand (SM 5220D LL)	42.0		5.00	4.80	mg/L			10/04/24 10:46	1
Total Suspended Solids (USGS I-3765-85)	4.00	J	5.00	3.70	mg/L			09/30/24 11:53	1

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrogen, Total (EPA Total Nitrogen)	0.826	J	1.00	0.570	mg/L			10/02/24 22:45	1

Definitions/Glossary

Client: Glencore Ltd
Job ID: 310-291589-1
Project/Site: Keokuk Ferro-Sil Landfill

Qualifiers

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client: Glencore Ltd
Job ID: 310-291589-1
Project/Site: Keokuk Ferro-Sil Landfill

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 310-435164/3
Matrix: Water
Analysis Batch: 435164

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	<0.450		1.00	0.450	mg/L			10/02/24 12:09	1
Sulfate	<0.420		1.00	0.420	mg/L			10/02/24 12:09	1

Lab Sample ID: LCS 310-435164/4
Matrix: Water
Analysis Batch: 435164

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	10.0	10.02		mg/L		100	90 - 110
Sulfate	10.0	10.29		mg/L		103	90 - 110

Method: 6020B - Metals (ICP/MS)

Lab Sample ID: MB 310-434714/1-A
Matrix: Water
Analysis Batch: 435361

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 434714

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Iron	<0.0360		0.100	0.0360	mg/L		10/01/24 09:30	10/04/24 15:56	1
Lithium	<0.00250		0.0100	0.00250	mg/L		10/01/24 09:30	10/04/24 15:56	1
Sodium	<0.480		1.00	0.480	mg/L		10/01/24 09:30	10/04/24 15:56	1
Strontium	<0.000530		0.00100	0.000530	mg/L		10/01/24 09:30	10/04/24 15:56	1

Lab Sample ID: LCS 310-434714/2-A
Matrix: Water
Analysis Batch: 435361

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 434714

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Iron	0.200	0.2142		mg/L		107	80 - 120
Lithium	0.200	0.2090		mg/L		104	80 - 120
Sodium	2.00	2.118		mg/L		106	80 - 120
Strontium	0.200	0.1967		mg/L		98	80 - 120

Method: 351.2 - Nitrogen, Total Kjeldahl

Lab Sample ID: MB 310-434768/1-A
Matrix: Water
Analysis Batch: 434972

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 434768

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Kjeldahl Nitrogen	<0.570		1.00	0.570	mg/L		10/01/24 05:29	10/02/24 09:37	1

Lab Sample ID: LCS 310-434768/2-A
Matrix: Water
Analysis Batch: 434972

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 434768

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Total Kjeldahl Nitrogen	4.01	3.991		mg/L		100	90 - 110

Method: 353.2 - Nitrogen, Nitrate-Nitrite

Lab Sample ID: MB 310-435042/99
Matrix: Water
Analysis Batch: 435042

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate Nitrite as N	<0.0800		0.100	0.0800	mg/L			10/02/24 22:19	1

Lab Sample ID: LCS 310-435042/100
Matrix: Water
Analysis Batch: 435042

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Nitrate Nitrite as N	2.07	2.227		mg/L		108	90 - 110

Method: 365.1 - Phosphorus, Total

Lab Sample ID: MB 310-434877/1-A
Matrix: Water
Analysis Batch: 434902

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 434877

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phosphorus, Total	<0.0670		0.100	0.0670	mg/L		10/01/24 15:18	10/01/24 20:32	1

Lab Sample ID: LCS 310-434877/2-A
Matrix: Water
Analysis Batch: 434902

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 434877

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Phosphorus, Total	1.00	0.9555		mg/L		95	90 - 110

Method: 5220D LL - COD

Lab Sample ID: MB 310-435265/5
Matrix: Water
Analysis Batch: 435265

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chemical Oxygen Demand	<4.80		5.00	4.80	mg/L			10/04/24 10:46	1

Lab Sample ID: LCS 310-435265/3
Matrix: Water
Analysis Batch: 435265

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chemical Oxygen Demand	125	121.3		mg/L		97	85 - 110

Method: I-3765-85 - Residue, Non-filterable (TSS)

Lab Sample ID: MB 310-434706/1
Matrix: Water
Analysis Batch: 434706

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Total Suspended Solids	<3.70		5.00	3.70	mg/L			09/30/24 11:53	1

Client: Glencore Ltd
Job ID: 310-291589-1
Project/Site: Keokuk Ferro-Sil Landfill

Method: I-3765-85 - Residue, Non-filterable (TSS) (Continued)

Lab Sample ID: LCS 310-434706/2
Client Sample ID: Lab Control Sample
Matrix: Water
Prep Type: Total/NA
Analysis Batch: 434706

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Total Suspended Solids			100	99.00		mg/L		99	81 - 116		

HPLC/IC

Analysis Batch: 435164

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-291589-1	MW-16	Total/NA	Groundwater	300.0	
310-291589-1	MW-16	Total/NA	Groundwater	300.0	
310-291589-2	Pond	Total/NA	Water	300.0	
MB 310-435164/3	Method Blank	Total/NA	Water	300.0	
LCS 310-435164/4	Lab Control Sample	Total/NA	Water	300.0	

Metals

Prep Batch: 434714

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-291589-1	MW-16	Total/NA	Groundwater	3005A	
310-291589-2	Pond	Total/NA	Water	200.8	
MB 310-434714/1-A	Method Blank	Total/NA	Water	200.8	
LCS 310-434714/2-A	Lab Control Sample	Total/NA	Water	200.8	

Analysis Batch: 435361

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-291589-1	MW-16	Total/NA	Groundwater	6020B	434714
310-291589-2	Pond	Total/NA	Water	200.8	434714
MB 310-434714/1-A	Method Blank	Total/NA	Water	6020B	434714
LCS 310-434714/2-A	Lab Control Sample	Total/NA	Water	6020B	434714

Analysis Batch: 435492

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-291589-1	MW-16	Total/NA	Groundwater	6020B	434714

General Chemistry

Analysis Batch: 434653

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-291589-2	Pond	Total/NA	Water	Total Nitrogen	

Analysis Batch: 434706

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-291589-2	Pond	Total/NA	Water	I-3765-85	
MB 310-434706/1	Method Blank	Total/NA	Water	I-3765-85	
LCS 310-434706/2	Lab Control Sample	Total/NA	Water	I-3765-85	

Prep Batch: 434768

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-291589-2	Pond	Total/NA	Water	351.2	
MB 310-434768/1-A	Method Blank	Total/NA	Water	351.2	
LCS 310-434768/2-A	Lab Control Sample	Total/NA	Water	351.2	

Prep Batch: 434877

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-291589-2	Pond	Total/NA	Water	365.1	
MB 310-434877/1-A	Method Blank	Total/NA	Water	365.1	
LCS 310-434877/2-A	Lab Control Sample	Total/NA	Water	365.1	

QC Association Summary

Client: Glencore Ltd
Job ID: 310-291589-1
Project/Site: Keokuk Ferro-Sil Landfill

General Chemistry

Analysis Batch: 434902

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-291589-2	Pond	Total/NA	Water	365.1	434877
MB 310-434877/1-A	Method Blank	Total/NA	Water	365.1	434877
LCS 310-434877/2-A	Lab Control Sample	Total/NA	Water	365.1	434877

Analysis Batch: 434972

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-291589-2	Pond	Total/NA	Water	351.2	434768
MB 310-434768/1-A	Method Blank	Total/NA	Water	351.2	434768
LCS 310-434768/2-A	Lab Control Sample	Total/NA	Water	351.2	434768

Analysis Batch: 435042

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-291589-2	Pond	Total/NA	Water	353.2	
MB 310-435042/99	Method Blank	Total/NA	Water	353.2	
LCS 310-435042/100	Lab Control Sample	Total/NA	Water	353.2	

Analysis Batch: 435265

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
310-291589-2	Pond	Total/NA	Water	5220D LL	
MB 310-435265/5	Method Blank	Total/NA	Water	5220D LL	
LCS 310-435265/3	Lab Control Sample	Total/NA	Water	5220D LL	

Lab Chronicle

Client: Glencore Ltd
Job ID: 310-291589-1
Project/Site: Keokuk Ferro-Sil Landfill

Client Sample ID: MW-16
Lab Sample ID: 310-291589-1
Date Collected: 09/26/24 12:00
Matrix: Groundwater
Date Received: 09/27/24 14:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	300.0		50	435164	HE7K	EET CF	10/02/24 09:27
Total/NA	Analysis	300.0		5	435164	HE7K	EET CF	10/02/24 13:30
Total/NA	Prep	3005A			434714	F5MW	EET CF	10/01/24 09:30
Total/NA	Analysis	6020B		1	435361	NFT2	EET CF	10/04/24 16:51
Total/NA	Prep	3005A			434714	F5MW	EET CF	10/01/24 09:30
Total/NA	Analysis	6020B		4	435492	NFT2	EET CF	10/07/24 17:16

Client Sample ID: Pond
Lab Sample ID: 310-291589-2
Date Collected: 09/26/24 11:00
Matrix: Water
Date Received: 09/27/24 14:40

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	300.0		5	435164	HE7K	EET CF	10/02/24 13:42
Total/NA	Prep	200.8			434714	F5MW	EET CF	10/01/24 09:30
Total/NA	Analysis	200.8		1	435361	NFT2	EET CF	10/04/24 16:55
Total/NA	Prep	351.2			434768	W9YR	EET CF	10/01/24 05:29
Total/NA	Analysis	351.2		1	434972	ENB7	EET CF	10/02/24 09:40
Total/NA	Analysis	353.2		1	435042	ZJX4	EET CF	10/02/24 22:45
Total/NA	Prep	365.1			434877	T5AC	EET CF	10/01/24 15:18
Total/NA	Analysis	365.1		1	434902	ZJX4	EET CF	10/01/24 20:34
Total/NA	Analysis	5220D LL		1	435265	ENB7	EET CF	10/04/24 10:46
Total/NA	Analysis	I-3765-85		1	434706	DGU1	EET CF	09/30/24 11:53
Total/NA	Analysis	Total Nitrogen		1	434653	HE7K	EET CF	10/02/24 22:45

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

Accreditation/Certification Summary

Client: Glencore Ltd
Job ID: 310-291589-1
Project/Site: Keokuk Ferro-Sil Landfill

Laboratory: Eurofins Cedar Falls

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	Identification Number	Expiration Date
Iowa	State	007	12-01-25

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
200.8	200.8	Water	Lithium
200.8	200.8	Water	Strontium
6020B	3005A	Groundwater	Lithium
Total Nitrogen		Water	Nitrogen, Total

Method Summary

Client: Glencore Ltd
Job ID: 310-291589-1
Project/Site: Keokuk Ferro-Sil Landfill

Method	Method Description	Protocol	Laboratory
300.0	Anions, Ion Chromatography	EPA	EET CF
200.8	Metals (ICP/MS)	EPA	EET CF
6020B	Metals (ICP/MS)	SW846	EET CF
351.2	Nitrogen, Total Kjeldahl	EPA	EET CF
353.2	Nitrogen, Nitrate-Nitrite	EPA	EET CF
365.1	Phosphorus, Total	EPA	EET CF
5220D LL	COD	SM	EET CF
I-3765-85	Residue, Non-filterable (TSS)	USGS	EET CF
Total Nitrogen	Nitrogen, Total	EPA	EET CF
200.8	Preparation, Total Metals	EPA	EET CF
3005A	Preparation, Total Metals	SW846	EET CF
351.2	Nitrogen, Total Kjeldahl	EPA	EET CF
365.1	Sample Digestion for Total Phosphorus	MCAWW	EET CF

Protocol References:

EPA = US Environmental Protection Agency

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.

SM = "Standard Methods For The Examination Of Water And Wastewater"

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

USGS = "Methods For Analysis Of Water And Fluvial Sediments", USGS, 1989

Laboratory References:

EET CF = Eurofins Cedar Falls, 3019 Venture Way, Cedar Falls, IA 50613, TEL (319)277-2401

eurofins | Environment Testing America

310-291589 Chain of Custody

Cooler/Sample Receipt and Temperature Log Form

Client Information

Client: Twin Rivers holding

City/State: CITY | STATE | Project:

Receipt Information

Date/Time Received: DATE 4/27/24 | TIME 1440 | Received By: B

Delivery Type: ☐ UPS ☐ FedEx ☐ FedEx Ground ☐ US Mail ☐ Spee-Dee
☑ Lab Courier ☐ Lab Field Services ☐ Client Drop-off ☐ Other:_____

Condition of Cooler/Containers

Sample(s) received in Cooler?	☒ Yes	☐ No	*If yes:* Cooler ID:
Multiple Coolers?	☐ Yes	☒ No	*If yes:* Cooler # _____ of _____
Cooler Custody Seals Present? No	☐ Yes	☑ No	*If yes:* Cooler custody seals intact? ☐ Yes ☐
Sample Custody Seals Present? No	☐ Yes	☒ No	*If yes:* Sample custody seals intact? ☐ Yes ☐
Trip Blank Present?	☐ Yes	☒ No	*If yes:* Which VOA samples are in cooler? ↓

Temperature Record

Coolant: ☒ Wet ice ☐ Blue ice ☐ Dry ice ☐ Other:_____ ☐ NONE

Thermometer ID: Y | Correction Factor (°C): 0

• **Temp Blank Temperature** – If no temp blank, or temp blank temperature above criteria, proceed to Sample Container Temperature

Uncorrected Temp (°C): 4.1 | Corrected Temp (°C): 4.1

• **Sample Container Temperature**

	CONTAINER 1	CONTAINER 2
Container(s) used:		
Uncorrected Temp (°C):		
Corrected Temp (°C):		

Exceptions Noted

1) If temperature exceeds criteria, was sample(s) received same day of sampling? ☐ Yes ☐ No
   a) *If yes:* Is there evidence that the chilling process began? ☐ Yes ☐ No

2) If temperature is <0°C, are there obvious signs that the integrity of sample containers is compromised? (e.g., bulging septa, broken/cracked bottles, frozen solid?) ☐ Yes ☐ No

NOTE: If yes, contact PM before proceeding. If no, proceed with login

Additional Comments

Chain of Custody Record

652717

eurofins | Environment Testing America

Address _____

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☑ Other

TAL-8210

Client Contact	Project Manager: Carol Wilson	Site Contact:	Date: 9/26/24	COC No
Company Name: Twin Rivers Holding	Tel/Email: chemeco2@netins.net	Lab Contact:	Carrier:	1 of 1 COCs
Address: c/o Glencore Ltd	Analysis Turnaround Time			Sampler: Carol Wilson
City/State/Zip: Manhattan, NY	☐ CALENDAR DAYS ☐ WORKING DAYS			For Lab Use Only:
Phone: 646-949-2486	TAT if different from Below _____			Walk-in Client:
Fax.	☐ 2 weeks ☐ 1 week ☐ 2 days ☐ 1 day			Lab Sampling
Project Name: Keokuk Ferro S.I Landfill				Job / SDG No
Site: 13-024				
P O #				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	chloride, sulfate	total metals *	COD	TSS	Total nitrogen	Total phosphorus	Sample Specific Notes
MW-16	9.26.24	1200 pm	G	GW	2	N	N	✓	✓					
Pond	9.26.24	1100 am	G	WW	7	N	N	✓	✓	✓	✓	✓	✓	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample

☑ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☑ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:
* Total metals list = Fe, Li, Na, Sr

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No | Cooler Temp (°C) Obs'd _____ Corr'd _____ Therm ID No _____

Relinquished by	Company	Date/Time	Received by	Company	Date/Time
Carol E Wilson	CHEM-ECO	9/27/24			
Relinquished by	Company	Date/Time	Received by	Company	Date/Time
Relinquished by	Company	Date/Time	Received in Laboratory by	Company	Date/Time
					9/27/24 1440

10/8/2024

Login Sample Receipt Checklist

Client: Glencore Ltd

Job Number: 310-291589-1

Login Number: 291589

List Source: Eurofins Cedar Falls

List Number: 1

Creator: Bunker, Xavier M

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Keokuk Ferro-Sil Monofill
2542 Carbide Lane
Keokuk, Iowa
Permit No. 56-SDP-17-91P

Attachment D

Leachate Collection System Report

ON-SITE REPRESENTATIVE'S DAILY CONSTRUCTION REPORT

Project: Ferrosil Landfill – Glencore Ltd. Project No: 7252 / 21-2007

Project Location: Carbide Lane, Keokuk, IA

Day: Thursday Date: 10/3/2024 Site Conditions Suitable for Work: Yes X No ☐

Weather: Clear Hi Temp: 82 Lo Temp: 48

Contractor: Hydro-View Midwest Supt.: Donnie Wagenbach

Subcontractor: Supt.:

Contractor Force:

Supervisory	1	Operators	1	Carpenters		Finishers	
Ironworkers		Electricians		Plumbers		Painters	
Laborers		Teamsters		Welders		Others	

Description of Work:
Jessica Coca, PE, Klingner, arrived on-site at approximately 9:55am. Contractor arrived at 10:00am. Contractor walked the site to observe the cleanouts with Klingner and then proceeded to begin work beginning with the southernmost lateral (cleanout near tipping pad) and then moved to the middle lateral followed by the northernmost lateral. While jetting was occurring, Klingner and the contractor supervisor, observed flows at the outlet at the leachate lagoon. Water was free flowing at the outlet and generally clear. The contractor performed jetting on the main stem of the system last. Klingner and the contractor supervisor observed flows at the outlet at the leachate lagoon during jetting of the main stem. Flows were initially dark and cloudy but free flowing. Flows cleared up and jetting operations were completed. The contractor and Klingner left the site at approximately 11:30.

Photos attached (4).

Special Instruction Given or Problems Encountered: None

Tests Taken: None

Jessica A. Coca, PE
On-Site Representative

KLINGNER & ASSOCIATES, P.C.
Engineers • Architects • Surveyors

610 North 4th Street, Suite 100 • Burlington, IA 52601
319.752.3603 • 319.752.3605 (Fax) • www.klingner.com

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Hydro-View equipment used for jetting

Jetting at northernmost lateral

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Free flowing water at outlet (during main stem jetting)

Free flowing water at outlet (during lateral jetting)

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