SCS ENGINEERS

# Transmittal

West Des Moines, IA

| | | | |
|---|---|---|---|
| PROJECT: | Mahaska Co,FY26 Env Comp,IA 27224360.26 | DATE: | 11/23/2025 |
| SUBJECT: | Mahaska County Sanitary Landfill, Closed MSWLF Units - 62-SDP-07-93C - 2024-2025 Biennial Water Quality Report | TRANSMITTAL ID: | 00001 |
| PURPOSE: | For your approval | VIA: | Info Exchange |

FROM

| NAME | COMPANY | EMAIL | PHONE |
|---|---|---|---|
| Nathan Ohrt<br>West Des Moines, IA | SCS Engineers | NOhrt@scsengineers.com | +1-515-415-9220 |

TO

| NAME | COMPANY | EMAIL | PHONE |
|---|---|---|---|
| Mike Smith<br>502 East 9th Street<br>Des Moines IA 50319-0034<br>United States | Iowa, State of | mike.smith@dnr.iowa.gov | 515-725-8200 |

REMARKS:

Good morning Mike-

SCS Engineers, on behalf of the Mahaska County Solid Waste Management Commission, is submitting for download the 2024-2025 Biennial Water Quality Report for the closed Original/C&D and Meinders/Hartog MSWLF units at the Mahaska County Sanitary Landfill. If you have any questions or comments regarding this report, please contact me at the number below. Thank you.

Nathan Ohrt
Senior Project Professional
SCS Engineers
West Des Moines, Iowa
319-331-9613
nohrt@scsengineers.com

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# Transmittal

DATE: 11/23/2025
TRANSMITTAL ID: 00001

DESCRIPTION OF CONTENTS

| QTY | DATED | TITLE | NOTES |
|---|---|---|---|
| 1 | 11/23/2025 | Mahaska County Sanitary Landfill, Closed MSWLF Units - 62-SDP-07-93C - 2024-2025 Biennial Water Quality Report.pdf | |

COPIES:

| | |
|---|---|
| Joe Farris | (Mahaska County Solid Waste Management Commission) |
| Christine Collier | (SCS Engineers) |
| Nathan Ohrt | (SCS Engineers) |
| Becky Jolly | |

November 24, 2025
File No. 27224360.26

Mr. Brad Davison
Iowa Department of Natural Resources
Land Quality Bureau
6200 Park Avenue
Des Moines, Iowa 50321

Subject: 2024-2025 Biennial Water Quality Report
Mahaska County Sanitary Landfill
Original/C&D and Meinders/Hartog MSWLF Units
Permit No. 62-SDP-07-93C

Dear Brad:

SCS Engineers, on behalf of the Mahaska County Solid Waste Management Commission, has completed the required groundwater monitoring and statistical evaluation for the closed Original/C&D and Meinders/Hartog municipal solid waste landfill units at the Mahaska County Sanitary Landfill for the years 2024-2025. Services were performed in general accordance with the requirements of the 1989 Iowa Administrative Code (IAC) 567-103(455B), the closure permit dated April 21, 1995 (Doc #27457), Permit Amendment #8 to the closure permit, issued February 26, 2021 (Doc #99859), which modified the groundwater monitoring requirements for the closed MSWLF units, and Permit Amendment #9, issued on August 13, 2024 (Doc #110684), that established an alternative two-year sampling and reporting schedule, with a subset of monitoring wells sampled annually and reporting occurring biennially. Please find enclosed a copy of the 2024-2025 Biennial Water Quality Report.

If you have any questions regarding this report, please contact Nathan Ohrt at (319) 331-9613.

Sincerely,

Nathan Ohrt
Senior Project Professional
SCS Engineers

Timothy C. Buelow, P.E.
VP – Senior Project Advisor
SCS Engineers

NPO/TCB

Copies: Mr. Joe Farris, Mahaska County Solid Waste Management Commission

# 2024-2025 Biennial Water Quality Report

Mahaska County Sanitary Landfill
Original/C&D and Meinders/Hartog MSWLF Units
Permit No. 62-SDP-07-93C
Oskaloosa, Iowa

SCS ENGINEERS

27224360.26 | November 2025

1690 All-State Court, Suite 100
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# Certification


I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

Date: 11/21/2025

Timothy C. Buelow, P.E.

License No. 14445

My license renewal date is December 31, 2025.

Pages or sheets covered by this seal:

All except Appendix B-1.

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# 1.0 INTRODUCTION

SCS Engineers (SCS), on behalf of the Mahaska County Solid Waste Management Commission, has completed the required groundwater monitoring and statistical evaluation for the closed Original/C&D and Meinders/Hartog municipal solid waste landfill units (closed MSWLF units) at the Mahaska County Sanitary Landfill. This Biennial Water Quality Report (BWQR) was prepared in general accordance with the requirements of the 1989 Iowa Administrative Code (IAC) 567-103, the closure permit dated April 25, 1995 (Doc #27457), and Permit Amendment #8 to the closure permit, issued February 26, 2021 (Doc #99859), which modified the groundwater monitoring requirements for the closed MSWLF units. Permit Amendment #9, issued on August 13, 2024 (Doc #110684), established an alternative two-year sampling and reporting schedule, with a subset of monitoring wells sampled annually and reporting occurring biennially. This report summarizes the 2024-2025 groundwater monitoring program for the closed MSWLF units.

## 1.1 REPORT PRIORITY

There are no items related to groundwater monitoring that require review or approval by the Iowa Department of Natural Resources (DNR) at this time.

## 1.2 RESPONSE TO DNR CORRESPONDENCE

There is currently no correspondence from the DNR requiring a response regarding groundwater quality items.

## 1.3 SITE LOCATION

The closed MSWLF units are depicted in **Figure 1**, Approved Monitoring Network. The closed MSWLF units are located approximately five miles south of Oskaloosa, Iowa. The closed MSWLF units consist of the original site, located in the SE ¼ and the E ½ of the SW ¼ of the NW ¼ of Section 18, T74N, R15W of Mahaska County, Iowa. The fill area of the original site is approximately 26.4 acres. The C&D site occupies a portion of the SW ¼ of the NE ¼ of Section 18, T74N, R15W of Mahaska County, Iowa. The fill area at the C&D site is approximately 3.3 acres. The Meinders site is located in a portion of the NW ¼ of Section 13, T74N, R16W of Mahaska County, Iowa. The fill area at the Meinders site is approximately 10.3 acres. The Hartog site is a small cell (approximately one acre) located northwest of the Meinders site.

## 1.4 BACKGROUND

According to the 2020 Annual Water Quality Report (Doc #99000):

> *The Original/C&D and Meinders/Hartog sites are closed landfill sites that currently do not accept waste. Final cover, consisting of 2-feet of clay and 1-foot of topsoil and rooting zone, were placed on the landfills in 1987. Follow up cover testing on the sites was conducted in 1992 to check material permeability and thickness. The sites were accepted for post-closure care by the DNR in 1993. The active site for the Mahaska County Sanitary landfill is located at the Binns and Stevens site.*

## 1.5 SAMPLING SUMMARY

Groundwater monitoring, conducted in accordance with Permit Amendment #9, took place in May 2024 and May 2025. Table 1 summarizes the monitoring points and sampling conducted during this reporting period.

Table 1. 2024-2025 Reporting Period Monitoring Summary

| Monitoring Well | May 2024* | May 2025 |
|---|---|---|
| MW-1A | Beryllium, Cadmium, Cobalt, Nickel, TSS | |
| MW-2A | Beryllium, Cadmium, Cobalt, Nickel, TSS | |
| MW-8 | Beryllium, Cadmium, Cobalt, Nickel, TSS | Beryllium, Cadmium, Cobalt, Nickel, TSS |
| MW-12 | Beryllium, Cadmium, Cobalt, Nickel, TSS | |
| MW-15 | Beryllium, Cadmium, Cobalt, Nickel, TSS | Beryllium, Cadmium, Cobalt, Nickel, TSS |

TSS: Total Suspended Solids
* - Sampling in 2024 was performed before the biennial sampling frequency was established. The entirety of the data collected in 2024 was included in the statistical evaluation.

The reporting period for this report is the 2024-2025 calendar years and includes the May 2024 and May 2025 sampling events. The field sampling forms and laboratory analytical data sheets for the May 2024 and May 2025 sampling events are included in **Appendices A and B-1**, respectively.


| HMSP Monitoring Wells |
|---|
| MW-1A |
| MW-2A |
| MW-8 |
| MW-12 |
| MW-15 |

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# Site Map

Legend

- HMSP Monitoring Well
- Approximate Monitoring Well Location
- Approximate Gas Probe Location
- Approximite Limits of Property Lines - Hartog & Meinders Site
- Approximate Property Line - Original and C&D Sites
- Hartog Site Waste Boundary
- Meinders Site Waste Boundary
- Original Site Waste Boundary
- C&D Site Waste Boundary

Mahaska County Sanitary Landfill
Original & C&D Sites and
Hartog & Meinders
Oskaloosa, Iowa
Project No: 27224360.26
Drawing Date: September 2025

N W E S

0 330 660 1,320 Feet

**Figure 1**

# 2.0 HYDROGEOLOGIC SITE SUMMARY

## 2.1 GEOLOGY AND HYDROGEOLOGY

Terracon Environmental, Inc. conducted a hydrogeologic investigation of the closed MSWLF unit areas in March 1994. The report entitled *Hydrogeological Assessment Report, Mahaska County Sanitary Landfill*, *Original, C&D, and Meinders Site* (Doc #27460), provided a detailed description of the geology for the area of the closed MSWLF units. Excerpts from the report are included below.

> *"… the upper portion of the landfill generally consists of glacial deposits, with exception of the alluvial deposits found in the vicinity of monitoring well nest MW7A&B. These glacial deposits consist of brown sandy lean clay (oxidized till). Pennsylvanian age shale generally underlies the glacial and alluvial deposits at the site. The stratigraphy appears to indicate the alluvial deposits have cut away and replaced a portion of the till in the southern part of the Meinders site. In general, the base of the landfilled waste appears to be overlying shale at the Meinders and the Original/C&D sites."*
>
> *"Based on the groundwater levels, it appears a water table system has developed in the upper glacial and alluvial deposits. Based on the available information, it appears this system is the uppermost aquifer…Figure 15* [not included] *shows groundwater flow is generally to the southwest across the Meinders site and appears to discharge to the unnamed tributary of Muchakinock Creek. Figure 15 also indicates groundwater flow across the Original/C&D site is to the south toward the unnamed tributary of Muchakinock Creek…Based on the anisotropy and the water table gradient in the glacial deposits, it is assumed that groundwater potentially impacted by the landfill would flow predominantly toward the tributaries rather than migrating into the underlying bedrock units."*

The *Alternative Source Demonstration Report*, dated April 29, 2016 (Doc #86132), included a summary of site mining activities and the use of mine spoils in landfilling operations at the active Binns & Stevens MSWLF unit, which contributed to a documented impact on groundwater quality caused by acid mine drainage. Similar use of strip-mined areas and mine spoils for landfilling was applied in the closed MSWLF units. An excerpt of the report is included below.

> *Historical surface strip coal mining was conducted at the landfill site in the 1930s and continued up to about the late 1960s. Several historical aerial photographs are shown on Exhibit C-1 through C-8 in Appendix C* [not included]*. The aerial photographs show the approximate landfill boundaries and monitoring well locations. The 1930s aerial indicates that land use at the site was primarily agricultural. Surface strip mining is apparent on the aerial photographs from the 1940s through the 1960s.*

The DNR agreed with this determination in correspondence for the closed sites dated April 9, 2020 (Doc #97431), stating the following:

> *The report is acceptable as received and details semi-annual groundwater sampling that took place in 2019. As in the past, multiple groundwater sampling locations had concentrations of metals in groundwater that exceeded the state maximum contaminant level (MCL). A previous report for the operating site indicates that these high metals concentrations are related to low groundwater pH, which is known to mobilize metal cations exposed as a result of past strip mining operations at the site. It is apparent that similar processes are likely operating at the closed sites.*

# 3.0 MONITORING WELL MAINTENANCE AND PERFORMANCE EVALUATION

The hydrologic monitoring system was evaluated to assess the reliability of the monitoring wells' performance using the following tasks:

- The groundwater elevations were compared to the screened interval of the monitoring wells.
- Water level conditions in the monitoring wells were reviewed to evaluate possible changes in the hydrologic setting/flow paths.
- Well depths were measured to evaluate integrity and siltation.
- A visual inspection of well integrity was performed during the sampling event.

## 3.1 WATER LEVEL MEASUREMENTS

The results of the water level measurements collected during the 2024 and 2025 sampling events are presented in Table 2. Shaded cells indicate water elevations within the screened interval

Table 2. Summary of Groundwater Levels and Well Performance

| Monitoring Well | Top of Screen | May 2024 Groundwater Elevation | May 2025 Groundwater Elevation |
|---|---|---|---|
| MW-1A | 756.8 | 759.35 | |
| MW-2A | 703.8 | 703.68 | |
| MW-8 | 682.7 | 691.59 | 692.07 |
| MW-12 | 706.3 | 711.45 | |
| MW-15 | 715.2 | 713.78 | 713.96 |

Notes: All measurements in feet above mean sea level.
Shaded cells indicate water levels within the screened interval.

During the 2024 and 2025 sampling events, water levels were observed to be within the screened interval in monitoring wells MW-2A and MW-15 and above the screened interval in monitoring wells MW-1A, MW-8, and MW-12. It is recommended that the current monitoring program be continued with no proposed changes.

## 3.2 GROUNDWATER FLOW

Groundwater contours were developed using groundwater elevation data collected during the May 2025 sampling event and are shown in **Figure 2**. The groundwater contours indicate flow generally to the south beneath the Original & C&D MSWLF units. Beneath the Meinders & Hartog MSWLF units, flow from the north and east converges into a generally southwest direction. The flow directions are generally consistent with previous evaluations of groundwater flow directions.

## 3.3 WELL DEPTH EVALUATION

SCS measured the well depths during the 2024-2025 sampling events. The monitoring well depths measured during this reporting period are included in Table 3.

Table 3. 2024-2025 Well Depth Summary Table

| Monitoring Well | Installed Well Depth (feet) | May 2024 | | May 2025 | |
|---|---|---|---|---|---|
| | | Measured Well Depth (feet) | Difference from Installed Depth (feet) | Measured Well Depth (feet) | Difference from Installed Depth (feet) |
| MW-1A | 44.6 | 43.4 | 1.2 | Not measured | NA |
| MW-2A | 38.7 | 39.5 | -0.8 | Not measured | NA |
| MW-8 | 27.6 | 27.3 | 0.3 | 27.4 | 0.2 |
| MW-12 | 19.1 | 20.2 | -1.1 | Not measured | NA |
| MW-15 | 27.8 | 28.8 | -1.0 | 28.9 | -1.1 |

The measured well depths were within 1.2 feet of the installed depths. Since the monitoring wells produced samples during this reporting period, it does not appear that siltation is adversely impacting the ability of the monitoring wells to produce samples consistently.

## 3.4 SAMPLING POINT OBSERVATIONS

No problems regarding the integrity of the monitoring wells were observed during this reporting period.


# Groundwater Contours

## Legend

- Approximate Groundwater Contours Based on Field Measurments Taken on October 29-30, 2025
- Approximate Monitoring Well Location
- Approximate Gas Probe Location
- Approximite Limits of Property Lines - Hartog & Meinders Site
- Approximate Property Line - Original and C&D Sites
- Hartog Site Waste Boundary
- Meinders Site Waste Boundary
- Original Site Waste Boundary
- C&D Site Waste Boundary

Mahaska County Sanitary Landfill
Original & C&D Sites and
Hartog & Meinders
Oskaloosa, Iowa
Project No: 27224360.26
Drawing Date: September 2025

N
W E
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0 330 660 1,320
Feet

**Figure 2**

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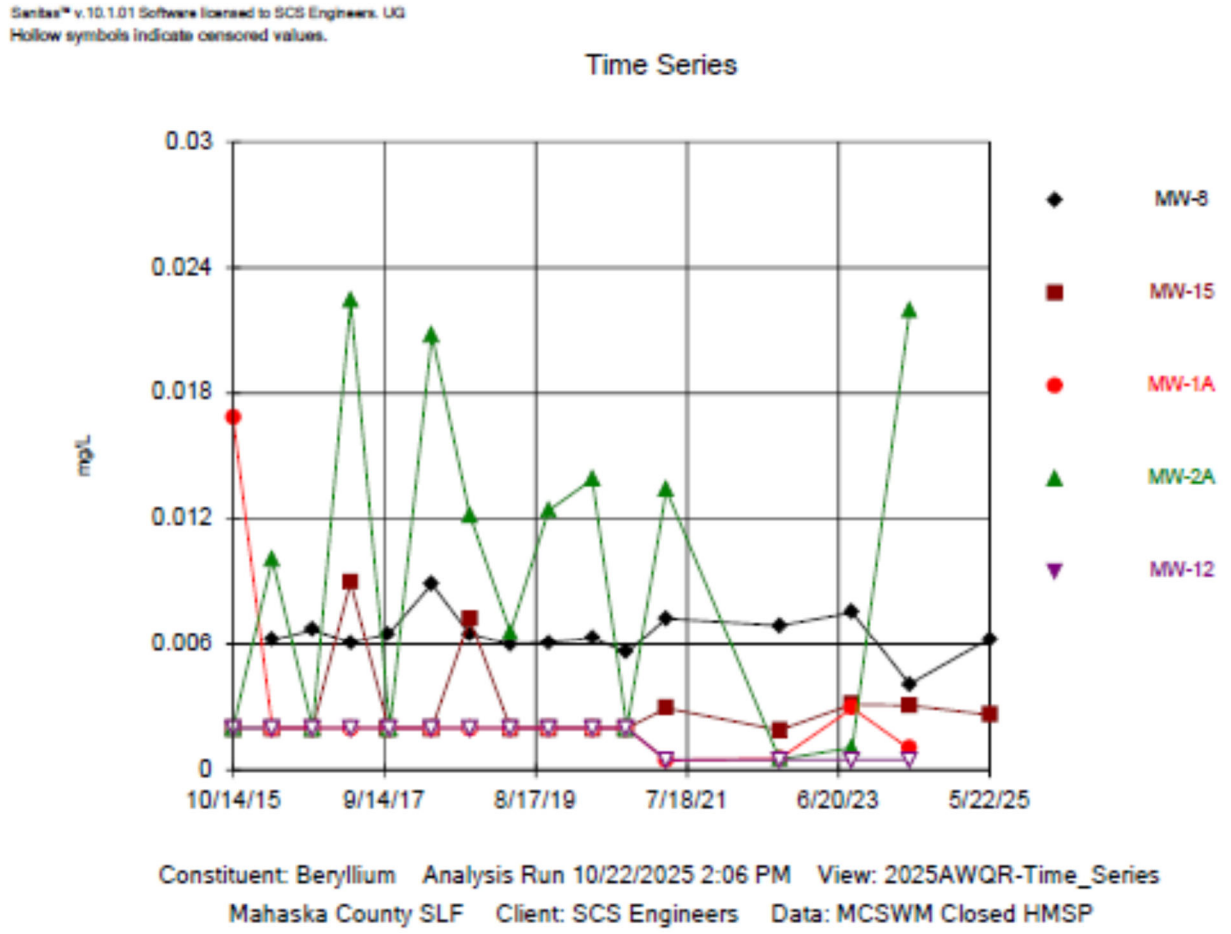
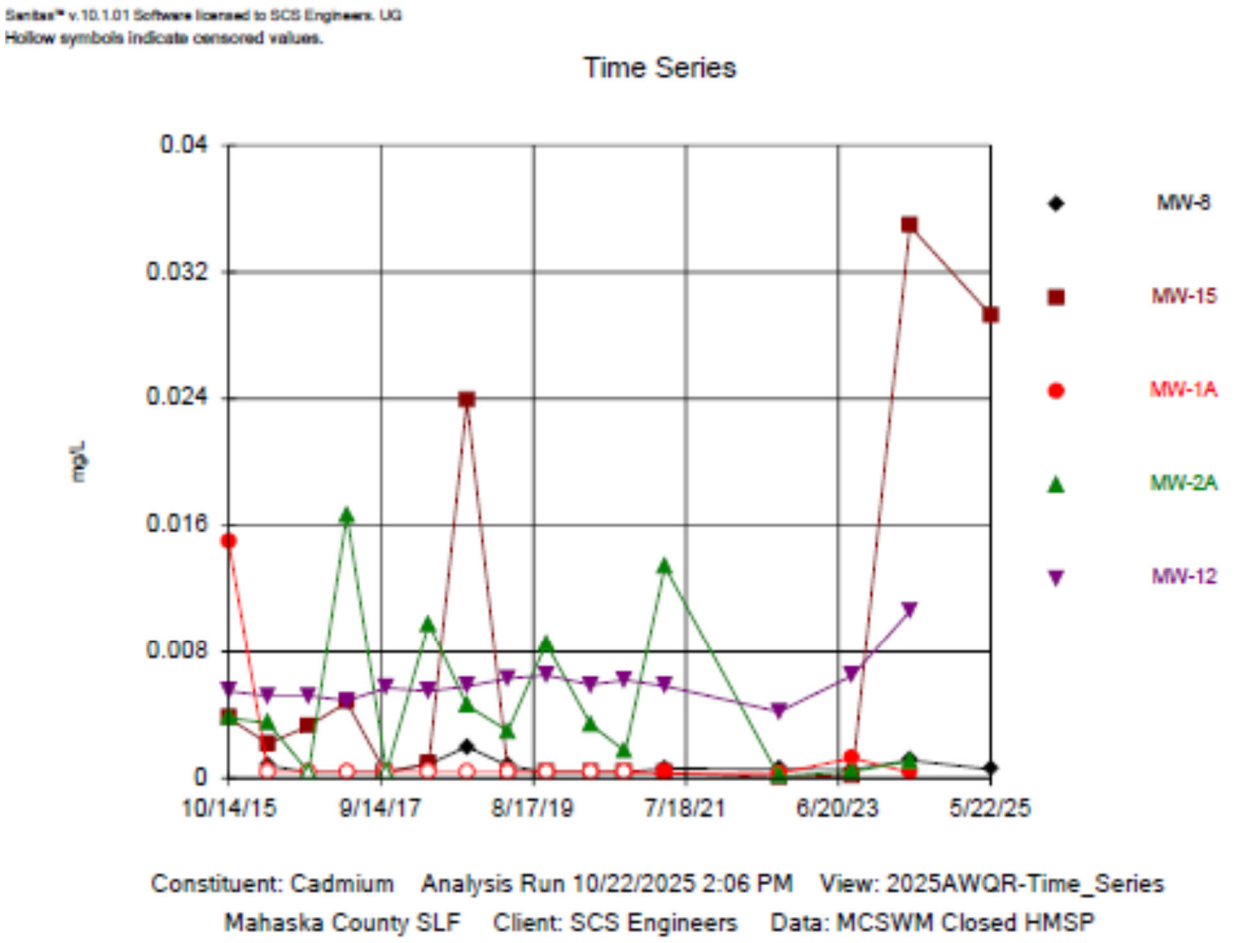
# 4.0 EVALUATION OF WATER QUALITY PARAMETERS

## 4.1 GROUNDWATER DATA EVALUATION

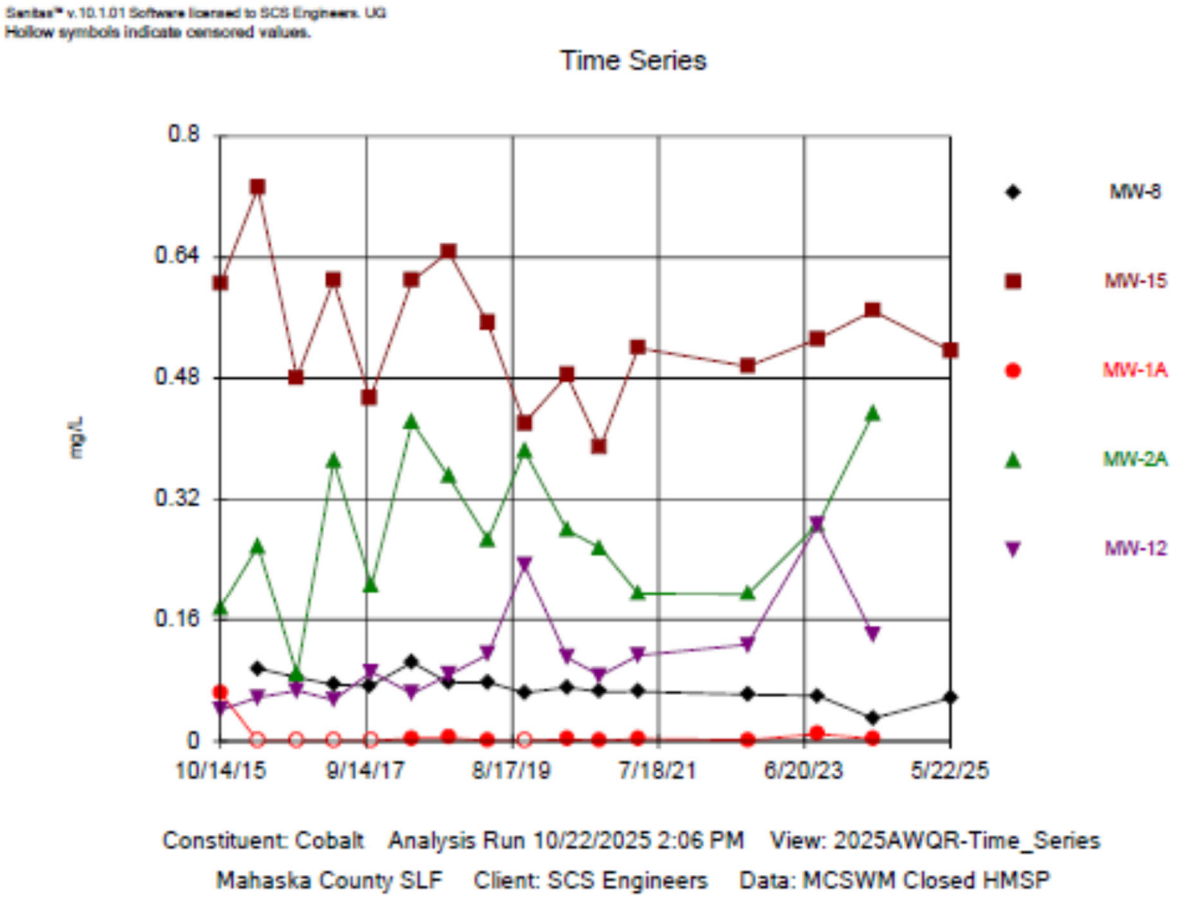
Analytical results for this reporting period are summarized in **Appendix C**, 2024-2025 Analytical Data. Historical laboratory analytical results prior to 2024 are available in the 2023 Annual Water Quality Report, dated October 31, 2013 (Doc #108129). Time series plots for the monitoring points at the closed MSWLF units are presented in the graphs below, followed by a discussion of the statistical findings.



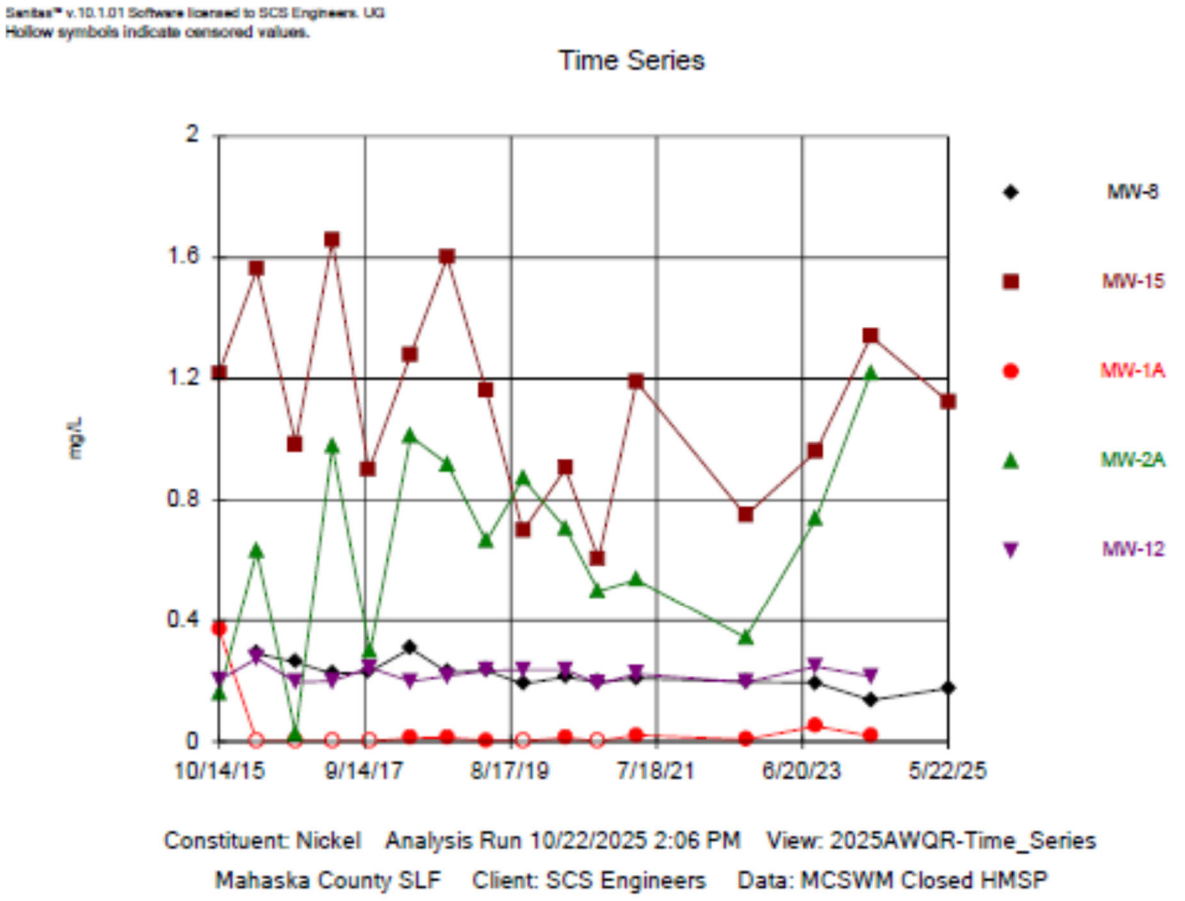

The beryllium concentrations were generally steady, except for monitoring well MW-2A, where the 2022 and 2023 measured concentrations were the lowest in the historical dataset dating to 2015, while the 2024 sample was near a historical high. It is unclear what led to the elevated beryllium concentration; there was no elevated total suspended solids (TSS) concentration that may have contributed to the beryllium concentration. The beryllium concentration in monitoring well MW-2A will be reviewed in subsequent sampling events.




The cadmium concentrations were generally steady, except for monitoring well MW-12, which shows a slightly increasing concentration trend in recent sampling events, and a significant increase in monitoring well MW-15 in the 2024 and 2025 sampling events. As with beryllium, there was no elevated TSS concentration likely to have impacted the cadmium concentration in monitoring well MW-15. The cadmium concentration in monitoring well MW-15 will be reviewed in subsequent sampling events.




Cobalt concentrations were generally stable, although the concentrations in monitoring well MW-2A increased during this reporting period to a historical high. The cobalt concentration in monitoring well MW-2A will be reviewed in subsequent sampling events.




The nickel concentrations were generally stable, although the concentration measured in monitoring well MW-2A increased during this reporting period to a historical high. The nickel concentrations in monitoring well MW-2A will be reviewed in subsequent sampling events.

## 4.2 STATISTICAL EVALUATION

The statistical evaluation was performed using Mann-Kendall trend testing and confidence intervals, or confidence bands when statistically significant trends were present.

Mann-Kendall trend testing was performed at a 99% confidence level ($\alpha = 0.01$). No statistically significant trends were identified. Negative Mann-Kendall statistics, although not necessarily statistically significant, indicate a decreasing concentration trend. Overall, of the constituent-monitoring well pairs analyzed, 14 of 19 (74%) had negative Mann-Kendall statistics, indicating generally stable groundwater conditions at the site. A Mann-Kendall summary table and graphs are included in **Appendix D**.

To further evaluate groundwater conditions, the measured concentrations were compared to the current Iowa Statewide Standards for protected groundwater sources (Groundwater Protection Standards, GWPS). Table 4 summarizes the constituent-monitoring well pairs with concentrations measured at statistically significant levels (SSLs) above the GWPSs.

Table 4. Statistically Significant Levels Above the GWPS

| | MW-1A | MW-2A | MW-8 | MW-12 | MW-15 |
|---|---|---|---|---|---|
| Beryllium | | | X | | |
| Cobalt | | X | X | X | X |
| Nickel | | X | X | X | X |

The measured SSLs are similar to those from recent reporting periods. A confidence interval summary table and graphs are included in **Appendix E**.

The landfill areas (both the active Binns & Stevens site and the closed MSWLF units) were surface strip mined for coal from the 1930s to the late 1960s. The Alternative Source Demonstration Report, dated April 29, 2016 (Doc #86132), was prepared for the Binns & Stevens site to evaluate the likely source of elevated metals concentrations measured in groundwater samples. The report concluded that acid mine drainage was the likely source of the elevated metal concentrations.

> *Results from sampling indicate there is a high acid generating potential of the subsurface deposits and the presence of naturally occurring metals that are mobilized into site groundwater during acid mine drainage. The data collected at the site for mineralogy, metals in spoil and the ionic chemistry for groundwater support the conclusion that acid mine drainage is the source for elevated metals concentrations in monitoring wells at the site.*

The DNR agreed with this determination for the closed MSWLF units in correspondence dated April 9, 2020 (Doc #97431), stating the following:

> *The report is acceptable as received and details semi-annual groundwater sampling that took place in 2019. As in the past, multiple groundwater sampling locations had concentrations of metals in groundwater that exceeded the state maximum contaminant level (MCL). A previous report for the operating site indicates that these high metals concentrations are related to low groundwater pH, which is known to mobilize metal cations exposed as a result of past strip mining operations at the site. It is apparent that similar processes are likely operating at the closed sites.*

Based on the determination that elevated metal concentrations are due to impact from acid mine drainage rather than the closed MSWLF units, the SSLs in Table 4 are not indicative of a release from the closed MSWLF units.

## 4.3 QA/QC INFORMATION

The quality assurance/quality control (QA/QC) program for the closed MSWLF units follows protocols similar to those included in the Binns & Stevens MSWLF unit HMSP (Doc #75077). Data validation procedures are performed on analytical results for laboratory quality control samples, and a quality assurance assessment of the data is conducted as the data is generated. The QA review procedure provides documentation of the accuracy and precision of the analytical data and confirms that the analyses, when feasible based on the methods utilized, are sufficiently sensitive to detect constituents at levels below regulatory standards, where such standards exist. SCS then conducts QA/QC data validation of the produced data, which includes a review of sample handling, analytical

sensitivity, and blanks, accuracy, and precision. An explanation of the laboratory QA/QC and data validation procedures is described in more detail below.

### 4.3.1 Sample Collection and Sample Handling

Sample receipt forms were reviewed by SCS and checked to verify that samples were received in good condition and within the acceptable temperature range. Chain of custody records for the sampling event were reviewed, and it was confirmed that information was complete, custody was not breached, and samples were analyzed within the acceptable hold time. The sample collection and handling procedures met the acceptable criteria.

### 4.3.2 Analytical Sensitivity and Blanks

Laboratory QA/QC procedures and post-analysis data validation assist in producing data of acceptable quality and reliability. Eurofins is a certified laboratory in Iowa that performed QA/QC procedures, including analyzing laboratory method blanks in association with samples collected for the project, to check for contributions to the analytical results that could be attributable to laboratory-based contamination. No method blank detections were indicated in the May 2024 and 2025 laboratory analytical data sheets.

### 4.3.3 Accuracy

Laboratory analytical accuracy can be assessed by evaluating the constituent recoveries from continuing calibration verification (CCV), laboratory control sample (LCS), and LCS duplicate (LCSD). LCS/LCSD samples assessed the accuracy of analytical procedures by checking the ability to recover constituents added to clean aqueous matrices. In some cases, the laboratory spiked project samples as matrix spike (MS) and MS duplicate (MSD) samples to assess the ability to recover constituents from a matrix similar to that of project samples. The post-analysis data validation conducted by SCS confirmed that the laboratory had performed QA/QC on its laboratory control samples and provided recommendations on how to proceed with data that may have been compromised. No data indicated accuracy issues during this reporting period.

### 4.3.4 Precision

According to Practical Guide for Ground-Water Sampling, Barcelona et al, November 1985, prepared in cooperation with the Robert S. Kerr Environmental Research Laboratory and the United States Environmental Protection Agency's Environmental Monitoring System Laboratory:

> *"Duplicate sample values which differ by less than ±50% relative difference indicate good error control."*

A duplicate sample was collected during the sampling events to evaluate the precision of analytical measurements and the reproducibility of the sampling technique. Duplicate samples were chosen at random. The relative percent difference (RPD; difference between the sample and its field duplicate divided by the mean of the two) was calculated to evaluate the precision of the data. The RPD can be evaluated only if the results of the analyses for both duplicates are detected quantitatively (above the reporting limit).

The concentrations reported for the sample at monitoring point MW-8 and the duplicate sample MW-D during the May 2024 sampling event showed <50% relative difference for the analyzed constituents. This result indicates that a problem with sampling or analysis is unlikely to have occurred.

The concentrations reported for the sample at monitoring point MW-15 and the duplicate sample MW-D during the May 2025 sampling event showed <50% relative difference for the analyzed constituents. This result indicates that a problem with sampling or analysis is unlikely to have occurred.

### 4.3.5 Data Quality Summary

Based on the above QA/QC procedures and SCS's field sampling standard operating procedures (SOP), the groundwater samples collected during this reporting period are considered to be representative of site conditions at the locations and times they were obtained. Based on the QA review, no samples were rejected as unusable due to QC failures. The data validation checklists are in **Appendix B-2**, Data Validation Documentation. In general, the quality of the analytical data for this reporting period does not appear to have been compromised by analytical irregularities. Results affected by QC anomalies are qualified with the appropriate data flags, which are listed in the laboratory reports in **Appendix B-1**.

## 4.4 RECOMMENDATIONS FOR FUTURE MONITORING

In accordance with Permit Amendments #8 and #9, the recommended sampling schedule for the 2026-2027 reporting period is summarized in Table 5.

Table 5. 2026-2027 AWQR Reporting Period Sampling Schedule

| Monitoring Well | 2026 Sampling Event | 2027 Sampling Event |
|---|---|---|
| MW-1A | Beryllium, Cadmium, Cobalt, Nickel, TSS | |
| MW-2A | Beryllium, Cadmium, Cobalt, Nickel, TSS | |
| MW-8 | | Beryllium, Cadmium, Cobalt, Nickel, TSS |
| MW-12 | Beryllium, Cadmium, Cobalt, Nickel, TSS | |
| MW-15 | | Beryllium, Cadmium, Cobalt, Nickel, TSS |

TSS: Total Suspended Solids

The groundwater quality at the Original/C&D and Meinders/Hartog MSWLF units is generally stable, indicating that the closed MSWLF units likely no longer pose a significant risk to human health and the environment from groundwater impacts associated with the waste in the MSWLF units.

# 5.0 GENERAL COMMENTS

The analysis and opinions expressed in this report are based upon data obtained from the samples collected at the indicated locations and from any other information discussed in this report. This report does not reflect any variation in subsurface stratigraphy, hydrogeology, or chemical concentrations that may occur between sampling locations or across the site. Actual subsurface conditions may vary and may not become evident without further exploration.

SCS has prepared this report for the exclusive use of our client for the specific application to the project discussed. No warranty is expressly stated or implied in this report. SCS has relied upon information furnished by others as noted in the report, and SCS accepts no responsibility for any deficiency, misstatements, or inaccuracy in this report as a result of misstatements, omissions, misrepresentations, fraudulent, or inaccurate information or data provided by others.

# 6.0 REFERENCES


1. Terracon Environmental, Inc. *Hydrogeological Assessment Report, Mahaska County Sanitary Landfill*, *Original, C&D, and Meinders Site.* March 1994 (Doc #27460)
2. Terracon Consultants, Inc. *Alternative Source Demonstration Report.* April 29, 2016 (Doc #86132)
3. Terracon Consultants, Inc. *2020 Annual Water Quality Report, Mahaska County Sanitary Landfill, Original/C&D and Meinders/Hartog Sites.* November 2020. (Doc #99000)
4. SCS Engineers. *2023 Annual Water Quality Report, Mahaska County Sanitary Landfill, Original/C&D and Meinders/Hartog MSWLF Units.* October 2023. (Doc #108129)

# APPENDIX A

## Field Sampling Forms

# FORM FOR GROUNDWATER SAMPLING

| | | | |
|---|---|---|---|
| Project: | **Mahaska County Sanitary Landfill - Closed** | | |
| Monitoring Well/Piezometer ID: | **MW-1A** | Date: | **5/15/2024** |
| Gradient: | Up | Sampler: | Konner Roth |

| **A. MW/PIEZOMETER CONDITIONS** | |
|---|---|
| Well/Piezometer Capped? | Yes |
| Litter/Standing Water? | No |

| **B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)** | |
|---|---|
| Measured Well Total Depth (feet): | 43.4 |
| Initial Static Water Level (feet): | 12.00 |
| Initial Groundwater Elevation (ft-amsl): | 759.35 |
| Equipment Used: | Dedicated Tubing – Peristaltic Pump |

**C. WELL PURGING**

**FIELD PARAMETERS** [stabilization criteria] RECORD EVERY 3 MINUTES

| Time | Temperature (°C) 10% | Dissolved Oxygen (mg/L) | Specific Conductivity (µS/cm) +/- 10% | pH (S.U.) +/- 0.1 | ORP (mV) | Turbidity (FNU) | |
|---|---|---|---|---|---|---|---|
| 1:01 PM | Purging start time. | | | | | | |
| 1:04 PM | 14.1 | 0.6 | 1858.2 | 7.45 | -78.8 | 155.1 | |
| 1:07 PM | 13.8 | 0.1 | 1887.0 | 7.62 | -104.7 | 113.3 | |
| 1:10 PM | 14.0 | <0.1 | 1882.0 | 7.69 | -121.4 | 86.2 | |
| 1:13 PM | 13.8 | <0.1 | 1888.2 | 7.78 | -137.5 | 71.2 | |
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| | Parameters stabilized, sample collected. | | | | | | |

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|---|---|
| Quantity of Water Removed from Well (liters): | 2.1 |
| Was well pumped/bailed dry? | No |
| Total Amount of Time Purged (minutes:seconds): | 12:00 |
| Average Purge Rate (mL/min): | 175.00 |

| **D. WELL MAINTENANCE** | | |
|---|---|---|
| Does the well require any future maintenance? | No | |
| If yes, explain: | | |

| | |
|---|---|
| Additional Comments: | Color-Bown/black particles Odor-None |

# FORM FOR GROUNDWATER SAMPLING

| | | | |
|---|---|---|---|
| Project: | **Mahaska County Sanitary Landfill - Closed** | | |
| Monitoring Well/Piezometer ID: | **MW-2A** | Date: | **5/15/2024** |
| Gradient: | Down | Sampler: | Konner Roth |

| **A. MW/PIEZOMETER CONDITIONS** | |
|---|---|
| Well/Piezometer Capped? | Yes |
| Litter/Standing Water? | No |

| **B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)** | |
|---|---|
| Measured Well Total Depth (feet): | 39.5 |
| Initial Static Water Level (feet): | 8.79 |
| Initial Groundwater Elevation (ft-amsl): | 703.68 |
| Equipment Used: | Dedicated Tubing – Peristaltic Pump |

**C. WELL PURGING**

**FIELD PARAMETERS** [stabilization criteria] RECORD EVERY 3 MINUTES

| Time | Temperature (°C) 10% | Dissolved Oxygen (mg/L) | Specific Conductivity (µS/cm) +/- 10% | pH (S.U.) +/- 0.1 | ORP (mV) | Turbidity (FNU) | |
|---|---|---|---|---|---|---|---|
| 11:47 AM | Purging start time. | | | | | | |
| 11:50 AM | 13.0 | 1.3 | 2033.2 | 3.91 | 168.2 | 45.9 | |
| 11:53 AM | 12.7 | 0.2 | 2034.0 | 3.96 | 159.1 | 26.8 | |
| 11:56 AM | 12.6 | <0.1 | 2038.8 | 3.98 | 156.0 | 20.6 | |
| 11:59 AM | 12.6 | <0.1 | 2036.1 | 3.99 | 154.0 | 18.4 | |
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| | Parameters stabilized, sample collected. | | | | | | |

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|---|---|
| Quantity of Water Removed from Well (liters): | 2.2 |
| Was well pumped/bailed dry? | No |
| Total Amount of Time Purged (minutes:seconds): | 12:00 |
| Average Purge Rate (mL/min): | 183.33 |

**D. WELL MAINTENANCE**

| | | |
|---|---|---|
| Does the well require any future maintenance? | No | |
| If yes, explain: | | |

| | |
|---|---|
| Additional Comments: | Color-Cloudy Odor-Sulfur |

# FORM FOR GROUNDWATER SAMPLING

| | | | |
|---|---|---|---|
| Project: | **Mahaska County Sanitary Landfill - Closed** | | |
| Monitoring Well/Piezometer ID: | **MW-8** | Date: | **5/15/2024** |
| Gradient: | Down | Sampler: | Konner Roth |

| **A. MW/PIEZOMETER CONDITIONS** | |
|---|---|
| Well/Piezometer Capped? | Yes |
| Litter/Standing Water? | No |

| **B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)** | |
|---|---|
| Measured Well Total Depth (feet): | 27.3 |
| Initial Static Water Level (feet): | 8.68 |
| Initial Groundwater Elevation (ft-amsl): | 691.59 |
| Equipment Used: | Dedicated Tubing – Peristaltic Pump |

**C. WELL PURGING**

**FIELD PARAMETERS** [stabilization criteria] RECORD EVERY 3 MINUTES

| Time | Temperature (°C) 10% | Dissolved Oxygen (mg/L) | Specific Conductivity (µS/cm) +/- 10% | pH (S.U.) +/- 0.1 | ORP (mV) | Turbidity (FNU) | |
|---|---|---|---|---|---|---|---|
| 10:07 AM | Purging start time. | | | | | | |
| 10:10 AM | 12.0 | 1.9 | 1692.5 | 3.72 | 237.9 | 3.8 | |
| 10:13 AM | 12.0 | 1.4 | 1636.9 | 3.73 | 249.7 | 3.9 | |
| 10:16 AM | 11.9 | 1.3 | 1592.0 | 3.72 | 258.7 | 4.8 | |
| 10:19 AM | 11.6 | 1.2 | 1571.8 | 3.71 | 265.8 | 5.6 | |
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| | Parameters stabilized, sample collected. | | | | | | |

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|---|---|
| Quantity of Water Removed from Well (liters): | 2.1 |
| Was well pumped/bailed dry? | No |
| Total Amount of Time Purged (minutes:seconds): | 12:00 |
| Average Purge Rate (mL/min): | 175.00 |

**D. WELL MAINTENANCE**

| | | |
|---|---|---|
| Does the well require any future maintenance? | No | |
| If yes, explain: | | |

| | |
|---|---|
| Additional Comments: | Color-Clear Odor-None |

# FORM FOR GROUNDWATER SAMPLING

| | | | |
|---|---|---|---|
| Project: | **Mahaska County Sanitary Landfill - Closed** | | |
| Monitoring Well/Piezometer ID: | **MW-12** | Date: | **5/15/2024** |
| Gradient: | Down | Sampler: | Konner Roth |

| **A. MW/PIEZOMETER CONDITIONS** | |
|---|---|
| Well/Piezometer Capped? | Yes |
| Litter/Standing Water? | No |

| **B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)** | |
|---|---|
| Measured Well Total Depth (feet): | 20.2 |
| Initial Static Water Level (feet): | 4.01 |
| Initial Groundwater Elevation (ft-amsl): | 711.45 |
| Equipment Used: | Dedicated Tubing – Peristaltic Pump |

**C. WELL PURGING**

**FIELD PARAMETERS** [stabilization criteria] RECORD EVERY 3 MINUTES

| Time | Temperature (°C) 10% | Dissolved Oxygen (mg/L) | Specific Conductivity (µS/cm) +/- 10% | pH (S.U.) +/- 0.1 | ORP (mV) | Turbidity (FNU) | |
|---|---|---|---|---|---|---|---|
| 12:26 PM | Purging start time. | | | | | | |
| 12:29 PM | 13.7 | 1.0 | 2049.6 | 5.75 | 84.1 | 5.5 | |
| 12:32 PM | 14.0 | 0.2 | 2040.1 | 5.78 | 82.9 | 5.6 | |
| 12:35 PM | 14.2 | <0.1 | 2042.1 | 5.78 | 86.5 | 7.1 | |
| 12:38 PM | 14.0 | <0.1 | 2041.8 | 5.78 | 90.0 | 7.8 | |
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| | Parameters stabilized, sample collected. | | | | | | |

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|---|---|
| Quantity of Water Removed from Well (liters): | 2.0 |
| Was well pumped/bailed dry? | No |
| Total Amount of Time Purged (minutes:seconds): | 12:00 |
| Average Purge Rate (mL/min): | 166.67 |

| **D. WELL MAINTENANCE** | | |
|---|---|---|
| Does the well require any future maintenance? | No | |
| If yes, explain: | | |

| | |
|---|---|
| Additional Comments: | Color-Clear Odor-None |

# FORM FOR GROUNDWATER SAMPLING

| | | | |
|---|---|---|---|
| Project: | **Mahaska County Sanitary Landfill - Closed** | | |
| Monitoring Well/Piezometer ID: | **MW-15** | Date: | **5/15/2024** |
| Gradient: | Down | Sampler: | Konner Roth |

| **A. MW/PIEZOMETER CONDITIONS** | |
|---|---|
| Well/Piezometer Capped? | Yes |
| Litter/Standing Water? | No |

| **B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)** | |
|---|---|
| Measured Well Total Depth (feet): | 28.8 |
| Initial Static Water Level (feet): | 19.23 |
| Initial Groundwater Elevation (ft-amsl): | 713.78 |
| Equipment Used: | Dedicated Tubing – Peristaltic Pump |

**C. WELL PURGING**

**FIELD PARAMETERS** [stabilization criteria] RECORD EVERY 3 MINUTES

| Time | Temperature (°C) 10% | Dissolved Oxygen (mg/L) | Specific Conductivity (µS/cm) +/- 10% | pH (S.U.) +/- 0.1 | ORP (mV) | Turbidity (FNU) | |
|---|---|---|---|---|---|---|---|
| 9:23 AM | Purging start time. | | | | | | |
| 9:26 AM | 15.2 | 0.5 | 4633.0 | 4.72 | 157.2 | 24.6 | |
| 9:29 AM | 15.1 | 0.1 | 4604.9 | 4.79 | 138.2 | 18.6 | |
| 9:32 AM | 15.1 | <0.1 | 4601.9 | 4.80 | 131.3 | 11.9 | |
| 9:35 AM | 15.0 | <0.1 | 4587.9 | 4.81 | 127.8 | 8.9 | |
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| | Parameters stabilized, sample collected. | | | | | | |

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|---|---|
| Quantity of Water Removed from Well (liters): | 1.7 |
| Was well pumped/bailed dry? | No |
| Total Amount of Time Purged (minutes:seconds): | 12:00 |
| Average Purge Rate (mL/min): | 141.67 |

**D. WELL MAINTENANCE**

| | | |
|---|---|---|
| Does the well require any future maintenance? | No | |
| If yes, explain: | | |

| | |
|---|---|
| Additional Comments: | Color-Yellow tint Odor-None |

# FORM FOR GROUNDWATER SAMPLING

| | | | |
|---|---|---|---|
| Project: | **Mahaska County Sanitary Landfill - Closed** | | |
| Monitoring Well/Piezometer ID: | **MW-8** | Date: | **5/22/2025** |
| Gradient: | Down | Sampler: | Garrett Horak |

| **A. MW/PIEZOMETER CONDITIONS** | | |
|---|---|---|
| Well/Piezometer Capped? | Yes | |
| Litter/Standing Water? | No | |

| **B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)** | |
|---|---|
| Measured Well Total Depth (feet): | 27.4 |
| Initial Static Water Level (feet): | 8.20 |
| Initial Groundwater Elevation (ft-amsl): | 692.07 |
| Equipment Used: | Dedicated Tubing – Peristaltic Pump |

**C. WELL PURGING**

**FIELD PARAMETERS** [stabilization criteria] RECORD EVERY 3 MINUTES

| Time | **Temperature (°C) 10%** | Dissolved Oxygen (mg/L) | **Specific Conductivity (µS/cm) +/- 10%** | **pH (S.U.) +/- 0.1** | ORP (mV) | Turbidity (FNU) | |
|---|---|---|---|---|---|---|---|
| 11:07 AM | Purging start time. | | | | | | |
| 11:10 AM | 12.5 | 1.1 | 555.4 | 6.56 | 40.1 | 21.3 | |
| 11:13 AM | 12.7 | 1.1 | 707.6 | 6.47 | 54.7 | 30.3 | |
| 11:16 AM | 12.6 | 1.0 | 1030.5 | 6.28 | 84.3 | 57.0 | |
| 11:19 AM | 14.9 | 7.6 | 3539.8 | 5.21 | 140.1 | 207.9 | |
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| | Parameters stabilized, sample collected. | | | | | | |

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|---|---|
| Quantity of Water Removed from Well (liters): | 1.7 |
| Was well pumped/bailed dry? | No |
| Total Amount of Time Purged (minutes:seconds): | 12:00 |
| Average Purge Rate (mL/min): | 141.67 |

**D. WELL MAINTENANCE**

| | | |
|---|---|---|
| Does the well require any future maintenance? | No | |
| If yes, explain: | | |

| | |
|---|---|
| Additional Comments: | Color: Clear<br>Odor: None |

# FORM FOR GROUNDWATER SAMPLING

| | | | |
|---|---|---|---|
| Project: | **Mahaska County Sanitary Landfill - Closed** | | |
| Monitoring Well/Piezometer ID: | **MW-15** | Date: | **5/22/2025** |
| Gradient: | Down | Sampler: | Garrett Horak |

| **A. MW/PIEZOMETER CONDITIONS** | |
|---|---|
| Well/Piezometer Capped? | Yes |
| Litter/Standing Water? | No |

| **B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)** | |
|---|---|
| Measured Well Total Depth (feet): | 28.9 |
| Initial Static Water Level (feet): | 19.05 |
| Initial Groundwater Elevation (ft-amsl): | 713.96 |
| Equipment Used: | Dedicated Tubing – Peristaltic Pump |

**C. WELL PURGING**

**FIELD PARAMETERS** [stabilization criteria] RECORD EVERY 3 MINUTES

| Time | **Temperature (°C) 10%** | Dissolved Oxygen (mg/L) | **Specific Conductivity (µS/cm) +/- 10%** | **pH (S.U.) +/- 0.1** | ORP (mV) | Turbidity (FNU) | |
|---|---|---|---|---|---|---|---|
| 9:47 AM | Purging start time. | | | | | | |
| 9:50 AM | 10.9 | 0.5 | 3014.7 | 3.43 | 273.6 | 3.5 | |
| 9:53 AM | 11.0 | 1.1 | 2964.8 | 3.58 | 231.5 | 8.3 | |
| 9:56 AM | 13.8 | 7.2 | 525.2 | 6.81 | 53.5 | 32.7 | |
| 9:59 AM | 12.5 | 0.5 | 501.6 | 6.59 | 23.7 | 13.3 | |
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| | Parameters stabilized, sample collected. | | | | | | |

| | |
|---|---|
| Quantity of Water Removed from Well (liters): | 1.9 |
| Was well pumped/bailed dry? | No |
| Total Amount of Time Purged (minutes:seconds): | 12:00 |
| Average Purge Rate (mL/min): | 158.33 |

**D. WELL MAINTENANCE**

| | | |
|---|---|---|
| Does the well require any future maintenance? | No | |
| If yes, explain: | | |

| | |
|---|---|
| Additional Comments: | Color: Clear<br>Odor: None |

# APPENDIX B-1

## Laboratory Analytical Data Sheets

eurofins | Environment Testing

1 2 3 4 5 6 7 8 9 10 11 12 13 14

# ANALYTICAL REPORT

## PREPARED FOR

Attn: Nathan Ohrt
SCS Engineers
1690 All State Court
Suite 100
West Des Moines, Iowa 50265

Generated 5/30/2024 2:33:57 PM

## JOB DESCRIPTION

Mahaska Co LF Closed Units 1st 2024 HMSP

## JOB NUMBER

310-281475-1

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

Generated
5/30/2024 2:33:57 PM

Authorized for release by
Mary Yang, Project Management Assistant I
Mary.Yang@ET.EurofinsUS.com
(319)277-2401

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## Job ID: 310-281475-1 Eurofins Cedar Falls

**Job Narrative**
**310-281475-1**

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 5/16/2024 4:15 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 0.9°C.

**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: SCS Engineers
Job ID: 310-281475-1
Project/Site: Mahaska Co LF Closed Units 1st 2024 HMSP

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---|---|---|---|---|
| 310-281475-1 | MW-1A | Water | 05/15/24 13:22 | 05/16/24 16:15 |
| 310-281475-2 | MW-2A | Water | 05/15/24 12:09 | 05/16/24 16:15 |
| 310-281475-3 | MW-8 | Water | 05/15/24 10:38 | 05/16/24 16:15 |
| 310-281475-4 | MW-12 | Water | 05/15/24 12:47 | 05/16/24 16:15 |
| 310-281475-5 | MW-15 | Water | 05/15/24 09:45 | 05/16/24 16:15 |
| 310-281475-6 | MW-D | Water | 05/15/24 10:38 | 05/16/24 16:15 |

# Detection Summary

Client: SCS Engineers
Job ID: 310-281475-1
Project/Site: Mahaska Co LF Closed Units 1st 2024 HMSP

## Client Sample ID: MW-1A — Lab Sample ID: 310-281475-1

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | 0.00102 | | 0.00100 | 0.000330 | mg/L | 1 | | 6020B | Total/NA |
| Cadmium | 0.000362 | | 0.000200 | 0.000100 | mg/L | 1 | | 6020B | Total/NA |
| Cobalt | 0.00328 | | 0.000500 | 0.000170 | mg/L | 1 | | 6020B | Total/NA |
| Nickel | 0.0188 | | 0.00500 | 0.00210 | mg/L | 1 | | 6020B | Total/NA |
| Total Suspended Solids | 80.0 | | 15.0 | 11.1 | mg/L | 1 | | I-3765-85 | Total/NA |

## Client Sample ID: MW-2A — Lab Sample ID: 310-281475-2

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | 0.0219 | | 0.00100 | 0.000330 | mg/L | 1 | | 6020B | Total/NA |
| Cadmium | 0.00110 | | 0.000200 | 0.000100 | mg/L | 1 | | 6020B | Total/NA |
| Cobalt | 0.433 | | 0.000500 | 0.000170 | mg/L | 1 | | 6020B | Total/NA |
| Nickel | 1.22 | | 0.00500 | 0.00210 | mg/L | 1 | | 6020B | Total/NA |
| Total Suspended Solids | 24.9 | | 1.88 | 1.39 | mg/L | 1 | | I-3765-85 | Total/NA |

## Client Sample ID: MW-8 — Lab Sample ID: 310-281475-3

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | 0.00405 | | 0.00100 | 0.000330 | mg/L | 1 | | 6020B | Total/NA |
| Cadmium | 0.00110 | | 0.000200 | 0.000100 | mg/L | 1 | | 6020B | Total/NA |
| Cobalt | 0.0302 | | 0.000500 | 0.000170 | mg/L | 1 | | 6020B | Total/NA |
| Nickel | 0.138 | | 0.00500 | 0.00210 | mg/L | 1 | | 6020B | Total/NA |

## Client Sample ID: MW-12 — Lab Sample ID: 310-281475-4

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Cadmium | 0.0106 | | 0.000200 | 0.000100 | mg/L | 1 | | 6020B | Total/NA |
| Cobalt | 0.139 | | 0.000500 | 0.000170 | mg/L | 1 | | 6020B | Total/NA |
| Nickel | 0.215 | | 0.00500 | 0.00210 | mg/L | 1 | | 6020B | Total/NA |
| Total Suspended Solids | 2.38 | | 1.88 | 1.39 | mg/L | 1 | | I-3765-85 | Total/NA |

## Client Sample ID: MW-15 — Lab Sample ID: 310-281475-5

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | 0.00308 | | 0.00100 | 0.000330 | mg/L | 1 | | 6020B | Total/NA |
| Cadmium | 0.0349 | | 0.000200 | 0.000100 | mg/L | 1 | | 6020B | Total/NA |
| Cobalt | 0.569 | | 0.000500 | 0.000170 | mg/L | 1 | | 6020B | Total/NA |
| Nickel | 1.34 | | 0.00500 | 0.00210 | mg/L | 1 | | 6020B | Total/NA |
| Total Suspended Solids | 18.0 | | 7.50 | 5.55 | mg/L | 1 | | I-3765-85 | Total/NA |

## Client Sample ID: MW-D — Lab Sample ID: 310-281475-6

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | 0.00413 | | 0.00100 | 0.000330 | mg/L | 1 | | 6020B | Total/NA |
| Cadmium | 0.00118 | | 0.000200 | 0.000100 | mg/L | 1 | | 6020B | Total/NA |
| Cobalt | 0.0303 | | 0.000500 | 0.000170 | mg/L | 1 | | 6020B | Total/NA |
| Nickel | 0.136 | | 0.00500 | 0.00210 | mg/L | 1 | | 6020B | Total/NA |
| Total Suspended Solids | 46.0 | | 5.00 | 3.70 | mg/L | 1 | | I-3765-85 | Total/NA |

This Detection Summary does not include radiochemical test results.

Client: SCS Engineers
Job ID: 310-281475-1
Project/Site: Mahaska Co LF Closed Units 1st 2024 HMSP

**Client Sample ID: MW-1A**
**Lab Sample ID: 310-281475-1**
**Date Collected: 05/15/24 13:22**
**Matrix: Water**
**Date Received: 05/16/24 16:15**

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | 0.00102 | | 0.00100 | 0.000330 | mg/L | | 05/20/24 09:30 | 05/29/24 16:26 | 1 |
| Cadmium | 0.000362 | | 0.000200 | 0.000100 | mg/L | | 05/20/24 09:30 | 05/24/24 21:18 | 1 |
| Cobalt | 0.00328 | | 0.000500 | 0.000170 | mg/L | | 05/20/24 09:30 | 05/24/24 21:18 | 1 |
| Nickel | 0.0188 | | 0.00500 | 0.00210 | mg/L | | 05/20/24 09:30 | 05/24/24 21:18 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Total Suspended Solids (USGS I-3765-85) | 80.0 | | 15.0 | 11.1 | mg/L | | | 05/20/24 13:20 | 1 |

Client: SCS Engineers
Job ID: 310-281475-1
Project/Site: Mahaska Co LF Closed Units 1st 2024 HMSP

**Client Sample ID: MW-2A**
**Lab Sample ID: 310-281475-2**
**Date Collected: 05/15/24 12:09**
**Matrix: Water**
**Date Received: 05/16/24 16:15**

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | 0.0219 | | 0.00100 | 0.000330 | mg/L | | 05/20/24 09:30 | 05/29/24 16:36 | 1 |
| Cadmium | 0.00110 | | 0.000200 | 0.000100 | mg/L | | 05/20/24 09:30 | 05/24/24 21:29 | 1 |
| Cobalt | 0.433 | | 0.000500 | 0.000170 | mg/L | | 05/20/24 09:30 | 05/24/24 21:29 | 1 |
| Nickel | 1.22 | | 0.00500 | 0.00210 | mg/L | | 05/20/24 09:30 | 05/24/24 21:29 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Total Suspended Solids (USGS I-3765-85) | 24.9 | | 1.88 | 1.39 | mg/L | | | 05/20/24 13:20 | 1 |

# Client Sample Results

Client: SCS Engineers
Job ID: 310-281475-1
Project/Site: Mahaska Co LF Closed Units 1st 2024 HMSP

**Client Sample ID: MW-8**
**Lab Sample ID: 310-281475-3**
**Date Collected: 05/15/24 10:38**
**Matrix: Water**
**Date Received: 05/16/24 16:15**

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | 0.00405 | | 0.00100 | 0.000330 | mg/L | | 05/20/24 09:30 | 05/29/24 16:40 | 1 |
| Cadmium | 0.00110 | | 0.000200 | 0.000100 | mg/L | | 05/20/24 09:30 | 05/24/24 21:31 | 1 |
| Cobalt | 0.0302 | | 0.000500 | 0.000170 | mg/L | | 05/20/24 09:30 | 05/24/24 21:31 | 1 |
| Nickel | 0.138 | | 0.00500 | 0.00210 | mg/L | | 05/20/24 09:30 | 05/24/24 21:31 | 1 |

## General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Total Suspended Solids (USGS I-3765-85) | <1.88 | | 1.88 | 1.39 | mg/L | | | 05/20/24 13:20 | 1 |

# Client Sample Results

Client: SCS Engineers
Job ID: 310-281475-1
Project/Site: Mahaska Co LF Closed Units 1st 2024 HMSP

## Client Sample ID: MW-12
**Lab Sample ID: 310-281475-4**

**Date Collected: 05/15/24 12:47**
**Matrix: Water**

**Date Received: 05/16/24 16:15**

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | <0.00100 | | 0.00100 | 0.000330 | mg/L | | 05/20/24 09:30 | 05/29/24 16:43 | 1 |
| **Cadmium** | **0.0106** | | 0.000200 | 0.000100 | mg/L | | 05/20/24 09:30 | 05/24/24 21:34 | 1 |
| **Cobalt** | **0.139** | | 0.000500 | 0.000170 | mg/L | | 05/20/24 09:30 | 05/24/24 21:34 | 1 |
| **Nickel** | **0.215** | | 0.00500 | 0.00210 | mg/L | | 05/20/24 09:30 | 05/24/24 21:34 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| **Total Suspended Solids (USGS I-3765-85)** | **2.38** | | 1.88 | 1.39 | mg/L | | | 05/20/24 13:20 | 1 |

Client: SCS Engineers
Job ID: 310-281475-1
Project/Site: Mahaska Co LF Closed Units 1st 2024 HMSP

**Client Sample ID: MW-15**
**Lab Sample ID: 310-281475-5**
**Date Collected: 05/15/24 09:45**
**Matrix: Water**
**Date Received: 05/16/24 16:15**

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | 0.00308 | | 0.00100 | 0.000330 | mg/L | | 05/20/24 09:30 | 05/29/24 16:47 | 1 |
| Cadmium | 0.0349 | | 0.000200 | 0.000100 | mg/L | | 05/20/24 09:30 | 05/24/24 21:36 | 1 |
| Cobalt | 0.569 | | 0.000500 | 0.000170 | mg/L | | 05/20/24 09:30 | 05/24/24 21:36 | 1 |
| Nickel | 1.34 | | 0.00500 | 0.00210 | mg/L | | 05/20/24 09:30 | 05/24/24 21:36 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Total Suspended Solids (USGS I-3765-85) | 18.0 | | 7.50 | 5.55 | mg/L | | | 05/20/24 13:20 | 1 |

Client: SCS Engineers
Job ID: 310-281475-1
Project/Site: Mahaska Co LF Closed Units 1st 2024 HMSP

**Client Sample ID: MW-D**
**Lab Sample ID: 310-281475-6**
**Date Collected: 05/15/24 10:38**
**Matrix: Water**
**Date Received: 05/16/24 16:15**

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | 0.00413 | | 0.00100 | 0.000330 | mg/L | | 05/20/24 09:30 | 05/29/24 16:50 | 1 |
| Cadmium | 0.00118 | | 0.000200 | 0.000100 | mg/L | | 05/20/24 09:30 | 05/24/24 21:47 | 1 |
| Cobalt | 0.0303 | | 0.000500 | 0.000170 | mg/L | | 05/20/24 09:30 | 05/24/24 21:47 | 1 |
| Nickel | 0.136 | | 0.00500 | 0.00210 | mg/L | | 05/20/24 09:30 | 05/24/24 21:47 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Total Suspended Solids (USGS I-3765-85) | 46.0 | | 5.00 | 3.70 | mg/L | | | 05/20/24 13:20 | 1 |

## 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: 6020B - Metals (ICP/MS)

**Lab Sample ID: MB 310-422060/1-A**
**Client Sample ID: Method Blank**
**Matrix: Water**
**Prep Type: Total/NA**
**Analysis Batch: 422792**
**Prep Batch: 422060**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | <0.00100 | | 0.00100 | 0.000330 | mg/L | | 05/20/24 09:30 | 05/24/24 21:05 | 1 |
| Cadmium | <0.000200 | | 0.000200 | 0.000100 | mg/L | | 05/20/24 09:30 | 05/24/24 21:05 | 1 |
| Cobalt | <0.000500 | | 0.000500 | 0.000170 | mg/L | | 05/20/24 09:30 | 05/24/24 21:05 | 1 |
| Nickel | <0.00500 | | 0.00500 | 0.00210 | mg/L | | 05/20/24 09:30 | 05/24/24 21:05 | 1 |

**Lab Sample ID: LCS 310-422060/2-A**
**Client Sample ID: Lab Control Sample**
**Matrix: Water**
**Prep Type: Total/NA**
**Analysis Batch: 422792**
**Prep Batch: 422060**

| Analyte | | | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cadmium | | | 0.100 | 0.09772 | | mg/L | | 98 | 80 - 120 | | |
| Cobalt | | | 0.100 | 0.09697 | | mg/L | | 97 | 80 - 120 | | |
| Nickel | | | 0.200 | 0.2023 | | mg/L | | 101 | 80 - 120 | | |

**Lab Sample ID: LCS 310-422060/2-A**
**Client Sample ID: Lab Control Sample**
**Matrix: Water**
**Prep Type: Total/NA**
**Analysis Batch: 423058**
**Prep Batch: 422060**

| Analyte | | | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Beryllium | | | 0.100 | 0.09697 | | mg/L | | 97 | 80 - 120 | | |

**Lab Sample ID: 310-281475-1 MS**
**Client Sample ID: MW-1A**
**Matrix: Water**
**Prep Type: Total/NA**
**Analysis Batch: 422792**
**Prep Batch: 422060**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec Limits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cadmium | 0.000362 | | 0.100 | 0.09418 | | mg/L | | 94 | 75 - 125 | | |
| Cobalt | 0.00328 | | 0.100 | 0.09965 | | mg/L | | 96 | 75 - 125 | | |
| Nickel | 0.0188 | | 0.200 | 0.2226 | | mg/L | | 102 | 75 - 125 | | |

**Lab Sample ID: 310-281475-1 MS**
**Client Sample ID: MW-1A**
**Matrix: Water**
**Prep Type: Total/NA**
**Analysis Batch: 423058**
**Prep Batch: 422060**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MS Result | MS Qualifier | Unit | D | %Rec | %Rec Limits | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Beryllium | 0.00102 | | 0.100 | 0.1019 | | mg/L | | 101 | 75 - 125 | | |

**Lab Sample ID: 310-281475-1 MSD**
**Client Sample ID: MW-1A**
**Matrix: Water**
**Prep Type: Total/NA**
**Analysis Batch: 422792**
**Prep Batch: 422060**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cadmium | 0.000362 | | 0.100 | 0.09635 | | mg/L | | 96 | 75 - 125 | 2 | 20 |
| Cobalt | 0.00328 | | 0.100 | 0.1001 | | mg/L | | 97 | 75 - 125 | 0 | 20 |
| Nickel | 0.0188 | | 0.200 | 0.2239 | | mg/L | | 103 | 75 - 125 | 1 | 20 |

## Method: 6020B - Metals (ICP/MS) (Continued)

**Lab Sample ID: 310-281475-1 MSD** — **Client Sample ID: MW-1A**
**Matrix: Water** — **Prep Type: Total/NA**
**Analysis Batch: 423058** — **Prep Batch: 422060**

| Analyte | Sample Result | Sample Qualifier | Spike Added | MSD Result | MSD Qualifier | Unit | D | %Rec | %Rec Limits | RPD | RPD Limit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Beryllium | 0.00102 | | 0.100 | 0.1017 | | mg/L | | 101 | 75 - 125 | 0 | 20 |

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

**Lab Sample ID: MB 310-422220/1** — **Client Sample ID: Method Blank**
**Matrix: Water** — **Prep Type: Total/NA**
**Analysis Batch: 422220**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Total Suspended Solids | <5.00 | | 5.00 | 3.70 | mg/L | | | 05/20/24 13:20 | 1 |

**Lab Sample ID: LCS 310-422220/2** — **Client Sample ID: Lab Control Sample**
**Matrix: Water** — **Prep Type: Total/NA**
**Analysis Batch: 422220**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Total Suspended Solids | 100 | 97.00 | | mg/L | | 97 | 81 - 116 |

## Metals

### Prep Batch: 422060

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-281475-1 | MW-1A | Total/NA | Water | 3005A | |
| 310-281475-2 | MW-2A | Total/NA | Water | 3005A | |
| 310-281475-3 | MW-8 | Total/NA | Water | 3005A | |
| 310-281475-4 | MW-12 | Total/NA | Water | 3005A | |
| 310-281475-5 | MW-15 | Total/NA | Water | 3005A | |
| 310-281475-6 | MW-D | Total/NA | Water | 3005A | |
| MB 310-422060/1-A | Method Blank | Total/NA | Water | 3005A | |
| LCS 310-422060/2-A | Lab Control Sample | Total/NA | Water | 3005A | |
| 310-281475-1 MS | MW-1A | Total/NA | Water | 3005A | |
| 310-281475-1 MSD | MW-1A | Total/NA | Water | 3005A | |

### Analysis Batch: 422792

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-281475-1 | MW-1A | Total/NA | Water | 6020B | 422060 |
| 310-281475-2 | MW-2A | Total/NA | Water | 6020B | 422060 |
| 310-281475-3 | MW-8 | Total/NA | Water | 6020B | 422060 |
| 310-281475-4 | MW-12 | Total/NA | Water | 6020B | 422060 |
| 310-281475-5 | MW-15 | Total/NA | Water | 6020B | 422060 |
| 310-281475-6 | MW-D | Total/NA | Water | 6020B | 422060 |
| MB 310-422060/1-A | Method Blank | Total/NA | Water | 6020B | 422060 |
| LCS 310-422060/2-A | Lab Control Sample | Total/NA | Water | 6020B | 422060 |
| 310-281475-1 MS | MW-1A | Total/NA | Water | 6020B | 422060 |
| 310-281475-1 MSD | MW-1A | Total/NA | Water | 6020B | 422060 |

### Analysis Batch: 423058

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-281475-1 | MW-1A | Total/NA | Water | 6020B | 422060 |
| 310-281475-2 | MW-2A | Total/NA | Water | 6020B | 422060 |
| 310-281475-3 | MW-8 | Total/NA | Water | 6020B | 422060 |
| 310-281475-4 | MW-12 | Total/NA | Water | 6020B | 422060 |
| 310-281475-5 | MW-15 | Total/NA | Water | 6020B | 422060 |
| 310-281475-6 | MW-D | Total/NA | Water | 6020B | 422060 |
| LCS 310-422060/2-A | Lab Control Sample | Total/NA | Water | 6020B | 422060 |
| 310-281475-1 MS | MW-1A | Total/NA | Water | 6020B | 422060 |
| 310-281475-1 MSD | MW-1A | Total/NA | Water | 6020B | 422060 |

## General Chemistry

### Analysis Batch: 422220

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-281475-1 | MW-1A | Total/NA | Water | I-3765-85 | |
| 310-281475-2 | MW-2A | Total/NA | Water | I-3765-85 | |
| 310-281475-3 | MW-8 | Total/NA | Water | I-3765-85 | |
| 310-281475-4 | MW-12 | Total/NA | Water | I-3765-85 | |
| 310-281475-5 | MW-15 | Total/NA | Water | I-3765-85 | |
| 310-281475-6 | MW-D | Total/NA | Water | I-3765-85 | |
| MB 310-422220/1 | Method Blank | Total/NA | Water | I-3765-85 | |
| LCS 310-422220/2 | Lab Control Sample | Total/NA | Water | I-3765-85 | |

# Lab Chronicle

Client: SCS Engineers
Job ID: 310-281475-1
Project/Site: Mahaska Co LF Closed Units 1st 2024 HMSP

## Client Sample ID: MW-1A
**Lab Sample ID: 310-281475-1**
**Date Collected: 05/15/24 13:22**
**Matrix: Water**
**Date Received: 05/16/24 16:15**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3005A | | | 422060 | KM3E | EET CF | 05/20/24 09:30 |
| Total/NA | Analysis | 6020B | | 1 | 423058 | NFT2 | EET CF | 05/29/24 16:26 |
| Total/NA | Prep | 3005A | | | 422060 | KM3E | EET CF | 05/20/24 09:30 |
| Total/NA | Analysis | 6020B | | 1 | 422792 | NFT2 | EET CF | 05/24/24 21:18 |
| Total/NA | Analysis | I-3765-85 | | 1 | 422220 | HE7K | EET CF | 05/20/24 13:20 |

## Client Sample ID: MW-2A
**Lab Sample ID: 310-281475-2**
**Date Collected: 05/15/24 12:09**
**Matrix: Water**
**Date Received: 05/16/24 16:15**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3005A | | | 422060 | KM3E | EET CF | 05/20/24 09:30 |
| Total/NA | Analysis | 6020B | | 1 | 423058 | NFT2 | EET CF | 05/29/24 16:36 |
| Total/NA | Prep | 3005A | | | 422060 | KM3E | EET CF | 05/20/24 09:30 |
| Total/NA | Analysis | 6020B | | 1 | 422792 | NFT2 | EET CF | 05/24/24 21:29 |
| Total/NA | Analysis | I-3765-85 | | 1 | 422220 | HE7K | EET CF | 05/20/24 13:20 |

## Client Sample ID: MW-8
**Lab Sample ID: 310-281475-3**
**Date Collected: 05/15/24 10:38**
**Matrix: Water**
**Date Received: 05/16/24 16:15**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3005A | | | 422060 | KM3E | EET CF | 05/20/24 09:30 |
| Total/NA | Analysis | 6020B | | 1 | 423058 | NFT2 | EET CF | 05/29/24 16:40 |
| Total/NA | Prep | 3005A | | | 422060 | KM3E | EET CF | 05/20/24 09:30 |
| Total/NA | Analysis | 6020B | | 1 | 422792 | NFT2 | EET CF | 05/24/24 21:31 |
| Total/NA | Analysis | I-3765-85 | | 1 | 422220 | HE7K | EET CF | 05/20/24 13:20 |

## Client Sample ID: MW-12
**Lab Sample ID: 310-281475-4**
**Date Collected: 05/15/24 12:47**
**Matrix: Water**
**Date Received: 05/16/24 16:15**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3005A | | | 422060 | KM3E | EET CF | 05/20/24 09:30 |
| Total/NA | Analysis | 6020B | | 1 | 423058 | NFT2 | EET CF | 05/29/24 16:43 |
| Total/NA | Prep | 3005A | | | 422060 | KM3E | EET CF | 05/20/24 09:30 |
| Total/NA | Analysis | 6020B | | 1 | 422792 | NFT2 | EET CF | 05/24/24 21:34 |
| Total/NA | Analysis | I-3765-85 | | 1 | 422220 | HE7K | EET CF | 05/20/24 13:20 |

# Lab Chronicle

Client: SCS Engineers
Job ID: 310-281475-1
Project/Site: Mahaska Co LF Closed Units 1st 2024 HMSP

## Client Sample ID: MW-15
**Lab Sample ID: 310-281475-5**
**Date Collected: 05/15/24 09:45**
**Matrix: Water**
**Date Received: 05/16/24 16:15**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3005A | | | 422060 | KM3E | EET CF | 05/20/24 09:30 |
| Total/NA | Analysis | 6020B | | 1 | 423058 | NFT2 | EET CF | 05/29/24 16:47 |
| Total/NA | Prep | 3005A | | | 422060 | KM3E | EET CF | 05/20/24 09:30 |
| Total/NA | Analysis | 6020B | | 1 | 422792 | NFT2 | EET CF | 05/24/24 21:36 |
| Total/NA | Analysis | I-3765-85 | | 1 | 422220 | HE7K | EET CF | 05/20/24 13:20 |

## Client Sample ID: MW-D
**Lab Sample ID: 310-281475-6**
**Date Collected: 05/15/24 10:38**
**Matrix: Water**
**Date Received: 05/16/24 16:15**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3005A | | | 422060 | KM3E | EET CF | 05/20/24 09:30 |
| Total/NA | Analysis | 6020B | | 1 | 423058 | NFT2 | EET CF | 05/29/24 16:50 |
| Total/NA | Prep | 3005A | | | 422060 | KM3E | EET CF | 05/20/24 09:30 |
| Total/NA | Analysis | 6020B | | 1 | 422792 | NFT2 | EET CF | 05/24/24 21:47 |
| Total/NA | Analysis | I-3765-85 | | 1 | 422220 | HE7K | EET CF | 05/20/24 13:20 |

**Laboratory References:**

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

# Accreditation/Certification Summary

Client: SCS Engineers
Job ID: 310-281475-1
Project/Site: Mahaska Co LF Closed Units 1st 2024 HMSP

## Laboratory: Eurofins Cedar Falls

The accreditations/certifications listed below are applicable to this report.

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

# Method Summary

Client: SCS Engineers
Job ID: 310-281475-1
Project/Site: Mahaska Co LF Closed Units 1st 2024 HMSP

| Method | Method Description | Protocol | Laboratory |
|---|---|---|---|
| 6020B | Metals (ICP/MS) | SW846 | EET CF |
| I-3765-85 | Residue, Non-filterable (TSS) | USGS | EET CF |
| 3005A | Preparation, Total Metals | SW846 | EET CF |

**Protocol References:**

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

310-281475 Chain of Custody

## Cooler/Sample Receipt and Temperatur

**Client Information**

Client: SCS

City/State: CITY | STATE | Project:

**Receipt Information**

Date/Time Received: DATE 5-16-24 TIME 1615 | Received By: MC

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: X | 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): 0.9 | Corrected Temp (°C): 0.9

**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**

Eurofins TestAmerica, Cedar Falls
3019 Venture Way

Cedar Falls IA 50613-6907
phone 319 277 2401 fax 319 277 2425

# Chain of Custody Record

eurofins

Regulatory Program ☐ DW ☐ NPDES ☑ RCRA ☐ Other

TestAmerica Laboratories Inc d/b/a Eurofins TestAmerica

| Client Contact | Project Manager Nathan Ohrt | Site Contact: Joe Farris | Date | COC No 1 |
|---|---|---|---|---|
| Nathan Ohrt | Email nohrt@scsengineers com | Lab Contact. | Carrier | 1 of 1 COCs |
| SCS Engineers | Cell 319-331 9613 | | | Sampler |
| | Analysis Turnaround Time | | | For Lab Use Only |
| | ☐ CALENDAR DAYS ☐ WORKING DAYS | | | Walk in Client |
| | Other | | | Lab Sampling |
| Project Name 1st 2024 HMSP | ☐ 2 weeks | | | |
| Site Mahaska County Landfill Closed Units | ☐ 1 week | | | Job / SDG No |
| P O # | ☐ 2 days | | | |
| | ☐ 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) | Beryllium | Cadmium | Cobalt | Nickel | Total Suspended Solids | Sample Specific Notes |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-1A | 5/15/24 | 13:22 | G | W | | N | Y | X | X | X | X | X | |
| MW-2A | 5/15/24 | 12:09 | G | W | | N | Y | X | X | X | X | X | |
| MW-8 | 5/15/24 | 10:38 | G | W | | N | Y | X | X | X | X | X | |
| MW-12 | 5/15/24 | 12:47 | G | W | | N | Y | X | X | X | X | X | |
| MW-15 | 5/15/24 | 09:45 | G | W | | N | Y | X | X | X | X | X | |
| MW-D | 5/15/24 | 10:38 | G | W | | N | Y | X | X | X | X | X | |

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

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 |
|---|---|---|---|---|---|
| Cole Tesar | SCS | 5/16/24 14:00 | MV | | 5-16-24 1615 |
| Relinquished by | Company | Date/Time | Received by | Company | Date/Time |
| Relinquished by | Company | Date/Time | Received in Laboratory by | Company | Date/Time |

Form No CA-C-WI-002 Rev 4.23, dated 4/16/2019



5/30/2024

# Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-281475-1

**Login Number: 281475**

**List Source: Eurofins Cedar Falls**

**List Number: 1**

**Creator: Costello, Mackenzie K**

| 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 | |

eurofins | Environment Testing

1 2 3 4 5 6 7 8 9 10 11 12 13 14

# ANALYTICAL REPORT

## PREPARED FOR

Attn: Nathan Ohrt
SCS Engineers
1690 All State Court
Suite 100
West Des Moines, Iowa 50265

Generated 5/30/2025 12:58:53 PM

## JOB DESCRIPTION

1st 2025 C&D HMSP Sampling
Mahaska County Landfill, Closed Units

## JOB NUMBER

310-307182-1

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

Generated
5/30/2025 12:58:53 PM

Authorized for release by
Samuel Miller, Project Management Assistant I
Samuel.Miller@et.eurofinsus.com
(319)595-2008

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## Job ID: 310-307182-1 — Eurofins Cedar Falls

**Job Narrative**
**310-307182-1**

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 5/23/2025 4:45 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 -0.3°C.

**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: SCS Engineers
Project/Site: 1st 2025 C&D HMSP Sampling

Job ID: 310-307182-1
SDG: Mahaska County Landfill, Closed Units

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---|---|---|---|---|
| 310-307182-1 | MW-8 | Water | 05/22/25 11:30 | 05/23/25 16:45 |
| 310-307182-2 | MW-15 | Water | 05/22/25 10:26 | 05/23/25 16:45 |
| 310-307182-3 | MW-D | Water | 05/22/25 10:52 | 05/23/25 16:45 |

# Detection Summary

Client: SCS Engineers
Project/Site: 1st 2025 C&D HMSP Sampling

Job ID: 310-307182-1
SDG: Mahaska County Landfill, Closed Units

## Client Sample ID: MW-8 — Lab Sample ID: 310-307182-1

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | 0.00626 | | 0.00100 | 0.000330 | mg/L | 1 | | 6020B | Total/NA |
| Cadmium | 0.000573 | | 0.000200 | 0.000100 | mg/L | 1 | | 6020B | Total/NA |
| Cobalt | 0.0567 | | 0.000500 | 0.000170 | mg/L | 1 | | 6020B | Total/NA |
| Nickel | 0.176 | | 0.00500 | 0.00230 | mg/L | 1 | | 6020B | Total/NA |

## Client Sample ID: MW-15 — Lab Sample ID: 310-307182-2

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | 0.00276 | | 0.00100 | 0.000330 | mg/L | 1 | | 6020B | Total/NA |
| Cadmium | 0.0269 | | 0.000200 | 0.000100 | mg/L | 1 | | 6020B | Total/NA |
| Cobalt | 0.490 | | 0.000500 | 0.000170 | mg/L | 1 | | 6020B | Total/NA |
| Nickel | 1.08 | | 0.00500 | 0.00230 | mg/L | 1 | | 6020B | Total/NA |
| Total Suspended Solids | 10.5 | | 3.75 | 2.63 | mg/L | 1 | | I-3765-85 | Total/NA |

## Client Sample ID: MW-D — Lab Sample ID: 310-307182-3

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | 0.00250 | | 0.00100 | 0.000330 | mg/L | 1 | | 6020B | Total/NA |
| Cadmium | 0.0317 | | 0.000200 | 0.000100 | mg/L | 1 | | 6020B | Total/NA |
| Cobalt | 0.543 | | 0.000500 | 0.000170 | mg/L | 1 | | 6020B | Total/NA |
| Nickel | 1.17 | | 0.00500 | 0.00230 | mg/L | 1 | | 6020B | Total/NA |
| Total Suspended Solids | 12.3 | | 3.75 | 2.63 | mg/L | 1 | | I-3765-85 | Total/NA |

This Detection Summary does not include radiochemical test results.

# Client Sample Results

Client: SCS Engineers
Project/Site: 1st 2025 C&D HMSP Sampling

Job ID: 310-307182-1
SDG: Mahaska County Landfill, Closed Units

## Client Sample ID: MW-8

**Date Collected: 05/22/25 11:30**
**Date Received: 05/23/25 16:45**

## Lab Sample ID: 310-307182-1

**Matrix: Water**

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | 0.00626 | | 0.00100 | 0.000330 | mg/L | | 05/28/25 09:20 | 05/29/25 16:39 | 1 |
| Cadmium | 0.000573 | | 0.000200 | 0.000100 | mg/L | | 05/28/25 09:20 | 05/29/25 16:39 | 1 |
| Cobalt | 0.0567 | | 0.000500 | 0.000170 | mg/L | | 05/28/25 09:20 | 05/29/25 16:39 | 1 |
| Nickel | 0.176 | | 0.00500 | 0.00230 | mg/L | | 05/28/25 09:20 | 05/29/25 16:39 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Total Suspended Solids (USGS I-3765-85) | <1.88 | | 1.88 | 1.31 | mg/L | | | 05/27/25 10:05 | 1 |

# Client Sample Results

Client: SCS Engineers
Project/Site: 1st 2025 C&D HMSP Sampling

Job ID: 310-307182-1
SDG: Mahaska County Landfill, Closed Units

## Client Sample ID: MW-15

**Date Collected: 05/22/25 10:26**
**Date Received: 05/23/25 16:45**

## Lab Sample ID: 310-307182-2

**Matrix: Water**

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | 0.00276 | | 0.00100 | 0.000330 | mg/L | | 05/28/25 09:20 | 05/29/25 16:42 | 1 |
| Cadmium | 0.0269 | | 0.000200 | 0.000100 | mg/L | | 05/28/25 09:20 | 05/29/25 16:42 | 1 |
| Cobalt | 0.490 | | 0.000500 | 0.000170 | mg/L | | 05/28/25 09:20 | 05/29/25 16:42 | 1 |
| Nickel | 1.08 | | 0.00500 | 0.00230 | mg/L | | 05/28/25 09:20 | 05/29/25 16:42 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Total Suspended Solids (USGS I-3765-85) | 10.5 | | 3.75 | 2.63 | mg/L | | | 05/27/25 09:08 | 1 |

# Client Sample Results

Client: SCS Engineers
Project/Site: 1st 2025 C&D HMSP Sampling

Job ID: 310-307182-1
SDG: Mahaska County Landfill, Closed Units

## Client Sample ID: MW-D

**Date Collected: 05/22/25 10:52**
**Date Received: 05/23/25 16:45**

## Lab Sample ID: 310-307182-3

**Matrix: Water**

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

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | 0.00250 | | 0.00100 | 0.000330 | mg/L | | 05/28/25 09:20 | 05/29/25 16:45 | 1 |
| Cadmium | 0.0317 | | 0.000200 | 0.000100 | mg/L | | 05/28/25 09:20 | 05/29/25 16:45 | 1 |
| Cobalt | 0.543 | | 0.000500 | 0.000170 | mg/L | | 05/28/25 09:20 | 05/29/25 16:45 | 1 |
| Nickel | 1.17 | | 0.00500 | 0.00230 | mg/L | | 05/28/25 09:20 | 05/29/25 16:45 | 1 |

### General Chemistry

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Total Suspended Solids (USGS I-3765-85) | 12.3 | | 3.75 | 2.63 | mg/L | | | 05/27/25 09:08 | 1 |

## 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: 6020B - Metals (ICP/MS)

**Lab Sample ID: MB 310-455834/1-A**
**Matrix: Water**
**Analysis Batch: 456144**

**Client Sample ID: Method Blank**
**Prep Type: Total/NA**
**Prep Batch: 455834**

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium | <0.00100 | | 0.00100 | 0.000330 | mg/L | | 05/28/25 09:20 | 05/29/25 15:34 | 1 |
| Cadmium | <0.000200 | | 0.000200 | 0.000100 | mg/L | | 05/28/25 09:20 | 05/29/25 15:34 | 1 |
| Cobalt | <0.000500 | | 0.000500 | 0.000170 | mg/L | | 05/28/25 09:20 | 05/29/25 15:34 | 1 |
| Nickel | <0.00500 | | 0.00500 | 0.00230 | mg/L | | 05/28/25 09:20 | 05/29/25 15:34 | 1 |

**Lab Sample ID: LCS 310-455834/2-A**
**Matrix: Water**
**Analysis Batch: 456144**

**Client Sample ID: Lab Control Sample**
**Prep Type: Total/NA**
**Prep Batch: 455834**

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec Limits |
|---|---|---|---|---|---|---|---|
| Beryllium | 0.100 | 0.09849 | | mg/L | | 98 | 80 - 120 |
| Cadmium | 0.100 | 0.09778 | | mg/L | | 98 | 80 - 120 |
| Cobalt | 0.100 | 0.09873 | | mg/L | | 99 | 80 - 120 |
| Nickel | 0.200 | 0.2008 | | mg/L | | 100 | 80 - 120 |

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

**Lab Sample ID: MB 310-455727/1**
**Matrix: Water**
**Analysis Batch: 455727**

**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 | <5.00 | | 5.00 | 3.50 | mg/L | | | 05/27/25 09:08 | 1 |

**Lab Sample ID: LCS 310-455727/2**
**Matrix: Water**
**Analysis Batch: 455727**

**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 | 107.0 | | mg/L | | 107 | 82 - 117 |

**Lab Sample ID: MB 310-455740/1**
**Matrix: Water**
**Analysis Batch: 455740**

**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 | <5.00 | | 5.00 | 3.50 | mg/L | | | 05/27/25 10:05 | 1 |

**Lab Sample ID: LCS 310-455740/2**
**Matrix: Water**
**Analysis Batch: 455740**

**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 | 82 - 117 |

## Metals

### Prep Batch: 455834

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-307182-1 | MW-8 | Total/NA | Water | 3005A | |
| 310-307182-2 | MW-15 | Total/NA | Water | 3005A | |
| 310-307182-3 | MW-D | Total/NA | Water | 3005A | |
| MB 310-455834/1-A | Method Blank | Total/NA | Water | 3005A | |
| LCS 310-455834/2-A | Lab Control Sample | Total/NA | Water | 3005A | |

### Analysis Batch: 456144

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-307182-1 | MW-8 | Total/NA | Water | 6020B | 455834 |
| 310-307182-2 | MW-15 | Total/NA | Water | 6020B | 455834 |
| 310-307182-3 | MW-D | Total/NA | Water | 6020B | 455834 |
| MB 310-455834/1-A | Method Blank | Total/NA | Water | 6020B | 455834 |
| LCS 310-455834/2-A | Lab Control Sample | Total/NA | Water | 6020B | 455834 |

## General Chemistry

### Analysis Batch: 455727

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-307182-2 | MW-15 | Total/NA | Water | I-3765-85 | |
| 310-307182-3 | MW-D | Total/NA | Water | I-3765-85 | |
| MB 310-455727/1 | Method Blank | Total/NA | Water | I-3765-85 | |
| LCS 310-455727/2 | Lab Control Sample | Total/NA | Water | I-3765-85 | |

### Analysis Batch: 455740

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---|---|---|---|---|---|
| 310-307182-1 | MW-8 | Total/NA | Water | I-3765-85 | |
| MB 310-455740/1 | Method Blank | Total/NA | Water | I-3765-85 | |
| LCS 310-455740/2 | Lab Control Sample | Total/NA | Water | I-3765-85 | |

# Lab Chronicle

Client: SCS Engineers
Project/Site: 1st 2025 C&D HMSP Sampling

Job ID: 310-307182-1
SDG: Mahaska County Landfill, Closed Units

## Client Sample ID: MW-8

**Lab Sample ID: 310-307182-1**

**Date Collected: 05/22/25 11:30**

**Matrix: Water**

**Date Received: 05/23/25 16:45**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3005A | | | 455834 | QTZ5 | EET CF | 05/28/25 09:20 |
| Total/NA | Analysis | 6020B | | 1 | 456144 | NFT2 | EET CF | 05/29/25 16:39 |
| Total/NA | Analysis | I-3765-85 | | 1 | 455740 | E6KR | EET CF | 05/27/25 10:05 |

## Client Sample ID: MW-15

**Lab Sample ID: 310-307182-2**

**Date Collected: 05/22/25 10:26**

**Matrix: Water**

**Date Received: 05/23/25 16:45**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3005A | | | 455834 | QTZ5 | EET CF | 05/28/25 09:20 |
| Total/NA | Analysis | 6020B | | 1 | 456144 | NFT2 | EET CF | 05/29/25 16:42 |
| Total/NA | Analysis | I-3765-85 | | 1 | 455727 | HE7K | EET CF | 05/27/25 09:08 |

## Client Sample ID: MW-D

**Lab Sample ID: 310-307182-3**

**Date Collected: 05/22/25 10:52**

**Matrix: Water**

**Date Received: 05/23/25 16:45**

| Prep Type | Batch Type | Batch Method | Run | Dilution Factor | Batch Number | Analyst | Lab | Prepared or Analyzed |
|---|---|---|---|---|---|---|---|---|
| Total/NA | Prep | 3005A | | | 455834 | QTZ5 | EET CF | 05/28/25 09:20 |
| Total/NA | Analysis | 6020B | | 1 | 456144 | NFT2 | EET CF | 05/29/25 16:45 |
| Total/NA | Analysis | I-3765-85 | | 1 | 455727 | HE7K | EET CF | 05/27/25 09:08 |

**Laboratory References:**

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

# Accreditation/Certification Summary

Client: SCS Engineers
Job ID: 310-307182-1
Project/Site: 1st 2025 C&D HMSP Sampling
SDG: Mahaska County Landfill, Closed Units

## Laboratory: Eurofins Cedar Falls

The accreditations/certifications listed below are applicable to this report.

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

# Method Summary

Client: SCS Engineers
Project/Site: 1st 2025 C&D HMSP Sampling

Job ID: 310-307182-1
SDG: Mahaska County Landfill, Closed Units

| Method | Method Description | Protocol | Laboratory |
|---|---|---|---|
| 6020B | Metals (ICP/MS) | SW846 | EET CF |
| I-3765-85 | Residue, Non-filterable (TSS) | USGS | EET CF |
| 3005A | Preparation, Total Metals | SW846 | EET CF |

**Protocol References:**

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

310-307182 Chain of Custody

# Cooler/Sample Receipt and Temperature Log Form

| | | | |
|---|---|---|---|
| **Client Information** | | | |
| Client: SCS | | | |
| City/State. CITY: W. Des Moines | STATE: IA | Project: | |
| **Receipt Information** | | | |
| Date/Time Received: DATE: 5-23-25 | TIME: 1645 | 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 # ____ 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. AT | 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: | PL 250N | |
| Uncorrected Temp (°C): | -0.3 | |
| Corrected Temp (°C): | -0.3 | |

**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**

EUROFINS
DES MOINES SERVICE CENTER
214

# Chain of Custody Record

eurofins

**Eurofins TestAmerica, Cedar Falls**
3019 Venture Way
Cedar Falls, IA 50613-6907
phone 319 277 2401 fax 319 277.2425

**Regulatory Program:** ☐ DW ☐ NPDES ☑ RCRA ☐ Other

**TestAmerica Laboratories, Inc. d/b/a Eurof**

| Client Contact | Project Manager: Nathan Ohrt | Site Contact: Joe Farris | Date: | COC No 1 |
|---|---|---|---|---|
| Benjamin Madson | Email bmadson@scsengineers.com | Lab Contact: Samuel Miller | Carrier: | 1 of 1 CO |
| SCS Engineers | Cell (515) 776-9255 | | | Sampler |
| 1690 All-State Court, Suite 100 | Analysis Turnaround Time | | | For Lab Use Only: |
| West Des Moines, IA 50265 | ☐ CALENDAR DAYS ☐ WORKING DAYS | | | Walk-in Client: |
| 515-631-6160 | Other: | | | Lab Sampling: |
| Project Name. 1st 2025 C&D HMSP Sampling | ☐ 2 weeks | | | |
| Site. Mahaska County Landfill, Closed Units | ☐ 1 week | | | Job / SDG No |
| PO # 27224360.25 | ☐ 2 days | | | |
| | ☐ 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) | Beryllium | Cadmium | Cobalt | Nickel | Total Suspended Solids | Sample Specific |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-8 | 5-22 | 11:30 | G | W | | N | Y | X | X | X | X | X | |
| MW-15 | 5-22 | 10:26 | G | W | | N | Y | X | X | X | X | X | |
| MW-D | 5-22 | 1052 | G | W | | N | Y | X | X | X | X | X | |

**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:**

| Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No. | | Cooler Temp. (°C) Obs'd _____ Corr'd: _____ Therm ID No _____ | | |
|---|---|---|---|---|---|
| Relinquished by: GTH | Company: SCS | Date/Time: 5-23 1:30 | Received by: | Company: | Date/Time: |
| Relinquished by: | Company: | Date/Time: | Received by: | Company: | Date/Time: |
| Relinquished by: | Company: | Date/Time: | Received in Laboratory by: | Company: | Date/Time: 5-23-25 1145 |

Form No. CA-C-WI-002, Rev. 4.23, c



5/30/2025

# Login Sample Receipt Checklist

Client: SCS Engineers

Job Number: 310-307182-1

SDG Number: Mahaska County Landfill, Closed Units

**Login Number: 307182**

**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. | 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 | |

# APPENDIX B-2

## Data Validation Documentation

Completed by: Semir Omerovic
Date of Sampling: 5/15/2024
Lab Report Date: 5/30/2024
Site Name: Mahaska County Sanitary Landfill - Closed MSWLF units
Project Type: HMSP - 2024 Annual Sampling Event
Lab Report Number: 310-281475

| | OK | NO | N/A | NOTES |
|---|---|---|---|---|
| **Sample Collection and Sample Handling** | | | | |
| Chain of Custody | X | | | |
| Temperature | X | | | |
| Preservation | X | | | |
| Condition | X | | | |
| Case Narrative | X | | | |
| Holding Times | X | | | |
| **Analytical Sensitivity and Blanks** | | | | |
| Method Blank Detections | X | | | |
| Trip Blank Detections | | | X | |
| **Accuracy** | | | | |
| ICV/CCV | X | | | |
| LCS/LCSD | X | | | |
| MS/MSD | X | | | |
| Surrogates (organics only) | X | | | |
| **Precision** | | | | |
| QA/QC Sample RPDs | X | | | |
| Field Duplicates | X | | | The measured concentrations for sample MW-8 and duplicate sample MW-D had <50% RPD for analyzed parameters. |

Completed by: Nathan Ohrt
Date of Sampling: 5/22/2025
Lab Report Date: 5/30/2025
Site Name: Mahaska County Sanitary Landfill - Closed MSWLF units
Project Type: HMSP - 2025 Annual Sampling Event
Lab Report Number: 310-307182

| | OK | NO | N/A | NOTES |
|---|---|---|---|---|
| **Sample Collection and Sample Handling** | | | | |
| Chain of Custody | X | | | |
| Temperature | X | | | |
| Preservation | X | | | |
| Condition | X | | | |
| Case Narrative | X | | | |
| Holding Times | X | | | |
| **Analytical Sensitivity and Blanks** | | | | |
| Method Blank Detections | X | | | |
| Trip Blank Detections | | | X | |
| **Accuracy** | | | | |
| ICV/CCV | X | | | |
| LCS/LCSD | X | | | |
| MS/MSD | X | | | |
| Surrogates (organics only) | X | | | |
| **Precision** | | | | |
| QA/QC Sample RPDs | X | | | |
| Field Duplicates | X | | | The measured concentrations for sample MW-15 and duplicate sample MW-D had <50% RPD for analyzed parameters. |

# APPENDIX C

# 2024-2025 Analytical Data

SCS ENGINEERS

**Summary of Groundwater Chemistry**

Mahaska County Solid Waste Management Commission - 62-SDP-07-93C

| Total Metals Constituents | Sample Date | MW-1A DNG | MW-2A DNG | MW-8 DNG | MW-12 DNG | MW-15 DNG |
|---|---|---|---|---|---|---|
| **Beryllium, mg/L (CAS NO - 7440-41-7)** | 5/15/2024 | **0.00102** | **0.0219** | **0.00405** | < 0.001 | **0.00308** |
| | 5/15/2024 | N/A | N/A | **0.00413** | N/A | N/A |
| | 5/22/2025 | N/A | N/A | **0.00626** | N/A | **0.0025** |
| | 5/22/2025 | N/A | N/A | N/A | N/A | **0.00276** |
| **Cadmium, mg/L (CAS NO - 7440-43-9)** | 5/15/2024 | **0.000362** | **0.0011** | **0.0011** | **0.0106** | **0.0349** |
| | 5/15/2024 | N/A | N/A | **0.00118** | N/A | N/A |
| | 5/22/2025 | N/A | N/A | **0.000573** | N/A | **0.0317** |
| | 5/22/2025 | N/A | N/A | N/A | N/A | **0.0269** |
| **Cobalt, mg/L (CAS NO - 7440-48-4)** | 5/15/2024 | **0.00328** | **0.433** | **0.0302** | **0.139** | **0.569** |
| | 5/15/2024 | N/A | N/A | **0.0303** | N/A | N/A |
| | 5/22/2025 | N/A | N/A | **0.0567** | N/A | **0.543** |
| | 5/22/2025 | N/A | N/A | N/A | N/A | **0.49** |
| **Nickel, mg/L (CAS NO - 7440-02-0)** | 5/15/2024 | **0.0188** | **1.22** | **0.138** | **0.215** | **1.34** |
| | 5/15/2024 | N/A | N/A | **0.136** | N/A | N/A |
| | 5/22/2025 | N/A | N/A | **0.176** | N/A | **1.17** |
| | 5/22/2025 | N/A | N/A | N/A | N/A | **1.08** |
| **Total Suspended Solids, mg/L (CAS NO - TSS)** | 5/15/2024 | **80** | **24.9** | < 1.88 | **2.38** | **18** |
| | 5/15/2024 | N/A | N/A | **46** | N/A | N/A |
| | 5/22/2025 | N/A | N/A | < 1.88 | N/A | **12.3** |
| | 5/22/2025 | N/A | N/A | N/A | N/A | **10.5** |

Note: * indicates 'J flag'. Detection is below the reporting limit, but greater than the MDL (Method Detection Limit). The concentration is estimated.

| **Denotes Detection.** |
|---|
| Denotes Confirmed Outlier. Statistically Excluded. |

Sampling performed over multiple dates is recorded on the first date sampled. Refer to field forms for exact sample date.

# APPENDIX D

## Mann-Kendall Trend Summary Table and Graphs

# Trend Test

Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS Printed 10/22/2025, 2:17 PM

| Constituent | Well | Slope | Calc. | Critical | Sig. | N | %NDs | Alpha | Method |
|---|---|---|---|---|---|---|---|---|---|
| Beryllium (mg/L) | MW-1A | 0 | -4 | -21 | No | 8 | 50 | 0.01 | NP |
| Beryllium (mg/L) | MW-2A | 0.00014 | 0 | 21 | No | 8 | 12.5 | 0.01 | NP |
| Beryllium (mg/L) | MW-8 | 0.0000756 | 2 | 21 | No | 8 | 0 | 0.01 | NP |
| Beryllium (mg/L) | MW-15 | 0.0001186 | 9 | 21 | No | 8 | 37.5 | 0.01 | NP |
| Cadmium (mg/L) | MW-1A | -0.000003749 | -6 | -21 | No | 8 | 50 | 0.01 | NP |
| Cadmium (mg/L) | MW-2A | -0.0006984 | -10 | -21 | No | 8 | 0 | 0.01 | NP |
| Cadmium (mg/L) | MW-8 | 0.00004411 | 13 | 21 | No | 8 | 37.5 | 0.01 | NP |
| Cadmium (mg/L) | MW-12 | 0.00001691 | 0 | 21 | No | 8 | 0 | 0.01 | NP |
| Cadmium (mg/L) | MW-15 | 0 | 1 | 21 | No | 8 | 50 | 0.01 | NP |
| Cobalt (mg/L) | MW-1A | 0.0007183 | 13 | 21 | No | 8 | 12.5 | 0.01 | NP |
| Cobalt (mg/L) | MW-2A | 0.001038 | 0 | 21 | No | 8 | 0 | 0.01 | NP |
| Cobalt (mg/L) | MW-8 | -0.002028 | -18 | -21 | No | 8 | 0 | 0.01 | NP |
| Cobalt (mg/L) | MW-12 | 0.007175 | 8 | 21 | No | 8 | 0 | 0.01 | NP |
| Cobalt (mg/L) | MW-15 | 0.02332 | 16 | 21 | No | 8 | 0 | 0.01 | NP |
| Nickel (mg/L) | MW-1A | 0.004172 | 13 | 21 | No | 8 | 25 | 0.01 | NP |
| Nickel (mg/L) | MW-2A | 0.01322 | 2 | 21 | No | 8 | 0 | 0.01 | NP |
| Nickel (mg/L) | MW-8 | -0.006031 | -12 | -21 | No | 8 | 0 | 0.01 | NP |
| Nickel (mg/L) | MW-12 | -0.003169 | -3 | -21 | No | 8 | 0 | 0.01 | NP |
| Nickel (mg/L) | MW-15 | 0.08565 | 14 | 21 | No | 8 | 0 | 0.01 | NP |

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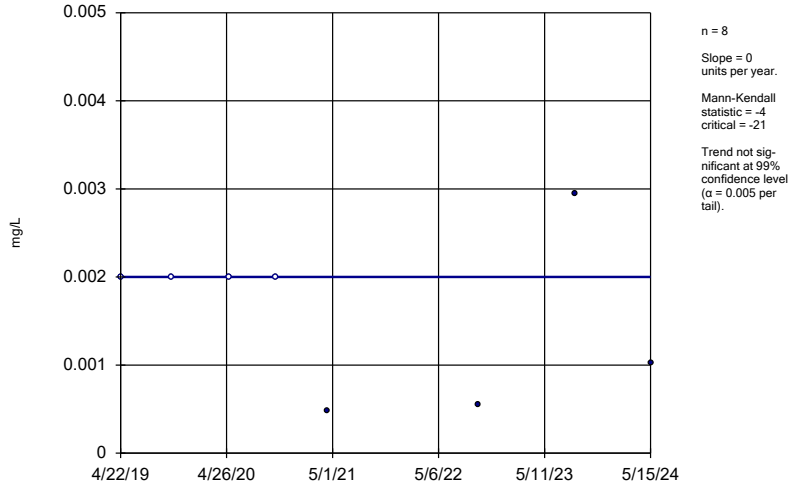
Hollow symbols indicate censored values.

## Sen's Slope Estimator

MW-1A




Constituent: Beryllium Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS

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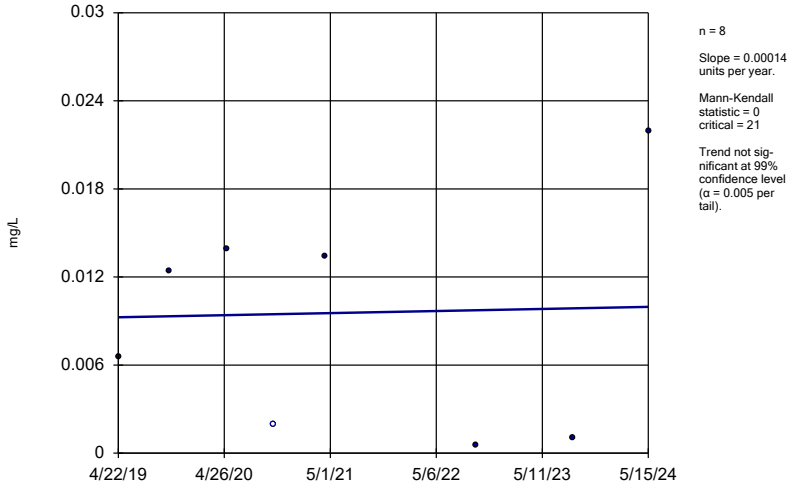
Hollow symbols indicate censored values.

## Sen's Slope Estimator

MW-2A




Constituent: Beryllium Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS

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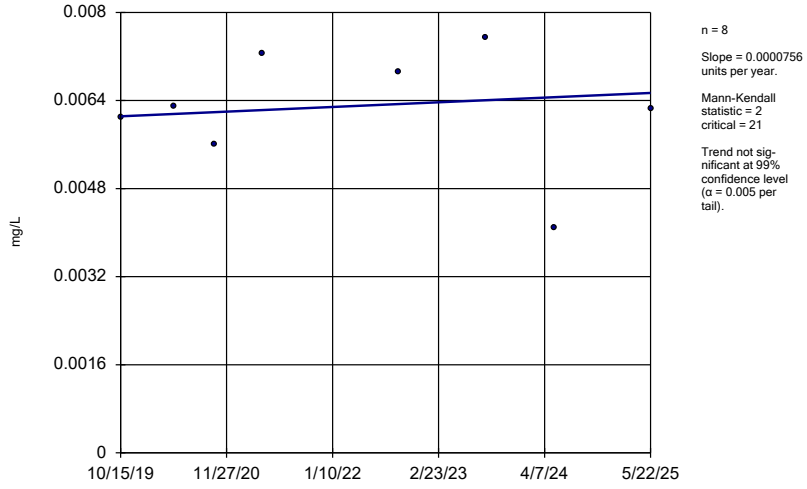
## Sen's Slope Estimator

MW-8




Constituent: Beryllium Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS

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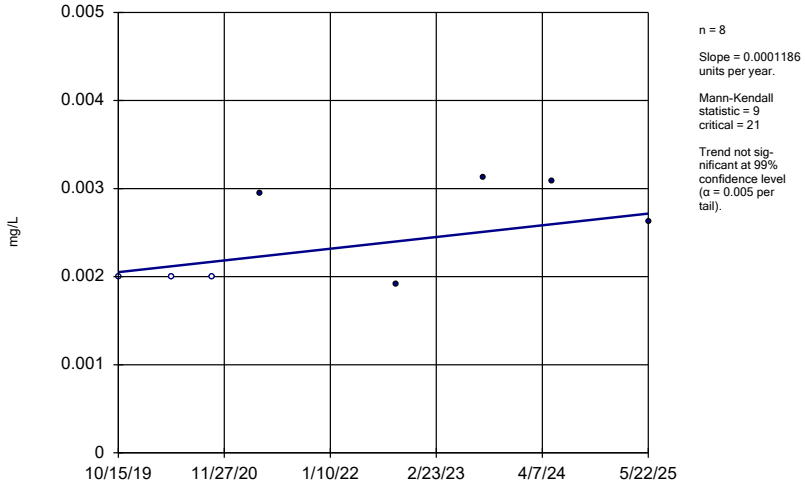
Hollow symbols indicate censored values.

## Sen's Slope Estimator

MW-15




Constituent: Beryllium Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS

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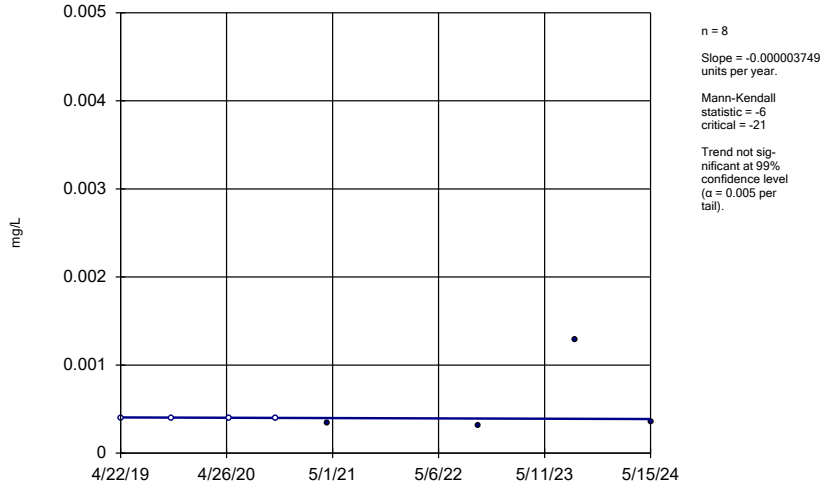
Hollow symbols indicate censored values.

## Sen's Slope Estimator

MW-1A




n = 8

Slope = -0.000003749 units per year.

Mann-Kendall statistic = -6
critical = -21

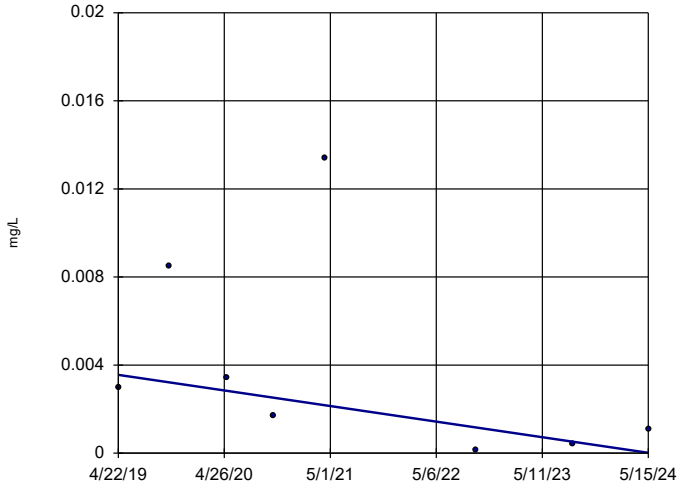
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Cadmium Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS

Sanitas™ v.10.1.01 Software licensed to SCS Engineers. UG

## Sen's Slope Estimator

MW-2A




n = 8

Slope = -0.0006984 units per year.

Mann-Kendall statistic = -10
critical = -21

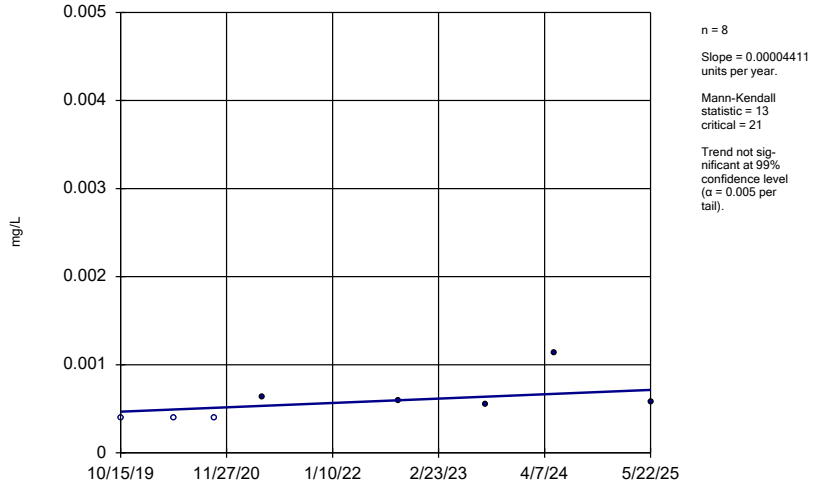
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Cadmium Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS

Sanitas™ v.10.1.01 Software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

## Sen's Slope Estimator

MW-8




n = 8

Slope = 0.00004411 units per year.

Mann-Kendall statistic = 13
critical = 21

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Cadmium Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS

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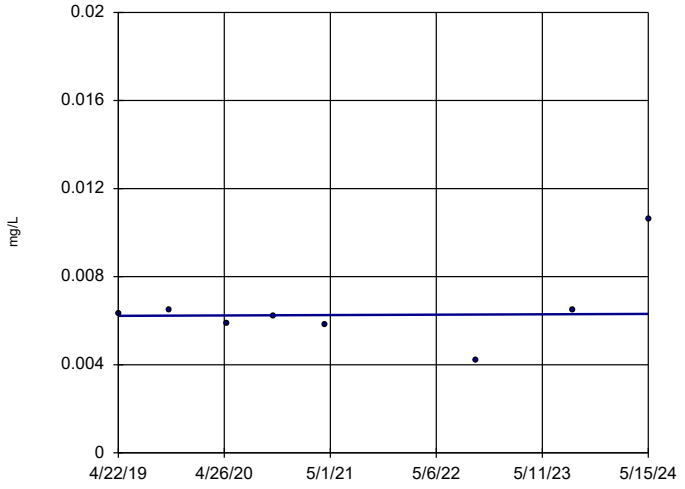
## Sen's Slope Estimator

MW-12




n = 8

Slope = 0.00001691 units per year.

Mann-Kendall statistic = 0
critical = 21

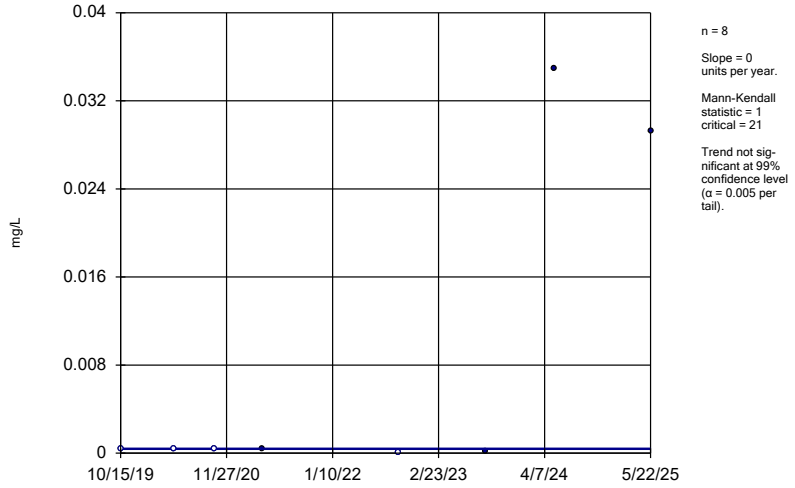
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Cadmium Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS

Sanitas™ v.10.1.01 Software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

## Sen's Slope Estimator

MW-15

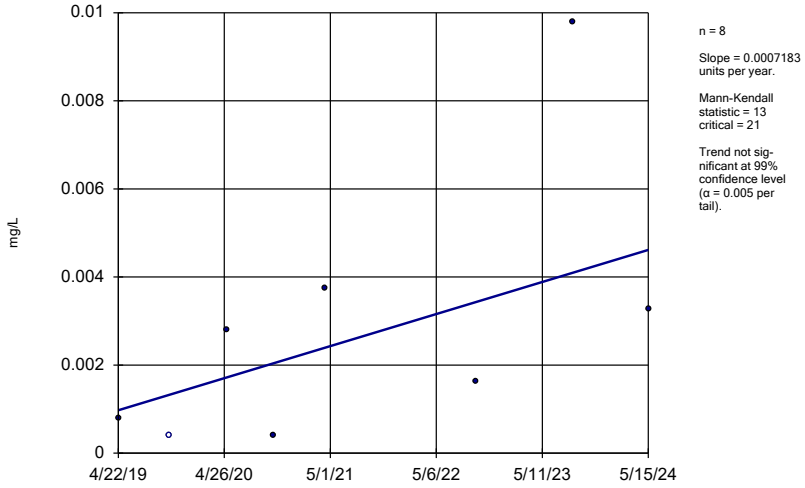



Constituent: Cadmium Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS

Sanitas™ v.10.1.01 Software licensed to SCS Engineers. UG
Hollow symbols indicate censored values.

## Sen's Slope Estimator

MW-1A

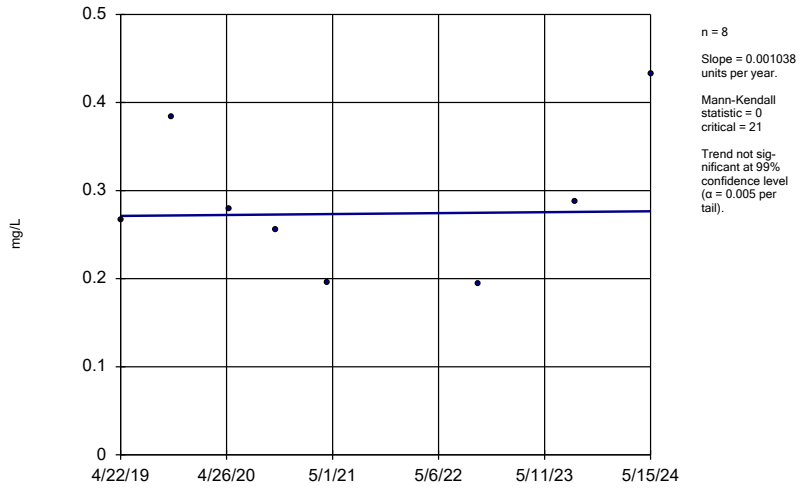



Constituent: Cobalt Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS

Sanitas™ v.10.1.01 Software licensed to SCS Engineers. UG

## Sen's Slope Estimator

MW-2A

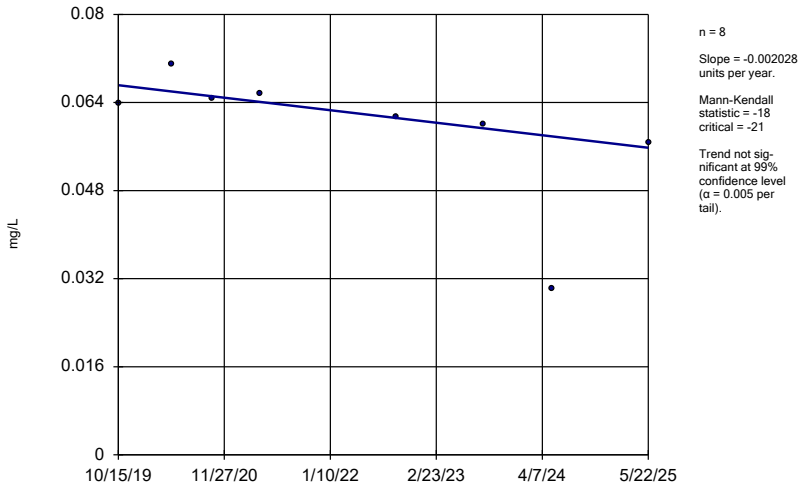



Constituent: Cobalt Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS

Sanitas™ v.10.1.01 Software licensed to SCS Engineers. UG

## Sen's Slope Estimator

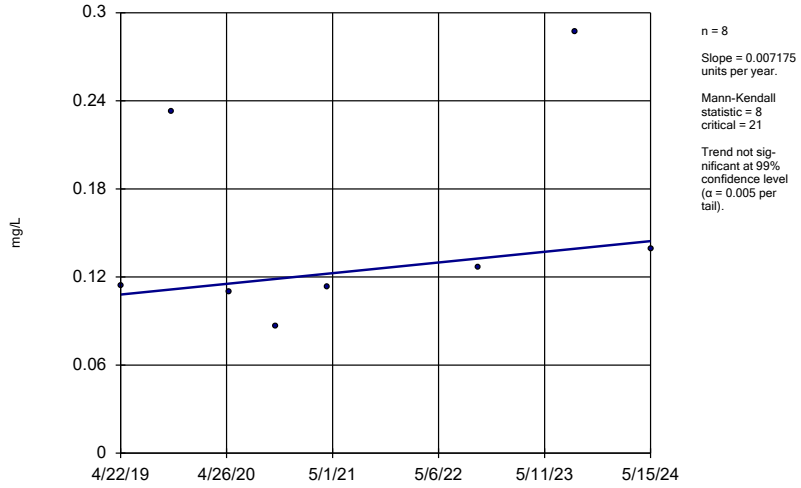
MW-8




Constituent: Cobalt Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS

## Sen's Slope Estimator

MW-12

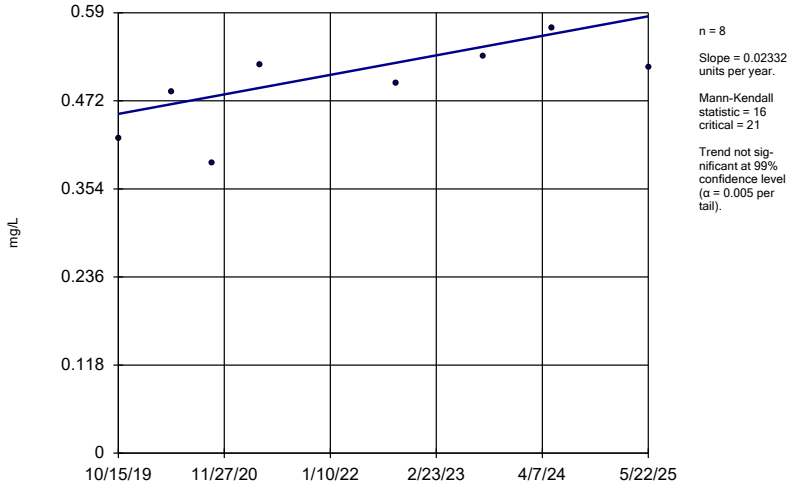



Constituent: Cobalt Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS



## Sen's Slope Estimator

MW-15

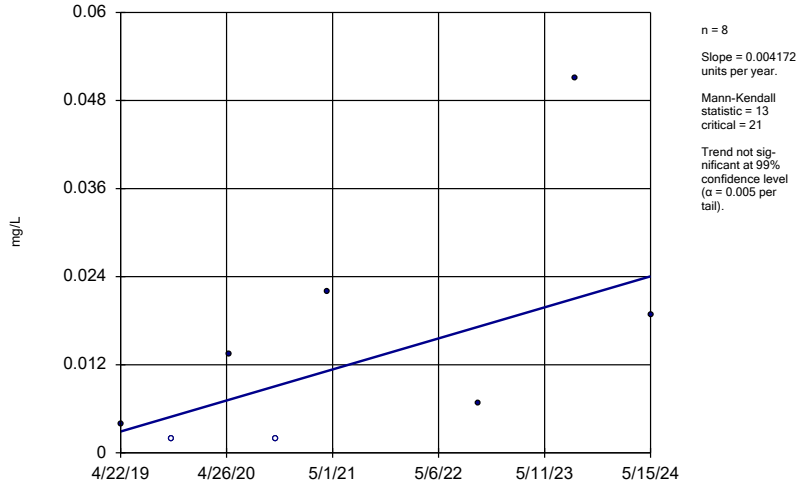



Constituent: Cobalt Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS


Hollow symbols indicate censored values.

## Sen's Slope Estimator

MW-1A

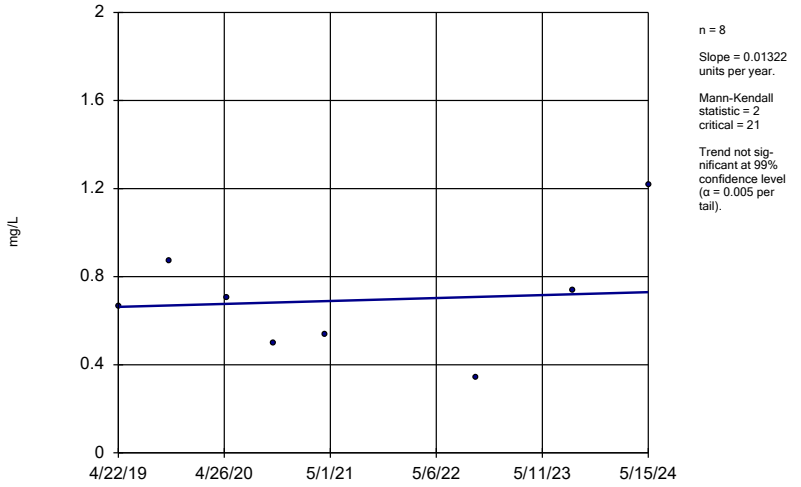



Constituent: Nickel Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS



## Sen's Slope Estimator

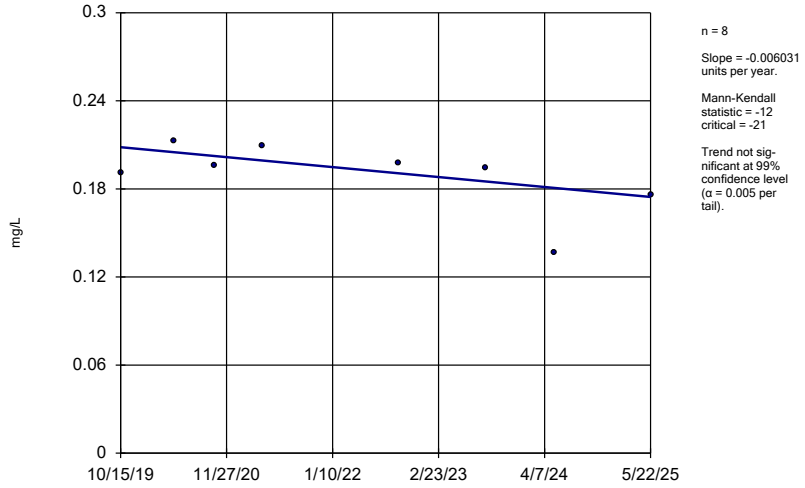
MW-2A




Constituent: Nickel Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS

## Sen's Slope Estimator

MW-8




n = 8

Slope = -0.006031 units per year.

Mann-Kendall statistic = -12
critical = -21

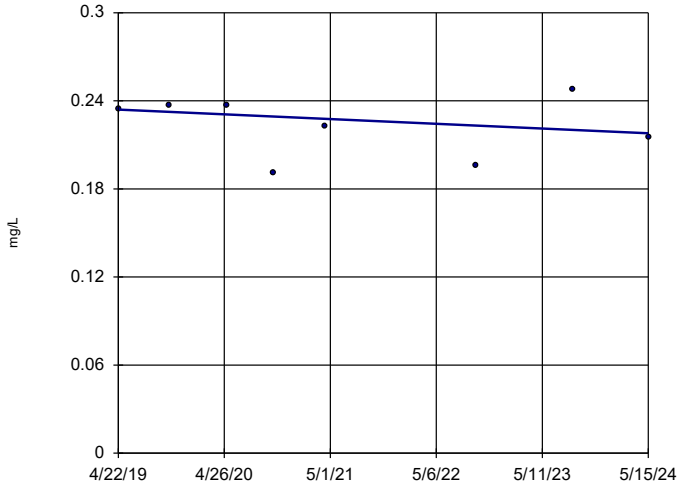
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Nickel Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS



## Sen's Slope Estimator

MW-12




n = 8

Slope = -0.003169 units per year.

Mann-Kendall statistic = -3
critical = -21

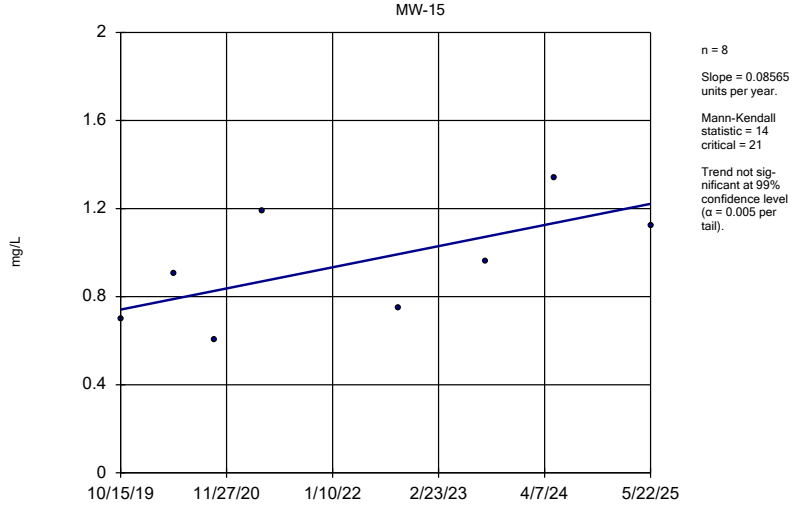
Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Nickel Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS



## Sen's Slope Estimator

MW-15




n = 8

Slope = 0.08565 units per year.

Mann-Kendall statistic = 14
critical = 21

Trend not significant at 99% confidence level (α = 0.005 per tail).

Constituent: Nickel Analysis Run 10/22/2025 2:15 PM View: 2025_AWQR-Mann_Kendall
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS

# APPENDIX E

## Confidence Interval Summary Tables and Graphs

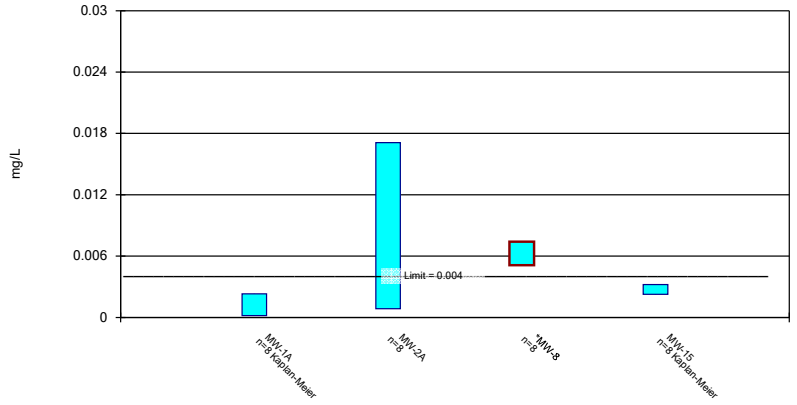
# Confidence Interval

Mahaska County SLF  Client: SCS Engineers  Data: MCSWM-Closed_2025_AWQR_AWRS  Printed 10/22/2025, 2:23 PM

| Constituent | Well | Upper Lim. | Lower Lim. | Compliance | Sig. | N | %NDs | Transform | Alpha | Method |
|---|---|---|---|---|---|---|---|---|---|---|
| Beryllium (mg/L) | MW-1A | 0.002313 | 0.0001829 | 0.004 | No | 8 | 50 | No | 0.01 | Param. |
| Beryllium (mg/L) | MW-2A | 0.01709 | 0.0008505 | 0.004 | No | 8 | 12.5 | No | 0.01 | Param. |
| **Beryllium (mg/L)** | **MW-8** | **0.007404** | **0.005108** | **0.004** | **Yes** | **8** | **0** | **No** | **0.01** | **Param.** |
| Beryllium (mg/L) | MW-15 | 0.003217 | 0.002263 | 0.004 | No | 8 | 37.5 | No | 0.01 | Param. |
| Cadmium (mg/L) | MW-1A | 0.00129 | 0.000319 | 0.005 | No | 8 | 50 | No | 0.004 | NP (normality) |
| Cadmium (mg/L) | MW-2A | 0.008887 | 0 | 0.005 | No | 8 | 0 | No | 0.01 | Param. |
| Cadmium (mg/L) | MW-8 | 0.00114 | 0.0004 | 0.005 | No | 8 | 37.5 | No | 0.004 | NP (normality) |
| Cadmium (mg/L) | MW-12 | 0.008423 | 0.004576 | 0.005 | No | 8 | 0 | No | 0.01 | Param. |
| Cadmium (mg/L) | MW-15 | 0.0349 | 0.00005 | 0.005 | No | 8 | 50 | No | 0.004 | NP (normality) |
| Cobalt (mg/L) | MW-1A | 0.006134 | 0 | 0.0021 | No | 8 | 12.5 | No | 0.01 | Param. |
| **Cobalt (mg/L)** | **MW-2A** | **0.3758** | **0.1981** | **0.0021** | **Yes** | **8** | **0** | **No** | **0.01** | **Param.** |
| **Cobalt (mg/L)** | **MW-8** | **0.0709** | **0.03025** | **0.0021** | **Yes** | **8** | **0** | **No** | **0.004** | **NP (normality)** |
| **Cobalt (mg/L)** | **MW-12** | **0.2257** | **0.07662** | **0.0021** | **Yes** | **8** | **0** | **No** | **0.01** | **Param.** |
| **Cobalt (mg/L)** | **MW-15** | **0.5538** | **0.4281** | **0.0021** | **Yes** | **8** | **0** | **No** | **0.01** | **Param.** |
| Nickel (mg/L) | MW-1A | 0.03138 | 0 | 0.1 | No | 8 | 25 | No | 0.01 | Param. |
| **Nickel (mg/L)** | **MW-2A** | **0.9795** | **0.4148** | **0.1** | **Yes** | **8** | **0** | **No** | **0.01** | **Param.** |
| **Nickel (mg/L)** | **MW-8** | **0.2146** | **0.1639** | **0.1** | **Yes** | **8** | **0** | **No** | **0.01** | **Param.** |
| **Nickel (mg/L)** | **MW-12** | **0.2442** | **0.2009** | **0.1** | **Yes** | **8** | **0** | **No** | **0.01** | **Param.** |
| **Nickel (mg/L)** | **MW-15** | **1.219** | **0.6731** | **0.1** | **Yes** | **8** | **0** | **No** | **0.01** | **Param.** |

## Parametric Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk at Alpha = 0.01.

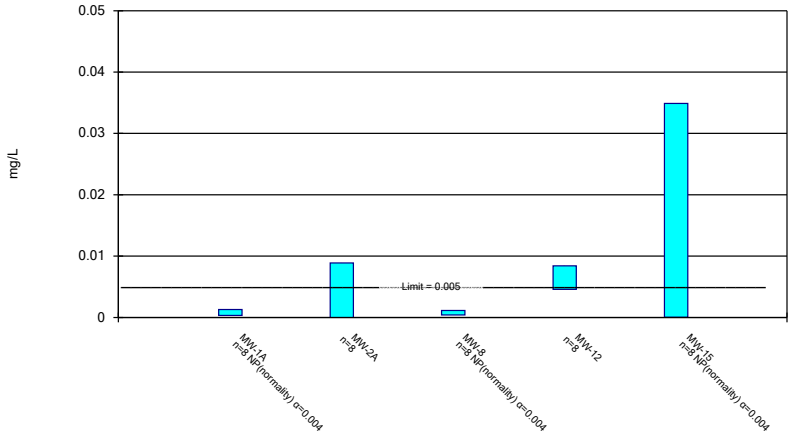



Constituent: Beryllium Analysis Run 10/22/2025 2:21 PM View: 2025_AWQR-Confidence_Interval
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS



## Parametric and Non-Parametric (NP) Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk at Alpha = 0.01.

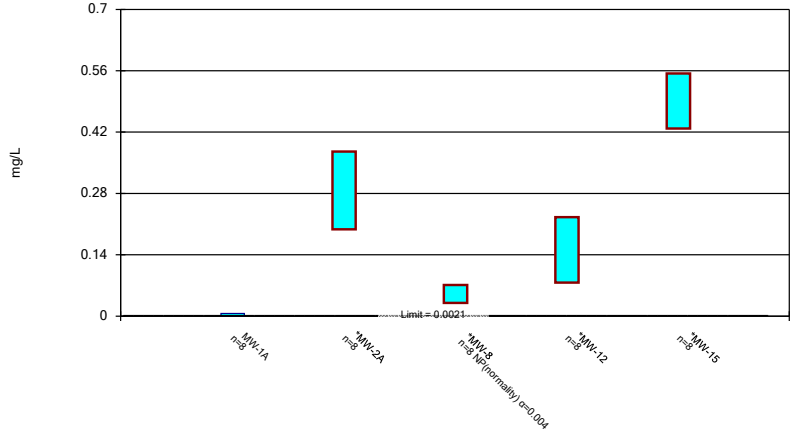



Constituent: Cadmium Analysis Run 10/22/2025 2:21 PM View: 2025_AWQR-Confidence_Interval
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS



## Parametric and Non-Parametric (NP) Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk at Alpha = 0.01.

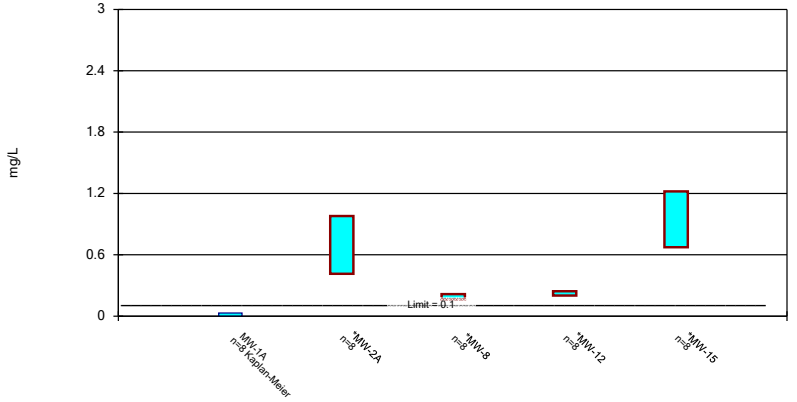



Constituent: Cobalt Analysis Run 10/22/2025 2:21 PM View: 2025_AWQR-Confidence_Interval
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS



## Parametric Confidence Interval

Compliance limit is exceeded.* Per-well alpha = 0.01. Normality Test: Shapiro Wilk at Alpha = 0.01.




Constituent: Nickel Analysis Run 10/22/2025 2:21 PM View: 2025_AWQR-Confidence_Interval
Mahaska County SLF Client: SCS Engineers Data: MCSWM-Closed_2025_AWQR_AWRS