

November 28, 2023

Mr. Brian L. Rath, P.E.
Environmental Engineer Senior
IDNR – Land Quality Bureau
Wallace State Office Building
502 East 9th Street
Des Moines, Iowa 50319



**RE: Required Groundwater and Gas Monitoring – 2023
Permit Amendment #14 (Doc #94603) & Permit Amendment #15 (Doc #95242)
Poweshiek County Sanitary Landfill 79-SDP-01-73C**

Dear Mr. Rath:

This letter is offered to address the water quality and gas monitoring results based on the monitoring under the Hydrologic Monitoring System Plan (HMSP) and the Gas Monitoring System Plan (GMSP) required by Permit Amendment #14 (Doc #94603) and Permit Amendment #15 (Doc #95242).

Hydrologic Monitoring System Plan (HMSP) and Gas Monitoring System Plan (GMSP) – 2022

- 1) On September 1, 2023 Monitoring Wells MW-3, MW-4, MW-5, and MW-9 (Figure 1) were sampled. Each sample was analyzed for parameters listed in Permit Amendment #14 (Appendix I VOC, plus total Cobalt at MW-3 and MW-4).
- 2) Water Elevation Measurements were collected at the time of sample collection at each water table monitoring well on September 1, 2023 and in the spring on March 3, 2023.
- 3) Explosive gas was monitored in the well head space at MW-2, MW-5, MW-8, MW-9, and MW-10 and in gas probes GP-1 and GP-2 semi-annually on March 3, 2023 and September 1, 2023 in accordance with Permit Amendment #15. Explosive gas was also monitored semi-annually in the site structures. Permit Amendment #13, dated October 9, 2018 (Doc #93471), changed the frequency of gas monitoring in both the subsurface features and in the site structures to a semi-annual basis.
- 4) The results of the 2023 HMSP/GMSP activities are reported in this letter which serves as the 2023 Annual Water Quality Report/2023 Landfill Gas Report.

Results of HMSP Activities

Water Quality - The Keystone Analytical Report for sample analyses are included in Attachment A. Field Sampling Forms for September 1, 2023 are included in Attachment B.

Review of the 2023 data indicates that a total of six (6) different compounds were detected at this site based on the four (4) wells sampled. A summary of the detected compounds at each monitoring well is included in Attachment A.

Volatile Organic Compounds (VOC) – VOC were analyzed at monitoring wells MW-3, MW-4, MW-5, and MW-9 on September 1, 2023. VOC as were detected as follows:

MW-3 (cis-1,2-dichloroethane (1.2 ug/L))

MW-4 (chloroethane (1.5 ug/L), cis-1,2-dichloroethane (1.3 ug/L), benzene (3.3 ug/L), and chlorobenzene (9.1 ug/L))

MW-5 (1,1-dichloroethane (1.2 ug/L))

MW-9 (none)

As illustrated on the summary table in Appendix A, the detected VOC at the referenced wells are all reported at concentrations well below the groundwater protection standard (GWPS) listed in IAC 567, Chapter 137 Statewide Standard for Protected Groundwater.

Historically, the benzene concentrations at MW-11R were reported at concentrations that were in excess of the GWPS. The consistent and historic absence of VOC at the designated step-out wells to MW-11R demonstrate that the benzene impact is isolated to MW-11R. MW-11R and the step-out wells were removed from the HMSP in Permit Amendment #11 dated December 21, 2016 (Doc #88021).

Inorganic Compounds – Based on the absence of inorganic compounds above appreciable concentrations at the site monitoring wells, the inorganic compound testing has been reduced to cobalt at MW-3 and MW-4. Review of the Summary of Detections (Attachment A) indicates the following detected inorganic compound concentrations at MW-3 and MW-4 over time:

MW-3 - 9/3/15 - cobalt (0.0128 mg/L), exceeds the GWPS of 0.0028 mg/L
9/12/16 - cobalt (0.0099 mg/L), exceeds the GWPS of 0.0028 mg/L
9/13/17 - cobalt (0.0263 mg/L), exceeds the GWPS of 0.0028 mg/L
9/11/19 - cobalt (0.0054 mg/L), exceeds the GWPS of 0.0021 mg/L
9/20/21 - cobalt (0.001 mg/L), does not exceed the GWPS of 0.0021 mg/L
9/11/19 - cobalt (0.006 mg/L), does not exceed the GWPS of 0.0021 mg/L

MW-4 - 9/3/15 - cobalt (0.0097 mg/L), exceeds the GWPS of 0.0028 mg/L
3/9/16 - cobalt (0.0229 mg/L), exceeds the GWPS of 0.0028 mg/L
9/12/16 - cobalt (0.0218 mg/L), exceeds the GWPS of 0.0028 mg/L
3/6/17 - cobalt (0.0241 mg/L), exceeds the GWPS of 0.0028 mg/L
9/13/17 - cobalt (0.0415 mg/L), exceeds the GWPS of 0.0028 mg/L
3/15/18 - cobalt (0.0314 mg/L), exceeds the GWPS of 0.0021 mg/L
9/11/19 - cobalt (0.0678 mg/L), exceeds the GWPS of 0.0021 mg/L
3/2/2020 - cobalt (0.0730 mg/L), exceeds the GWPS of 0.0021 mg/L
9/20/2021 - cobalt (0.0717 mg/L), exceeds the GWPS of 0.0021 mg/L
3/1/2022 - cobalt (0.0511 mg/L), exceeds the GWPS of 0.0021 mg/L
9/1/2023 - cobalt (0.0781 mg/L), exceeds the GWPS of 0.0021 mg/L

Historically, the arsenic and cobalt concentrations at MW-11R were reported at concentrations that were in excess of the GWPS. The consistent and historic absence of arsenic and cobalt at the designated step-out wells to MW-11R demonstrate that the arsenic and cobalt impacts are isolated to MW-11R. MW-11R and the step-out wells were removed from the HMSP in Permit Amendment #11 dated December 21, 2016 (Doc #88021).

Quality Assurance/Quality Control - A blind duplicate sample was collected at MW-3 during the September 1, 2023, sampling episode.

The purpose of the field duplicate is to evaluate the precision of sample collection and analysis process from the field through the laboratory. The calculation of the Relative Percent Difference (RPD) for duplicate pair results is used as the means to evaluate the precision.

The Quality Control (QC) limit for the RPD on field duplicates is established at thirty percent (30%) for duplicate pairs that have reported concentrations five (5) times greater than the laboratory Reporting Limit. For samples and respective duplicates with reported analyte concentrations nearer the Reporting Limit, the RPD calculations demonstrate greater variability and the RPD can be very large. RPD values are considered non-representative in the following conditions:

- a) Both the original and/or the duplicate results are less than five (5) times the Reporting Limit.
- b) One or both results are qualified, flagged, or estimated.
- c) One or both results are non-detected.

The results of the blind duplicate and the monitoring well results for September 1, 2023 are within the limits established and indicate that the data quality is acceptable without restriction.

Water Elevation Measurements - Water elevation measurements were collected at each well on March 3, 2023 and September 1, 2023 and are included in the Table in Attachment C. Review of the water elevation data for 2023 does not indicate excessive variability compared to historic water elevation data. The variability in water levels appears to be cyclic over time. A copy of the September 1, 2023 Water Table Contour Map (Figure 2) is included herein and illustrates groundwater flow paths across the site. The shape of the water table surface illustrated in the map is relatively unchanged from the previous year's map.

Explosive Gas Monitoring – Explosive gas monitoring is conducted in the on-site structures on a semi-annual basis. Explosive gas monitoring was conducted in the head space of monitoring wells MW-2, MW-5, MW-8, MW-9, and MW-10 and in subsurface gas probes GP-1 and GP-2 on a semi-annual basis. The gas monitoring is performed in accordance with Permit Amendment #13 (Doc #93471) and Permit Amendment #15 (Doc #95242). The explosive gas monitoring is summarized in the Tables in Attachment D.

The results of the monitoring indicate that gas concentrations were undetected in structures and were undetected in MW-2, MW-5, MW-8, MW-9, MW-10, GP-1, and GP-2 and are reported as 0% LEL.

As requested in Permit Amendment #15 (Doc #95242), an evaluation of the screen interval is made in MW-2, MW-5, MW-8, MW-9, and MW-10 with reference to the water table elevation. This is included on the water elevation table in Appendix C and in the data tables in Appendix D. Review of the data indicates that all wells (MW-2, MW-5, MW-8, MW-9, and MW-10) had a portion of the screened interval exposed on either March 3, 2023 and/or September 1, 2023.

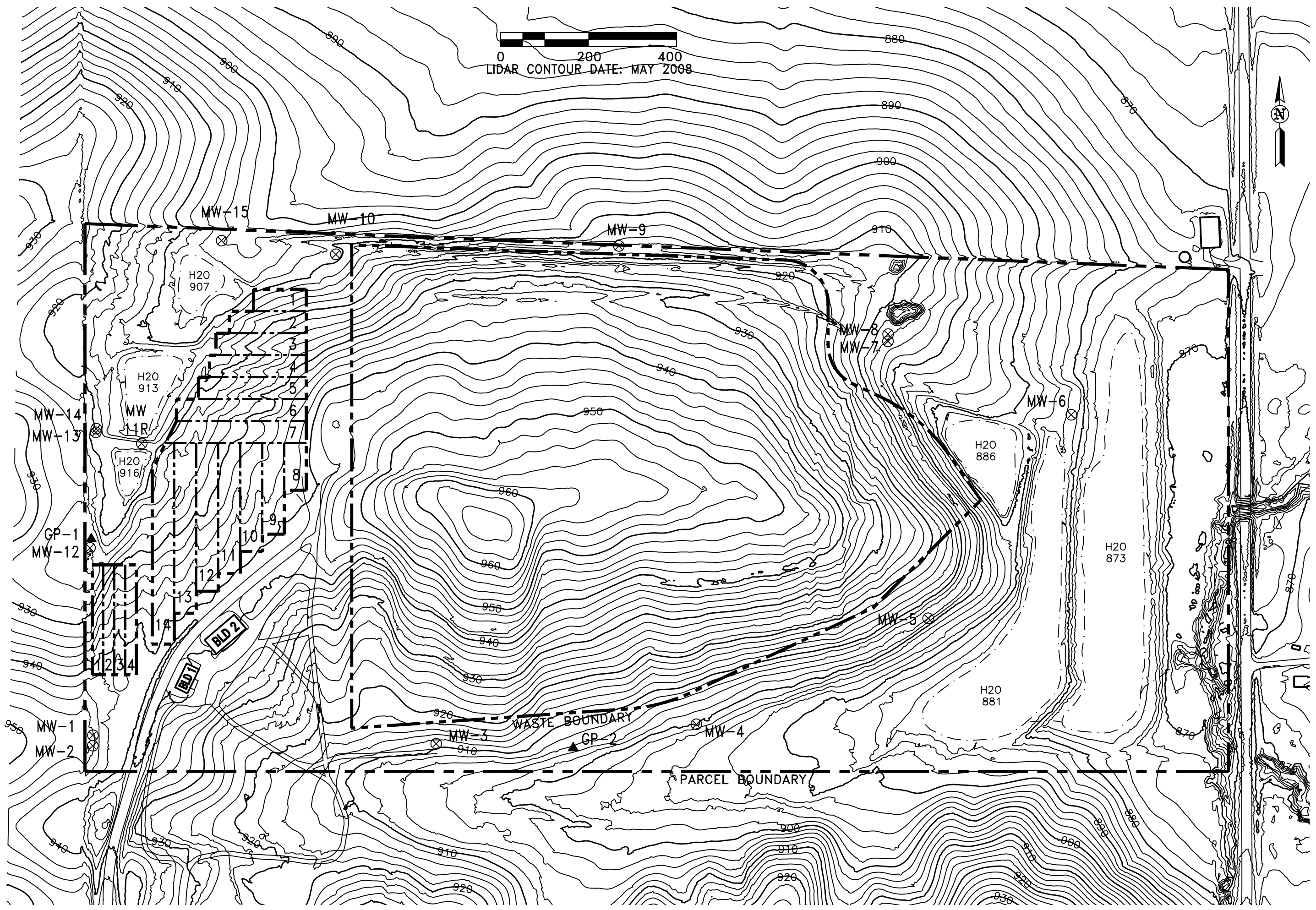
Conclusions

- 1) Continued sampling of the HMSP monitoring wells on an *annual* frequency. The next episode should occur in March, 2024 in order to accommodate the alternating seasons required by Permit Amendment #14 (Doc #94063).
- 2) The GMSP should continue at MW-2, MW-5, MW-8, MW-9, MW-10, GP-1, GP-2, Building #1, and Building #2 on a semi-annual basis.
- 3) The results of the 2024 HMSP & GMSP activities should be reported in the Annual Water Quality Report due November 30.
- 4) Evaluate the condition of the site (water quality, landfill gas concentrations, leachate control, and cover integrity) with regard to the impending Closure Permit expiration on March 2, 2025.

Please feel free to contact our office at (515) 733-4144 with any questions you may have.

	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.
	 11/28/23
	DOUGLAS J. LUZBETAK, P.E. DATE
	License number 12654
	My license renewal date is December 31, 2024.
	Pages or sheets covered by this seal: <u>All except Attachment A</u>

cc: Lyle Brehm, P.E., Poweshiek County Engineer





HLW Engineering Group
204 West Broad Street, P.O. Box 314
Story City, Iowa 50248
Phone: (515) 733-4144
FAX: (515) 733-4146

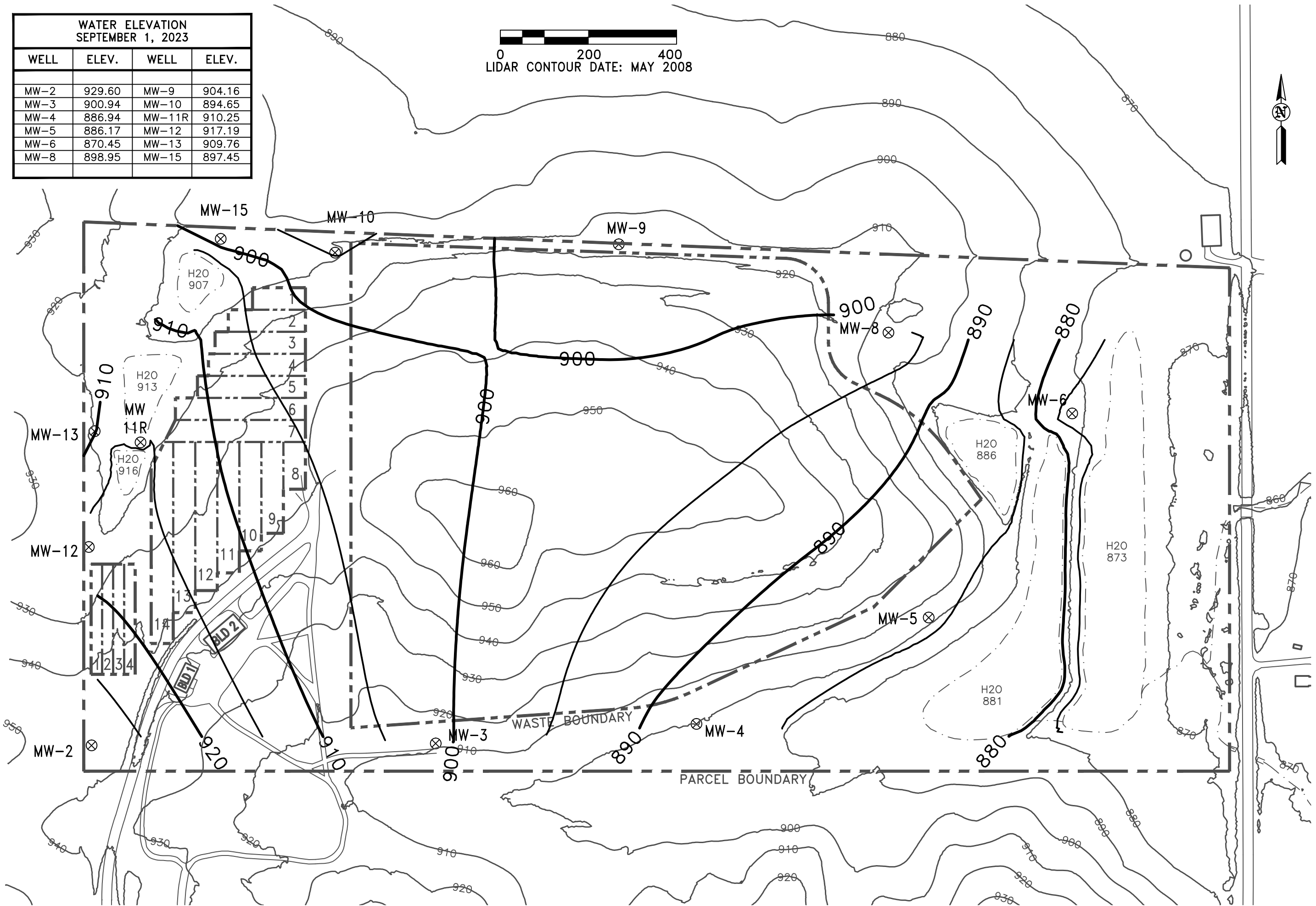
SITE PLAN

POWESHIEK COUNTY SANITARY LANDFILL
MONTEZUMA, IOWA

FIGURE: 1

REVISION	NO.	DATE
DRAWN	6011	9-23-23
DRA		

WATER ELEVATION SEPTEMBER 1, 2023			
WELL	ELEV.	WELL	ELEV.
MW-2	929.60	MW-9	904.16
MW-3	900.94	MW-10	894.65
MW-4	886.94	MW-11R	910.25
MW-5	886.17	MW-12	917.19
MW-6	870.45	MW-13	909.76
MW-8	898.95	MW-15	897.45



GROUNDWATER CONTOURS

POWESHIEK COUNTY SANITARY LANDFILL
MONTEZUMA, IOWA

HLW Engineering Group
204 West Broad Street, P.O. Box 314
Story City, Iowa 50248
Phone: (515) 733-4144
FAX: (515) 733-4146



FIGURE:

2

REVISION NO. DATE

DRAWN PROJECT NO. DATE
DRA 6011 9-23-23

ATTACHMENT A

Water Quality Results & Summary

HMSP Sampling & Testing Results
Summary of Detections

Date	Compound	Statewide Standard IAC-137	Units	MW-1 (upgradient (bedrock)	MW-2 (upgradient)	MW-3	MW-4	MW-5	MW-6	MW-7 (bedrock)	MW-8	MW-9	MW-10	MW-11R	MW-12 Step-Out Well	MW-13 Step-Out Well	MW-15 Step-Out Well
9/3/2015	Chloroethane	2,800	ug/L	<1	<1	<1	1.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
3/9/2016	Chloroethane	2,800	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
9/12/2016	Chloroethane	2,800	ug/L	<1	<1	2.7	2.6	1.0	<1	<1	<1	<1	<1	<1	<1	<1	<1
3/6/2017	Chloroethane	2,800	ug/L	NT	NT	<1	1.7	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/13/2017	Chloroethane	2,800	ug/L	NT	NT	1.0	2.3	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
3/15/2018	Chloroethane	2,800	ug/L	NT	NT	<1	1.8	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/11/2019	Chloroethane	2,800	ug/L	NT	NT	<1	5.1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
3/2/2020	Chloroethane	2,800	ug/L	NT	NT	<1	2.7	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/20/2021	Chloroethane	2,800	ug/L	NT	NT	1.0	4.6	1.0	NT	NT	NT	<1	NT	NT	NT	NT	NT
3/1/2022	Chloroethane	2,800	ug/L	NT	NT	<1	<1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/1/2023	Chloroethane	2,800	ug/L	NT	NT	<1	1.5	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/3/2015	Acetone	6,300	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	18.8	<10	<10	<10
3/9/2016	Acetone	6,300	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
9/12/2016	Acetone	6,300	ug/L	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
3/6/2017	Acetone	6,300	ug/L	NT	NT	<10	<10	<10	NT	NT	NT	<10	NT	NT	NT	NT	NT
9/13/2017	Acetone	6,300	ug/L	NT	NT	<10	<10	NR*	NT	NT	NT	<10	NT	NT	NT	NT	NT
3/15/2018	Acetone	6,300	ug/L	NT	NT	<10	<10	<10	NT	NT	NT	<10	NT	NT	NT	NT	NT
9/11/2019	Acetone	6,300	ug/L	NT	NT	<10	<10	<10	NT	NT	NT	<10	NT	NT	NT	NT	NT
3/2/2020	Acetone	6,300	ug/L	NT	NT	<10	<10	<10	NT	NT	NT	<10	NT	NT	NT	NT	NT
9/20/2021	Acetone	6,300	ug/L	NT	NT	<10	<10	<10	NT	NT	NT	<10	NT	NT	NT	NT	NT
3/1/2022	Acetone	6,300	ug/L	NT	NT	<10	<10	<10	NT	NT	NT	<10	NT	NT	NT	NT	NT
9/1/2023	Acetone	6,300	ug/L	NT	NT	<10	<10	<10	NT	NT	NT	<10	NT	NT	NT	NT	NT
9/3/2015	cis-1,2-DCE	70	ug/L	<1	<1	<1	1.4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
3/9/2016	cis-1,2-DCE	70	ug/L	<1	<1	<1	2.1	<1	<1	<1	<1	1.7	<1	<1	<1	<1	<1
9/12/2016	cis-1,2-DCE	70	ug/L	<1	<1	3.6	1.3	<1	<1	<1	<1	3.5	<1	<1	<1	<1	<1
3/6/2017	cis-1,2-DCE	70	ug/L	NT	NT	<1	3.1	<1	NT	NT	NT	2.8	NT	NT	NT	NT	NT
9/13/2017	cis-1,2-DCE	70	ug/L	NT	NT	<1	4.4	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
3/15/2018	cis-1,2-DCE	70	ug/L	NT	NT	<1	4.9	<1	NT	NT	NT	3.1	NT	NT	NT	NT	NT
9/11/2019	cis-1,2-DCE	70	ug/L	NT	NT	<1	5	<1	NT	NT	NT	3.3	NT	NT	NT	NT	NT
3/2/2020	cis-1,2-DCE	70	ug/L	NT	NT	<1	3	<1	NT	NT	NT	2.3	NT	NT	NT	NT	NT
9/20/2021	cis-1,2-DCE	70	ug/L	NT	NT	1.4	3.6	<1	NT	NT	NT	2.3	NT	NT	NT	NT	NT
3/1/2022	cis-1,2-DCE	70	ug/L	NT	NT	<1	2.1	<1	NT	NT	NT	2.5	NT	NT	NT	NT	NT
9/1/2023	cis-1,2-DCE	70	ug/L	NT	NT	1.2	1.3	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/3/2015	Benzene	5	ug/L	<1	<1	<1	1.0	<1	<1	<1	<1	<1	<1	8.0	<1	<1	<1
3/9/2016	Benzene	5	ug/L	<1	<1	<1	1.1	<1	<1	<1	<1	<1	<1	5.7	<1	<1	<1
9/12/2016	Benzene	5	ug/L	<1	<1	1.5	<1	<1	<1	<1	<1	<1	<1	6.7	<1	<1	<1
3/6/2017	Benzene	5	ug/L	NT	NT	<1	1.1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/13/2017	Benzene	5	ug/L	NT	NT	<1	1.6	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
3/15/2018	Benzene	5	ug/L	NT	NT	<1	<1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/11/2019	Benzene	5	ug/L	NT	NT	<1	1.4	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
3/2/2020	Benzene	5	ug/L	NT	NT	<1	2.4	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/20/2021	Benzene	5	ug/L	NT	NT	<1	2.0	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
3/1/2022	Benzene	5	ug/L	NT	NT	<1	<1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/1/2023	Benzene	5	ug/L	NT	NT	<1	3.3	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/3/2015	TCE	5	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	4.3	<1	<1	<1
3/9/2016	TCE	5	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
9/12/2016	TCE	5	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
3/6/2017	TCE	5	ug/L	NT	NT	<1	<1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/13/2017	TCE	5	ug/L	NT	NT	<1	<1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
3/15/2018	TCE	5	ug/L	NT	NT	<1	<1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/11/2019	TCE	5	ug/L	NT	NT	<1	<1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
3/2/2020	TCE	5	ug/L	NT	NT	<1	<1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/20/2021	TCE	5	ug/L	NT	NT	<1	<1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
3/1/2022	TCE	5	ug/L	NT	NT	<1	<1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/1/2023	TCE	5	ug/L	NT	NT	<1	<1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/3/2015	Chlorobenzene	100	ug/L	<1	<1	<1	1.4	<1	<1	<1	<1	<1	<1	2.1	<1	<1	<1
3/9/2016	Chlorobenzene	100	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.9	<1	<1	<1
9/12/2016	Chlorobenzene	100	ug/L	<1	<1	1.9	<1	<1	<1	<1	<1	<1	<1	5.2	<1	<1	<1
3/6/2017	Chlorobenzene	100	ug/L	NT	NT	<1	1.3	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/13/2017	Chlorobenzene	100	ug/L	NT	NT	<1	2.1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
3/15/2018	Chlorobenzene	100	ug/L	NT	NT	<1	1.6	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/11/2019	Chlorobenzene	100	ug/L	NT	NT	<1	3.6	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
3/2/2020	Chlorobenzene	100	ug/L	NT	NT	<1	4	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/20/2021	Chlorobenzene	100	ug/L	NT	NT	<1	5.9	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
3/1/2022	Chlorobenzene	100	ug/L	NT	NT	<1	2.1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/1/2023	Chlorobenzene	100	ug/L	NT	NT	<1	9.1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/3/2015	Xylenes, total	10,000	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	2.8	<2	<2	<2
3/9/2016	Xylenes, total	10,000	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
9/12/2016	Xylenes, total	10,000	ug/L	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
3/6/2017	Xylenes, total	10,000	ug/L	NT	NT	<2	<2	<2	NT	NT	NT	<2	NT	NT	NT	NT	NT
9/13/2017	Xylenes, total	10,000	ug/L	NT	NT	<2	<2	<2	NT	NT	NT	<2	NT	NT	NT	NT	NT
3/15/2018	Xylenes, total	10,000	ug/L	NT	NT	<2	<2	<2	NT	NT	NT	<2	NT	NT	NT	NT	NT
9/11/2019	Xylenes, total	10,000	ug/L	NT	NT	<2	<2	<2	NT	NT	NT	<2	NT	NT	NT	NT	NT
3/2/2020	Xylenes, total	10,000	ug/L	NT	NT	<2	<2	<2	NT	NT	NT	<2	NT	NT	NT	NT	NT
9/20/2021	Xylenes, total	10,000	ug/L	NT	NT	<2	<2	<2	NT	NT	NT	<2	NT	NT	NT	NT	NT
3/1/2022	Xylenes, total	10,000	ug/L	NT	NT	<2	<2	<2	NT	NT	NT	<2	NT	NT	NT	NT	NT
9/1/2023	Xylenes, total	10,000	ug/L	NT	NT	<2	<2	<2	NT	NT	NT	<2	NT	NT	NT	NT	NT
9/3/2015	1,1-dichloroethane	140	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
3/9/2016	1,1-dichloroethane	140	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
9/12/2016	1,1-dichloroethane	140	ug/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
3/6/2017	1,1-dichloroethane	140	ug/L	NT	NT	<1	<1	3.3	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/13/2017	1,1-dichloroethane	140	ug/L	NT	NT	<1	<1	2.8	NT	NT	NT	<1	NT	NT	NT	NT	NT
3/15/2018	1,1-dichloroethane	140	ug/L	NT	NT	<1	<1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/11/2019	1,1-dichloroethane	140	ug/L	NT	NT	<1	<1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
3/2/2020	1,1-dichloroethane	140	ug/L	NT	NT	<1	<1	<1	NT	NT	NT	<1	NT	NT	NT	NT	NT
9/20/2021	1,1-dichloroethane	140	ug/L	NT	NT	<1	<1	2.8	NT	NT	NT	<1	NT	NT	NT	NT	NT
3/1/2022	1,1-dichlor																

	Compound	Statewide Standard IAC-137	Units	MW-1 (upgradient (bedrock)	MW-2 (upgradient)	MW-3	MW-4	MW-5	MW-6	MW-7 (bedrock)	MW-8	MW-9	MW-10	MW-11R	MW-12 Step-Out Well	MW-13 Step-Out Well	MW-15 Step-Out Well
Date																	
9/3/2015	Arsenic, total	0.01	mg/L	<0.004	<0.004	0.0144	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.0099	<0.004	<0.004	<0.004
3/9/2016	Arsenic, total	0.01	mg/L	<0.004	<0.004	<0.004	0.0042	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.0246	<0.004	<0.004	<0.004
9/12/2016	Arsenic, total	0.01	mg/L	<0.004	<0.004	0.0053	<0.004	<0.004	<0.004	<0.004	0.0049	<0.004	<0.004	0.0574	<0.004	<0.004	<0.004
3/6/2017	Arsenic, total	0.01	mg/L	NT	NT	<0.004	<0.004	NT	NT	NT	<0.004	NT	NT	NT	NT	NT	NT
9/13/2017	Arsenic, total	0.01	mg/L	NT	NT	<0.004	<0.004	NT	NT	NT	<0.004	NT	NT	NT	NT	NT	NT
3/15/2018	Arsenic, total	0.01	mg/L	NT	NT	<0.004	<0.004	NT	NT	NT	<0.004	NT	NT	NT	NT	NT	NT
9/11/2019	Arsenic, total	0.01	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
3/2/2020	Arsenic, total	0.01	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/20/2021	Arsenic, total	0.01	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
3/1/2022	Arsenic, total	0.01	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/1/2023	Arsenic, total	0.01	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/3/2015	Barium, total	2	mg/L	0.0147	0.160	0.208	0.298	0.187	0.207	0.0369	0.136	1.99	0.158	0.417	0.335	0.179	0.129
3/9/2016	Barium, total	2	mg/L	0.026	0.186	0.228	0.388	0.227	0.216	0.0363	0.144	1.26	0.195	0.675	0.34	0.162	0.175
9/12/2016	Barium, total	2	mg/L	0.029	0.182	0.326	0.412	0.292	0.209	0.0307	0.261	0.999	0.185	0.647	0.306	0.16	0.133
3/6/2017	Barium, total	2	mg/L	0.0286	0.188	0.312	0.381	0.207	NT	NT	0.435	1.67	0.445	NT	NT	NT	NT
9/13/2017	Barium, total	2	mg/L	0.0131	0.195	0.324	0.427	0.305	NT	NT	0.223	1.03	0.207	NT	NT	NT	NT
3/15/2018	Barium, total	2	mg/L	NT	0.177	0.268	0.418	0.233	NT	NT	0.103	1.28	0.187	NT	NT	NT	NT
9/11/2019	Barium, total	2	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
3/2/2020	Barium, total	2	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/20/2021	Barium, total	2	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
3/1/2022	Barium, total	2	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/1/2023	Barium, total	2	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/3/2015	Cadmium, total	0.005	mg/L	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
3/9/2016	Cadmium, total	0.005	mg/L	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
9/12/2016	Cadmium, total	0.005	mg/L	0.0013	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008
3/6/2017	Cadmium, total	0.005	mg/L	<0.0008	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/13/2017	Cadmium, total	0.005	mg/L	<0.0008	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
3/15/2018	Cadmium, total	0.005	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/11/2019	Cadmium, total	0.005	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
3/2/2020	Cadmium, total	0.005	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/20/2021	Cadmium, total	0.005	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
3/1/2022	Cadmium, total	0.005	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/1/2023	Cadmium, total	0.005	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/3/2015	Cobalt, total	0.0028	mg/L	0.0011	<0.0008	0.0128	0.0097	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	0.0052	<0.0008	<0.0008	<0.0008
3/9/2016	Cobalt, total	0.0028	mg/L	0.0011	<0.0008	<0.0008	0.0229	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	<0.0008	0.0077	<0.0008	<0.0008	<0.0008
9/12/2016	Cobalt, total	0.0028	mg/L	<0.0008	<0.0008	0.0099	0.0218	0.0012	<0.0008	<0.0008	0.0011	<0.0008	<0.0008	0.0089	<0.0008	<0.0008	<0.0008
3/6/2017	Cobalt, total	0.0028	mg/L	0.0021	NT	<0.0008	0.0241	<0.0008	NT	NT	0.0018	NT	NT	NT	NT	NT	NT
9/13/2017	Cobalt, total	0.0028	mg/L	0.0014	NT	0.0263	0.0415	0.0008	NT	NT	<0.0008	NT	NT	NT	NT	NT	NT
3/15/2018	Cobalt, total	0.0021	mg/L	NT	NT	<0.0008	0.0314	0.0022	NT	NT	<0.0008	NT	NT	NT	NT	NT	NT
9/11/2019	Cobalt, total	0.0021	mg/L	NT	NT	0.0054	0.0678	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
3/2/2020	Cobalt, total	0.0021	mg/L	NT	NT	<0.0008	0.0730	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/20/2021	Cobalt, total	0.0021	mg/L	NT	NT	0.0010	0.0717	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
3/1/2022	Cobalt, total	0.0021	mg/L	NT	NT	<0.0004	0.0511	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/1/2023	Cobalt, total	0.0021	mg/L	NT	NT	0.0006	0.0781	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/3/2015	Copper, total	1.3	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
3/9/2016	Copper, total	1.3	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
9/12/2016	Copper, total	1.3	mg/L	0.0064	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	0.0058	<0.004	0.0043	<0.004	<0.004	0.0043	<0.004
3/6/2017	Copper, total	1.3	mg/L	<0.004	NT	NT	NT	NT	NT	NT	0.0072	NT	NT	NT	NT	NT	NT
9/13/2017	Copper, total	1.3	mg/L	<0.004	NT	NT	NT	NT	NT	NT	<0.004	NT	<0.004	NT	NT	NT	NT
3/15/2018	Copper, total	1.3	mg/L	NT	NT	NT	NT	NT	NT	NT	<0.004	NT	<0.004	NT	NT	NT	NT
9/11/2019	Copper, total	1.3	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
3/2/2020	Copper, total	1.3	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/20/2021	Copper, total	1.3	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
3/1/2022	Copper, total	1.3	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/1/2023	Copper, total	1.3	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/3/2015	Nickel, total	0.1	mg/L	0.0044	<0.004	0.0076	0.048	<0.004	<0.004	<0.004	0.0166	<0.004	<0.004	0.0287	<0.004	<0.004	<0.004
3/9/2016	Nickel, total	0.1	mg/L	<0.004	<0.004	<0.004	0.0577	0.0075	<0.004	<0.004	0.0053	<0.004	<0.004	0.0282	<0.004	<0.004	<0.004
9/12/2016	Nickel, total	0.1	mg/L	0.0045	0.0114	0.0067	0.0462	0.0192	<0.004	<0.004	0.0162	<0.004	<0.004	0.0257	<0.004	<0.004	<0.004
3/6/2017	Nickel, total	0.1	mg/L	0.0063	<0.004	<0.004	0.0515	0.0195	NT	NT	0.0268	NT	NT	NT	NT	NT	NT
9/13/2017	Nickel, total	0.1	mg/L	<0.004	<0.004	0.0110	0.0614	0.0161	NT	NT	0.0112	NT	NT	NT	NT	NT	NT
3/15/2018	Nickel, total	0.1	mg/L	NT	<0.004	<0.004	0.0514	0.0194	NT	NT	0.0053	NT	NT	NT	NT	NT	NT
9/11/2019	Nickel, total	0.1	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
3/2/2020	Nickel, total	0.1	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/20/2021	Nickel, total	0.1	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
3/1/2022	Nickel, total	0.1	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/1/2023	Nickel, total	0.1	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/3/2015	Antimony, total	0.006	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
3/9/2016	Antimony, total	0.006	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
9/12/2016	Antimony, total	0.006	mg/L	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0032	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
3/6/2017	Antimony, total	0.006	mg/L	NT	NT	NT	NT	NT	NT	NT	<0.002	NT	NT	NT	NT	NT	NT
9/13/2017	Antimony, total	0.006	mg/L	NT	NT	NT	NT	NT	NT	NT	<0.002	NT	NT	NT	NT	NT	NT
3/15/2018	Antimony, total	0.006	mg/L	NT	NT	NT	NT	NT	NT	NT	<0.002	NT	NT	NT	NT	NT	NT
9/11/2019	Antimony, total	0.006	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
3/2/2020	Antimony, total	0.006	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/20/2021	Antimony, total	0.006	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
3/1/2022	Antimony, total	0.006	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/1/2023	Antimony, total	0.006	mg/L	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT
9/3/2015	Zinc, total	2	mg/L	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008	0.0095	<0.008	<0.008	<0.008
3/9/2016																	



Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GI0072

Project Description

Poweshiek Co. Landfill-COC1

For:

Todd Whipple

HLW Engineering

PO Box 314

Story City, IA 50248

A handwritten signature in black ink that reads "Heather Murphy". The signature is written in a cursive, flowing style.

Heather Murphy

Customer Relationship Specialist

Friday, September 15, 2023

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Keystone Laboratories - Newton. If you have any questions, comments, or require further assistance regarding this report, please contact your service representative listed above.

I certify that all test results meet all of the requirements of the accrediting authority listed within this report. Analytical results are reported on a 'as received' basis unless specified otherwise. Analytical results for solids with units ending in (dry) are reported on a dry weight basis. A statement of uncertainty for each analysis is available upon request. This laboratory report shall not be reproduced, except in full, without the written approval of Microbac Laboratories. The reported results are related only to the samples analyzed as received.

Microbac Laboratories, Inc.

600 East 17th Street South | Newton, IA 50208 | 641-792-8451 p | www.microbac.com



Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GI0072

HLW Engineering

Todd Whipple
PO Box 314
Story City, IA 50248

Project Name: Poweshiek Co. Landfill-COC1

Project / PO Number: / 6011
Received: 09/01/2023
Reported: 09/15/2023

Sample Summary Report

<u>Sample Name</u>	<u>Laboratory ID</u>	<u>Client Matrix</u>	<u>Sample Type</u>	<u>Sample Begin</u>	<u>Sample Taken</u>	<u>Lab Received</u>
MW-3	1GI0072-01	Water	GRAB		09/01/23 11:00	09/01/23 13:36
MW-4	1GI0072-02	Water	GRAB		09/01/23 11:20	09/01/23 13:36
MW-5	1GI0072-03	Water	GRAB		09/01/23 12:15	09/01/23 13:36
MW-9	1GI0072-04	Water	GRAB		09/01/23 12:15	09/01/23 13:36
Duplicate	1GI0072-05	Water	GRAB		09/01/23 00:00	09/01/23 13:36

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GI0072

Analytical Testing Parameters

Client Sample ID:	MW-3	Collected By:	Whipple, Todd
Sample Matrix:	Water	Collection Date:	09/01/2023 11:00
Lab Sample ID:	1GI0072-01		

Determination of Volatile Organic Compounds	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 5030B/EPA 8260B								
Chloromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Vinyl Chloride	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Bromomethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Chloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Trichlorofluoromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
1,1-Dichloroethylene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Acetone	<10.0	10.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Methyl Iodide	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Carbon Disulfide	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Methylene Chloride	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Acrylonitrile	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
trans-1,2-Dichloroethylene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
1,1-Dichloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Vinyl Acetate	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
cis-1,2-Dichloroethylene	1.2	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
2-Butanone (MEK)	<10.0	10.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Bromochloromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Chloroform	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
1,1,1-Trichloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Carbon Tetrachloride	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Benzene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
1,2-Dichloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Trichloroethylene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
1,2-Dichloropropane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Dibromomethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Bromodichloromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
cis-1,3-Dichloropropene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
4-Methyl-2-pentanone (MIBK)	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Toluene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
trans-1,3-Dichloropropene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
1,1,2-Trichloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Tetrachloroethylene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
2-Hexanone (MBK)	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Dibromochloromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
1,2-Dibromoethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Chlorobenzene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
1,1,1,2-Tetrachloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Ethylbenzene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Xylenes, total	<2.0	2.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Styrene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GI0072

Client Sample ID: MW-3
Sample Matrix: Water
Lab Sample ID: 1GI0072-01

Collected By: Whipple, Todd
Collection Date: 09/01/2023 11:00

Determination of Volatile Organic Compounds	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
Bromoform	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
1,2,3-Trichloropropane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
trans-1,4-Dichloro-2-butene	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
1,1,2,2-Tetrachloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
1,4-Dichlorobenzene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
1,2-Dichlorobenzene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
1,2-Dibromo-3-chloropropane	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1228	CSM
Surrogate: Dibromofluoromethane	127	Limit: 75-136	% Rec	1		09/05/23 0000	09/05/23 1228	CSM
Surrogate: Dibromofluoromethane	127	Limit: 80-126	% Rec	1	S-GC	09/05/23 0000	09/05/23 1228	CSM
Surrogate: 1,2-Dichloroethane-d4	119	Limit: 63-138	% Rec	1		09/05/23 0000	09/05/23 1228	CSM
Surrogate: 1,2-Dichloroethane-d4	119	Limit: 61-142	% Rec	1		09/05/23 0000	09/05/23 1228	CSM
Surrogate: Toluene-d8	101	Limit: 82-121	% Rec	1		09/05/23 0000	09/05/23 1228	CSM
Surrogate: Toluene-d8	101	Limit: 87-116	% Rec	1		09/05/23 0000	09/05/23 1228	CSM
Surrogate: 4-Bromofluorobenzene	105	Limit: 85-111	% Rec	1		09/05/23 0000	09/05/23 1228	CSM
Surrogate: 4-Bromofluorobenzene	105	Limit: 80-116	% Rec	1		09/05/23 0000	09/05/23 1228	CSM

Determination of Total Metals	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 3005A/EPA 6020A								
Cobalt, total	0.0006	0.0004	mg/L	4		09/06/23 1605	09/07/23 1731	RVV

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GI0072

Client Sample ID: MW-4
Sample Matrix: Water
Lab Sample ID: 1GI0072-02

Collected By: Whipple, Todd
Collection Date: 09/01/2023 11:20

Determination of Volatile Organic Compounds	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 5030B/EPA 8260B								
Chloromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Vinyl Chloride	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Bromomethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Chloroethane	1.5	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Trichlorofluoromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
1,1-Dichloroethylene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Acetone	<10.0	10.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Methyl Iodide	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Carbon Disulfide	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Methylene Chloride	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Acrylonitrile	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
trans-1,2-Dichloroethylene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
1,1-Dichloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Vinyl Acetate	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
cis-1,2-Dichloroethylene	1.3	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
2-Butanone (MEK)	<10.0	10.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Bromochloromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Chloroform	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
1,1,1-Trichloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Carbon Tetrachloride	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Benzene	3.3	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
1,2-Dichloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Trichloroethylene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
1,2-Dichloropropane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Dibromomethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Bromodichloromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
cis-1,3-Dichloropropene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
4-Methyl-2-pentanone (MIBK)	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Toluene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
trans-1,3-Dichloropropene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
1,1,2-Trichloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Tetrachloroethylene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
2-Hexanone (MBK)	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Dibromochloromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
1,2-Dibromoethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Chlorobenzene	9.1	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
1,1,1,2-Tetrachloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Ethylbenzene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Xylenes, total	<2.0	2.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Styrene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Bromoform	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
1,2,3-Trichloropropane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GI0072

Client Sample ID:	MW-4	Collected By:	Whipple, Todd
Sample Matrix:	Water	Collection Date:	09/01/2023 11:20
Lab Sample ID:	1GI0072-02		

Determination of Volatile Organic Compounds	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
trans-1,4-Dichloro-2-butene	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
1,1,2,2-Tetrachloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
1,4-Dichlorobenzene	3.7	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
1,2-Dichlorobenzene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
1,2-Dibromo-3-chloropropane	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1255	CSM
Surrogate: Dibromofluoromethane	120	Limit: 75-136	% Rec	1		09/05/23 0000	09/05/23 1255	CSM
Surrogate: Dibromofluoromethane	120	Limit: 80-126	% Rec	1		09/05/23 0000	09/05/23 1255	CSM
Surrogate: 1,2-Dichloroethane-d4	121	Limit: 63-138	% Rec	1		09/05/23 0000	09/05/23 1255	CSM
Surrogate: 1,2-Dichloroethane-d4	121	Limit: 61-142	% Rec	1		09/05/23 0000	09/05/23 1255	CSM
Surrogate: Toluene-d8	101	Limit: 82-121	% Rec	1		09/05/23 0000	09/05/23 1255	CSM
Surrogate: Toluene-d8	101	Limit: 87-116	% Rec	1		09/05/23 0000	09/05/23 1255	CSM
Surrogate: 4-Bromofluorobenzene	102	Limit: 85-111	% Rec	1		09/05/23 0000	09/05/23 1255	CSM
Surrogate: 4-Bromofluorobenzene	102	Limit: 80-116	% Rec	1		09/05/23 0000	09/05/23 1255	CSM

Determination of Total Metals	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 3005A/EPA 6020A								
Cobalt, total	0.0781	0.0004	mg/L	4		09/06/23 1605	09/07/23 1807	RVV

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GI0072

Client Sample ID: MW-5
Sample Matrix: Water
Lab Sample ID: 1GI0072-03

Collected By: Whipple, Todd
Collection Date: 09/01/2023 12:15

Determination of Volatile Organic Compounds	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 5030B/EPA 8260B								
Chloromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Vinyl Chloride	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Bromomethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Chloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Trichlorofluoromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
1,1-Dichloroethylene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Acetone	<10.0	10.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Methyl Iodide	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Carbon Disulfide	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Methylene Chloride	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Acrylonitrile	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
trans-1,2-Dichloroethylene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
1,1-Dichloroethane	1.2	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Vinyl Acetate	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
cis-1,2-Dichloroethylene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
2-Butanone (MEK)	<10.0	10.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Bromochloromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Chloroform	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
1,1,1-Trichloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Carbon Tetrachloride	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Benzene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
1,2-Dichloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Trichloroethylene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
1,2-Dichloropropane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Dibromomethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Bromodichloromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
cis-1,3-Dichloropropene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
4-Methyl-2-pentanone (MIBK)	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Toluene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
trans-1,3-Dichloropropene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
1,1,2-Trichloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Tetrachloroethylene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
2-Hexanone (MBK)	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Dibromochloromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
1,2-Dibromoethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Chlorobenzene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
1,1,1,2-Tetrachloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Ethylbenzene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Xylenes, total	<2.0	2.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Styrene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Bromoform	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
1,2,3-Trichloropropane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GI0072

Client Sample ID:	MW-5	Collected By:	Whipple, Todd
Sample Matrix:	Water	Collection Date:	09/01/2023 12:15
Lab Sample ID:	1GI0072-03		

Determination of Volatile Organic Compounds	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
trans-1,4-Dichloro-2-butene	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
1,1,2,2-Tetrachloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
1,4-Dichlorobenzene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
1,2-Dichlorobenzene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
1,2-Dibromo-3-chloropropane	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1322	CSM
Surrogate: Dibromofluoromethane	122	Limit: 75-136	% Rec	1		09/05/23 0000	09/05/23 1322	CSM
Surrogate: Dibromofluoromethane	122	Limit: 80-126	% Rec	1		09/05/23 0000	09/05/23 1322	CSM
Surrogate: 1,2-Dichloroethane-d4	121	Limit: 63-138	% Rec	1		09/05/23 0000	09/05/23 1322	CSM
Surrogate: 1,2-Dichloroethane-d4	121	Limit: 61-142	% Rec	1		09/05/23 0000	09/05/23 1322	CSM
Surrogate: Toluene-d8	103	Limit: 82-121	% Rec	1		09/05/23 0000	09/05/23 1322	CSM
Surrogate: Toluene-d8	103	Limit: 87-116	% Rec	1		09/05/23 0000	09/05/23 1322	CSM
Surrogate: 4-Bromofluorobenzene	103	Limit: 85-111	% Rec	1		09/05/23 0000	09/05/23 1322	CSM
Surrogate: 4-Bromofluorobenzene	103	Limit: 80-116	% Rec	1		09/05/23 0000	09/05/23 1322	CSM

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GI0072

Client Sample ID: MW-9
Sample Matrix: Water
Lab Sample ID: 1GI0072-04

Collected By: Whipple, Todd
Collection Date: 09/01/2023 12:15

Determination of Volatile Organic Compounds	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 5030B/EPA 8260B								
Chloromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Vinyl Chloride	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Bromomethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Chloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Trichlorofluoromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
1,1-Dichloroethylene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Acetone	<10.0	10.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Methyl Iodide	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Carbon Disulfide	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Methylene Chloride	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Acrylonitrile	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
trans-1,2-Dichloroethylene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
1,1-Dichloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Vinyl Acetate	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
cis-1,2-Dichloroethylene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
2-Butanone (MEK)	<10.0	10.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Bromochloromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Chloroform	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
1,1,1-Trichloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Carbon Tetrachloride	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Benzene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
1,2-Dichloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Trichloroethylene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
1,2-Dichloropropane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Dibromomethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Bromodichloromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
cis-1,3-Dichloropropene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
4-Methyl-2-pentanone (MIBK)	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Toluene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
trans-1,3-Dichloropropene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
1,1,2-Trichloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Tetrachloroethylene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
2-Hexanone (MBK)	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Dibromochloromethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
1,2-Dibromoethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Chlorobenzene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
1,1,1,2-Tetrachloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Ethylbenzene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Xylenes, total	<2.0	2.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Styrene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Bromoform	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
1,2,3-Trichloropropane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GI0072

Client Sample ID: MW-9
Sample Matrix: Water
Lab Sample ID: 1GI0072-04

Collected By: Whipple, Todd
Collection Date: 09/01/2023 12:15

Determination of Volatile Organic Compounds	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
trans-1,4-Dichloro-2-butene	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
1,1,2,2-Tetrachloroethane	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
1,4-Dichlorobenzene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
1,2-Dichlorobenzene	<1.0	1.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
1,2-Dibromo-3-chloropropane	<5.0	5.0	ug/L	1		09/05/23 0000	09/05/23 1349	CSM
Surrogate: Dibromofluoromethane	122	Limit: 75-136	% Rec	1		09/05/23 0000	09/05/23 1349	CSM
Surrogate: Dibromofluoromethane	122	Limit: 80-126	% Rec	1		09/05/23 0000	09/05/23 1349	CSM
Surrogate: 1,2-Dichloroethane-d4	121	Limit: 63-138	% Rec	1		09/05/23 0000	09/05/23 1349	CSM
Surrogate: 1,2-Dichloroethane-d4	121	Limit: 61-142	% Rec	1		09/05/23 0000	09/05/23 1349	CSM
Surrogate: Toluene-d8	102	Limit: 82-121	% Rec	1		09/05/23 0000	09/05/23 1349	CSM
Surrogate: Toluene-d8	102	Limit: 87-116	% Rec	1		09/05/23 0000	09/05/23 1349	CSM
Surrogate: 4-Bromofluorobenzene	101	Limit: 85-111	% Rec	1		09/05/23 0000	09/05/23 1349	CSM
Surrogate: 4-Bromofluorobenzene	101	Limit: 80-116	% Rec	1		09/05/23 0000	09/05/23 1349	CSM

Client Sample ID: Duplicate
Sample Matrix: Water
Lab Sample ID: 1GI0072-05

Collected By: Whipple, Todd
Collection Date: 09/01/2023

Determination of Total Metals	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 3005A/EPA 6020A								
Cobalt, total	0.0006	0.0004	mg/L	4		09/06/23 1605	09/07/23 1813	RVV

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GI0072

Batch Log Summary

Method	Batch	Laboratory ID	Client / Source ID
EPA 8260B	1GI0132	1GI0132-BS1	
		1GI0132-BSD1	
		1GI0132-BLK1	
		1GI0072-01	MW-3
		1GI0072-02	MW-4
		1GI0072-03	MW-5
		1GI0072-04	MW-9
		1GI0132-MS1	1GH2610-01
		1GI0132-MSD1	1GH2610-01
Method	Batch	Laboratory ID	Client / Source ID
EPA 6020A	1GI0229	1GI0229-BLK1	
		1GI0229-BS1	
		1GI0072-01	MW-3
		1GI0229-MS1	1GI0072-01
		1GI0229-MSD1	1GI0072-01
		1GI0229-PS1	1GI0072-01
		1GI0072-02	MW-4
		1GI0072-05	Duplicate

Batch Quality Control Summary: Keystone Laboratories - Newton

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GI0132 - EPA 5030B - EPA 8260B										
Blank (1GI0132-BLK1)				Prepared: 09/05/23 00:00 Analyzed: 09/05/23 11:02						
Chloromethane	<1.0	1.0	ug/L							
Vinyl Chloride	<1.0	1.0	ug/L							
Bromomethane	<1.0	1.0	ug/L							
Chloroethane	<1.0	1.0	ug/L							
Trichlorofluoromethane	<1.0	1.0	ug/L							
1,1-Dichloroethylene	<1.0	1.0	ug/L							
Acetone	<10.0	10.0	ug/L							
Methyl Iodide	<1.0	1.0	ug/L							
Carbon Disulfide	<1.0	1.0	ug/L							
Methylene Chloride	<5.0	5.0	ug/L							
Acrylonitrile	<5.0	5.0	ug/L							
trans-1,2-Dichloroethylene	<1.0	1.0	ug/L							
1,1-Dichloroethane	<1.0	1.0	ug/L							
Vinyl Acetate	<5.0	5.0	ug/L							
cis-1,2-Dichloroethylene	<1.0	1.0	ug/L							
2-Butanone (MEK)	<10.0	10.0	ug/L							

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GI0072

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GI0132 - EPA 5030B - EPA 8260B										
Blank (1GI0132-BLK1)										
Prepared: 09/05/23 00:00 Analyzed: 09/05/23 11:02										
Bromochloromethane	<1.0	1.0	ug/L							
Chloroform	<1.0	1.0	ug/L							
1,1,1-Trichloroethane	<1.0	1.0	ug/L							
Carbon Tetrachloride	<1.0	1.0	ug/L							
Benzene	<1.0	1.0	ug/L							
1,2-Dichloroethane	<1.0	1.0	ug/L							
Trichloroethylene	<1.0	1.0	ug/L							
1,2-Dichloropropane	<1.0	1.0	ug/L							
Dibromomethane	<1.0	1.0	ug/L							
Bromodichloromethane	<1.0	1.0	ug/L							
cis-1,3-Dichloropropene	<1.0	1.0	ug/L							
4-Methyl-2-pentanone (MIBK)	<5.0	5.0	ug/L							
Toluene	<1.0	1.0	ug/L							
trans-1,3-Dichloropropene	<1.0	1.0	ug/L							
1,1,2-Trichloroethane	<1.0	1.0	ug/L							
Tetrachloroethylene	<1.0	1.0	ug/L							
2-Hexanone (MBK)	<5.0	5.0	ug/L							
Dibromochloromethane	<1.0	1.0	ug/L							
1,2-Dibromoethane	<1.0	1.0	ug/L							
Chlorobenzene	<1.0	1.0	ug/L							
1,1,1,2-Tetrachloroethane	<1.0	1.0	ug/L							
Ethylbenzene	<1.0	1.0	ug/L							
Xylenes, total	<2.0	2.0	ug/L							
Styrene	<1.0	1.0	ug/L							
Bromoform	<1.0	1.0	ug/L							
1,2,3-Trichloropropane	<1.0	1.0	ug/L							
trans-1,4-Dichloro-2-butene	<5.0	5.0	ug/L							
1,1,2,2-Tetrachloroethane	<1.0	1.0	ug/L							
1,4-Dichlorobenzene	<1.0	1.0	ug/L							
1,2-Dichlorobenzene	<1.0	1.0	ug/L							
1,2-Dibromo-3-chloropropane	<5.0	5.0	ug/L							
Surrogate: Dibromofluoromethane										
	59.6		ug/L	50.4		118	80-126			
Surrogate: Dibromofluoromethane										
	59.6		ug/L	50.4		118	75-136			
Surrogate: 1,2-Dichloroethane-d4										
	58.7		ug/L	50.4		116	63-138			
Surrogate: 1,2-Dichloroethane-d4										
	58.7		ug/L	50.4		116	61-142			
Surrogate: Toluene-d8										
	50.8		ug/L	50.2		101	87-116			
Surrogate: Toluene-d8										
	50.8		ug/L	50.2		101	82-121			
Surrogate: 4-Bromofluorobenzene										
	52.6		ug/L	50.4		104	85-111			
Surrogate: 4-Bromofluorobenzene										
	52.6		ug/L	50.4		104	80-116			
LCS (1GI0132-BS1)										
Prepared: 09/05/23 00:00 Analyzed: 09/05/23 09:42										
Chloromethane	108.4	1.0	ug/L	100		108	63-155			
Vinyl Chloride	111.4	1.0	ug/L	100		111	70-154			
Bromomethane	89.77	1.0	ug/L	100		89.8	52-176			

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GI0072

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GI0132 - EPA 5030B - EPA 8260B										
LCS (1GI0132-BS1)				Prepared: 09/05/23 00:00 Analyzed: 09/05/23 09:42						
Chloroethane	115.6	1.0	ug/L	100		116	72-148			
Trichlorofluoromethane	100.4	1.0	ug/L	100		100	70-152			
1,1-Dichloroethylene	62.45	1.0	ug/L	50.0		125	70-148			
Acetone	131.3	10.0	ug/L	104		126	43-172			
Methyl Iodide	193.4	1.0	ug/L	113		172	69-170			QS-02
Carbon Disulfide	126.7	1.0	ug/L	106		119	72-162			
Methylene Chloride	54.28	5.0	ug/L	50.0		109	68-142			
Acrylonitrile	116.9	5.0	ug/L	100		116	67-144			
trans-1,2-Dichloroethylene	60.69	1.0	ug/L	50.0		121	66-148			
1,1-Dichloroethane	59.53	1.0	ug/L	50.0		119	66-143			
Vinyl Acetate	145.5	5.0	ug/L	103		141	43-153			
cis-1,2-Dichloroethylene	57.13	1.0	ug/L	49.5		115	71-149			
2-Butanone (MEK)	137.5	10.0	ug/L	106		129	52-159			
Bromochloromethane	62.40	1.0	ug/L	50.0		125	69-143			
Chloroform	59.37	1.0	ug/L	50.0		119	69-144			
1,1,1-Trichloroethane	54.55	1.0	ug/L	50.0		109	62-129			
Carbon Tetrachloride	61.60	1.0	ug/L	50.0		123	63-141			
Benzene	55.75	1.0	ug/L	50.0		112	71-134			
1,2-Dichloroethane	53.47	1.0	ug/L	50.0		107	72-132			
Trichloroethylene	58.27	1.0	ug/L	50.0		117	71-135			
1,2-Dichloropropane	61.29	1.0	ug/L	50.0		123	69-136			
Dibromomethane	60.04	1.0	ug/L	50.0		120	73-147			
Bromodichloromethane	59.30	1.0	ug/L	50.0		119	68-129			
cis-1,3-Dichloropropene	56.67	1.0	ug/L	50.3		113	65-134			
4-Methyl-2-pentanone (MIBK)	125.6	5.0	ug/L	103		122	58-147			
Toluene	55.70	1.0	ug/L	50.0		111	72-133			
trans-1,3-Dichloropropene	50.47	1.0	ug/L	50.4		100	67-130			
1,1,2-Trichloroethane	52.14	1.0	ug/L	50.0		104	69-135			
Tetrachloroethylene	50.60	1.0	ug/L	50.0		101	69-130			
2-Hexanone (MBK)	135.1	5.0	ug/L	110		122	55-144			
Dibromochloromethane	64.22	1.0	ug/L	49.5		130	73-127			QS-02
1,2-Dibromoethane	51.18	1.0	ug/L	50.0		102	67-132			
Chlorobenzene	51.91	1.0	ug/L	50.0		104	72-123			
1,1,1,2-Tetrachloroethane	60.67	1.0	ug/L	50.0		121	73-127			
Ethylbenzene	53.83	1.0	ug/L	50.0		108	71-127			
Xylenes, total	156.6	2.0	ug/L	150		104	74-127			
Styrene	53.14	1.0	ug/L	50.0		106	66-126			
Bromoform	58.92	1.0	ug/L	50.0		118	68-130			
1,2,3-Trichloropropane	56.81	1.0	ug/L	50.0		114	63-136			
trans-1,4-Dichloro-2-butene	101.1	5.0	ug/L	102		98.8	54-134			
1,1,2,2-Tetrachloroethane	57.66	1.0	ug/L	49.8		116	61-131			
1,4-Dichlorobenzene	52.95	1.0	ug/L	50.0		106	70-129			
1,2-Dichlorobenzene	51.17	1.0	ug/L	50.0		102	69-126			

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GI0072

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GI0132 - EPA 5030B - EPA 8260B										
LCS (1GI0132-BS1)				Prepared: 09/05/23 00:00 Analyzed: 09/05/23 09:42						
1,2-Dibromo-3-chloropropane	55.91	5.0	ug/L	50.0		112	50-143			
Surrogate: Dibromofluoromethane	52.8		ug/L	50.4		105	80-126			
Surrogate: Dibromofluoromethane	52.8		ug/L	50.4		105	75-136			
Surrogate: 1,2-Dichloroethane-d4	55.5		ug/L	50.4		110	63-138			
Surrogate: 1,2-Dichloroethane-d4	55.5		ug/L	50.4		110	61-142			
Surrogate: Toluene-d8	52.5		ug/L	50.2		105	87-116			
Surrogate: Toluene-d8	52.5		ug/L	50.2		105	82-121			
Surrogate: 4-Bromofluorobenzene	48.5		ug/L	50.4		96.1	85-111			
Surrogate: 4-Bromofluorobenzene	48.5		ug/L	50.4		96.1	80-116			
LCS Dup (1GI0132-BS1)				Prepared: 09/05/23 00:00 Analyzed: 09/05/23 10:09						
Chloromethane	97.98	1.0	ug/L	100		98.0	63-155	10.1	24	
Vinyl Chloride	100.5	1.0	ug/L	100		101	70-154	10.2	25	
Bromomethane	86.29	1.0	ug/L	100		86.3	52-176	3.95	27	
Chloroethane	106.4	1.0	ug/L	100		106	72-148	8.34	25	
Trichlorofluoromethane	92.57	1.0	ug/L	100		92.6	70-152	8.07	26	
1,1-Dichloroethylene	56.92	1.0	ug/L	50.0		114	70-148	9.27	24	
Acetone	129.7	10.0	ug/L	104		125	43-172	1.21	30	
Methyl Iodide	179.1	1.0	ug/L	113		159	69-170	7.66	30	
Carbon Disulfide	116.3	1.0	ug/L	106		109	72-162	8.54	24	
Methylene Chloride	51.68	5.0	ug/L	50.0		103	68-142	4.91	21	
Acrylonitrile	115.6	5.0	ug/L	100		115	67-144	1.11	24	
trans-1,2-Dichloroethylene	55.85	1.0	ug/L	50.0		112	66-148	8.31	27	
1,1-Dichloroethane	56.06	1.0	ug/L	50.0		112	66-143	6.00	24	
Vinyl Acetate	246.3	5.0	ug/L	103		238	43-153	51.4	30	QS-02
cis-1,2-Dichloroethylene	63.28	1.0	ug/L	49.5		128	71-149	10.2	26	
2-Butanone (MEK)	144.1	10.0	ug/L	106		136	52-159	4.68	27	
Bromochloromethane	59.63	1.0	ug/L	50.0		119	69-143	4.54	23	
Chloroform	56.13	1.0	ug/L	50.0		112	69-144	5.61	23	
1,1,1-Trichloroethane	51.41	1.0	ug/L	50.0		103	62-129	5.93	24	
Carbon Tetrachloride	57.78	1.0	ug/L	50.0		116	63-141	6.40	25	
Benzene	53.08	1.0	ug/L	50.0		106	71-134	4.91	24	
1,2-Dichloroethane	50.86	1.0	ug/L	50.0		102	72-132	5.00	24	
Trichloroethylene	54.83	1.0	ug/L	50.0		110	71-135	6.08	24	
1,2-Dichloropropane	58.55	1.0	ug/L	50.0		117	69-136	4.57	24	
Dibromomethane	58.90	1.0	ug/L	50.0		118	73-147	1.92	25	
Bromodichloromethane	57.10	1.0	ug/L	50.0		114	68-129	3.78	22	
cis-1,3-Dichloropropene	54.45	1.0	ug/L	50.3		108	65-134	4.00	23	
4-Methyl-2-pentanone (MIBK)	128.3	5.0	ug/L	103		124	58-147	2.08	27	
Toluene	53.05	1.0	ug/L	50.0		106	72-133	4.87	24	
trans-1,3-Dichloropropene	50.16	1.0	ug/L	50.4		99.5	67-130	0.616	24	
1,1,2-Trichloroethane	51.32	1.0	ug/L	50.0		103	69-135	1.59	23	
Tetrachloroethylene	48.30	1.0	ug/L	50.0		96.6	69-130	4.65	25	
2-Hexanone (MBK)	138.5	5.0	ug/L	110		126	55-144	2.50	25	

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GI0072

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GI0132 - EPA 5030B - EPA 8260B										

LCS Dup (1GI0132-BSD1)

Prepared: 09/05/23 00:00 Analyzed: 09/05/23 10:09

Dibromochloromethane	63.32	1.0	ug/L	49.5		128	73-127	1.41	22	QS-02
1,2-Dibromoethane	51.21	1.0	ug/L	50.0		102	67-132	0.0586	24	
Chlorobenzene	49.77	1.0	ug/L	50.0		99.5	72-123	4.21	23	
1,1,1,2-Tetrachloroethane	59.59	1.0	ug/L	50.0		119	73-127	1.80	24	
Ethylbenzene	51.40	1.0	ug/L	50.0		103	71-127	4.62	26	
Xylenes, total	150.3	2.0	ug/L	150		100	74-127	4.11	25	
Styrene	51.01	1.0	ug/L	50.0		102	66-126	4.09	23	
Bromoform	58.63	1.0	ug/L	50.0		117	68-130	0.493	23	
1,2,3-Trichloropropane	57.18	1.0	ug/L	50.0		114	63-136	0.649	24	
trans-1,4-Dichloro-2-butene	100.2	5.0	ug/L	102		97.9	54-134	0.874	27	
1,1,2,2-Tetrachloroethane	57.67	1.0	ug/L	49.8		116	61-131	0.0173	29	
1,4-Dichlorobenzene	51.68	1.0	ug/L	50.0		103	70-129	2.43	24	
1,2-Dichlorobenzene	50.80	1.0	ug/L	50.0		102	69-126	0.726	26	
1,2-Dibromo-3-chloropropane	57.41	5.0	ug/L	50.0		115	50-143	2.65	30	

Surrogate: Dibromofluoromethane	52.6		ug/L	50.4		104	80-126			
Surrogate: Dibromofluoromethane	52.6		ug/L	50.4		104	75-136			
Surrogate: 1,2-Dichloroethane-d4	55.3		ug/L	50.4		110	63-138			
Surrogate: 1,2-Dichloroethane-d4	55.3		ug/L	50.4		110	61-142			
Surrogate: Toluene-d8	52.1		ug/L	50.2		104	87-116			
Surrogate: Toluene-d8	52.1		ug/L	50.2		104	82-121			
Surrogate: 4-Bromofluorobenzene	48.3		ug/L	50.4		95.9	85-111			
Surrogate: 4-Bromofluorobenzene	48.3		ug/L	50.4		95.9	80-116			

Matrix Spike (1GI0132-MS1)

Source: 1GH2610-01

Prepared: 09/05/23 00:00 Analyzed: 09/05/23 21:24

Chloromethane	452.6	4.0	ug/L	400	ND	113	61-152			
Vinyl Chloride	464.4	4.0	ug/L	400	ND	116	66-149			
Bromomethane	280.3	4.0	ug/L	400	ND	70.1	43-171			
Chloroethane	493.1	4.0	ug/L	400	ND	123	69-148			
Trichlorofluoromethane	430.5	4.0	ug/L	400	ND	108	62-163			
1,1-Dichloroethylene	265.5	4.0	ug/L	200	ND	133	70-148			
Acetone	605.0	40.0	ug/L	416	ND	145	45-173			
Methyl Iodide	517.2	4.0	ug/L	450	ND	115	62-167			
Carbon Disulfide	534.2	4.0	ug/L	426	ND	126	71-163			
Methylene Chloride	232.3	20.0	ug/L	200	ND	116	69-140			
Acrylonitrile	518.6	20.0	ug/L	402	ND	129	58-151			
trans-1,2-Dichloroethylene	260.0	4.0	ug/L	200	ND	130	69-144			
1,1-Dichloroethane	255.7	4.0	ug/L	200	ND	128	70-138			
Vinyl Acetate	621.7	20.0	ug/L	413	ND	150	58-142			QS-02
cis-1,2-Dichloroethylene	277.9	4.0	ug/L	198	ND	140	68-151			
2-Butanone (MEK)	653.7	40.0	ug/L	425	ND	154	50-160			
Bromochloromethane	273.7	4.0	ug/L	200	ND	137	65-143			
Chloroform	289.3	4.0	ug/L	200	39.26	125	71-143			
1,1,1-Trichloroethane	232.1	4.0	ug/L	200	ND	116	63-133			
Carbon Tetrachloride	260.8	4.0	ug/L	200	ND	130	63-142			

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GI0072

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GI0132 - EPA 5030B - EPA 8260B										
Matrix Spike (1GI0132-MS1)	Source: 1GH2610-01			Prepared: 09/05/23 00:00 Analyzed: 09/05/23 21:24						
Benzene	230.9	4.0	ug/L	200	ND	115	69-133			
1,2-Dichloroethane	220.8	4.0	ug/L	200	ND	110	63-138			
Trichloroethylene	238.4	4.0	ug/L	200	ND	119	71-133			
1,2-Dichloropropane	252.3	4.0	ug/L	200	ND	126	69-132			
Dibromomethane	250.9	4.0	ug/L	200	ND	125	70-147			
Bromodichloromethane	249.8	4.0	ug/L	200	4.10	123	67-130			
cis-1,3-Dichloropropene	175.4	4.0	ug/L	201	ND	87.1	61-126			
4-Methyl-2-pentanone (MIBK)	594.6	20.0	ug/L	412	ND	144	55-147			
Toluene	229.4	4.0	ug/L	200	ND	115	71-133			
trans-1,3-Dichloropropene	189.0	4.0	ug/L	202	ND	93.7	63-124			
1,1,2-Trichloroethane	224.5	4.0	ug/L	200	ND	112	69-133			
Tetrachloroethylene	205.6	4.0	ug/L	200	ND	103	70-124			
2-Hexanone (MBK)	607.1	20.0	ug/L	441	ND	138	53-141			
Dibromochloromethane	260.7	4.0	ug/L	198	ND	132	74-122			QS-02
1,2-Dibromoethane	212.2	4.0	ug/L	200	ND	106	66-127			
Chlorobenzene	208.2	4.0	ug/L	200	ND	104	76-116			
1,1,1,2-Tetrachloroethane	248.5	4.0	ug/L	200	ND	124	77-121			QS-02
Ethylbenzene	216.6	4.0	ug/L	200	ND	108	73-124			
Xylenes, total	635.2	8.0	ug/L	600	ND	106	75-123			
Styrene	216.0	4.0	ug/L	200	ND	108	70-120			
Bromoform	246.3	4.0	ug/L	200	ND	123	70-124			
1,2,3-Trichloropropane	242.9	4.0	ug/L	200	ND	121	62-135			
trans-1,4-Dichloro-2-butene	332.2	20.0	ug/L	410	ND	81.1	50-120			
1,1,2,2-Tetrachloroethane	238.8	4.0	ug/L	199	ND	120	63-126			
1,4-Dichlorobenzene	210.7	4.0	ug/L	200	ND	105	72-119			
1,2-Dichlorobenzene	207.0	4.0	ug/L	200	ND	104	71-117			
1,2-Dibromo-3-chloropropane	229.9	20.0	ug/L	200	ND	115	49-134			
Surrogate: Dibromofluoromethane	226		ug/L	201		112	80-126			
Surrogate: Dibromofluoromethane	226		ug/L	201		112	75-136			
Surrogate: 1,2-Dichloroethane-d4	236		ug/L	202		117	63-138			
Surrogate: 1,2-Dichloroethane-d4	236		ug/L	202		117	61-142			
Surrogate: Toluene-d8	218		ug/L	201		108	87-116			
Surrogate: Toluene-d8	218		ug/L	201		108	82-121			
Surrogate: 4-Bromofluorobenzene	196		ug/L	202		97.4	85-111			
Surrogate: 4-Bromofluorobenzene	196		ug/L	202		97.4	80-116			
Matrix Spike Dup (1GI0132-MSD1)	Source: 1GH2610-01			Prepared: 09/05/23 00:00 Analyzed: 09/05/23 21:51						
Chloromethane	434.2	4.0	ug/L	400	ND	109	61-152	4.14	26	
Vinyl Chloride	453.5	4.0	ug/L	400	ND	113	66-149	2.39	23	
Bromomethane	268.6	4.0	ug/L	400	ND	67.2	43-171	4.26	29	
Chloroethane	474.7	4.0	ug/L	400	ND	119	69-148	3.80	25	
Trichlorofluoromethane	413.6	4.0	ug/L	400	ND	103	62-163	4.02	25	
1,1-Dichloroethylene	253.4	4.0	ug/L	200	ND	127	70-148	4.66	22	
Acetone	621.3	40.0	ug/L	416	ND	149	45-173	2.66	30	

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GI0072

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GI0132 - EPA 5030B - EPA 8260B										
Matrix Spike Dup (1GI0132-MSD1)	Source: 1GH2610-01			Prepared: 09/05/23 00:00 Analyzed: 09/05/23 21:51						
Methyl Iodide	513.2	4.0	ug/L	450	ND	114	62-167	0.769	24	
Carbon Disulfide	511.0	4.0	ug/L	426	ND	120	71-163	4.43	22	
Methylene Chloride	225.3	20.0	ug/L	200	ND	113	69-140	3.06	19	
Acrylonitrile	533.5	20.0	ug/L	402	ND	133	58-151	2.82	15	
trans-1,2-Dichloroethylene	249.0	4.0	ug/L	200	ND	124	69-144	4.34	22	
1,1-Dichloroethane	245.7	4.0	ug/L	200	ND	123	70-138	3.99	20	
Vinyl Acetate	645.9	20.0	ug/L	413	ND	156	58-142	3.82	24	QS-02
cis-1,2-Dichloroethylene	275.4	4.0	ug/L	198	ND	139	68-151	0.925	22	
2-Butanone (MEK)	688.6	40.0	ug/L	425	ND	162	50-160	5.20	23	QS-02
Bromochloromethane	266.1	4.0	ug/L	200	ND	133	65-143	2.83	22	
Chloroform	279.3	4.0	ug/L	200	39.26	120	71-143	3.50	21	
1,1,1-Trichloroethane	228.7	4.0	ug/L	200	ND	114	63-133	1.49	23	
Carbon Tetrachloride	256.1	4.0	ug/L	200	ND	128	63-142	1.83	22	
Benzene	226.5	4.0	ug/L	200	ND	113	69-133	1.92	18	
1,2-Dichloroethane	217.0	4.0	ug/L	200	ND	108	63-138	1.74	20	
Trichloroethylene	233.9	4.0	ug/L	200	ND	117	71-133	1.91	23	
1,2-Dichloropropane	249.2	4.0	ug/L	200	ND	125	69-132	1.24	20	
Dibromomethane	248.3	4.0	ug/L	200	ND	124	70-147	1.04	22	
Bromodichloromethane	247.3	4.0	ug/L	200	4.10	122	67-130	0.982	21	
cis-1,3-Dichloropropene	170.4	4.0	ug/L	201	ND	84.6	61-126	2.87	21	
4-Methyl-2-pentanone (MIBK)	618.4	20.0	ug/L	412	ND	150	55-147	3.93	23	QS-02
Toluene	229.4	4.0	ug/L	200	ND	115	71-133	0.0174	19	
trans-1,3-Dichloropropene	192.0	4.0	ug/L	202	ND	95.2	63-124	1.62	21	
1,1,2-Trichloroethane	226.8	4.0	ug/L	200	ND	113	69-133	1.01	19	
Tetrachloroethylene	200.6	4.0	ug/L	200	ND	100	70-124	2.44	24	
2-Hexanone (MBK)	634.0	20.0	ug/L	441	ND	144	53-141	4.34	24	QS-02
Dibromochloromethane	261.2	4.0	ug/L	198	ND	132	74-122	0.199	21	QS-02
1,2-Dibromoethane	213.2	4.0	ug/L	200	ND	107	66-127	0.470	23	
Chlorobenzene	207.9	4.0	ug/L	200	ND	104	76-116	0.135	21	
1,1,1,2-Tetrachloroethane	246.5	4.0	ug/L	200	ND	123	77-121	0.824	25	QS-02
Ethylbenzene	214.9	4.0	ug/L	200	ND	107	73-124	0.816	20	
Xylenes, total	627.9	8.0	ug/L	600	ND	105	75-123	1.16	20	
Styrene	212.4	4.0	ug/L	200	ND	106	70-120	1.64	23	
Bromoform	246.2	4.0	ug/L	200	ND	123	70-124	0.0325	22	
1,2,3-Trichloropropane	244.5	4.0	ug/L	200	ND	122	62-135	0.640	28	
trans-1,4-Dichloro-2-butene	328.2	20.0	ug/L	410	ND	80.1	50-120	1.19	26	
1,1,2,2-Tetrachloroethane	248.8	4.0	ug/L	199	ND	125	63-126	4.10	24	
1,4-Dichlorobenzene	213.4	4.0	ug/L	200	ND	107	72-119	1.26	24	
1,2-Dichlorobenzene	210.0	4.0	ug/L	200	ND	105	71-117	1.46	24	
1,2-Dibromo-3-chloropropane	244.7	20.0	ug/L	200	ND	122	49-134	6.22	28	
Surrogate: Dibromofluoromethane	219		ug/L	201		109	80-126			
Surrogate: Dibromofluoromethane	219		ug/L	201		109	75-136			

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GI0072

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GI0132 - EPA 5030B - EPA 8260B										
Matrix Spike Dup (1GI0132-MSD1)	Source: 1GH2610-01		Prepared: 09/05/23 00:00 Analyzed: 09/05/23 21:51							
Surrogate: 1,2-Dichloroethane-d4	233		ug/L	202		116	63-138			
Surrogate: 1,2-Dichloroethane-d4	233		ug/L	202		116	61-142			
Surrogate: Toluene-d8	216		ug/L	201		108	87-116			
Surrogate: Toluene-d8	216		ug/L	201		108	82-121			
Surrogate: 4-Bromofluorobenzene	196		ug/L	202		97.3	85-111			
Surrogate: 4-Bromofluorobenzene	196		ug/L	202		97.3	80-116			

Determination of Total Metals	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GI0229 - EPA 3005A Total Recoverable Metals - EPA 6020A										
Blank (1GI0229-BLK1)	Prepared: 09/06/23 16:05 Analyzed: 09/07/23 17:19									
Cobalt, total	<0.0004	0.0004	mg/L							
LCS (1GI0229-BS1)	Prepared: 09/06/23 16:05 Analyzed: 09/07/23 17:25									
Cobalt, total	0.0984	0.0004	mg/L	0.100		98.4	80-120			
Matrix Spike (1GI0229-MS1)	Source: 1GI0072-01		Prepared: 09/06/23 16:05 Analyzed: 09/07/23 17:49							
Cobalt, total	0.110	0.0004	mg/L	0.100	0.0006	110	75-125			
Matrix Spike Dup (1GI0229-MSD1)	Source: 1GI0072-01		Prepared: 09/06/23 16:05 Analyzed: 09/07/23 17:55							
Cobalt, total	0.121	0.0004	mg/L	0.100	0.0006	120	75-125	9.18	20	
Post Spike (1GI0229-PS1)	Source: 1GI0072-01		Prepared: 09/06/23 16:05 Analyzed: 09/07/23 18:01							
Cobalt, total	0.0798		mg/L	0.0800	0.0006	99.0	80-120			

Definitions

QS-02:	The spike recovery for this QC sample exceeded established acceptance limits. However, all samples were below the reporting and/or regulatory limit so the data is acceptable.
RL:	Reporting Limit
RPD:	Relative Percent Difference
S-GC:	Surrogate recovery outside of control limits. The data was accepted based on valid recovery of the remaining surrogate.

Cooler Receipt Log

Cooler ID: Default Cooler Temp: 8.1°C

Cooler Inspection Checklist

Custody Seals	No	Containers Intact	Yes
COC/Labels Agree	Yes	Preservation Confirmed	No
Received On Ice	Yes		

Keystone Laboratories - Newton

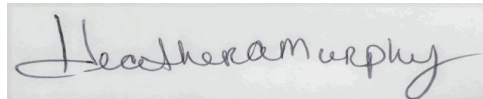
CERTIFICATE OF ANALYSIS

1GI0072

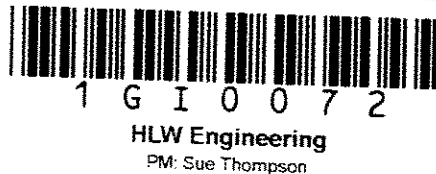
Report Comments

*The data and information on this, and other accompanying documents, represents only the sample(s) analyzed. This report is incomplete unless all pages indicated in the footnote are present and an authorized signature is included. **The services were provided under and subject to Microbac's standard terms and conditions which can be located and reviewed at <https://www.microbac.com/standard-terms-conditions>.***

Reviewed and Approved By:



Heather Murphy
Customer Relationship Specialist
heather.murphy@microbac.com
09/15/23 15:58



SITE INFORMATION

Sampler: TODD WHIPPLE
Project: Poweshiek Co. Landfill-COC1
6011

REPORT TO

Todd Whipple
HLW Engineering
PO Box 314
Story City, IA 50248

Lyle Brehm
Poweshiek County Landfill
PO Box 306
Montezuma, IA 50171

SPECIAL INSTRUCTIONS

None

Turn Around Time

☐ Standard ☐ RUSH, need by ___/___/___

LAB USE ONLY

Work Order 1G I 0072

Temperature 8.1

Turn-Cooler: No

☐ Custody Seal
☒ Containers Intact
☒ COC/Labels Agree
☒ Preservation Confirmed
☒ Received on Ice

Number	Sample Identification / Client ID	Matrix	Sample Type	Date	Time	Number of Containers	Analyses	Lab Sample Number
01-001	MW-3	Water	GRAB	<u>9/1/23</u>	<u>7:00</u>	<u>7</u>	co-t-6020 indfill-appl-voc-group	<u>01</u>
02-001	MW-4	Water	GRAB	<u>9/1/23</u>	<u>11:20</u>	<u>7</u>	co-t-6020 indfill-appl-voc-group	<u>02</u>
03-001	MW-5	Water	GRAB	<u>9/1/23</u>	<u>11:55</u>	<u>6</u>	indfill-appl-voc-group	<u>03</u>
04-001	MW-9	Water	GRAB	<u>9/1/23</u>	<u>12:15</u>	<u>6</u>	indfill-appl-voc-group	<u>04</u>
05-001	Duplicate	Water	GRAB	<u>9/1/23</u>	<u>✓</u>	<u>1</u>	co-t-6020 indfill-appl-voc-group	<u>05</u>

Relinquished By [Signature] Date/Time 9/1/23 13:36

Relinquished By _____ Date/Time _____

Received By _____ Date/Time _____

Received for Lab By [Signature] Date/Time 9/1/23 13:36

Original - Lab Copy Yellow - Sampler Copy

Remarks:

ATTACHMENT B

Field Sampling Forms

**POWESHIEK COUNTY SANITARY LANDFILL
PERMIT # 79-SDP-1-73C**

9/1/2023

Sampled by: T. Whipple

Weather conditions: Sunny, slight breeze, 75-85 degrees

IDNR Form 542-1322

Monitoring Well: MW-3 (dg)

Primary Sampling Method:
Secondary Sampling Method:

No-Purge for Appendix I

Purge & Sample for all analytes beyond Appendix I

GENERAL INFORMATION

TOC	912.42
Well Depth	21.17
Capped	YES
Standing Water	NO
Litter	NO
Level Tape	Solinst 101
NTU Meter	Hach 2100P
No-Purge Equipment -	Solinst 429
Purge Equipment -	Waterra

NO PURGE METHOD

TOC	912.42
Well Depth	21.17
Top Screen	898.54
Bottom Screen	891.25
Bottom Well	891.25
Sampler Length (ft)	4.00
Sampler Volume (mL)	440.00
Feet cordage	16.00
Top sample	896.42
Bottom sample	892.42
Turbidity(NTU)	2.18

Date	Time	Water Level	Water Elevation	Notes
9/1/2023	11:00	11.48	900.94	

ANALYTES, CONTAINERS, AND VOLUMES

Analyte	Required Volume (mL)	Volume Collected No-Purge (mL)	Volume Collected Purge & Sample (mL)	Turbidity this Container (NTU)
All	Field NTU	10	10	2.18
Appendix I	Metals	250	150	2.18
Appendix I	VOC	120	240	2.18
Full Appendix II	10 more containers	5620		
TSS	TSS	1000		
Paragraph e		750		
Paragraph f		480		
Total			400	0

PURGE & SAMPLE METHOD - Purge by Waterra Inertial Lift Pump, then well rest, then sample collection

TOC	912.42	2" dia.	Date	Time	Depth	Elevation	Gallons	# of Vol.	Purged Dry?
Well Depth	21.17	Before purging	9/1/2023	11:00	11.48	900.94	0	0.0	dry
		After purging				912.42			
		Top of Screen 7/15/1989				898.54			
						13.88			feet above (+) or below (-) top screen
		Bottom of Well 7/15/1989				891.25			
		Bottom of Well	9/1/2023		21.10	891.32			
						0.07			feet sedimentation
		Recovery				912.42			
		Recovery				912.42			
		Recovery				912.42			
		Recovery				912.42	pH	Conductivity	Temp.(C)
		Before Sampling				912.42			

Monitoring Well: MW-4 (dg)

Primary Sampling Method:
Secondary Sampling Method:

No-Purge for Appendix I
Purge & Sample for all analytes beyond Appendix I

GENERAL INFORMATION

TOC	902.13
Well Depth	24.50
Capped	YES
Standing Water	NO
Litter	NO
Level Tape	Solinst 101
NTU Meter	Hach 2100P
No-Purge Equipment -	Solinst 429
Purge Equipment -	Waterra

NO PURGE METHOD

TOC	902.13
Well Depth	24.50
Top Screen	887.41
Bottom Screen	877.63
Bottom Well	877.63
Sampler Length (ft)	4.00
Sampler Volume (mL)	440.00
Feet cordage	19.00
Top sample	883.13
Bottom sample	879.13
Turbidity(NTU)	5.90

Date	Time	Water Level	Water Elevation	Notes
9/1/2023	11:20	15.69	886.44	

ANALYTES, CONTAINERS, AND VOLUMES

Analyte	Required Volume (mL)	Volume Collected No-Purge (mL)	Volume Collected Purge & Sample (mL)	Turbidity this Container (NTU)
All	Field NTU	10	10	5.90
Appendix I	Metals	250	150	5.90
Appendix I	VOC	120	240	5.90
Full Appendix II	10 more containers	5620		
TSS	TSS	1000		
Paragraph e		750		
Paragraph f		480		
Total			400	0

PURGE & SAMPLE METHOD - Purge by Waterra Inertial Lift Pump, then well rest, then sample collection

TOC	902.13	2" dia.	Date	Time	Depth	Elevation	Gallons	# of Vol.	Purged Dry?
Well Depth	24.50	Before purging	9/1/2023	11:20	15.69	886.44	0	0.0	No
		After purging				902.13			
		Top of Screen 9/15/1990				887.41			
						14.72			feet above (+) or below (-) top screen
		Bottom of Well 9/15/1990				877.63			
		Bottom of Well	9/1/2023		24.40	877.73			
						0.10			feet sedimentation
		Recovery				902.13			
		Recovery				902.13			
		Recovery				902.13			
		Recovery				902.13	pH	Conductivity	Temp.(C)
		Before Sampling				902.13			

Monitoring Well: MW-5 (dg)

Primary Sampling Method:
Secondary Sampling Method:

No-Purge for Appendix I
Purge & Sample for all analytes beyond Appendix I

GENERAL INFORMATION

TOC	906.43
Well Depth	25.58
Capped	YES
Standing Water	NO
Litter	NO
Level Tape	Solinst 101
NTU Meter	Hach 2100P
No-Purge Equipment -	Solinst 429
Purge Equipment -	Waterra

NO PURGE METHOD

TOC	906.43
Well Depth	25.58
Top Screen	890.59
Bottom Screen	880.85
Bottom Well	880.85
Sampler Length (ft)	4.00
Sampler Volume (mL)	440.00
Feet cordage	20.00
Top sample	886.43
Bottom sample	882.43
Turbidity(NTU)	1.50

Date	Time	Water Level	Water Elevation	Notes
9/1/2023	11:55	20.26	886.17	

ANALYTES, CONTAINERS, AND VOLUMES

Analyte	Required Volume (mL)	Volume Collected No-Purge (mL)	Volume Collected Purge & Sample (mL)	Turbidity this Container (NTU)
All	Field NTU	10	10	1.50
Appendix I	Metals	250		
Appendix I	VOC	120	240	1.50
Full Appendix II	10 more containers	5620		
TSS	TSS	1000		
Paragraph e		750		
Paragraph f		480		
Total			250	0

PURGE & SAMPLE METHOD - Purge by Waterra Inertial Lift Pump, then well rest, then sample collection

TOC	906.43	2" dia.	Date	Time	Depth	Elevation	Gallons	# of Vol.	Purged Dry?
Well Depth	25.58	Before purging	9/1/2023	11:55	20.26	886.17	0	0.0	dry
		After purging				906.43			
		Top of Screen 1/15/1988				890.59			
						15.84			feet above (+) or below (-) top screen
		Bottom of Well 1/15/1988				880.85			
		Bottom of Well	9/1/2023		25.50	880.93			
						0.08			feet sedimentation
		Recovery				906.43			
		Recovery				906.43			
		Recovery				906.43			
		Recovery				906.43	pH	Conductivity	Temp.(C)
		Before Sampling				906.43			

Monitoring Well: MW-9 (dg)

Primary Sampling Method:
Secondary Sampling Method:

No-Purge for Appendix I
Purge & Sample for all analytes beyond Appendix I

GENERAL INFORMATION

TOC	917.72
Well Depth	20.89
Capped	YES
Standing Water	NO
Litter	NO
Level Tape	Solinst 101
NTU Meter	Hach 2100P
No-Purge Equipment -	Solinst 429
Purge Equipment -	Waterra

NO PURGE METHOD

TOC	917.72
Well Depth	20.89
Top Screen	907.33
Bottom Screen	896.83
Bottom Well	896.83
Sampler Length (ft)	4.00
Sampler Volume (mL)	440.00
Feet cordage	15.00
Top sample	902.72
Bottom sample	898.72
Turbidity(NTU)	1.49

Date	Time	Water Level	Water Elevation	Notes
9/1/2023	12:15	13.56	904.16	

ANALYTES, CONTAINERS, AND VOLUMES

Analyte	Required Volume (mL)	Volume Collected No-Purge (mL)	Volume Collected Purge & Sample (mL)	Turbidity this Container (NTU)
All	Field NTU	10	10	1.49
Appendix I	Metals	250		
Appendix I	VOC	120	240	1.49
Full Appendix II	10 more containers	5620		
TSS	TSS	1000		
Paragraph e		750		
Paragraph f		480		
Total			250	0

PURGE & SAMPLE METHOD - Purge by Waterra Inertial Lift Pump, then well rest, then sample collection

TOC	917.72	2" dia.	Date	Time	Depth	Elevation	Gallons	# of Vol.	Purged Dry?
Well Depth	20.89	Before purging	9/1/2023	12:15	13.56	904.16	0	0.0	dry
		After purging				18.30			
		Top of Screen 3/15/1992				907.33			
						-889.03			feet above (+) or below (-) top screen
		Bottom of Well 3/15/1992				896.83			
		Bottom of Well	9/1/2023		20.20	897.52			
						0.69			feet sedimentation
		Recovery				917.72			
		Recovery				917.72			
		Recovery				917.72			
		Recovery				917.72	pH	Conductivity	Temp.(C)
		Before Sampling				917.72			

ATTACHMENT C

Water Elevation Data & Well Screen Evaluation

Water Level Data
Poweshiek County Sanitary Landfill

Well/TOC	MW-2	947.7	MW-3	912.42	MW-4	902.13	MW-5	906.43	MW-6	884.63	MW-8	907.94	MW-9	917.72	MW-10	909.9	MW-11	920.59	MW-12	926.79	MW-13	921.79	MW-15	907.23
	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation
09/21/1994	17.03	930.67	8.30	904.12	9.74	892.39	22.19	884.24	10.08	874.55	10.64	897.3	15.49	902.23	10.78	899.12	7.59	913						
10/23/1994	17.77	929.93	9.99	902.43	12.44	889.69	24.35	882.08	12.26	872.37	11.25	896.69	15.82	901.9	13.89	896.01	8.38	912.21						
01/26/1995	17.96	929.74	10.02	902.4	12.05	890.08	23.35	883.08	9.99	874.64	10.58	897.36	16.02	901.7	12.6	897.3	8.62	911.97						
02/17/1995	18.29	929.41	10.66	901.76	12.54	889.59	23.20	883.23	10.88	873.75	11.10	896.84	16.06	901.66	13.52	896.38	9.16	911.43						
03/27/1995	18.20	929.5	9.20	903.22	10.20	891.93	22.95	883.48	5.98	878.65	10.04	897.9	13.95	903.77	10.42	899.48	9.05	911.54						
04/25/1995	13.68	934.02	8.84	903.58	10.68	891.45	21.39	885.04	4.10	880.53	6.70	901.24	11.16	906.56	10.30	899.6	6.33	914.26						
05/22/1995	9.60	938.1	9.22	903.2	11.40	890.73	18.02	888.41	5.45	879.18	7.40	900.54	11.75	905.97	10.81	899.09	5.28	915.31						
06/13/1995	9.72	937.98	9.30	903.12	11.30	890.83	17.69	888.74	5.33	879.3	7.46	900.48	10.50	907.22	10.95	898.95	5.16	915.43						
07/25/1995	13.01	934.69	10.31	902.11	12.52	889.61	19.03	887.4	9.03	875.6	9.63	898.31	11.82	905.9	13.05	896.85	6.45	914.14						
08/23/1995	14.82	932.88	10.94	901.48	13.76	888.37	20.01	886.42	11.59	873.04	10.62	897.32	13.38	904.34	13.96	895.94	7.54	913.05						
09/26/1995	16.45	931.25	11.32	901.1	14.87	887.26	20.75	885.68	13.02	871.61	11.20	896.74	14.35	903.37	14.40	895.5	8.25	912.34						
10/19/1995	17.37	930.33	11.05	901.37	14.24	887.89	22.89	883.54	13.90	870.73	11.65	896.29	15.02	902.7	15.92	893.98	8.43	912.16						
11/22/1995	17.56	930.14	7.49	904.93	10.65	891.48	22.77	883.66	12.61	872.02	10.94	897	12.28	905.44	14.38	895.52	7.80	912.79	9.82	916.97	10.99	910.8	6.9	900.33
12/28/1995	17.63	930.07	9.48	902.94	12.08	890.05	21.85	884.58	11.60	873.03	10.60	897.34	12.34	905.38	14.11	895.79	8.99	911.6	10.02	916.77	11.33	910.46	7.34	899.89
01/26/1996	16.32	931.38	9.26	903.16	11.89	890.24	21.62	884.81	11.02	873.61	10.36	897.58	11.94	905.78	14.03	895.87	8.36	912.23	9.21	917.58	10.55	911.24	6.88	900.35
02/29/1996	13.55	934.15	10.40	902.02	11.50	890.63	19.60	886.83	10.65	873.98	8.05	899.89	10.90	906.82	13.40	896.5	9.30	911.29	7.9	918.89	6.65	915.14	4.5	902.73
03/20/1996	13.83	933.87	9.83	902.59	11.82	890.31	26.01	880.42	9.43	875.20	9.02	898.92	12.07	905.65	16.39	893.51	6.94	913.65	8.76	918.03	7.80	913.99	6.32	900.91
04/17/1996	15.82	931.88	10.18	902.24	12.14	889.99	20.75	885.68	9.36	875.27	9.69	898.25	13.09	904.63	14.97	894.93	7.48	913.11	9.34	917.45	9.12	912.67	6.64	900.59
05/22/1996	12.00	935.70	8.43	903.99	10.62	891.51	19.87	886.56	4.65	879.98	7.27	900.67	9.96	907.76	9.98	899.92	5.77	914.82	7.69	919.10	6.25	915.54	3.94	903.29
06/24/1996	11.56	936.14	9.63	902.79	10.89	891.24	17.68	888.75	6.33	878.30	8.59	899.35	11.30	906.42	11.23	898.67	4.95	915.64	7.51	919.28	5.87	915.92	3.40	903.83
07/22/1996	14.33	933.37	10.71	901.71	12.65	889.48	18.92	887.51	9.78	874.85	10.07	897.87	7.14	910.58	13.01	896.89	6.27	914.32	8.63	918.16	8.53	913.26	5.78	901.45
08/30/1996	16.31	931.39	11.31	901.11	13.59	888.54	20.30	886.13	11.92	872.71	11.11	896.83	14.58	903.14	14.14	895.76	7.72	912.87	9.37	917.42	10.43	911.36	6.94	900.29
09/12/1996	16.75	930.95	11.46	900.96	14.05	888.08	20.50	885.93	12.30	872.33	11.30	896.64	14.85	902.87	14.30	895.60	8.00	912.59	9.55	917.24	10.87	910.92	7.30	899.93
10/28/1996	17.96	929.74	10.89	901.53	12.42	889.71	22.48	883.95	12.07	872.56	11.84	896.10	15.50	902.22	15.25	894.65	8.51	912.08	9.83	916.96	11.49	910.30	7.44	899.79
11/25/1996	17.98	929.72	17.89	894.53	10.73	891.40	22.35	884.08	12.11	872.52	10.74	897.20	15.52	902.20	15.13	894.77	8.39	912.20	9.66	917.13	11.46	910.33	7.05	900.18
12/23/1996	18.39	929.31	9.10	903.32	12.04	890.09	22.23	884.20	10.64	873.99	10.24	897.70	15.03	902.69	11.66	898.24	8.70	911.89	9.72	917.07	11.64	910.15	7.32	899.91
01/30/1997	18.62	929.08	9.12	903.30	12.12	890.01	22.31	884.12	10.83	873.80	10.99	896.95	15.86	901.86	13.40	896.50	8.68	911.91	9.91	916.88	11.76	910.03	7.28	899.95
02/26/1997	17.47	930.23	8.94	903.48	11.91	890.22	21.92	884.51	11.14	873.49	10.88	897.06	15.72	902.00	14.04	895.86	6.34	914.25	10.06	916.73	8.52	913.27	6.34	900.89
03/12/1997	16.20	931.50	8.10	904.32	10.90	891.23	20.50	885.93	9.60	875.03	10.40	897.54	7.60	910.12	13.85	896.05	6.30	914.29	7.97	918.82	7.05	914.74	4.4	902.83
04/23/1997	16.35	931.35	8.29	904.13	10.41	891.72	18.46	887.97	8.29	876.34	7.82	900.12	10.38	907.34	10.63	899.27	6.88	913.71	8.71	918.08	8.54	913.25	5.43	901.80
05/20/1997	14.50	933.20	9.00	903.42	11.09	891.04	16.93	889.50	6.99	877.64	8.32	899.62	10.68	907.04	10.91	898.99	6.58	914.01	8.33	918.46	7.61	914.18	4.86	902.37
06/18/1997	14.47	933.23	9.97	902.45	12.02	890.11	17.78	888.65	6.78	877.85	9.43	898.51	10.96	906.76	12.14	897.76	7.20	913.39	8.91	917.88	8.73	913.06	5.9	901.33
07/22/1997	14.88	932.82	10.27	902.15	12.36	889.77	19.00	887.43	7.96	876.67	10.41	897.53	11.46	906.26	13.65	896.25	7.75	912.84	9.27	917.52	9.49	912.30	6.46	900.77
08/19/1997	15.98	931.72	10.80	901.62	13.42	888.71	19.85	886.58	10.06	874.57	10.97	896.97	14.27	903.45	14.22	895.68	8.19	912.40	9.61	917.18	10.32	911.47	6.97	900.26
09/13/1997	17.05	930.65	11.10	901.32	13.95	888.18	20.42	886.01	11.70	872.93	11.50	896.44	14.93	902.79	14.55	895.35	8.60	911.99	9.9	916.89	11	910.79	7.6	899.63
10/23/1997	15.96	931.74	9.19	903.23	11.99	890.14	22.74	883.69	11.62	873.01	10.98	896.96	14.02	903.70	13.95	895.95	8.32	912.27	9.68	917.11	11	910.79	7.05	900.18
11/20/1997	15.03	932.67	8.85	903.57	11.01	891.12	21.61	884.82	10.62	874.01	8.95	898.99	12.86	904.86	11.13	898.77	7.27	913.32	9.16	917.63	9.05	912.74	6.03	901.20
12/18/1997	15.21	932.49	5.56	906.86	9.65	892.48	20.67	885.76	6.01	878.62	8.72	899.22	13.02	904.70	11.46	898.44	6.97	913.62	8.93	917.86	8.58	913.21	6.11	901.12
01/20/1998	13.78	933.92	9.04	903.38	11.05	891.08	17.87	888.56	6.20	878.43	8.40	899.54	12.14	905.58	10.82	899.08	6.53	914.06	8.47	918.32	7.98	913.81	4.94	902.29
02/24/1998	13.70	934.00	4.54	907.88	8.17	893.96	13.58	892.85	3.37	881.26	4.16	903.78	9.46	908.26	5.96	903.94	6.10	914.49	7.81	918.98	7.22	914.57	4.21	903.02
03/12/1998	12.60	935.10	7.20	905.22	9.40	892.73	15.70	890.73	4.30	880.33	5.65	902.29	10.10	907.62	9.70	900.20	5.85	914.74	7.8	918.99	6.9	914.89	3.85	903.38
04/23/1998	12.21	935.49	7.02	905.40	9.01	893.12	14.98	891.45	4.14	880.49	5.52	902.42	9.92	907.80	9.59	900.31	5.74	914.85	7.52	919.27	6.85	914.94	3.78	903.45
05/27/1998	10.38	937.32	7.75	904.67	9.62	892.51	15.34	891.09	4.50	880.13	6.24	901.70	10.15	907.57	9.49	900.41	4.80	915.79	7.4	919.39	5.87	915.92	2.96	904.27
06/30/1998	10.60	937.10	7.81	904.61	9.84	892.29	13.91	892.52	4.47	880.16	6.32	901.62	9.87	907.85	9.46	900.44	3.44	917.15	6.82	919.97	5.13	916.66	2.71	904.52
07/28/1998	13.73	933.97	11.14	901.28	12.06	890.07	16.51	889.92	6.32	878.31	8.94	899.00	11.58	906.14	11.07	898.83	4.89	915.70	8.19	918.60	7.44	914.35	5.04	902.19
08/27/1998	15.51	932.19	12.98	899.44	14.52	887.61	17.83	888.60	9.85	874.78	9.76	898.18	13.22	904.50	12.86	897.04	6.37	914.22	8.82	917.97	9.48	912.31	6.06	901.17
09/01/1998	15.30	932.40	8.85	903.57	11.35	890.78	18.05	888.38	8.98</															

Water Level Data
Poweshiek County Sanitary Landfill

Well/TOC	MW-2	947.7	MW-3	912.42	MW-4	902.13	MW-5	906.43	MW-6	884.63	MW-8	907.94	MW-9	917.72	MW-10	909.9	MW-11 MW-11R	920.59 921.95	MW-12	926.79	MW-13	921.79	MW-15	907.23
	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation	Water Depth	Water Elevation
03/06/2000	17.80	929.90	9.70	902.72	11.20	890.93	22.15	884.28	11.48	873.15	10.85	897.09	14.91	902.81	11.85	898.05	8.85	911.74	9.75	917.04	11.3	910.49	7.02	900.21
10/02/2000	16.80	930.90	11.01	901.41	12.93	889.20	23.07	883.36	6.22	878.41	10.66	897.28	14.46	903.26	15.96	893.94	8.92	911.67	9.72	917.07	10.83	910.96	7.33	899.90
03/23/2001	9.90	937.80	4.50	907.92	7.50	894.63	16.80	889.63	3.00	881.63	3.40	904.54	6.10	911.62	4.25	905.65	5.50	915.09	6	920.79	4.8	916.99	2.5	904.73
09/04/2001	16.3	931.40	11.35	901.07	14.2	887.93	18.3	888.13	11.05	873.58	9.8	898.14	14.4	903.32	14.15	895.75	7.5	913.09	9.1	917.69	10.5	911.29	7.25	899.98
03/07/2002	19.4	928.30	10.3	902.12	11.9	890.23	21	885.43	10.05	874.58	10.96	896.98	15.7	902.02	15	894.90	9.2	911.39	9.9	916.89	12.05	909.74	7.68	899.55
09/03/2002	15.35	932.35	9.15	903.27	10.75	891.38	20.35	886.08	6.35	878.28	8.7	899.24	12.8	904.92	10.9	899.00	7.1	913.49	8.6	918.19	8.7	913.09	6.45	900.78
03/07/2003	16.6	931.10	10.3	902.12	12.45	889.68	20.9	885.53	11.18	873.45	10.1	897.84	15.4	902.32	14.7	895.20	9.1	911.49	9.6	917.19	10.4	911.39	6.8	900.43
09/22/2003	16.15	931.55	10.7	901.72	12.7	889.43	19	887.43	9.9	874.73	9.45	898.49	14.4	903.32	13.75	896.15	7.4	913.19	9.1	917.69	10	911.79	6.9	900.33
03/22/2004	11.6	936.10	7.4	905.02	9.15	892.98	17	889.43	3.75	880.88	6	901.94	9.6	908.12	8.15	901.75	5.2	915.39	6.7	920.09	6.3	915.49	3.4	903.83
09/03/2004	16.15	931.55	10.7	901.72	12.7	889.43	19	887.43	9.9	874.73	9.45	898.49	14.4	903.32	13.75	896.15	7.4	913.19	9.1	917.69	10	911.79	6.9	900.33
03/15/2005	16.91	930.79	9.69	902.73	10.65	891.48	20.47	885.96	6.55	878.08	8.61	899.33	13.2	904.52	12.7	897.20	6.93	913.66	8.5	918.29	8.6	913.19	5.87	901.36
09/01/2005	17.83	929.87	10.9	901.52	13.89	888.24	20.06	886.37	12.11	872.52	9.9	898.04	14.84	902.88	14.28	895.62	8.04	912.55	9.49	917.30	10.3	911.49	7.38	899.85
01/24/2006	19.36	928.34	10.18	902.24	12.68	889.45	22.42	884.01	12.78	871.85	10.87	897.07	15.32	902.40	15.32	894.58	9.15	911.44	9.53	917.26	11.84	909.95	7.83	899.40
03/06/2006	19.32	928.38	9.9	902.52	12.18	889.95	23.56	882.87	12.03	872.60	10.95	896.99	14.9	902.82	15.97	893.93	9.31	911.28	9.66	917.13	11.85	909.94	7.9	899.33
09/11/2006	17.98	929.72	10.3	902.12	13.3	888.83	19.96	886.47	10.31	874.32	10.01	897.93	14.25	903.47	15.04	894.86	8.08	912.51	9.51	917.28	10.98	910.81	8.57	898.66
03/28/2007	13.94	933.76	4.88	907.54	7.92	894.21	19.89	886.54	2.92	881.71	3.37	904.57	7.72	910.00	8.25	901.65	5.28	915.31	6.64	920.15	7.6	914.19	3.36	903.87
09/11/2007	15.57	932.13	8.48	903.94	10.08	892.05	18.2	888.23	5.98	878.65	7.86	900.08	13.55	904.17	10.33	899.57	6.05	914.54	7.47	919.32	8.89	912.90	5.91	901.32
03/20/2008	7.1	940.60	6.2	906.22	7.98	894.15	11.85	894.58	3	881.63	2.8	905.14	6.1	911.62	8	901.90	4.45	916.14	4.9	921.89	5	916.79	2.7	904.53
09/06/2008	14.65	933.05	8.6	903.82	11.05	891.08	16.4	890.03	7.6	877.03	7.98	899.96	13.45	904.27	13.38	896.52	5.65	914.94	7.3	919.49	7.85	913.94	5.38	901.85
03/16/2009	11.6	936.10	7.7	904.72	9.7	892.43	16.6	889.83	4.83	879.80	4.4	903.54	10.5	907.22	9.65	900.25	4.3	916.29	6.4	920.39	5.58	916.21	3.2	904.03
09/08/2009	12.75	934.95	9.05	903.37	10.95	891.18	16.8	889.63	5.8	878.83	7.1	900.84	11.65	906.07	11.4	898.50	4.4	916.19	6.2	920.59	6.4	915.39	4.5	902.73
03/04/2010	NT	NT	8.4	904.02	10.5	891.63	17.4	889.03	5.9	878.73	7.7	900.24	13.5	904.22	13	896.90	5.8	914.79	7.1	919.69	7.4	914.39	4.8	902.43
09/08/2010	13.6	934.10	8.5	903.92	10.5	891.63	16.85	889.58	5.75	878.88	7	900.94	12.3	905.42	11.4	898.50	4.4	916.19	5.9	920.89	6.75	915.04	3.9	903.33
03/10/2011	16.6	931.10	6.47	905.95	8.75	893.38	20.6	885.83	3.7	880.93	5.55	902.39	11.15	906.57	7.35	902.55	5.5	915.09	6.65	920.14	6.75	915.04	3.25	903.98
09/06/2011	17.35	930.35	9.8	902.62	13.2	888.93	18.7	887.73	9.8	874.83	9.2	898.74	13.65	904.07	14	895.90	6.9	913.69	8.35	918.44	9.65	912.14	6.15	901.08
03/01/2012	18.30	929.40	5.75	906.67	8.55	893.58	20.75	885.68	3.50	881.13	5.55	902.39	9.15	908.57	9.30	900.60	5.95	914.64	6.95	919.84	9.4	912.39	5.9	901.33
09/10/2012	19.10	928.60	12.10	900.32	16.80	885.33	19.55	886.88	13.70	870.93	9.75	898.19	14.30	903.42	15.15	894.75	8.55	912.04	10.05	916.74	11.9	909.89	9.3	897.93
03/15/2013	18.10	929.60	5.60	906.82	8.55	893.58	19.80	886.63	8.55	876.08	3.20	904.74	7.60	910.12	10.75	899.15	5.95	914.64	7.75	919.04	6.3	915.49	3.8	903.43
09/09/2013	15.80	931.90	10.80	901.62	15.05	887.08	17.35	889.08	11.80	872.83	8.15	899.79	12.60	905.12	14.10	895.80	7.75	912.84	8.9	917.89	11.5	910.29	8.5	898.73
03/11/2014	19.30	928.40	9.80	902.62	14.00	888.13	21.00	885.43	13.30	871.33	9.60	898.34	10.70	907.02	15.65	894.25	6.60	913.99	8.9	917.89	11.1	910.69	7.5	899.73
09/05/2014	13.90	933.80	8.90	903.52	10.60	891.53	16.35	890.08	4.40	880.23	6.30	901.64	12.00	905.72	11.00	898.90	6.15	914.44	6.7	920.09	8.4	913.39	5.5	901.73
03/09/2015	13.50	934.20	5.55	906.87	8.60	893.53	17.70	888.73	6.70	877.93	7.75	900.19	12.30	905.42	9.60	900.30	5.85	914.74	6.85	919.94	6.75	915.04	5.45	901.78
09/03/2015	13.03	934.67	8.99	903.43	11.24	890.89	16.45	889.98	5.12	879.51	6.84	901.10	12.20	905.52	12.85	897.05	6.61	913.98	6.45	920.34	7.69	914.10	5.21	902.02
03/09/2016	12.18	935.52	8.25	904.17	10.50	891.63	16.60	889.83	4.70	879.93	4.80	903.14	11.05	906.67	11.70	898.20	7.87	914.08	6.7	920.09	6.7	915.09	4.7	902.53
09/12/2016	16.65	931.05	9.60	902.82	11.75	890.38	20.70	885.73	8.27	876.36	8.75	899.19	13.72	904.00	13.70	896.20	9.80	912.15	8.35	918.44	9.91	911.88	6.9	900.33
03/06/2017	15.22	932.48	8.70	903.72	11.00	891.13	22.03	884.40	4.80	879.83	7.59	900.35	12.43	905.29	12.54	897.36	9.57	912.38	7.88	918.91	8.07	913.72	5.69	901.54
09/13/2017	15.40	932.30	10.35	902.07	13.10	889.03	20.05	886.38	10.70	873.93	9.12	898.82	13.65	904.07	14.78	895.12	10.52	911.43	8.84	917.95	10.21	911.58	7.41	899.82
03/15/2018	18.33	929.37	8.85	903.57	11.05	891.08	21.02	885.41	5.11	879.52	7.89	900.05	12.43	905.29	13.42	896.48	8.72	913.23	8.48	918.31	9.01	912.78	6.6	900.63
09/12/2018	11.51	936.19	8.45	903.97	10.15	891.98	17.08	889.35	4.12	880.51	4.85	903.09	7.91	909.81	9.34	900.56	7.20	914.75	5.47	921.32	5.19	916.60	2.88	904.35
04/02/2019	9.14	938.56	NR	NR	10.35	891.78	17.22	889.21	4.31	880.32	3.93	904.01	9.85	907.87	10.68	899.22	7.31	914.64	5.67	921.12	5.72	916.07	3.24	903.99
09/11/2019	16.77	930.93	10.31	902.11	13.36	888.77	19.32	887.11	11.43	873.20	8.55	899.39	13.33	904.39	14.34	895.56	10.11	911.84	8.19	918.60	9.96	911.83	6.63	900.60
03/02/2020	13.84	933.86	8.03	904.39	10.51	891.62	16.28	890.15	4.77	879.86	5.39	902.55	10.79	906.93	9.41	900.49	8.28	913.67	5.76	921.03	6.79	915.00	3.52	903.71
09/01/2020	16.71	930.99	10.45	901.97	13.82	888.31	19.87	886.56	11.22	873.41	8.69	899.25	13.23	904.49	10.33	899.57	10.44	911.51	8.21	918.58	9.75	912.04	6.52	900.71
03/01/2021	17.50	930.20	4.89	907.53	7.70	894.43	17.89	888.54			2.55	905.39	12.22	905.50	4.15	905.75	8.41	913.54	6.85	919.94	8.79	913.00	4.98	902.25
09/20/2021	18.41	929.29	11.27	901.15	15.44	886.69	20.53	885.90	13.74	870.89	9.25	898.69	13.62	904.10	15.10	894.80	11.22	910.73	9.18	917.61	11.1	910.69	7.78	899.45
03/01/2022	18.01	929.69	8.70	903.72	11.22	890.91	21.76	884.67	8.67	875.96	9.06													

ATTACHMENT D

Explosive Gas Monitoring Results

Poweshiek County Sanitary Landfill
 INDR Permit No. 79-SDP-1-73C
 EXPLOSIVE GAS MONITORING RESULTS

Ambient Air - Breathing Zone						
Location	Top of Casing Elevation	Depth to Water Feet	Static Water Elevation	Top of Screen Elevation	Exposed (-) or Submerged (+) Screen Feet	3/3/2023 %LEL
Building 1	N/A	N/A	N/A	N/A	N/A	0
Building 2	N/A	N/A	N/A	N/A	N/A	0
Subsurface - Well Headspace						
MW-2	947.70	17.51	930.19	931.08	-0.89	0
MW-5	906.43	19.15	887.28	890.59	-3.31	0
MW-8	907.94	2.48	905.46	902.2	3.26	0
MW-9	917.72	7.25	910.47	907.33	3.14	0
MW-10	909.90	9.47	900.43	899.5	0.93	0
GP-1	N/A	N/A	N/A	N/A	N/A	0
GP-2	N/A	N/A	N/A	N/A	N/A	0
HLW Representative	JGH					
Weather	Mostly Sunny 43 degrees Slight Breeze					

Ambient Air - Breathing Zone						
Location	Top of Casing Elevation	Depth to Water Feet	Static Water Elevation	Top of Screen Elevation	Exposed (-) or Submerged (+) Screen Feet	9/1/2023 %LEL
Building 1	N/A	N/A	N/A	N/A	N/A	0
Building 2	N/A	N/A	N/A	N/A	N/A	0
Subsurface - Well Headspace						
MW-2	947.70	18.1	929.60	931.08	-1.48	0
MW-5	906.43	20.26	886.17	890.59	-4.42	0
MW-8	907.94	9.09	898.85	902.2	-3.35	0
MW-9	917.72	13.56	904.16	907.33	-3.17	0
MW-10	909.90	15.25	894.65	899.5	-4.85	0
GP-1	N/A	N/A	N/A	N/A	N/A	0
GP-2	N/A	N/A	N/A	N/A	N/A	0
HLW Representative	TDW					
Weather	Sunny 75-85 degrees Slight Breeze					