

2023
ANNUAL GROUNDWATER QUALITY REPORT
(Number 30)

OF
THE CEDAR COUNTY SANITARY LANDFILL
16-SDP-01-76C
TIPTON, IOWA

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Certification

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Date: 11-30-2023

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Cedar County Sanitary Landfill Annual Water Quality Report

2023

This annual water quality report evaluates the analytical results for the October 2023 monitoring event but also includes data from previous sampling events.

Introduction and Background

This is the thirtieth (30th) annual water-quality report for the closed Cedar County Sanitary Landfill and covers the analytical results for the sampling of six monitoring wells during October 2023. The initial closure permit (permit #16-SDP-1-76C) was issued June 14, 1993 with an expiration date of June 14, 2023 and included post-closure requirements based upon old regulations.

In 1995-1996, a Ground Water Quality Assessment Plan (GWQAP) was prepared. Multiple wells were determined to have various levels of volatile compounds attributed to the landfill, reportedly due to some of the wells being located adjacent to the deposited waste. Additional wells were installed to determine the extent of the contamination and additional monitoring was required. The Hydrologic Monitoring System Plan was modified to include additional sampling and analysis for several volatiles from multiple wells. Various permit amendments over the years eliminated some of the parameters when it was noted that they were never detected in a specific monitoring well.

With the transition to updated solid waste rules, the IDNR began requiring additional and modified monitoring requirements. An IDNR letter of April 4, 2014 and Permit Amendment #12 (#82747) dated March 18, 2015 required the collection and analysis of Appendix 1 parameters during the fall 2015 sampling event. In addition, the permit amendment substituted explosive gas monitoring in the vadose zone in the monitoring wells for the previous ambient explosive gas monitoring.

Following a meeting with IDNR staff, Permit Amendment #13 (#84113) reduced the number of monitoring wells to eight shallow wells: MW-3A, MW-4, MW-15, MW-16, MW-17, MW-18, MW-23, and MW-26.

Permit Amendment #14 (#85257) dated January 29, 2016 modified the original monitoring requirements to include Appendix I and total suspended solids (TSS) sampling during the spring and fall 2016 events for the eight shallow wells listed in Amendment #13. It also required the semi-annual monitoring of the remaining wells for static water levels and explosive gases. Amendment #14 reduced the monitoring of the leachate piezometers to semi-annually and approved a groundwater scientist to prepare the groundwater reports and sampling plans.

Permit Amendment #15 (#87995) issued December 20, 2016, required the spring and fall 2017 sampling of eight monitoring wells for Appendix I parameters. This amendment also reduced the number of water level measurements and substituted quarterly explosive gas monitoring with semi-annual monitoring of the vadose zone in specific monitoring wells. The amendment also required the semi-annual monitoring of the three leachate piezometers.

Permit Amendment #16 (#91818) issued March 16, 2018, approved the abandonment of five bedrock monitoring wells (abandonment of two piezometers was also approved after further discussion). Abandonment of those wells was completed in July and September 2018. The abandonment documents were submitted on October 20, 2018. Permit Amendment #16 also required the semi-annual sampling of eight monitoring wells for Appendix I parameters and listed the groundwater water level and gas monitoring locations to be monitored semiannually.

Permit Amendment #17 (#93877) dated December 10, 2019 reduced some of the monitoring requirements to annually.

Permit Amendment #18 (#93877) dated February 21, 2022 further reduced the monitoring requirements. The amendment provided for the annual monitoring of wells MW-3A, MW-16, MW-17, MW-18, MW-23, and MW-26. Static water levels and explosive gas monitoring locations continue to be monitored at all the monitoring wells on an annual basis. The routine monitoring of the leachate piezometers was eliminated from the monitoring requirements. Inspections of the landfill was also reduced to an annual frequency.

On January 20, 2023 the Closure Permit termination date was extended to from June 14, 2023 to June 14, 2024 by Permit Amendment #19 (Doc #105550).

Permit Amendment #19 (*sic*) was issued on November 7, 2023 (Doc #108163) approving the leachate seep repair (Doc #108030) completed in the fall of 2023.

Table 1 lists the monitoring wells and their salient geological characteristics.

Site Location and Geology of Wells

The landfill site occupies about 23 acres chiefly in the E 1/2 NW 1/4 SE 1/4 sec. 7, T. 80 N., R. 3 W., in western Cedar County, Iowa. Figure 1 in Appendix A shows the waste and property boundaries and monitoring well locations. Figure 2 in Appendix A shows the landfill waste boundaries, monitoring well locations and shallow water-level contours using October 19, 2023 data. Closure of the landfill occurred in 1993 under previous rules and an Iowa Department of Natural Resource (IDNR) closure permit was issued June 14, 1993. The site was pasture prior to landfilling. There are no potential groundwaters or surface water receptors reported.

Household and municipal wastes from Cedar County were the chief refuse materials. The landfill was developed mainly as a ravine fill in Wisconsinan loess and underlying pre-Illinoian glacial till in the Southern Iowa Drift Plain (Prior, 1991).

Table 1 — Current sampled wells at the Cedar County Sanitary Landfill, and their salient characteristics

Monitoring Well	Screened Interval (Depth below grade, ft.)	Screened Across
MW-3A	14.0-34.0	Loess and weathered glacial till.
MW-16	12.8-27.8	Loess, coarse silt, and weathered glacial till.
MW-17	13.0-28.0	Loess and weathered glacial till.
MW-18	8.8-28.8	Loess, laminated silt, and weathered glacial till
MW-23	13.6-33.6	Clayey silt, clayey laminated silt, paleosol, and glacial till
MW-26	8.5-28.5	Gray-brown silty clay, gray sandy silty clay, brown sandy lean clay trace gravel

October 2023 Sampling Protocol

Based upon Permit Amendment #18 and the IDNR review letter dated February 21, 2022, (#102402), MW-3A, MW-16, MW-17, MW-18, MW-23, and MW-26 were sampled during the October 2023 monitoring event. Methane gas monitoring and static water levels were conducted on these six monitoring wells and the additional wells (MW-4, MW-14, MW-15, MW19, and MW-20) listed in paragraphs #2 and #3 of permit amendment #18 (#102402).

Immediately upon removal of each monitoring well's inner casing cap, methane and oxygen levels are measured using a Gas Clip Tech MGC Pump meter. Static water levels are then measured. For the wells sampled, Appendix I samples were collected using a stainless-steel Solinst Model 429 Point Source Sampler to obtain samples that are not affected by mechanically induced turbidity. Well depth readings are also taken and compared to the original reported well depth.

The field and laboratory reports for the 2023 monitoring event are provided in Appendix B. A summary of the detections for Appendix I compound since October 2015 are listed in Table 2.

Table 2 - Cedar County Sampling Summary (All data in µg/l)

Well	Date	Vinyl Chloride	Chloroethane	Trichlorofluoro methane	Acetone	trans-1,2 Dichloro ethylene	1,1-Dichloro-ethane	cis-1,2 Dichloro ethylene	1,2-Dichloro ethane	1,1,1-Tri chloroethane	Benzene	Toluene	TCE	PCE	Chloro benzene	1,4-Dichloro benzene	Arsenic	Barium	Cadmium	Cobalt	Copper	Nickel	Zinc	Methane Gas %LEL
MW-3A	Fall 2015			20.8			8.4			1.2								285	1.0				8.6	<1
	Spring 2016																	283	1.6					<1
	Fall 2016			18.1			10.4			1.4			1.1	1.2				277					8.7	<1
	Spring 2017			12.6			7.4											254						<1
	Fall 2017			21.0			12.3			1.4								263						<1
	Spring 2018			21.0			11.2											253						<1
	Fall 2018			7.6			5.8			2.0			1.2	1.6				244	1.7					<1
	Fall 2019			9.2			8.9			1.1								281						<1
	Spring 2020			10.4			8.2											268						<1
	Fall 2021			11.4			8.6							1.0				265						<1
	Spring 2022			13.0			10.1			1.1								295						<1
	Fall 2023			9.4			8											292						<1
MW-16	Fall 2015	1.9	1.2					9.2							2.2			254	0.9	7.6		109	13.1	<1
	Spring 2016																	185	1.0	2.0		100		100%
	Fall 2016	2.0	2.1					8.1					1.0		2.8			172		2.8		104		100%
	Spring 2017	4.5	1.1			1.1	2.2	22.4					1.3					202		5.0		98.8		<1
	Fall 2017		1.4					12.5							2.5			247		7.4		96.1		<1
	Spring 2018							15.6							1.7			255		7.1		97.3		23%
	Fall 2018	1.3					1.0	18.2					1.0		1.0			253		6.9		94.1		<1
	Spring 2019	1.2	1.2					8.9							1.7			198		12.4	5.2	82.1	11.9	<1
	Fall 2019		1.2					8.2							2.3			312		33.6	5.5	115		<1
	Spring 2020							7.2							2.2			202		5.0		72.4		100%
	Fall 2020							9.4							4.1			232		8.3		80.5		<1
	Spring 2021							3.0							3.6			179		1.7	6.4	52.2		100%
	Fall 2021	1.1						7.3							4.7			179		5.5		66.8		<1
	Spring 2022							7.2							4.6			189		4.6		65.4		79.2
	Fall 2023	1.2					1.5	13.7							1.4			327		11.4		71		<1
MW-17	Fall 2015	4.5						2.9			1.1				19.9		9.5	341	0.9	25.8		49.7	109	50%
	Spring 2016																11.6	389		27.9		39.8		42%
	Fall 2016	5.8	1.6					2.8			1.3				25.5	1.1	19.4	373		30.4		55.1		100%
	Spring 2017	7.0	1.2		27.8			2.1							20.2	1.4	6.3	267		12.9		31.9		<1
	Fall 2017	5.6	1.1					2.5			1.7				22.1	1.1	36.0	396		33		41.3		62%
	Spring 2018														3.1	3.9	5.3	210		8.1		18.5		50%
	Fall 2018	4.8						2.5							17.8		6.5	345		12.1		25.8		43%
	Spring 2019														3.7	3.9	13.1	276		12.7		20.3		45%
	Fall 2019	2.1			130			1.0			1.5	1.2			11.6		32.5	469		14.8		10.2		19%
	Spring 2020														3.2	2.5	14.6	270		4.9		6		43%
	Fall 2020	3.3	1.0					2.2			1.8				16.9	1.8	37.0	396		11.7		7.3		26%
	Spring 2021														1.5	1.3	11.7	191		5.5		6.7		30%
	Fall 2021	2.5									1.2				11.6	2.0	16.5	361		3.8		8.6		18%
	Spring 2022														1.5	1.6	8.9	201		2.1		4.9		17.8%
	Fall 2023	2.1													9.2	2.2	11.7	373		0.5		4.3		<1
State GWPS		2	2800	2000	6300	100	140	70	5	200	5	1000	5	5	100	75	10	2000	5	2.8	1300	100	2000	

Table 2 - Cedar County Sampling Summary (continued) (All data in µg/l)

Well	Date	Vinyl Chloride	Chloroethane	Trichlorofluoro methane	Acetone	trans-1,2 Dichloro ethylene	1,1-Dichloro-ethane	cis-1,2 Dichloro ethylene	1,2-Dichloro ethane	1,1,1-Tri chloroethane	Benzene	Toluene	TCE	PCE	Chloro benzene	1,4-Dichloro benzene	Arsenic	Barium	Cadmium	Cobalt	Copper	Nickel	Zinc	Methane Gas %LEL
MW-18	Fall 2015		7.0				1.0	7.4	2.6							7.6		492		10.2		42.1	9.8	<1
	Spring 2016		6.8					6.0	2.0									503		12.3		55.4		100%
	Fall 2016		7.8					5.5	1.7							10.3		487		11.2		61.7		100%
	Spring 2017	1.8	5.3				1.2	5.1	1.6						1.1	10.0		475		9.5		60.1		<1
	Fall 2017		5.9					5.0								8.3	4.4	471		10.9		5.28		16%
	Spring 2018		5.2				1.5	5.7								7.5	5.8	510		12.9		52.5		<1
	Fall 2018		2.8					4.2	1.2							6.3	4.7	518		13.0		60.0		2.8%
	Spring 2019		2.9					3.1								3.0		378		25.9		61.1		10.0%
	Fall 2019		4.0		14.6			4.2										399		19.8		57.1		6.0%
	Spring 2020		4.4		15.7		1.0	3.6								3.7		382		17.0	9.7	64.5		60.0%
	Fall 2020		5.9				3.0	4.9			1.4					7.1	4.2	426		12.8		54.6		<1
	Spring 2021		2.8				1.6	2.2								7.9		392	1.5	1.8	7.8	56.6		7%
	Fall 2021		6.1				2.6	4.2			1.0					8.7		429		11.2		67.0		<1
	Spring 2022	1.2	5.6				2.4	4.2								9.3		446	0.8	6.80		58.0		72.7
	Fall 2023	1.3	3.7				1.9	4.9								9.7	5.7	441		12.60		65.0		<1
MW-23	Fall 2015						29.2							1.1				348	2.3	5.4	6.7	11.6	28.9	14%
	Spring 2016						28.6	1.0										361	0.8	4.7		8.9		<1
	Fall 2016		1.2				39.9	2.7					1.5	1.0				333		3.4		6.6		15%
	Spring 2017	1.3					30.7	2.0						1.0				315		4.3		7.3		<1
	Fall 2017	1.0	1.1				41.1	3.8					1.3					333		3.7		7.2		3.5%
	Spring 2018						15.7	1.1										332	1.2	2.3	4.9	10.1		<1
	Fall 2018						11.8							1.0				314	2.0	1.7	6.9	18.1		<1
	Spring 2019						34.9	9.1										358		1.4		9.3		73%
	Fall 2019	1.4	1.6				30.9	25.7										806	1.0	31.4		41.6		<1
	Spring 2020		2.2				33.8	40.8					1.8					349		4.8		10.9		2%
	Fall 2020	1.0	2.3			1.6	35.2	60.8					1.6					344		5.9		11.0		<1
	Spring 2021	1.7	2.4			1.5	16.2	72.9										387		3.1		8.3		<1
	Fall 2021	3.0	2.5			1.8	13.9	115.0										388		7.3	4.6	11.3	30.2	<1
	Spring 2022	2.0	2.6			1.8	22.6	85.5										360		3.0		8.2		<1
	Fall 2023						13.3	19.6										352		11.0		12.7		<1
MW-26	Fall 2015													1.8				152		1.2			11.9	<1
	Spring 2016																	990						<1
	Fall 2016													1.7				125						<1
	Spring 2017																	808						<1
	Fall 2017													1.5				163						<1
	Spring 2018													1.4				98.1						<1
	Fall 2018													1.0				84.6	1.0					<1
	Fall 2019																	125.0						<1
	Spring 2020																	97.5		0.6				<1
	Fall 2021													1.1				197.0						<1
	Spring 2022																	95.8						<1
	Fall 2023																	174.0						<1
State GWPS		2	2800	2000	6300	100	140	70	5	200	5	1000	5	5	100	75	10	2000	5	2.8	1300	100	2000	

Results below the lab MRL were left blank, reflecting non-detected parameter

2023 Monitoring Results

Volatile Organic Compound (VOC) Results

Monitoring wells MW-3A, MW-16, MW-17, MW-18, and MW-23 all had at least one detected volatile during the 2023 sampling event. MW-26 reported no VOC detections.

Review of Table 2 indicates that the VOC detections vary across each well over time. Some compound detections are sporadic, while some compounds are consistently detected at a particular well. In 2023, only one compound (vinyl chloride) was detected above the GWPS (2.0 µg/l) at only one well, MW-17 (2.1 µg/l). Table 3 summarizes the VOC detected above GWPS in 2023.

Table 3 - Reported VOCs Exceeding the Statewide Groundwater Protection Standard

Monitoring Well	October, 2023 Vinyl Chloride (µg/l)
MW-17	2.1
Statewide Standard	2.0

Historic VOC detections that exceeded a GWPS were limited to:

MW-16 - vinyl chloride (2017 and prior)
MW-17 - vinyl chloride (2015 through current)
MW-23 – vinyl chloride (2021 and 2022)
MW-23 – cis-1,2-dichloroethene (2021 and 2022)

Note that the reported vinyl chloride detections summarized above occur sporadically at MW-16, MW-17, and MW-23 bouncing between undetected concentrations to concentrations slightly above the GWPS. Cis-1,2-dichloroethene is consistently detected at MW-16 and MW-23, but typically below GWPS. The cis-1,2-dichloroethene concentration at MW-23 demonstrated a sharp spike in concentration in 2021 (above the GWPS) but has since diminished.

In order to further assess the condition of the VOC detections at the site, Time Series Graphs are prepared and are included in Appendix C. Note that toluene was not graphed, as there were no verified detections of toluene in any site monitoring well. The February 21, 2022 IDNR Letter (Doc #102402) indicated that stable or declining trends in VOC data should be documented at the site wells in order to facilitate the completion of the Environmental Covenant.

Review of the fourteen (14) times series graphs (Appendix C) indicate that the monitored VOC are interpreted to have a static or declining trends over time at all wells. However, trans-1,2-dichloroethene and cis-1,2-dichloroethene at MW-23 require additional discussion.

The trans-1,2-dichloroethene results were reported as undetected from October, 2015 to September, 2020. Detections were then recorded for four consecutive sampling events at very low levels, and has since diminished to non-detected concentrations. A clear trend for trans-1,2-dichloroethene at MW-23 is not apparent. However, it is assumed that the trans-1,2-dichloroethene concentrations will not vary greatly or increase over time. Ongoing consideration

of trans-1,2-dichloroethene is considered to be a moot point since the detected concentrations (less than 2.0 ug/L) are significantly less than the GWPS (100 ug/L) and do not pose significant potential for environmental or human health impacts.

The cis-1,2-dichloroethene at MW-23 results were reported as relatively low concentrations (significantly below the GWPS) until September 2019 when a marked increase is observed. The concentrations reached a peak in September, 2021 (above the GWPS) but have since drastically fallen to concentrations well below the GWPS. A trend line through the data may be relatively flat, but may not clearly represent a trend. The trend in cis-1,2-dichloroethene concentrations at MW-23 since 2021 is clearly downward based on available data.

The VOC detections at the site monitoring wells have been interpreted to be landfill gas related. The gas impacted wells are predominantly located east-northeast (hydraulically upgradient MW-23) and to the west (hydraulically downgradient MW-16 and MW-17). Substantial landfill-owned acres exist adjacent to the referenced monitoring wells. Completed human health exposure pathways are not apparent near the monitoring wells located in the interior of the landfill-owned parcels.

Appendix I Metal Results

The sampling of the wells using a Solinst Model 429 Point Source Sampler minimizes the turbidity normally associated with well pumps (including low flow pumps). The field measured turbidity confirms values generally less than 5 NTU. The single exception in 2023 was a turbidity of 10.85 at MW-16 on October 19, 2023. Water quality results are interpreted to be free of turbidity impacts. Table 4 summarizes the field turbidity on October 19, 2023.

Table 4 – 2023 Turbidity results (NTU)

Monitoring Well	2023	Field Notes
MW-3A	1.01	
MW-16	10.85	
MW-17	1.85	
MW-18	3.40	
MW-23	4.36	Dead ants
MW-26	2.80	

Table 5 lists the metals that exceeded the State Ground Water Protection Standards in 2023.

Table 5 - Reported Metals Exceeding the Statewide Groundwater Protection Standard

Monitoring Well	October 2023 Cobalt (µg/L)	October 2023 Arsenic (µg/L)
MW-16	11.4	
MW-17		11.7
MW-18	12.6	
MW-23	11.0	
Statewide Standard	2.1	10.0

The reported metals that exceed the GWPS in 2023 are fairly representative of the findings over time. MW-16, MW-17, MW-18, and MW-23 have had historic exceedances of the cobalt GWPS over time, while MW-17 has also had historic exceedances of the arsenic GWPS over time. Each referenced well has been interpreted to be impacted to some degree by landfill gas. Trends appear static over time in MW-16, MW-17, MW-18, and MW-23.

Static Water Level and Well Depth Data

The measured 2023 static water levels are included in the comprehensive summary in Appendix D.

Well depths were measured in the six (6) HMSP monitoring wells in 2023. Bottom depth measurements are unchanged from 2021.

Explosive Gas Monitoring of the Vadose Zone

Per IDNR request, the head space or vadose zone in the monitoring wells were tested for explosive gases. Table 6 shows the static water levels, the well screen interval, and the 2023 gas monitoring results. No wells were reported where water levels were above the screen interval in 2023.

During the 2023 spring monitoring event there were no monitoring wells that had methane gas detections. There is no evidence that methane gas is migrating or leaving the Commission-owned property.

Table 6 – Cedar County Landfill Well & Gas Monitoring – October 19, 2023

Well	Screened Interval	Static Water Level	WL vs screen position	Methane reading (LEL)
MW-3A	16.40-36.40	23.82	Within	<1.0%
MW-4	21.50-30.10	27.40	Within	<1.0%
MW-14	16.20-36.20	26.09	Within	<1.0%
MW-15	11.30-26.65	19.48	Within	<1.0%
MW-16	15.00-30.81	26.13	Within	<1.0%
MW-17	15.00-29.91	23.93	Within	<1.0%
MW-18	10.10-30.41	24.49	Within	<1.0%
MW-19	11.80-27.45	26.95	Within	<1.0%
MW-20	12.00-27.00	22.52	Within	<1.0%
MW-23	16.10-37.45	31.90	Within	<1.0%
MW-26	8.50-30.45	18.82	Within	<1.0%

Summary of Monitoring Events

The following evaluates the wells monitored during the October 19, 2023 sampling event. Historical data has previously been provided to the Department.

MW-3A reported the detection of trichlorofluoromethane and 1,1-dichloroethane during the 2023 monitoring event. All detections are below the groundwater protection standards (GWPS). The total metals were also below the GWPS. Previous sampling events indicated frequent and minor detections of volatile compounds. Routine volatile monitoring was not conducted prior to fall 2015.

No methane gas has been detected in this well. During the 2023 monitoring event the static water level was again within the well screen.

MW-16 reported the detection of vinyl chloride, 1,1-dichloroethane, cis-1,2, dichloroethylene and chlorobenzene during the 2023 sampling event. All reported VOC detections were below the statewide GWPS. The cobalt result (11.4 µg/l) exceed the statewide GWPS (2.1 µg/l) during the 2023 sampling event.

Methane gas was not detected in this monitoring well during the 2023 monitoring event. The static water level in MW-16 was within the well screen.

MW-17 reported the detection of vinyl chloride, chlorobenzene and 1,4-dichlorobenzene during the 2023 event. None of the results exceeded the statewide GWPS. The vinyl chloride concentration is detected at a concentration (2.1 µg/l), slightly above the GPWS (2.0 µg/l). Arsenic was also reported (11.7 µg/l) above the GWPS (10.0 µg/l) during the 2023 monitoring.

Methane gas not was detected during 2023 event. The static water level remained within the well screen.

MW-18 reported the detection of five (5) VOC during the 2023 monitoring. None of the VOCs exceeded a GWPS. The 2023 cobalt concentration (12.6 µg/l) exceeded the GWPS (2.1 µg/l).

Methane gas was not detected during the monitoring event at MW-18. The static water level remained within the well screen during all monitoring events.

MW-23 reported detections of two (2) volatiles during the 2023 sampling event, both below the GWPS. The reported cobalt level (11.0 µg/l) exceeded the statewide GWPS (2.1 µg/l).

No methane gas was detected during this monitoring event. The static water level has remained within the well screen during the monitoring events.

MW-26 had no VOC detected during 2023 and all the metals were below any statewide GWPS.

Methane gas was not detected during this monitoring event. The static water level was within the screen during the sampling event.

Summary of All Exceedances to the Statewide Ground Water Protection Standards

The results of the 2023 monitoring events, reported exceedances of the statewide GWPS for:

MW-3A – none
MW-16 – cobalt
MW-17 – vinyl chloride, arsenic
MW-18 – cobalt
MW-23 – cobalt
MW-26 - none

Monitoring Results Analysis

Previous AWQRs offered the interpretation that the detection of volatiles in the wells located on the west side of the landfill (MW-16, MW-17, and MW-18) can be correlated to the frequent detection of methane gas in the vadose zone of the wells. Vinyl chloride represents a final daughter product in the degradation of PCE/TCE and likely represents the fringe of impact. The gas impacts may produce changes in redox and dissolved oxygen content and may be tied to the intermittent metal (arsenic and cobalt) compound detections.

In the fall of 2016 and 2017, repairs were made to settled and eroded areas, especially along the west waste boundary. The landfill was graded, a terrace was removed, and the area was reseeded to promote drainage. Following the repairs, methane gas levels and the detection of volatiles has declined.

Explosive gas monitoring continues to be conducted annually on eleven wells. The 2023 monitoring (Table 6) reported no methane gas detections in any of the site monitoring wells.

Site Status Relative to Completion of the Environmental Covenant

- Repair of erosion and leachate seeps previously observed in the west portion of the site - During late fall of 2019, a contractor removed the terraces, and repaired erosion and leachate seeps using off-site soils. The repaired areas were seeded, and vegetation was reestablished.
- Repair of the leachate seep in the center portion of the landfill- During 2023 a contractor made the authorized repairs to the landfill cap at the leachate seep in the center portion of the site. The Construction Certification for the repairs was submitted to IDNR on October 24, 2023 (Doc #108030). The repairs were approved by IDNR in a Permit Amendment issued November 7, 2023 (Doc #108163).
- Evaluation of VOC trends over time – The VOC detections over time are evaluated herein with time series graphs included in Appendix C. Based on the evaluated results, it appears that the VOC concentrations are generally low-level (below GWPS), are relatively stable or declining, and are inconsistently present/absent. The VOC results over time support the interpretation that the VOC are landfill gas derived. Landfill gas

migration is anticipated to be of limited aerial extent based on the topography of the site. Further, the landfill owns an appreciable land buffer in most directions from the filled waste boundary. Migration of landfill gas and VOC impacted gas/water are demonstrated to be restricted and attenuated.

Recommendations

Substantial improvements have been completed at the site in the past several years with the goal of completing an Environmental Covenant for the site and ending regulation of the site under IAC 113.

The active seeps in the central portion of the site have been remedied in 2023.

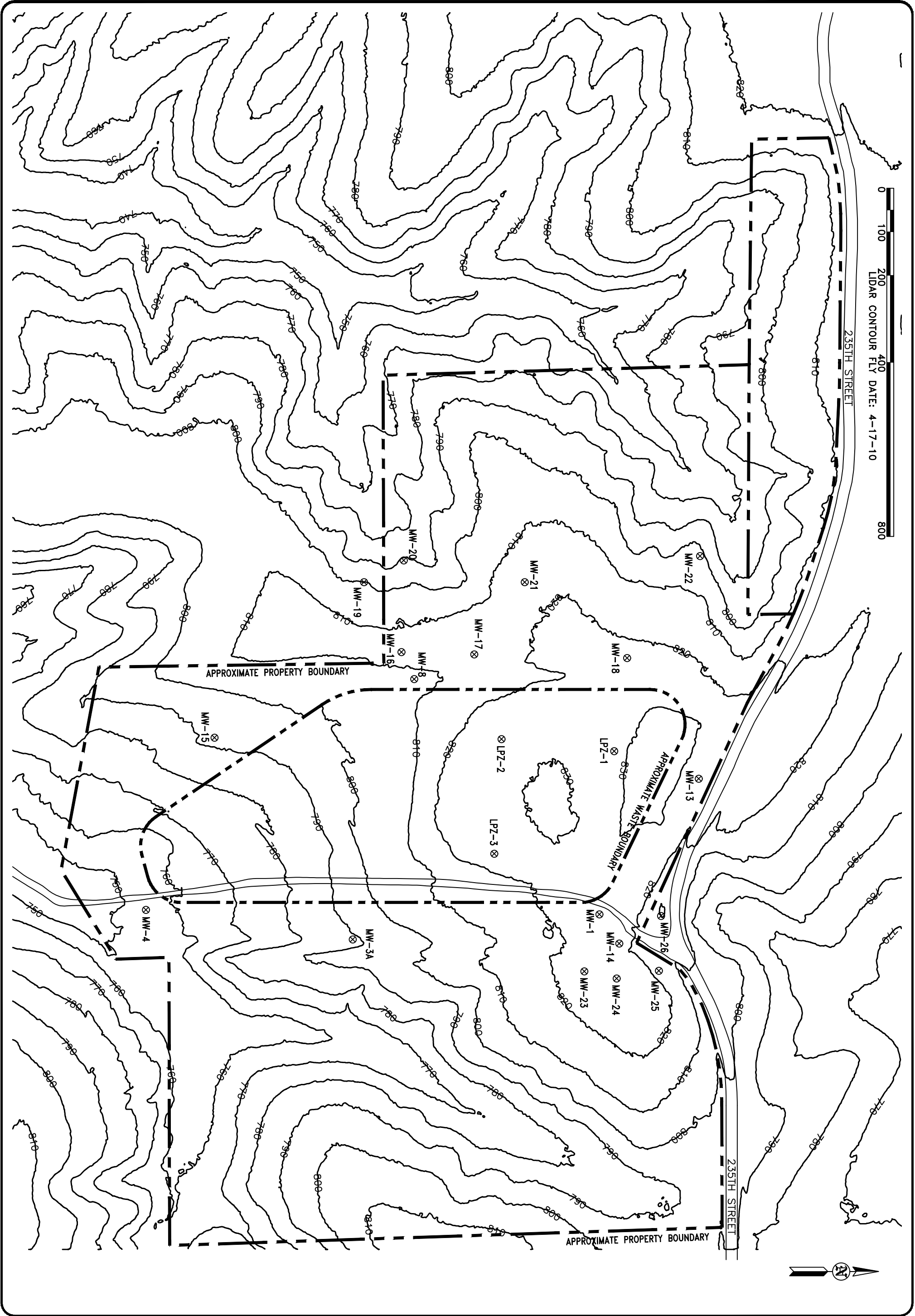
A positive assessment of VOC impacts and trends is completed herein.

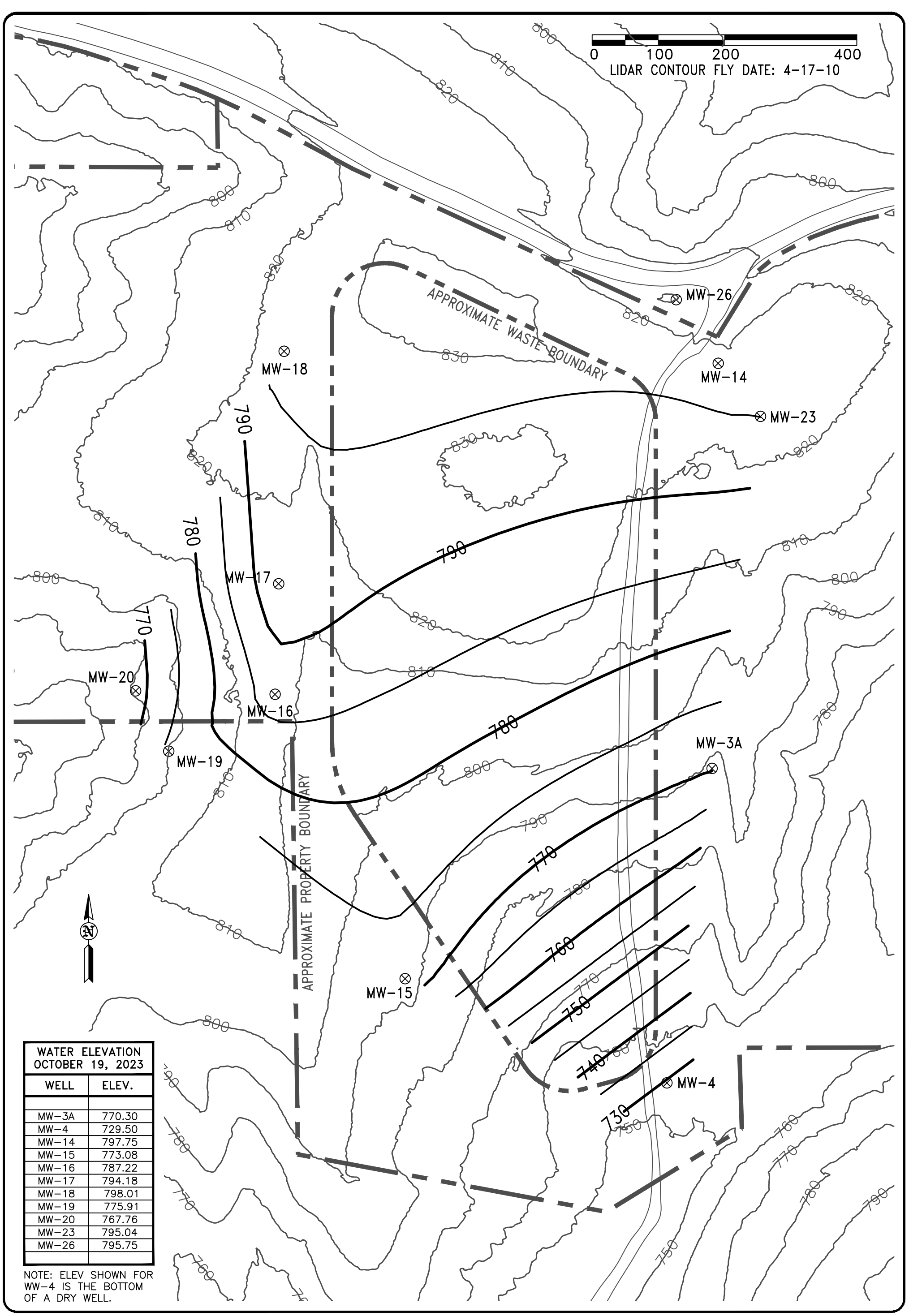
We make the following recommendations for 2024:

- 1) Prepare a draft Environmental Covenant document for review and comment by IDNR. Once completed to the satisfaction of each party, the document should be fully executed and filed with the deed.
- 2) Water quality sampling, gas monitoring, and reporting should be suspended in 2024 and the cost savings used to offset the costs of developing the Environmental Covenant in 2024.
- 3) Perform an inspection of the landfill in the Spring of 2024 to assess the quality of vegetation at the site, especially in the 2023 repair areas.
- 4) Monitoring well MW-19 should be properly plugged and abandoned in accordance with IAC 567, Chapter 39, in order to eliminate ownership issues and potential need for easement or access to MW-19 in the future (currently not included in the HMSP).
- 5) All remaining monitoring wells should be properly plugged and abandoned in accordance with IAC 567, Chapter 39 upon issuance of the Environmental Covenant.

APPENDIX A

SITE MAP AND GROUNDWATER CONTOUR MAP





WATER ELEVATION OCTOBER 19, 2023	
WELL	ELEV.
MW-3A	770.30
MW-4	729.50
MW-14	797.75
MW-15	773.08
MW-16	787.22
MW-17	794.18
MW-18	798.01
MW-19	775.91
MW-20	767.76
MW-23	795.04
MW-26	795.75

NOTE: ELEV SHOWN FOR
WW-4 IS THE BOTTOM
OF A DRY WELL.

APPENDIX B

2023 FIELD REPORT AND 2023 LABORATORY REPORT

**CEDAR COUNTY SANITARY LANDFILL
PERMIT # 16-SDP-1-76C**

Date: October 19, 2023

Sampled by: Todd Whipple

Weather: Overcast, sprinkles, slight breeze, 48-56 F

Well #

Ground Water

MW-3A (dg)	TOC	Depth	2" dia.	Time	Depth	Elevation	Gallons	# of Vol.	Dry?	NTU
	794.12	37.00	Static gw level	8:03	23.82	770.30				1.01
	Capped	YES	After Pumping				Bailer for metals			
	Standing Water	NO					Dedicated Waterra Inertia pumped			
	Litter	NO	Comments: -- Gas 0%							

MW-16 (dg)	TOC	Depth	2" dia.	Time	Depth	Elevation	Gallons	# of Vol.	Dry?	NTU
	813.35	30.81	Static gw level	8:40	26.13	787.22		0.0	No	10.85
	Capped	NO	After Pumping				Bailer for metals			
	Standing Water	NO					Dedicated Waterra Inertia pumped			
	Litter	NO	Comments: -- Gas 0%							

MW-17 (dg)	TOC	Depth	2" dia.	Time	Depth	Elevation	Gallons	# of Vol.	Dry?	NTU
	818.11	29.91	Static gw level	9:00	23.93	794.18			No	1.85
	Capped	YES	After Pumping				Bailer for metals			
	Standing Water	NO					Dedicated Waterra Inertia pumped			
	Litter	NO	Comments: -- Gas 0%							

MW-18 (dg)	TOC	Depth	2" dia.	Time	Depth	Elevation	Gallons	# of Vol.	Dry?	NTU
	822.50	30.41	Static gw level	9:16	24.48	798.02			No	3.40
	Capped	YES	After Pumping				Bailer for metals			
	Standing Water	NO					Dedicated Waterra Inertia pumped			
	Litter	NO	Comments: -- Gas 0%							

MW-23 (dg)	TOC	Depth	2" dia.	Time	Depth	Elevation	Gallons	# of Vol.	Dry?	NTU
	826.94	37.45	Static gw level	7:42	31.90	795.04			No	4.36
	Capped	YES	After Pumping				Bailer for metals			
	Standing Water	NO					Dedicated Waterra Inertia pumped			
	Litter	NO	Comments: Dead ants, 0% gas							

MW-26 (dg)	TOC	Depth	2" dia.	Time	Depth	Elevation	Gallons	# of Vol.	Dry?	NTU
	814.57	30.45	Static gw level	7:22	18.82	795.75				2.8
	Capped	YES	After Pumping				Bailer for metals			
	Standing Water	NO					Dedicated Waterra Inertia pumped			
	Litter	NO	Comments: -- Gas 0%							



Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Project Description

Cedar Co. - New Regs

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 style with a horizontal line underneath the name.

Heather Murphy

Customer Relationship Specialist

Tuesday, October 31, 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

1GJ1896

HLW Engineering

Todd Whipple
PO Box 314
Story City, IA 50248

Project Name: Cedar Co. - New Regs

Project / PO Number: / Appendix Sampling
Received: 10/19/2023
Reported: 10/31/2023

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-3A	1GJ1896-01	Water	GRAB		10/19/23 08:03	10/19/23 13:26
MW-16	1GJ1896-02	Water	GRAB		10/19/23 08:40	10/19/23 13:26
MW-17	1GJ1896-03	Water	GRAB		10/19/23 09:00	10/19/23 13:26
MW-18	1GJ1896-04	Water	GRAB		10/19/23 09:16	10/19/23 13:26
MW-23	1GJ1896-05	Water	GRAB		10/19/23 07:42	10/19/23 13:26
MW-26	1GJ1896-06	Water	GRAB		10/19/23 07:22	10/19/23 13:26
Duplicate	1GJ1896-07	Water	GRAB		10/19/23 00:00	10/19/23 13:26

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Analytical Testing Parameters

Client Sample ID:	MW-3A	Collected By:	Whipple, Todd
Sample Matrix:	Water	Collection Date:	10/19/2023 8:03
Lab Sample ID:	1GJ1896-01		

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		10/24/23 0000	10/24/23 1159	LJS
Vinyl Chloride	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Bromomethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Chloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Trichlorofluoromethane	9.4	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
1,1-Dichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Acetone	<10.0	10.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Methyl Iodide	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Carbon Disulfide	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Methylene Chloride	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Acrylonitrile	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
trans-1,2-Dichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
1,1-Dichloroethane	8.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Vinyl Acetate	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
cis-1,2-Dichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
2-Butanone (MEK)	<10.0	10.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Bromochloromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Chloroform	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
1,1,1-Trichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Carbon Tetrachloride	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Benzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
1,2-Dichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Trichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
1,2-Dichloropropane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Dibromomethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Bromodichloromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
cis-1,3-Dichloropropene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
4-Methyl-2-pentanone (MIBK)	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Toluene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
trans-1,3-Dichloropropene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
1,1,2-Trichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Tetrachloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
2-Hexanone (MBK)	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Dibromochloromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
1,2-Dibromoethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Chlorobenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
1,1,1,2-Tetrachloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Ethylbenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Xylenes, total	<2.0	2.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Styrene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Client Sample ID: MW-3A
Sample Matrix: Water
Lab Sample ID: 1GJ1896-01

Collected By: Whipple, Todd
Collection Date: 10/19/2023 8:03

Determination of Volatile Organic Compounds	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
Bromoform	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
1,2,3-Trichloropropane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
trans-1,4-Dichloro-2-butene	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
1,1,2,2-Tetrachloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
1,4-Dichlorobenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
1,2-Dichlorobenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
1,2-Dibromo-3-chloropropane	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1159	LJS
Surrogate: Dibromofluoromethane	93.5	Limit: 80-126	% Rec	1		10/24/23 0000	10/24/23 1159	LJS
Surrogate: Dibromofluoromethane	93.5	Limit: 75-136	% Rec	1		10/24/23 0000	10/24/23 1159	LJS
Surrogate: 1,2-Dichloroethane-d4	92.2	Limit: 63-138	% Rec	1		10/24/23 0000	10/24/23 1159	LJS
Surrogate: 1,2-Dichloroethane-d4	92.2	Limit: 61-142	% Rec	1		10/24/23 0000	10/24/23 1159	LJS
Surrogate: Toluene-d8	102	Limit: 82-121	% Rec	1		10/24/23 0000	10/24/23 1159	LJS
Surrogate: Toluene-d8	102	Limit: 87-116	% Rec	1		10/24/23 0000	10/24/23 1159	LJS
Surrogate: 4-Bromofluorobenzene	98.2	Limit: 80-116	% Rec	1		10/24/23 0000	10/24/23 1159	LJS
Surrogate: 4-Bromofluorobenzene	98.2	Limit: 85-111	% Rec	1		10/24/23 0000	10/24/23 1159	LJS

Determination of Total Metals	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 3005A/EPA 6020A								
Antimony, total	<0.0020	0.0020	mg/L	4		10/23/23 1004	10/24/23 0256	RVV
Arsenic, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0256	RVV
Barium, total	0.292	0.0040	mg/L	4		10/23/23 1004	10/24/23 0256	RVV
Beryllium, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0256	RVV
Cadmium, total	<0.0008	0.0008	mg/L	4		10/23/23 1004	10/24/23 0256	RVV
Chromium, total	<0.0080	0.0080	mg/L	4		10/23/23 1004	10/24/23 0256	RVV
Cobalt, total	<0.0004	0.0004	mg/L	4		10/23/23 1004	10/24/23 0256	RVV
Copper, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0256	RVV
Lead, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0256	RVV
Nickel, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0256	RVV
Selenium, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0256	RVV
Silver, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0256	RVV
Thallium, total	<0.0020	0.0020	mg/L	4		10/23/23 1004	10/24/23 0256	RVV
Vanadium, total	<0.0200	0.0200	mg/L	4		10/23/23 1004	10/24/23 0256	RVV
Zinc, total	<0.0200	0.0200	mg/L	4		10/23/23 1004	10/24/23 0256	RVV

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Client Sample ID: MW-16
Sample Matrix: Water
Lab Sample ID: 1GJ1896-02

Collected By: Whipple, Todd
Collection Date: 10/19/2023 8:40

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		10/24/23 0000	10/24/23 1239	LJS
Vinyl Chloride	1.2	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Bromomethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Chloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Trichlorofluoromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
1,1-Dichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Acetone	<10.0	10.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Methyl Iodide	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Carbon Disulfide	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Methylene Chloride	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Acrylonitrile	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
trans-1,2-Dichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
1,1-Dichloroethane	1.5	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Vinyl Acetate	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
cis-1,2-Dichloroethylene	13.7	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
2-Butanone (MEK)	<10.0	10.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Bromochloromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Chloroform	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
1,1,1-Trichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Carbon Tetrachloride	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Benzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
1,2-Dichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Trichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
1,2-Dichloropropane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Dibromomethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Bromodichloromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
cis-1,3-Dichloropropene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
4-Methyl-2-pentanone (MIBK)	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Toluene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
trans-1,3-Dichloropropene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
1,1,2-Trichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Tetrachloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
2-Hexanone (MBK)	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Dibromochloromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
1,2-Dibromoethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Chlorobenzene	1.4	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
1,1,1,2-Tetrachloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Ethylbenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Xylenes, total	<2.0	2.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Styrene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Bromoform	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
1,2,3-Trichloropropane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Client Sample ID: MW-16
Sample Matrix: Water
Lab Sample ID: 1GJ1896-02

Collected By: Whipple, Todd
Collection Date: 10/19/2023 8:40

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		10/24/23 0000	10/24/23 1239	LJS
1,1,2,2-Tetrachloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
1,4-Dichlorobenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
1,2-Dichlorobenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
1,2-Dibromo-3-chloropropane	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1239	LJS
Surrogate: Dibromofluoromethane	95.0	Limit: 80-126	% Rec	1		10/24/23 0000	10/24/23 1239	LJS
Surrogate: Dibromofluoromethane	95.0	Limit: 75-136	% Rec	1		10/24/23 0000	10/24/23 1239	LJS
Surrogate: 1,2-Dichloroethane-d4	95.3	Limit: 63-138	% Rec	1		10/24/23 0000	10/24/23 1239	LJS
Surrogate: 1,2-Dichloroethane-d4	95.3	Limit: 61-142	% Rec	1		10/24/23 0000	10/24/23 1239	LJS
Surrogate: Toluene-d8	102	Limit: 87-116	% Rec	1		10/24/23 0000	10/24/23 1239	LJS
Surrogate: Toluene-d8	102	Limit: 82-121	% Rec	1		10/24/23 0000	10/24/23 1239	LJS
Surrogate: 4-Bromofluorobenzene	99.0	Limit: 85-111	% Rec	1		10/24/23 0000	10/24/23 1239	LJS
Surrogate: 4-Bromofluorobenzene	99.0	Limit: 80-116	% Rec	1		10/24/23 0000	10/24/23 1239	LJS

Determination of Total Metals	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 3005A/EPA 6020A								
Antimony, total	<0.0020	0.0020	mg/L	4		10/23/23 1004	10/24/23 0302	RVV
Arsenic, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0302	RVV
Barium, total	0.327	0.0040	mg/L	4		10/23/23 1004	10/24/23 0302	RVV
Beryllium, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0302	RVV
Cadmium, total	<0.0008	0.0008	mg/L	4		10/23/23 1004	10/24/23 0302	RVV
Chromium, total	<0.0080	0.0080	mg/L	4		10/23/23 1004	10/24/23 0302	RVV
Cobalt, total	0.0114	0.0004	mg/L	4		10/23/23 1004	10/24/23 0302	RVV
Copper, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0302	RVV
Lead, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0302	RVV
Nickel, total	0.0710	0.0040	mg/L	4		10/23/23 1004	10/24/23 0302	RVV
Selenium, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0302	RVV
Silver, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0302	RVV
Thallium, total	<0.0020	0.0020	mg/L	4		10/23/23 1004	10/24/23 0302	RVV
Vanadium, total	<0.0200	0.0200	mg/L	4		10/23/23 1004	10/24/23 0302	RVV
Zinc, total	<0.0200	0.0200	mg/L	4		10/23/23 1004	10/24/23 0302	RVV

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Client Sample ID: MW-17
Sample Matrix: Water
Lab Sample ID: 1GJ1896-03

Collected By: Whipple, Todd
Collection Date: 10/19/2023 9:00

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		10/24/23 0000	10/24/23 1319	LJS
Vinyl Chloride	2.1	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Bromomethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Chloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Trichlorofluoromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
1,1-Dichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Acetone	<10.0	10.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Methyl Iodide	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Carbon Disulfide	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Methylene Chloride	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Acrylonitrile	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
trans-1,2-Dichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
1,1-Dichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Vinyl Acetate	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
cis-1,2-Dichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
2-Butanone (MEK)	<10.0	10.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Bromochloromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Chloroform	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
1,1,1-Trichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Carbon Tetrachloride	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Benzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
1,2-Dichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Trichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
1,2-Dichloropropane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Dibromomethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Bromodichloromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
cis-1,3-Dichloropropene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
4-Methyl-2-pentanone (MIBK)	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Toluene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
trans-1,3-Dichloropropene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
1,1,2-Trichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Tetrachloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
2-Hexanone (MBK)	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Dibromochloromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
1,2-Dibromoethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Chlorobenzene	9.2	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
1,1,1,2-Tetrachloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Ethylbenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Xylenes, total	<2.0	2.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Styrene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Bromoform	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
1,2,3-Trichloropropane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Client Sample ID: MW-17
Sample Matrix: Water
Lab Sample ID: 1GJ1896-03

Collected By: Whipple, Todd
Collection Date: 10/19/2023 9:00

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		10/24/23 0000	10/24/23 1319	LJS
1,1,2,2-Tetrachloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
1,4-Dichlorobenzene	2.2	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
1,2-Dichlorobenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
1,2-Dibromo-3-chloropropane	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1319	LJS
Surrogate: Dibromofluoromethane	96.0	Limit: 80-126	% Rec	1		10/24/23 0000	10/24/23 1319	LJS
Surrogate: Dibromofluoromethane	96.0	Limit: 75-136	% Rec	1		10/24/23 0000	10/24/23 1319	LJS
Surrogate: 1,2-Dichloroethane-d4	97.2	Limit: 63-138	% Rec	1		10/24/23 0000	10/24/23 1319	LJS
Surrogate: 1,2-Dichloroethane-d4	97.2	Limit: 61-142	% Rec	1		10/24/23 0000	10/24/23 1319	LJS
Surrogate: Toluene-d8	101	Limit: 87-116	% Rec	1		10/24/23 0000	10/24/23 1319	LJS
Surrogate: Toluene-d8	101	Limit: 82-121	% Rec	1		10/24/23 0000	10/24/23 1319	LJS
Surrogate: 4-Bromofluorobenzene	98.0	Limit: 85-111	% Rec	1		10/24/23 0000	10/24/23 1319	LJS
Surrogate: 4-Bromofluorobenzene	98.0	Limit: 80-116	% Rec	1		10/24/23 0000	10/24/23 1319	LJS

Determination of Total Metals	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 3005A/EPA 6020A								
Antimony, total	<0.0020	0.0020	mg/L	4		10/23/23 1004	10/24/23 0321	RVV
Arsenic, total	0.0117	0.0040	mg/L	4		10/23/23 1004	10/24/23 0321	RVV
Barium, total	0.373	0.0040	mg/L	4		10/23/23 1004	10/24/23 0321	RVV
Beryllium, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0321	RVV
Cadmium, total	<0.0008	0.0008	mg/L	4		10/23/23 1004	10/24/23 0321	RVV
Chromium, total	<0.0080	0.0080	mg/L	4		10/23/23 1004	10/24/23 0321	RVV
Cobalt, total	0.0005	0.0004	mg/L	4		10/23/23 1004	10/24/23 0321	RVV
Copper, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0321	RVV
Lead, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0321	RVV
Nickel, total	0.0043	0.0040	mg/L	4		10/23/23 1004	10/24/23 0321	RVV
Selenium, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0321	RVV
Silver, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0321	RVV
Thallium, total	<0.0020	0.0020	mg/L	4		10/23/23 1004	10/24/23 0321	RVV
Vanadium, total	<0.0200	0.0200	mg/L	4		10/23/23 1004	10/24/23 0321	RVV
Zinc, total	<0.0200	0.0200	mg/L	4		10/23/23 1004	10/24/23 0321	RVV

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Client Sample ID: MW-18
Sample Matrix: Water
Lab Sample ID: 1GJ1896-04

Collected By: Whipple, Todd
Collection Date: 10/19/2023 9:16

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		10/24/23 0000	10/24/23 1358	LJS
Vinyl Chloride	1.3	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Bromomethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Chloroethane	3.7	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Trichlorofluoromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
1,1-Dichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Acetone	<10.0	10.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Methyl Iodide	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Carbon Disulfide	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Methylene Chloride	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Acrylonitrile	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
trans-1,2-Dichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
1,1-Dichloroethane	1.9	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Vinyl Acetate	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
cis-1,2-Dichloroethylene	4.9	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
2-Butanone (MEK)	<10.0	10.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Bromochloromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Chloroform	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
1,1,1-Trichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Carbon Tetrachloride	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Benzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
1,2-Dichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Trichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
1,2-Dichloropropane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Dibromomethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Bromodichloromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
cis-1,3-Dichloropropene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
4-Methyl-2-pentanone (MIBK)	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Toluene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
trans-1,3-Dichloropropene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
1,1,2-Trichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Tetrachloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
2-Hexanone (MBK)	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Dibromochloromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
1,2-Dibromoethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Chlorobenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
1,1,1,2-Tetrachloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Ethylbenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Xylenes, total	<2.0	2.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Styrene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Bromoform	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
1,2,3-Trichloropropane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Client Sample ID: MW-18
Sample Matrix: Water
Lab Sample ID: 1GJ1896-04

Collected By: Whipple, Todd
Collection Date: 10/19/2023 9:16

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		10/24/23 0000	10/24/23 1358	LJS
1,1,2,2-Tetrachloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
1,4-Dichlorobenzene	9.7	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
1,2-Dichlorobenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
1,2-Dibromo-3-chloropropane	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1358	LJS
Surrogate: Dibromofluoromethane	97.9	Limit: 75-136	% Rec	1		10/24/23 0000	10/24/23 1358	LJS
Surrogate: Dibromofluoromethane	97.9	Limit: 80-126	% Rec	1		10/24/23 0000	10/24/23 1358	LJS
Surrogate: 1,2-Dichloroethane-d4	97.8	Limit: 61-142	% Rec	1		10/24/23 0000	10/24/23 1358	LJS
Surrogate: 1,2-Dichloroethane-d4	97.8	Limit: 63-138	% Rec	1		10/24/23 0000	10/24/23 1358	LJS
Surrogate: Toluene-d8	101	Limit: 82-121	% Rec	1		10/24/23 0000	10/24/23 1358	LJS
Surrogate: Toluene-d8	101	Limit: 87-116	% Rec	1		10/24/23 0000	10/24/23 1358	LJS
Surrogate: 4-Bromofluorobenzene	99.0	Limit: 80-116	% Rec	1		10/24/23 0000	10/24/23 1358	LJS
Surrogate: 4-Bromofluorobenzene	99.0	Limit: 85-111	% Rec	1		10/24/23 0000	10/24/23 1358	LJS

Determination of Total Metals	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 3005A/EPA 6020A								
Antimony, total	<0.0020	0.0020	mg/L	4		10/23/23 1004	10/24/23 0327	RVV
Arsenic, total	0.0057	0.0040	mg/L	4		10/23/23 1004	10/24/23 0327	RVV
Barium, total	0.441	0.0040	mg/L	4		10/23/23 1004	10/24/23 0327	RVV
Beryllium, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0327	RVV
Cadmium, total	<0.0008	0.0008	mg/L	4		10/23/23 1004	10/24/23 0327	RVV
Chromium, total	<0.0080	0.0080	mg/L	4		10/23/23 1004	10/24/23 0327	RVV
Cobalt, total	0.0126	0.0004	mg/L	4		10/23/23 1004	10/24/23 0327	RVV
Copper, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0327	RVV
Lead, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0327	RVV
Nickel, total	0.0650	0.0040	mg/L	4		10/23/23 1004	10/24/23 0327	RVV
Selenium, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0327	RVV
Silver, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0327	RVV
Thallium, total	<0.0020	0.0020	mg/L	4		10/23/23 1004	10/24/23 0327	RVV
Vanadium, total	<0.0200	0.0200	mg/L	4		10/23/23 1004	10/24/23 0327	RVV
Zinc, total	<0.0200	0.0200	mg/L	4		10/23/23 1004	10/24/23 0327	RVV

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Client Sample ID: MW-23
Sample Matrix: Water
Lab Sample ID: 1GJ1896-05

Collected By: Whipple, Todd
Collection Date: 10/19/2023 7:42

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		10/24/23 0000	10/24/23 1438	LJS
Vinyl Chloride	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Bromomethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Chloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Trichlorofluoromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
1,1-Dichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Acetone	<10.0	10.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Methyl Iodide	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Carbon Disulfide	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Methylene Chloride	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Acrylonitrile	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
trans-1,2-Dichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
1,1-Dichloroethane	13.3	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Vinyl Acetate	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
cis-1,2-Dichloroethylene	19.6	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
2-Butanone (MEK)	<10.0	10.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Bromochloromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Chloroform	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
1,1,1-Trichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Carbon Tetrachloride	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Benzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
1,2-Dichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Trichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
1,2-Dichloropropane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Dibromomethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Bromodichloromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
cis-1,3-Dichloropropene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
4-Methyl-2-pentanone (MIBK)	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Toluene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
trans-1,3-Dichloropropene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
1,1,2-Trichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Tetrachloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
2-Hexanone (MBK)	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Dibromochloromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
1,2-Dibromoethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Chlorobenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
1,1,1,2-Tetrachloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Ethylbenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Xylenes, total	<2.0	2.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Styrene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Bromoform	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
1,2,3-Trichloropropane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Client Sample ID: MW-23
Sample Matrix: Water
Lab Sample ID: 1GJ1896-05

Collected By: Whipple, Todd
Collection Date: 10/19/2023 7:42

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		10/24/23 0000	10/24/23 1438	LJS
1,1,2,2-Tetrachloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
1,4-Dichlorobenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
1,2-Dichlorobenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
1,2-Dibromo-3-chloropropane	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1438	LJS
Surrogate: Dibromofluoromethane	96.3	Limit: 80-126	% Rec	1		10/24/23 0000	10/24/23 1438	LJS
Surrogate: Dibromofluoromethane	96.3	Limit: 75-136	% Rec	1		10/24/23 0000	10/24/23 1438	LJS
Surrogate: 1,2-Dichloroethane-d4	93.7	Limit: 63-138	% Rec	1		10/24/23 0000	10/24/23 1438	LJS
Surrogate: 1,2-Dichloroethane-d4	93.7	Limit: 61-142	% Rec	1		10/24/23 0000	10/24/23 1438	LJS
Surrogate: Toluene-d8	102	Limit: 87-116	% Rec	1		10/24/23 0000	10/24/23 1438	LJS
Surrogate: Toluene-d8	102	Limit: 82-121	% Rec	1		10/24/23 0000	10/24/23 1438	LJS
Surrogate: 4-Bromofluorobenzene	98.5	Limit: 85-111	% Rec	1		10/24/23 0000	10/24/23 1438	LJS
Surrogate: 4-Bromofluorobenzene	98.5	Limit: 80-116	% Rec	1		10/24/23 0000	10/24/23 1438	LJS

Determination of Total Metals	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 3005A/EPA 6020A								
Antimony, total	<0.0020	0.0020	mg/L	4		10/23/23 1004	10/24/23 0333	RVV
Arsenic, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0333	RVV
Barium, total	0.352	0.0040	mg/L	4		10/23/23 1004	10/24/23 0333	RVV
Beryllium, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0333	RVV
Cadmium, total	<0.0008	0.0008	mg/L	4		10/23/23 1004	10/24/23 0333	RVV
Chromium, total	<0.0080	0.0080	mg/L	4		10/23/23 1004	10/24/23 0333	RVV
Cobalt, total	0.0110	0.0004	mg/L	4		10/23/23 1004	10/24/23 0333	RVV
Copper, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0333	RVV
Lead, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0333	RVV
Nickel, total	0.0127	0.0040	mg/L	4		10/23/23 1004	10/24/23 0333	RVV
Selenium, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0333	RVV
Silver, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0333	RVV
Thallium, total	<0.0020	0.0020	mg/L	4		10/23/23 1004	10/24/23 0333	RVV
Vanadium, total	<0.0200	0.0200	mg/L	4		10/23/23 1004	10/24/23 0333	RVV
Zinc, total	<0.0200	0.0200	mg/L	4		10/23/23 1004	10/24/23 0333	RVV

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Client Sample ID: MW-26
Sample Matrix: Water
Lab Sample ID: 1GJ1896-06

Collected By: Whipple, Todd
Collection Date: 10/19/2023 7:22

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		10/24/23 0000	10/24/23 1517	LJS
Vinyl Chloride	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Bromomethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Chloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Trichlorofluoromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
1,1-Dichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Acetone	<10.0	10.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Methyl Iodide	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Carbon Disulfide	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Methylene Chloride	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Acrylonitrile	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
trans-1,2-Dichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
1,1-Dichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Vinyl Acetate	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
cis-1,2-Dichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
2-Butanone (MEK)	<10.0	10.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Bromochloromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Chloroform	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
1,1,1-Trichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Carbon Tetrachloride	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Benzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
1,2-Dichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Trichloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
1,2-Dichloropropane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Dibromomethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Bromodichloromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
cis-1,3-Dichloropropene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
4-Methyl-2-pentanone (MIBK)	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Toluene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
trans-1,3-Dichloropropene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
1,1,2-Trichloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Tetrachloroethylene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
2-Hexanone (MBK)	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Dibromochloromethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
1,2-Dibromoethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Chlorobenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
1,1,1,2-Tetrachloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Ethylbenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Xylenes, total	<2.0	2.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Styrene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Bromoform	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
1,2,3-Trichloropropane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Client Sample ID: MW-26
Sample Matrix: Water
Lab Sample ID: 1GJ1896-06

Collected By: Whipple, Todd
Collection Date: 10/19/2023 7:22

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		10/24/23 0000	10/24/23 1517	LJS
1,1,2,2-Tetrachloroethane	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
1,4-Dichlorobenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
1,2-Dichlorobenzene	<1.0	1.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
1,2-Dibromo-3-chloropropane	<5.0	5.0	ug/L	1		10/24/23 0000	10/24/23 1517	LJS
Surrogate: Dibromofluoromethane	97.9	Limit: 80-126	% Rec	1		10/24/23 0000	10/24/23 1517	LJS
Surrogate: Dibromofluoromethane	97.9	Limit: 75-136	% Rec	1		10/24/23 0000	10/24/23 1517	LJS
Surrogate: 1,2-Dichloroethane-d4	93.4	Limit: 61-142	% Rec	1		10/24/23 0000	10/24/23 1517	LJS
Surrogate: 1,2-Dichloroethane-d4	93.4	Limit: 63-138	% Rec	1		10/24/23 0000	10/24/23 1517	LJS
Surrogate: Toluene-d8	103	Limit: 82-121	% Rec	1		10/24/23 0000	10/24/23 1517	LJS
Surrogate: Toluene-d8	103	Limit: 87-116	% Rec	1		10/24/23 0000	10/24/23 1517	LJS
Surrogate: 4-Bromofluorobenzene	98.8	Limit: 80-116	% Rec	1		10/24/23 0000	10/24/23 1517	LJS
Surrogate: 4-Bromofluorobenzene	98.8	Limit: 85-111	% Rec	1		10/24/23 0000	10/24/23 1517	LJS

Determination of Total Metals	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 3005A/EPA 6020A								
Antimony, total	<0.0020	0.0020	mg/L	4		10/23/23 1004	10/24/23 0339	RVV
Arsenic, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0339	RVV
Barium, total	0.174	0.0040	mg/L	4		10/23/23 1004	10/24/23 0339	RVV
Beryllium, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0339	RVV
Cadmium, total	<0.0008	0.0008	mg/L	4		10/23/23 1004	10/24/23 0339	RVV
Chromium, total	<0.0080	0.0080	mg/L	4		10/23/23 1004	10/24/23 0339	RVV
Cobalt, total	<0.0004	0.0004	mg/L	4		10/23/23 1004	10/24/23 0339	RVV
Copper, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0339	RVV
Lead, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0339	RVV
Nickel, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0339	RVV
Selenium, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0339	RVV
Silver, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0339	RVV
Thallium, total	<0.0020	0.0020	mg/L	4		10/23/23 1004	10/24/23 0339	RVV
Vanadium, total	<0.0200	0.0200	mg/L	4		10/23/23 1004	10/24/23 0339	RVV
Zinc, total	<0.0200	0.0200	mg/L	4		10/23/23 1004	10/24/23 0339	RVV

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Client Sample ID: Duplicate
Sample Matrix: Water
Lab Sample ID: 1GJ1896-07

Collected By: Whipple, Todd
Collection Date: 10/19/2023

Determination of Total Metals	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 3005A/EPA 6020A								
Antimony, total	<0.0020	0.0020	mg/L	4		10/23/23 1004	10/24/23 0345	RVV
Arsenic, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0345	RVV
Barium, total	0.360	0.0040	mg/L	4		10/23/23 1004	10/24/23 0345	RVV
Beryllium, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0345	RVV
Cadmium, total	<0.0008	0.0008	mg/L	4		10/23/23 1004	10/24/23 0345	RVV
Chromium, total	<0.0080	0.0080	mg/L	4		10/23/23 1004	10/24/23 0345	RVV
Cobalt, total	0.0110	0.0004	mg/L	4		10/23/23 1004	10/24/23 0345	RVV
Copper, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0345	RVV
Lead, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0345	RVV
Nickel, total	0.0124	0.0040	mg/L	4		10/23/23 1004	10/24/23 0345	RVV
Selenium, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0345	RVV
Silver, total	<0.0040	0.0040	mg/L	4		10/23/23 1004	10/24/23 0345	RVV
Thallium, total	<0.0020	0.0020	mg/L	4		10/23/23 1004	10/24/23 0345	RVV
Vanadium, total	<0.0200	0.0200	mg/L	4		10/23/23 1004	10/24/23 0345	RVV
Zinc, total	<0.0200	0.0200	mg/L	4		10/23/23 1004	10/24/23 0345	RVV

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Batch Log Summary

Method	Batch	Laboratory ID	Client / Source ID
EPA 6020A	1GJ1312	1GJ1312-BLK1	
		1GJ1312-BS1	
		1GJ1312-MS1	1GJ1464-01
		1GJ1312-MSD1	1GJ1464-01
		1GJ1312-PS1	1GJ1464-01
		1GJ1896-01	MW-3A
		1GJ1896-02	MW-16
		1GJ1896-03	MW-17
		1GJ1896-04	MW-18
		1GJ1896-05	MW-23
		1GJ1896-06	MW-26
		1GJ1896-07	Duplicate

Method	Batch	Laboratory ID	Client / Source ID
EPA 8260B	1GJ1482	1GJ1482-BS1	
		1GJ1482-BSD1	
		1GJ1482-BLK1	
		1GJ1896-01	MW-3A
		1GJ1896-02	MW-16
		1GJ1896-03	MW-17
		1GJ1896-04	MW-18
		1GJ1896-05	MW-23
		1GJ1896-06	MW-26
		1GJ1482-MS1	1GJ1896-01
		1GJ1482-MSD1	1GJ1896-01
		1GJ1482-BLK2	

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 1GJ1482 - EPA 5030B - EPA 8260B										
Blank (1GJ1482-BLK1)				Prepared: 10/24/23 00:00 Analyzed: 10/24/23 10:41						
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							

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GJ1482 - EPA 5030B - EPA 8260B										
Blank (1GJ1482-BLK1)				Prepared: 10/24/23 00:00 Analyzed: 10/24/23 10:41						
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							
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	46.2		ug/L	50.4		91.8	75-136			
Surrogate: Dibromofluoromethane	46.2		ug/L	50.4		91.8	80-126			
Surrogate: 1,2-Dichloroethane-d4	44.2		ug/L	50.4		87.6	61-142			
Surrogate: 1,2-Dichloroethane-d4	44.2		ug/L	50.4		87.6	63-138			

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GJ1482 - EPA 5030B - EPA 8260B										
Blank (1GJ1482-BLK1)				Prepared: 10/24/23 00:00 Analyzed: 10/24/23 10:41						
Surrogate: Toluene-d8	51.5		ug/L	50.2		102	82-121			
Surrogate: Toluene-d8	51.5		ug/L	50.2		102	87-116			
Surrogate: 4-Bromofluorobenzene	50.5		ug/L	50.4		100	80-116			
Surrogate: 4-Bromofluorobenzene	50.5		ug/L	50.4		100	85-111			
Blank (1GJ1482-BLK2)				Prepared: 10/24/23 00:00 Analyzed: 10/24/23 20:33						
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							
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							

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GJ1482 - EPA 5030B - EPA 8260B										
Blank (1GJ1482-BLK2)				Prepared: 10/24/23 00:00 Analyzed: 10/24/23 20:33						
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	48.2		ug/L	50.4		95.7	75-136			
Surrogate: Dibromofluoromethane	48.2		ug/L	50.4		95.7	80-126			
Surrogate: 1,2-Dichloroethane-d4	46.2		ug/L	50.4		91.7	61-142			
Surrogate: 1,2-Dichloroethane-d4	46.2		ug/L	50.4		91.7	63-138			
Surrogate: Toluene-d8	52.2		ug/L	50.2		104	82-121			
Surrogate: Toluene-d8	52.2		ug/L	50.2		104	87-116			
Surrogate: 4-Bromofluorobenzene	50.4		ug/L	50.4		100	80-116			
Surrogate: 4-Bromofluorobenzene	50.4		ug/L	50.4		100	85-111			
LCS (1GJ1482-BS1)				Prepared: 10/24/23 00:00 Analyzed: 10/24/23 08:43						
Chloromethane	26.06	1.0	ug/L	30.0		86.9	63-155			
Vinyl Chloride	29.76	1.0	ug/L	30.0		99.2	70-154			
Bromomethane	29.16	1.0	ug/L	30.0		97.2	52-176			
Chloroethane	30.29	1.0	ug/L	30.0		101	72-148			
Trichlorofluoromethane	27.98	1.0	ug/L	30.0		93.3	70-152			
1,1-Dichloroethylene	46.37	1.0	ug/L	50.0		92.7	70-148			
Acetone	112.8	10.0	ug/L	102		111	43-172			
Methyl Iodide	106.0	1.0	ug/L	99.7		106	69-170			
Carbon Disulfide	98.40	1.0	ug/L	101		97.4	72-162			
Methylene Chloride	46.47	5.0	ug/L	50.0		92.9	68-142			
Acrylonitrile	90.71	5.0	ug/L	100		90.3	67-144			
trans-1,2-Dichloroethylene	46.75	1.0	ug/L	50.0		93.5	66-148			
1,1-Dichloroethane	48.59	1.0	ug/L	50.0		97.2	66-143			
Vinyl Acetate	64.62	5.0	ug/L	102		63.4	43-153			
cis-1,2-Dichloroethylene	49.70	1.0	ug/L	49.5		100	71-149			
2-Butanone (MEK)	107.0	10.0	ug/L	103		104	52-159			
Bromochloromethane	49.03	1.0	ug/L	50.0		98.1	69-143			
Chloroform	49.64	1.0	ug/L	50.0		99.3	69-144			
1,1,1-Trichloroethane	46.34	1.0	ug/L	50.0		92.7	62-129			
Carbon Tetrachloride	45.52	1.0	ug/L	50.0		91.0	63-141			
Benzene	51.79	1.0	ug/L	50.0		104	71-134			
1,2-Dichloroethane	54.60	1.0	ug/L	50.0		109	72-132			
Trichloroethylene	54.22	1.0	ug/L	50.0		108	71-135			
1,2-Dichloropropane	54.92	1.0	ug/L	50.0		110	69-136			

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GJ1482 - EPA 5030B - EPA 8260B										
LCS (1GJ1482-BS1)										
				Prepared: 10/24/23 00:00 Analyzed: 10/24/23 08:43						
Dibromomethane	60.84	1.0	ug/L	50.0		122	73-147			
Bromodichloromethane	48.47	1.0	ug/L	50.0		96.9	68-129			
cis-1,3-Dichloropropene	55.27	1.0	ug/L	50.3		110	65-134			
4-Methyl-2-pentanone (MIBK)	110.7	5.0	ug/L	101		109	58-147			
Toluene	50.42	1.0	ug/L	50.0		101	72-133			
trans-1,3-Dichloropropene	56.72	1.0	ug/L	50.4		112	67-130			
1,1,2-Trichloroethane	59.09	1.0	ug/L	50.0		118	69-135			
Tetrachloroethylene	49.54	1.0	ug/L	50.0		99.1	69-130			
2-Hexanone (MBK)	114.0	5.0	ug/L	103		110	55-144			
Dibromochloromethane	58.02	1.0	ug/L	49.5		117	73-127			
1,2-Dibromoethane	58.60	1.0	ug/L	50.0		117	67-132			
Chlorobenzene	49.34	1.0	ug/L	50.0		98.7	72-123			
1,1,1,2-Tetrachloroethane	56.29	1.0	ug/L	50.0		113	73-127			
Ethylbenzene	49.94	1.0	ug/L	50.0		99.9	71-127			
Xylenes, total	152.4	2.0	ug/L	150		102	74-127			
Styrene	50.33	1.0	ug/L	50.0		101	66-126			
Bromoform	58.36	1.0	ug/L	50.0		117	68-130			
1,2,3-Trichloropropane	55.24	1.0	ug/L	50.0		110	63-136			
trans-1,4-Dichloro-2-butene	113.1	5.0	ug/L	104		109	54-134			
1,1,2,2-Tetrachloroethane	56.14	1.0	ug/L	49.8		113	61-131			
1,4-Dichlorobenzene	48.84	1.0	ug/L	50.0		97.7	70-129			
1,2-Dichlorobenzene	48.77	1.0	ug/L	50.0		97.5	69-126			
1,2-Dibromo-3-chloropropane	49.78	5.0	ug/L	50.0		99.6	50-143			
Surrogate: Dibromofluoromethane	47.4		ug/L	50.4		94.2	75-136			
Surrogate: Dibromofluoromethane	47.4		ug/L	50.4		94.2	80-126			
Surrogate: 1,2-Dichloroethane-d4	50.0		ug/L	50.4		99.2	61-142			
Surrogate: 1,2-Dichloroethane-d4	50.0		ug/L	50.4		99.2	63-138			
Surrogate: Toluene-d8	49.7		ug/L	50.2		99.0	82-121			
Surrogate: Toluene-d8	49.7		ug/L	50.2		99.0	87-116			
Surrogate: 4-Bromofluorobenzene	51.2		ug/L	50.4		102	80-116			
Surrogate: 4-Bromofluorobenzene	51.2		ug/L	50.4		102	85-111			
LCS Dup (1GJ1482-BSD1)										
				Prepared: 10/24/23 00:00 Analyzed: 10/24/23 09:22						
Chloromethane	26.31	1.0	ug/L	30.0		87.7	63-155	0.955	24	
Vinyl Chloride	29.86	1.0	ug/L	30.0		99.5	70-154	0.335	25	
Bromomethane	30.06	1.0	ug/L	30.0		100	52-176	3.04	27	
Chloroethane	30.95	1.0	ug/L	30.0		103	72-148	2.16	25	
Trichlorofluoromethane	29.04	1.0	ug/L	30.0		96.8	70-152	3.72	26	
1,1-Dichloroethylene	47.48	1.0	ug/L	50.0		95.0	70-148	2.37	24	
Acetone	109.7	10.0	ug/L	102		108	43-172	2.78	30	
Methyl Iodide	107.2	1.0	ug/L	99.7		108	69-170	1.14	30	
Carbon Disulfide	100.0	1.0	ug/L	101		99.1	72-162	1.66	24	
Methylene Chloride	46.84	5.0	ug/L	50.0		93.7	68-142	0.793	21	
Acrylonitrile	91.75	5.0	ug/L	100		91.3	67-144	1.14	24	

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CERTIFICATE OF ANALYSIS

1GJ1896

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GJ1482 - EPA 5030B - EPA 8260B										
LCS Dup (1GJ1482-BSD1)				Prepared: 10/24/23 00:00 Analyzed: 10/24/23 09:22						
trans-1,2-Dichloroethylene	47.56	1.0	ug/L	50.0		95.1	66-148	1.72	27	
1,1-Dichloroethane	48.95	1.0	ug/L	50.0		97.9	66-143	0.738	24	
Vinyl Acetate	64.26	5.0	ug/L	102		63.1	43-153	0.559	30	
cis-1,2-Dichloroethylene	49.70	1.0	ug/L	49.5		100	71-149	0.00	26	
2-Butanone (MEK)	105.8	10.0	ug/L	103		102	52-159	1.19	27	
Bromochloromethane	49.49	1.0	ug/L	50.0		99.0	69-143	0.934	23	
Chloroform	50.35	1.0	ug/L	50.0		101	69-144	1.42	23	
1,1,1-Trichloroethane	47.21	1.0	ug/L	50.0		94.5	62-129	1.86	24	
Carbon Tetrachloride	47.30	1.0	ug/L	50.0		94.6	63-141	3.84	25	
Benzene	52.87	1.0	ug/L	50.0		106	71-134	2.06	24	
1,2-Dichloroethane	55.47	1.0	ug/L	50.0		111	72-132	1.58	24	
Trichloroethylene	55.66	1.0	ug/L	50.0		111	71-135	2.62	24	
1,2-Dichloropropane	54.99	1.0	ug/L	50.0		110	69-136	0.127	24	
Dibromomethane	62.62	1.0	ug/L	50.0		125	73-147	2.88	25	
Bromodichloromethane	48.96	1.0	ug/L	50.0		97.9	68-129	1.01	22	
cis-1,3-Dichloropropene	56.36	1.0	ug/L	50.3		112	65-134	1.95	23	
4-Methyl-2-pentanone (MIBK)	111.3	5.0	ug/L	101		110	58-147	0.513	27	
Toluene	51.51	1.0	ug/L	50.0		103	72-133	2.14	24	
trans-1,3-Dichloropropene	57.55	1.0	ug/L	50.4		114	67-130	1.45	24	
1,1,2-Trichloroethane	59.43	1.0	ug/L	50.0		119	69-135	0.574	23	
Tetrachloroethylene	50.79	1.0	ug/L	50.0		102	69-130	2.49	25	
2-Hexanone (MBK)	113.5	5.0	ug/L	103		110	55-144	0.396	25	
Dibromochloromethane	57.85	1.0	ug/L	49.5		117	73-127	0.293	22	
1,2-Dibromoethane	59.17	1.0	ug/L	50.0		118	67-132	0.968	24	
Chlorobenzene	50.20	1.0	ug/L	50.0		100	72-123	1.73	23	
1,1,1,2-Tetrachloroethane	56.37	1.0	ug/L	50.0		113	73-127	0.142	24	
Ethylbenzene	50.81	1.0	ug/L	50.0		102	71-127	1.73	26	
Xylenes, total	154.7	2.0	ug/L	150		103	74-127	1.50	25	
Styrene	50.55	1.0	ug/L	50.0		101	66-126	0.436	23	
Bromoform	58.98	1.0	ug/L	50.0		118	68-130	1.06	23	
1,2,3-Trichloropropane	55.15	1.0	ug/L	50.0		110	63-136	0.163	24	
trans-1,4-Dichloro-2-butene	113.6	5.0	ug/L	104		109	54-134	0.424	27	
1,1,2,2-Tetrachloroethane	56.80	1.0	ug/L	49.8		114	61-131	1.17	29	
1,4-Dichlorobenzene	50.03	1.0	ug/L	50.0		100	70-129	2.41	24	
1,2-Dichlorobenzene	49.39	1.0	ug/L	50.0		98.8	69-126	1.26	26	
1,2-Dibromo-3-chloropropane	50.18	5.0	ug/L	50.0		100	50-143	0.800	30	
Surrogate: Dibromofluoromethane	47.0		ug/L	50.4		93.3	75-136			
Surrogate: Dibromofluoromethane	47.0		ug/L	50.4		93.3	80-126			
Surrogate: 1,2-Dichloroethane-d4	49.4		ug/L	50.4		98.0	61-142			
Surrogate: 1,2-Dichloroethane-d4	49.4		ug/L	50.4		98.0	63-138			
Surrogate: Toluene-d8	49.6		ug/L	50.2		98.8	82-121			
Surrogate: Toluene-d8	49.6		ug/L	50.2		98.8	87-116			
Surrogate: 4-Bromofluorobenzene	50.5		ug/L	50.4		100	80-116			

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CERTIFICATE OF ANALYSIS

1GJ1896

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GJ1482 - EPA 5030B - EPA 8260B										
LCS Dup (1GJ1482-BSD1)				Prepared: 10/24/23 00:00 Analyzed: 10/24/23 09:22						
Surrogate: 4-Bromofluorobenzene	50.5		ug/L	50.4		100	85-111			
Matrix Spike (1GJ1482-MS1)				Source: 1GJ1896-01 Prepared: 10/24/23 00:00 Analyzed: 10/24/23 18:35						
Chloromethane	262.0	10.0	ug/L	300	ND	87.3	61-152			
Vinyl Chloride	308.1	10.0	ug/L	300	ND	103	66-149			
Bromomethane	288.7	10.0	ug/L	300	ND	96.2	43-171			
Chloroethane	304.3	10.0	ug/L	300	ND	101	69-148			
Trichlorofluoromethane	310.8	10.0	ug/L	300	9.38	100	62-163			
1,1-Dichloroethylene	484.5	10.0	ug/L	500	ND	96.9	70-148			
Acetone	1136	100	ug/L	1020	ND	111	45-173			
Methyl Iodide	1057	10.0	ug/L	997	ND	106	62-167			
Carbon Disulfide	998.2	10.0	ug/L	1010	ND	98.8	71-163			
Methylene Chloride	459.9	50.0	ug/L	500	ND	92.0	69-140			
Acrylonitrile	924.8	50.0	ug/L	1000	ND	92.1	58-151			
trans-1,2-Dichloroethylene	480.9	10.0	ug/L	500	ND	96.2	69-144			
1,1-Dichloroethane	505.7	10.0	ug/L	500	8.02	99.5	70-138			
Vinyl Acetate	621.7	50.0	ug/L	1020	ND	61.0	58-142			
cis-1,2-Dichloroethylene	504.0	10.0	ug/L	495	ND	102	68-151			
2-Butanone (MEK)	1091	100	ug/L	1030	ND	106	50-160			
Bromochloromethane	486.3	10.0	ug/L	500	ND	97.3	65-143			
Chloroform	511.1	10.0	ug/L	500	ND	102	71-143			
1,1,1-Trichloroethane	488.9	10.0	ug/L	500	ND	97.8	63-133			
Carbon Tetrachloride	480.5	10.0	ug/L	500	ND	96.1	63-142			
Benzene	532.0	10.0	ug/L	500	ND	106	69-133			
1,2-Dichloroethane	556.7	10.0	ug/L	500	ND	111	63-138			
Trichloroethylene	559.7	10.0	ug/L	500	ND	112	71-133			
1,2-Dichloropropane	555.1	10.0	ug/L	500	ND	111	69-132			
Dibromomethane	616.7	10.0	ug/L	500	ND	123	70-147			
Bromodichloromethane	485.7	10.0	ug/L	500	ND	97.1	67-130			
cis-1,3-Dichloropropene	545.3	10.0	ug/L	503	ND	108	61-126			
4-Methyl-2-pentanone (MIBK)	1142	50.0	ug/L	1010	ND	113	55-147			
Toluene	512.0	10.0	ug/L	500	ND	102	71-133			
trans-1,3-Dichloropropene	551.5	10.0	ug/L	504	ND	109	63-124			
1,1,2-Trichloroethane	583.5	10.0	ug/L	500	ND	117	69-133			
Tetrachloroethylene	511.7	10.0	ug/L	500	ND	102	70-124			
2-Hexanone (MBK)	1169	50.0	ug/L	1030	ND	113	53-141			
Dibromochloromethane	571.3	10.0	ug/L	495	ND	115	74-122			
1,2-Dibromoethane	577.6	10.0	ug/L	500	ND	116	66-127			
Chlorobenzene	500.0	10.0	ug/L	500	ND	100	76-116			
1,1,1,2-Tetrachloroethane	558.5	10.0	ug/L	500	ND	112	77-121			
Ethylbenzene	508.0	10.0	ug/L	500	ND	102	73-124			
Xylenes, total	1541	20.0	ug/L	1500	ND	103	75-123			
Styrene	505.4	10.0	ug/L	500	ND	101	70-120			

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GJ1482 - EPA 5030B - EPA 8260B										
Matrix Spike (1GJ1482-MS1)	Source: 1GJ1896-01			Prepared: 10/24/23 00:00 Analyzed: 10/24/23 18:35						
Bromoform	571.4	10.0	ug/L	500	ND	114	70-124			
1,2,3-Trichloropropane	557.1	10.0	ug/L	500	ND	111	62-135			
trans-1,4-Dichloro-2-butene	1070	50.0	ug/L	1040	ND	103	50-120			
1,1,2,2-Tetrachloroethane	565.5	10.0	ug/L	498	ND	113	63-126			
1,4-Dichlorobenzene	494.5	10.0	ug/L	500	ND	98.9	72-119			
1,2-Dichlorobenzene	490.1	10.0	ug/L	500	ND	98.0	71-117			
1,2-Dibromo-3-chloropropane	504.8	50.0	ug/L	500	ND	101	49-134			
Surrogate: Dibromofluoromethane	482		ug/L	504		95.6	80-126			
Surrogate: Dibromofluoromethane	482		ug/L	504		95.6	75-136			
Surrogate: 1,2-Dichloroethane-d4	505		ug/L	504		100	63-138			
Surrogate: 1,2-Dichloroethane-d4	505		ug/L	504		100	61-142			
Surrogate: Toluene-d8	498		ug/L	502		99.1	87-116			
Surrogate: Toluene-d8	498		ug/L	502		99.1	82-121			
Surrogate: 4-Bromofluorobenzene	513		ug/L	504		102	85-111			
Surrogate: 4-Bromofluorobenzene	513		ug/L	504		102	80-116			
Matrix Spike Dup (1GJ1482-MSD1)	Source: 1GJ1896-01			Prepared: 10/24/23 00:00 Analyzed: 10/24/23 19:14						
Chloromethane	262.0	10.0	ug/L	300	ND	87.3	61-152	0.00	26	
Vinyl Chloride	305.1	10.0	ug/L	300	ND	102	66-149	0.978	23	
Bromomethane	290.7	10.0	ug/L	300	ND	96.9	43-171	0.690	29	
Chloroethane	312.3	10.0	ug/L	300	ND	104	69-148	2.59	25	
Trichlorofluoromethane	304.4	10.0	ug/L	300	9.38	98.3	62-163	2.08	25	
1,1-Dichloroethylene	480.3	10.0	ug/L	500	ND	96.1	70-148	0.871	22	
Acetone	1183	100	ug/L	1020	ND	116	45-173	4.03	30	
Methyl Iodide	1052	10.0	ug/L	997	ND	106	62-167	0.446	24	
Carbon Disulfide	989.5	10.0	ug/L	1010	ND	98.0	71-163	0.875	22	
Methylene Chloride	469.5	50.0	ug/L	500	ND	93.9	69-140	2.07	19	
Acrylonitrile	951.3	50.0	ug/L	1000	ND	94.7	58-151	2.83	15	
trans-1,2-Dichloroethylene	481.6	10.0	ug/L	500	ND	96.3	69-144	0.145	22	
1,1-Dichloroethane	503.3	10.0	ug/L	500	8.02	99.1	70-138	0.476	20	
Vinyl Acetate	639.5	50.0	ug/L	1020	ND	62.8	58-142	2.82	24	
cis-1,2-Dichloroethylene	505.7	10.0	ug/L	495	ND	102	68-151	0.337	22	
2-Butanone (MEK)	1124	100	ug/L	1030	ND	109	50-160	2.96	23	
Bromochloromethane	499.3	10.0	ug/L	500	ND	99.9	65-143	2.64	22	
Chloroform	513.8	10.0	ug/L	500	ND	103	71-143	0.527	21	
1,1,1-Trichloroethane	491.2	10.0	ug/L	500	ND	98.3	63-133	0.469	23	
Carbon Tetrachloride	480.6	10.0	ug/L	500	ND	96.1	63-142	0.0208	22	
Benzene	529.4	10.0	ug/L	500	ND	106	69-133	0.490	18	
1,2-Dichloroethane	557.9	10.0	ug/L	500	ND	112	63-138	0.215	20	
Trichloroethylene	551.1	10.0	ug/L	500	ND	110	71-133	1.55	23	
1,2-Dichloropropane	549.0	10.0	ug/L	500	ND	110	69-132	1.10	20	
Dibromomethane	621.7	10.0	ug/L	500	ND	124	70-147	0.807	22	
Bromodichloromethane	488.9	10.0	ug/L	500	ND	97.8	67-130	0.657	21	
cis-1,3-Dichloropropene	543.4	10.0	ug/L	503	ND	108	61-126	0.349	21	

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Determination of Volatile Organic Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GJ1482 - EPA 5030B - EPA 8260B										
Matrix Spike Dup (1GJ1482-MSD1)	Source: 1GJ1896-01			Prepared: 10/24/23 00:00 Analyzed: 10/24/23 19:14						
4-Methyl-2-pentanone (MIBK)	1169	50.0	ug/L	1010	ND	115	55-147	2.40	23	
Toluene	508.5	10.0	ug/L	500	ND	102	71-133	0.686	19	
trans-1,3-Dichloropropene	562.4	10.0	ug/L	504	ND	112	63-124	1.96	21	
1,1,2-Trichloroethane	594.3	10.0	ug/L	500	ND	119	69-133	1.83	19	
Tetrachloroethylene	503.2	10.0	ug/L	500	ND	101	70-124	1.68	24	
2-Hexanone (MBK)	1195	50.0	ug/L	1030	ND	116	53-141	2.16	24	
Dibromochloromethane	579.5	10.0	ug/L	495	ND	117	74-122	1.43	21	
1,2-Dibromoethane	578.9	10.0	ug/L	500	ND	116	66-127	0.225	23	
Chlorobenzene	495.3	10.0	ug/L	500	ND	99.1	76-116	0.944	21	
1,1,1,2-Tetrachloroethane	558.1	10.0	ug/L	500	ND	112	77-121	0.0717	25	
Ethylbenzene	499.5	10.0	ug/L	500	ND	99.9	73-124	1.69	20	
Xylenes, total	1529	20.0	ug/L	1500	ND	102	75-123	0.795	20	
Styrene	502.8	10.0	ug/L	500	ND	101	70-120	0.516	23	
Bromoform	582.3	10.0	ug/L	500	ND	116	70-124	1.89	22	
1,2,3-Trichloropropane	559.4	10.0	ug/L	500	ND	112	62-135	0.412	28	
trans-1,4-Dichloro-2-butene	1090	50.0	ug/L	1040	ND	105	50-120	1.89	26	
1,1,2,2-Tetrachloroethane	567.3	10.0	ug/L	498	ND	114	63-126	0.318	24	
1,4-Dichlorobenzene	483.5	10.0	ug/L	500	ND	96.7	72-119	2.25	24	
1,2-Dichlorobenzene	483.5	10.0	ug/L	500	ND	96.7	71-117	1.36	24	
1,2-Dibromo-3-chloropropane	510.8	50.0	ug/L	500	ND	102	49-134	1.18	28	
Surrogate: Dibromofluoromethane	490		ug/L	504		97.3	75-136			
Surrogate: Dibromofluoromethane	490		ug/L	504		97.3	80-126			
Surrogate: 1,2-Dichloroethane-d4	515		ug/L	504		102	61-142			
Surrogate: 1,2-Dichloroethane-d4	515		ug/L	504		102	63-138			
Surrogate: Toluene-d8	502		ug/L	502		99.9	82-121			
Surrogate: Toluene-d8	502		ug/L	502		99.9	87-116			
Surrogate: 4-Bromofluorobenzene	512		ug/L	504		101	80-116			
Surrogate: 4-Bromofluorobenzene	512		ug/L	504		101	85-111			

Determination of Total Metals	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GJ1312 - EPA 3005A Total Recoverable Metals - EPA 6020A										
Blank (1GJ1312-BLK1)	Prepared: 10/23/23 10:04 Analyzed: 10/24/23 01:25									
Antimony, total	<0.0020	0.0020	mg/L							
Arsenic, total	<0.0040	0.0040	mg/L							
Barium, total	<0.0040	0.0040	mg/L							
Beryllium, total	<0.0040	0.0040	mg/L							
Cadmium, total	<0.0008	0.0008	mg/L							
Chromium, total	<0.0080	0.0080	mg/L							
Cobalt, total	<0.0004	0.0004	mg/L							
Copper, total	<0.0040	0.0040	mg/L							
Lead, total	<0.0040	0.0040	mg/L							
Nickel, total	<0.0040	0.0040	mg/L							

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Determination of Total Metals	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GJ1312 - EPA 3005A Total Recoverable Metals - EPA 6020A										
Blank (1GJ1312-BLK1)				Prepared: 10/23/23 10:04 Analyzed: 10/24/23 01:25						
Selenium, total	<0.0040	0.0040	mg/L							
Silver, total	<0.0040	0.0040	mg/L							
Thallium, total	<0.0020	0.0020	mg/L							
Vanadium, total	<0.0200	0.0200	mg/L							
Zinc, total	<0.0200	0.0200	mg/L							
LCS (1GJ1312-BS1)				Prepared: 10/23/23 10:04 Analyzed: 10/24/23 01:31						
Antimony, total	0.0973	0.0020	mg/L	0.100		97.3	80-120			
Arsenic, total	0.0973	0.0040	mg/L	0.100		97.3	80-120			
Barium, total	0.104	0.0040	mg/L	0.100		104	80-120			
Beryllium, total	0.0966	0.0040	mg/L	0.100		96.6	80-120			
Cadmium, total	0.0985	0.0008	mg/L	0.100		98.5	80-120			
Chromium, total	0.0960	0.0080	mg/L	0.100		96.0	80-120			
Cobalt, total	0.100	0.0004	mg/L	0.100		100	80-120			
Copper, total	0.0996	0.0040	mg/L	0.100		99.6	80-120			
Lead, total	0.0986	0.0040	mg/L	0.100		98.6	80-120			
Nickel, total	0.0989	0.0040	mg/L	0.100		98.9	80-120			
Selenium, total	0.0979	0.0040	mg/L	0.100		97.9	80-120			
Silver, total	0.109	0.0040	mg/L	0.100		109	80-120			
Thallium, total	0.0974	0.0020	mg/L	0.100		97.4	80-120			
Vanadium, total	0.0998	0.0200	mg/L	0.100		99.8	80-120			
Zinc, total	0.100	0.0200	mg/L	0.100		100	80-120			
Matrix Spike (1GJ1312-MS1)				Source: 1GJ1464-01 Prepared: 10/23/23 10:04 Analyzed: 10/24/23 01:44						
Antimony, total	0.0989	0.0020	mg/L	0.100	ND	98.9	75-125			
Arsenic, total	0.100	0.0040	mg/L	0.100	0.0016	98.5	75-125			
Barium, total	0.454	0.0040	mg/L	0.100	0.342	112	75-125			
Beryllium, total	0.0973	0.0040	mg/L	0.100	ND	97.3	75-125			
Cadmium, total	0.0999	0.0008	mg/L	0.100	ND	99.9	75-125			
Chromium, total	0.0939	0.0080	mg/L	0.100	0.0006	93.9	75-125			
Cobalt, total	0.0969	0.0004	mg/L	0.100	ND	96.9	75-125			
Copper, total	0.0910	0.0040	mg/L	0.100	0.0015	89.5	75-125			
Lead, total	0.0939	0.0040	mg/L	0.100	0.0006	93.9	75-125			
Nickel, total	0.0984	0.0040	mg/L	0.100	0.0043	94.0	75-125			
Selenium, total	0.0986	0.0040	mg/L	0.100	ND	98.6	75-125			
Silver, total	0.106	0.0040	mg/L	0.100	ND	106	75-125			
Thallium, total	0.0945	0.0020	mg/L	0.100	0.0002	94.3	75-125			
Vanadium, total	0.103	0.0200	mg/L	0.100	ND	103	75-125			
Zinc, total	0.0941	0.0200	mg/L	0.100	ND	94.1	75-125			
Matrix Spike Dup (1GJ1312-MSD1)				Source: 1GJ1464-01 Prepared: 10/23/23 10:04 Analyzed: 10/24/23 01:50						
Antimony, total	0.0993	0.0020	mg/L	0.100	ND	99.3	75-125	0.423	20	
Arsenic, total	0.0998	0.0040	mg/L	0.100	0.0016	98.2	75-125	0.320	20	
Barium, total	0.438	0.0040	mg/L	0.100	0.342	95.4	75-125	3.64	20	
Beryllium, total	0.0978	0.0040	mg/L	0.100	ND	97.8	75-125	0.540	20	
Cadmium, total	0.0980	0.0008	mg/L	0.100	ND	98.0	75-125	1.94	20	

Keystone Laboratories - Newton

CERTIFICATE OF ANALYSIS

1GJ1896

Determination of Total Metals	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1GJ1312 - EPA 3005A Total Recoverable Metals - EPA 6020A										
Matrix Spike Dup (1GJ1312-MSD1) Source: 1GJ1464-01 Prepared: 10/23/23 10:04 Analyzed: 10/24/23 01:50										
Chromium, total	0.0938	0.0080	mg/L	0.100	0.0006	93.8	75-125	0.0239	20	
Cobalt, total	0.0975	0.0004	mg/L	0.100	ND	97.5	75-125	0.552	20	
Copper, total	0.0943	0.0040	mg/L	0.100	0.0015	92.8	75-125	3.50	20	
Lead, total	0.0953	0.0040	mg/L	0.100	0.0006	95.3	75-125	1.57	20	
Nickel, total	0.0998	0.0040	mg/L	0.100	0.0043	95.4	75-125	1.43	20	
Selenium, total	0.0982	0.0040	mg/L	0.100	ND	98.2	75-125	0.426	20	
Silver, total	0.108	0.0040	mg/L	0.100	ND	108	75-125	1.25	20	
Thallium, total	0.0961	0.0020	mg/L	0.100	0.0002	95.9	75-125	1.64	20	
Vanadium, total	0.104	0.0200	mg/L	0.100	ND	104	75-125	1.62	20	
Zinc, total	0.0950	0.0200	mg/L	0.100	ND	95.0	75-125	0.960	20	
Post Spike (1GJ1312-PS1) Source: 1GJ1464-01 Prepared: 10/23/23 10:04 Analyzed: 10/24/23 02:08										
Antimony, total	0.0835		mg/L	0.0800	0.0002	104	80-120			
Arsenic, total	0.0852		mg/L	0.0800	0.0015	105	80-120			
Barium, total	0.426		mg/L	0.0800	0.335	113	80-120			
Beryllium, total	0.0805		mg/L	0.0800	0.000008	101	80-120			
Cadmium, total	0.0820		mg/L	0.0800	0.00005	102	80-120			
Chromium, total	0.0793		mg/L	0.0800	0.0006	98.5	80-120			
Cobalt, total	0.0837		mg/L	0.0800	0.00008	105	80-120			
Copper, total	0.0795		mg/L	0.0800	0.0015	97.5	80-120			
Lead, total	0.0800		mg/L	0.0800	0.0006	99.3	80-120			
Nickel, total	0.0848		mg/L	0.0800	0.0042	101	80-120			
Selenium, total	0.0796		mg/L	0.0800	0.0011	98.1	80-120			
Silver, total	0.0870		mg/L	0.0800	0.0015	107	80-120			
Thallium, total	0.0800		mg/L	0.0800	0.0002	99.7	80-120			
Vanadium, total	0.0872		mg/L	0.0800	0.0065	101	80-120			
Zinc, total	0.0788		mg/L	0.0800	-0.0005	98.4	80-120			

Definitions

RL: Reporting Limit
RPD: Relative Percent Difference

Cooler Receipt Log

Cooler ID: Default Cooler **Temp:** 5.4°C

Cooler Inspection Checklist

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

Keystone Laboratories - Newton

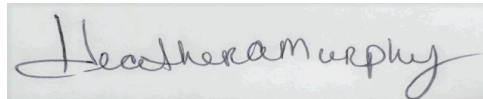
CERTIFICATE OF ANALYSIS

1GJ1896

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
10/31/23 11:55



SITE INFORMATION

Sampler: TODD WHIPPLE
Project: Cedar Co. - New Regs
Appendix Sampling

REPORT TO

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

INVOICE TO

Gary Crock
Cedar County Solid Waste Commission
1202 240th St
Tipton, IA 52772

SPECIAL INSTRUCTIONS

None

Turn Around Time

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

LAB USE ONLY

Work Order 1651896
Temperature 5.4
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-3A	Water	GRAB	<u>10/19/23</u>	<u>8:03</u>	<u>7</u>	Indfill-app1-voc-group	Indfill-app1-metals-6020	<u>01</u>
02-001	MW-16	Water	GRAB	<u>10/19/23</u>	<u>8:40</u>	<u>7</u>	Indfill-app1-voc-group	Indfill-app1-metals-6020	<u>02</u>
03-001	MW-17	Water	GRAB	<u>10/19/23</u>	<u>9:00</u>	<u>7</u>	Indfill-app1-voc-group	Indfill-app1-metals-6020	<u>03</u>
04-001	MW-18	Water	GRAB	<u>10/19/23</u>	<u>9:16</u>	<u>7</u>	Indfill-app1-voc-group	Indfill-app1-metals-6020	<u>04</u>
05-001	MW-23	Water	GRAB	<u>10/19/23</u>	<u>7:42</u>	<u>7</u>	Indfill-app1-voc-group	Indfill-app1-metals-6020	<u>05</u>
06-001	MW-26	Water	GRAB	<u>10/19/23</u>	<u>7:22</u>	<u>7</u>	Indfill-app1-voc-group	Indfill-app1-metals-6020	<u>06</u>
07-001	Duplicate	Water	GRAB	<u>10/19/23</u>	<u>✓</u>	<u>1</u>	Indfill-app1-voc-group	Indfill-app1-metals-6020	<u>07</u>

Relinquished By

Date/Time

Relinquished By

Date/Time

Remarks:

Received By

Date/Time

Received for Lab By

Date/Time

Original - Lab Copy Yellow - Sampler Copy

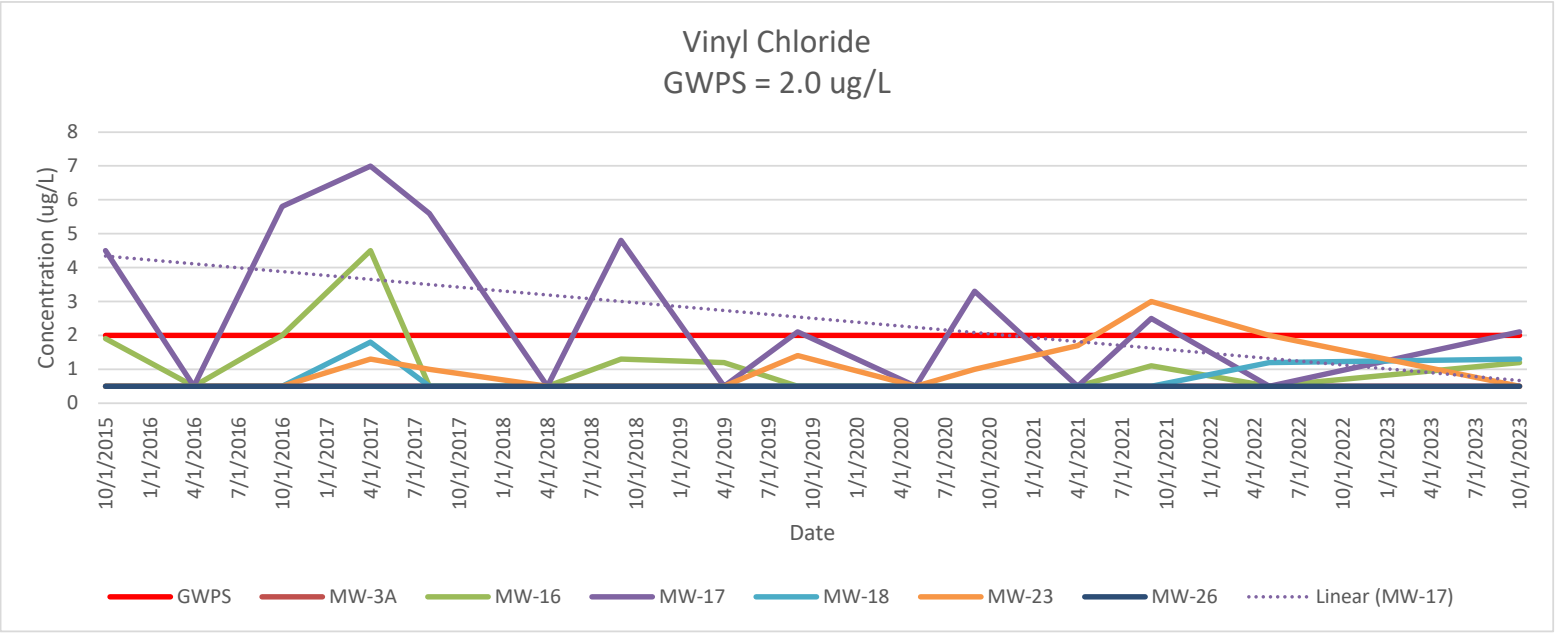
APPENDIX C

TIME SERIES GRAPHS – VOC

Times Series Graphs
Cedar County Sanitary Landfill
16-SDP-01-76C

0.5 = Red text represent undetected values that are reported at one-half of the MRL

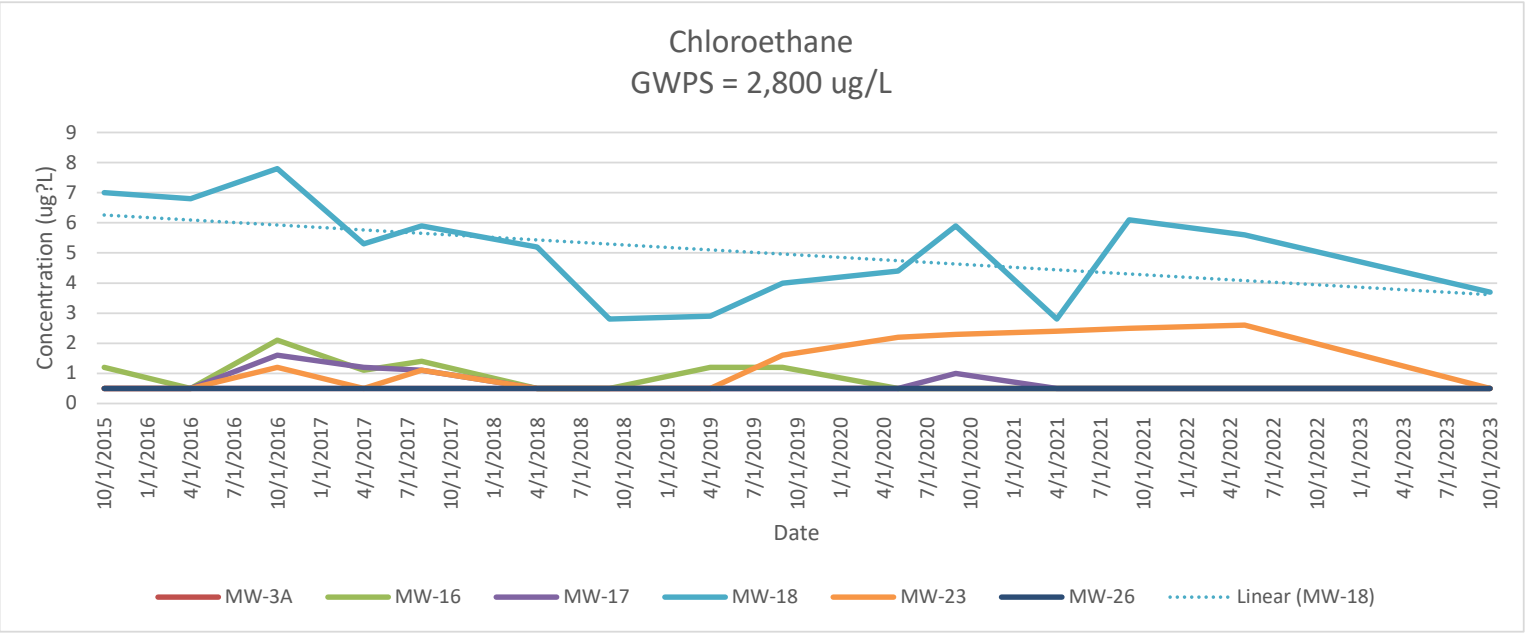
Date	Compound (ug/L)	GWPS	MW-3A	MW-16	MW-17	MW-18	MW-23	MW-26
10/5/2015	vinyl chloride	2	0.5	1.9	4.5	0.5	0.5	0.5
4/13/2016	vinyl chloride	2	0.5	0.5	0.5	0.5	0.5	0.5
10/4/2016	vinyl chloride	2	0.5	2	5.8	0.5	0.5	0.5
4/3/2017	vinyl chloride	2	0.5	4.5	7	1.8	1.3	0.5
8/29/2017	vinyl chloride	2	0.5	0.5	5.6	0.5	1	0.5
4/17/2018	vinyl chloride	2	0.5	0.5	0.5	0.5	0.5	0.5
9/17/2018	vinyl chloride	2	0.5	1.3	4.8	0.5	0.5	0.5
4/9/2019	vinyl chloride	2	0.5	1.2	0.5	0.5	0.5	0.5
9/4/2019	vinyl chloride	2	0.5	0.5	2.1	0.5	1.4	0.5
5/11/2020	vinyl chloride	2	0.5	0.5	0.5	0.5	0.5	0.5
9/21/2020	vinyl chloride	2	0.5	0.5	3.3	0.5	1	0.5
4/22/2021	vinyl chloride	2	0.5	0.5	0.5	0.5	1.7	0.5
9/13/2021	vinyl chloride	2	0.5	1.1	2.5	0.5	3	0.5
5/18/2022	vinyl chloride	2	0.5	0.5	0.5	1.2	2	0.5
10/19/2023	vinyl chloride	2	0.5	1.2	2.1	1.3	0.5	0.5



Times Series Graphs
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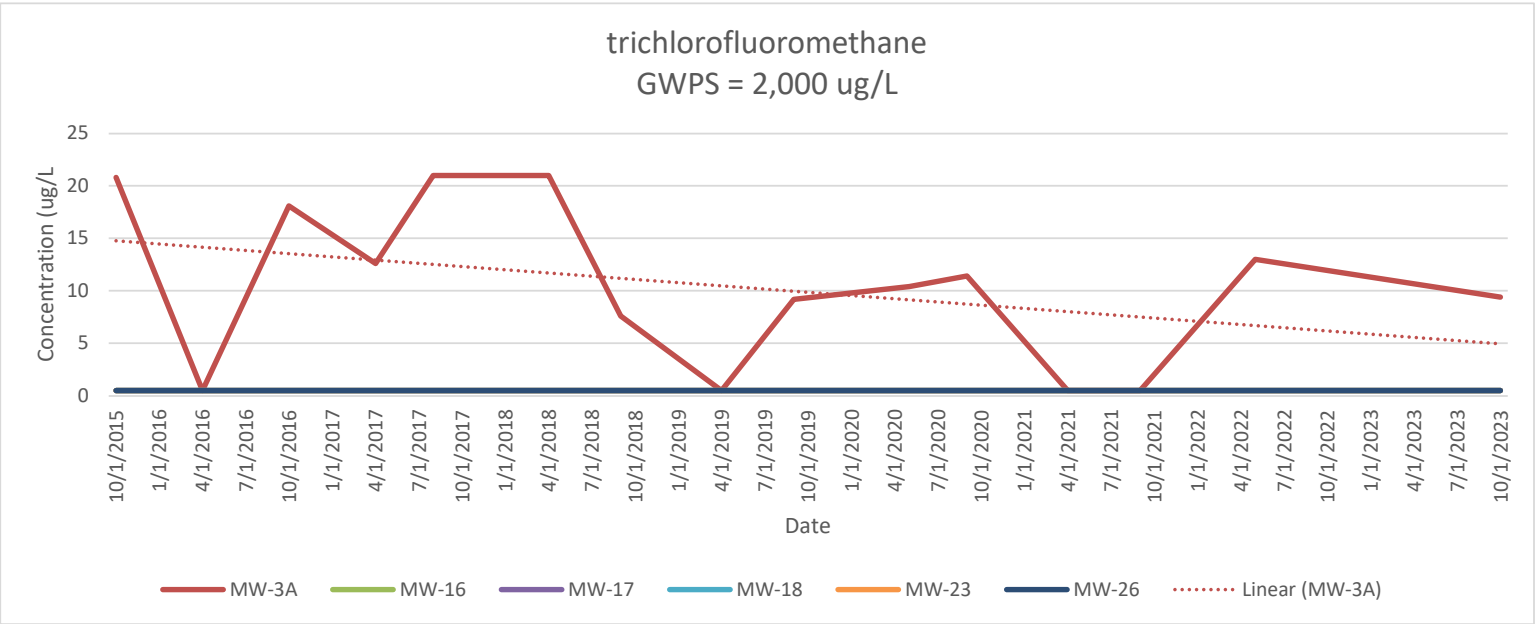
Date	Compound (ug/L)	GWPS	MW-3A	MW-16	MW-17	MW-18	MW-23	MW-26
10/5/2015	chloroethane	2800	0.5	1.2	0.5	7	0.5	0.5
4/13/2016	chloroethane	2800	0.5	0.5	0.5	6.8	0.5	0.5
10/4/2016	chloroethane	2800	0.5	2.1	1.6	7.8	1.2	0.5
4/3/2017	chloroethane	2800	0.5	1.1	1.2	5.3	0.5	0.5
8/29/2017	chloroethane	2800	0.5	1.4	1.1	5.9	1.1	0.5
4/17/2018	chloroethane	2800	0.5	0.5	0.5	5.2	0.5	0.5
9/17/2018	chloroethane	2800	0.5	0.5	0.5	2.8	0.5	0.5
4/9/2019	chloroethane	2800	0.5	1.2	0.5	2.9	0.5	0.5
9/4/2019	chloroethane	2800	0.5	1.2	0.5	4	1.6	0.5
5/11/2020	chloroethane	2800	0.5	0.5	0.5	4.4	2.2	0.5
9/21/2020	chloroethane	2800	0.5	0.5	1	5.9	2.3	0.5
4/22/2021	chloroethane	2800	0.5	0.5	0.5	2.8	2.4	0.5
9/13/2021	chloroethane	2800	0.5	0.5	0.5	6.1	2.5	0.5
5/18/2022	chloroethane	2800	0.5	0.5	0.5	5.6	2.6	0.5
10/19/2023	chloroethane	2800	0.5	0.5	0.5	3.7	0.5	0.5



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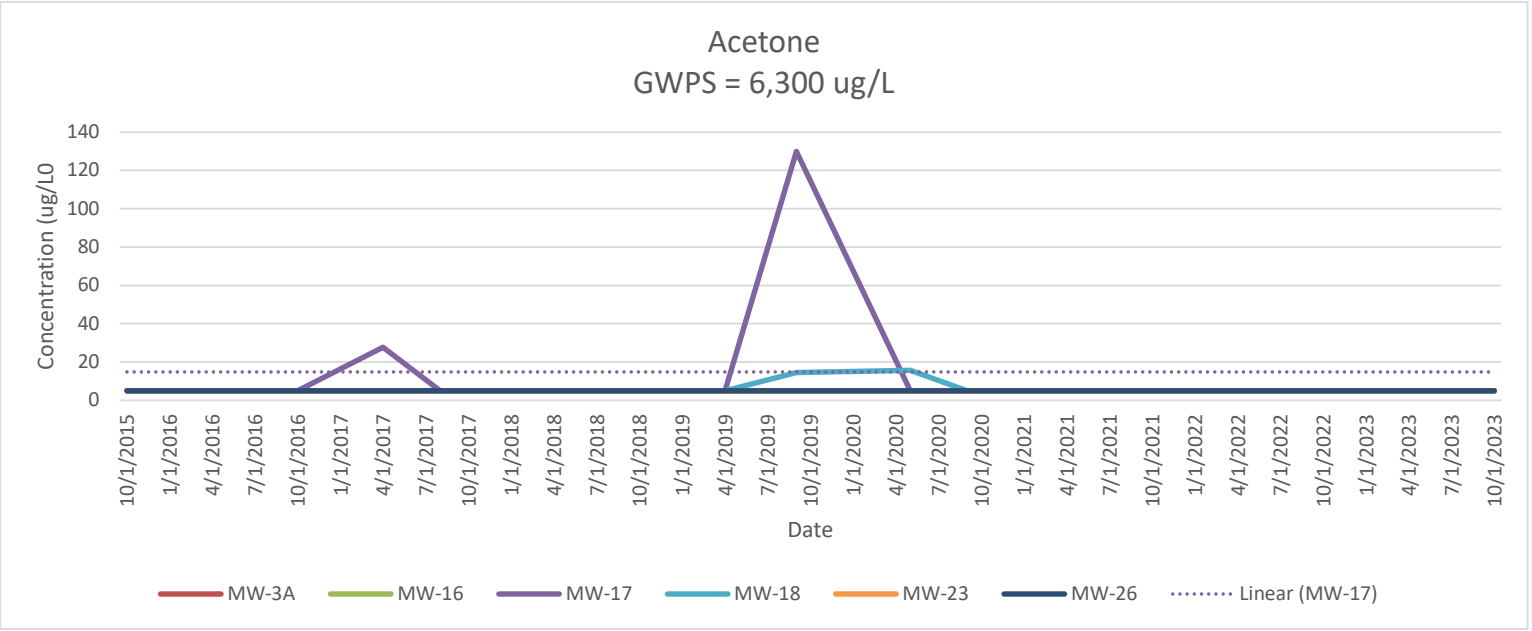
Date	Compound (ug/L)	GWPS	MW-3A	MW-16	MW-17	MW-18	MW-23	MW-26
10/5/2015	trichlorofluoromethane	2000	20.8	0.5	0.5	0.5	0.5	0.5
4/13/2016	trichlorofluoromethane	2000	0.5	0.5	0.5	0.5	0.5	0.5
10/4/2016	trichlorofluoromethane	2000	18.1	0.5	0.5	0.5	0.5	0.5
4/3/2017	trichlorofluoromethane	2000	12.6	0.5	0.5	0.5	0.5	0.5
8/29/2017	trichlorofluoromethane	2000	21	0.5	0.5	0.5	0.5	0.5
4/17/2018	trichlorofluoromethane	2000	21	0.5	0.5	0.5	0.5	0.5
9/17/2018	trichlorofluoromethane	2000	7.6	0.5	0.5	0.5	0.5	0.5
4/9/2019	trichlorofluoromethane	2000	0.5	0.5	0.5	0.5	0.5	0.5
9/4/2019	trichlorofluoromethane	2000	9.2	0.5	0.5	0.5	0.5	0.5
5/11/2020	trichlorofluoromethane	2000	10.4	0.5	0.5	0.5	0.5	0.5
9/21/2020	trichlorofluoromethane	2000	11.4	0.5	0.5	0.5	0.5	0.5
4/22/2021	trichlorofluoromethane	2000	0.5	0.5	0.5	0.5	0.5	0.5
9/13/2021	trichlorofluoromethane	2000	0.5	0.5	0.5	0.5	0.5	0.5
5/18/2022	trichlorofluoromethane	2000	13	0.5	0.5	0.5	0.5	0.5
10/19/2023	trichlorofluoromethane	2000	9.4	0.5	0.5	0.5	0.5	0.5



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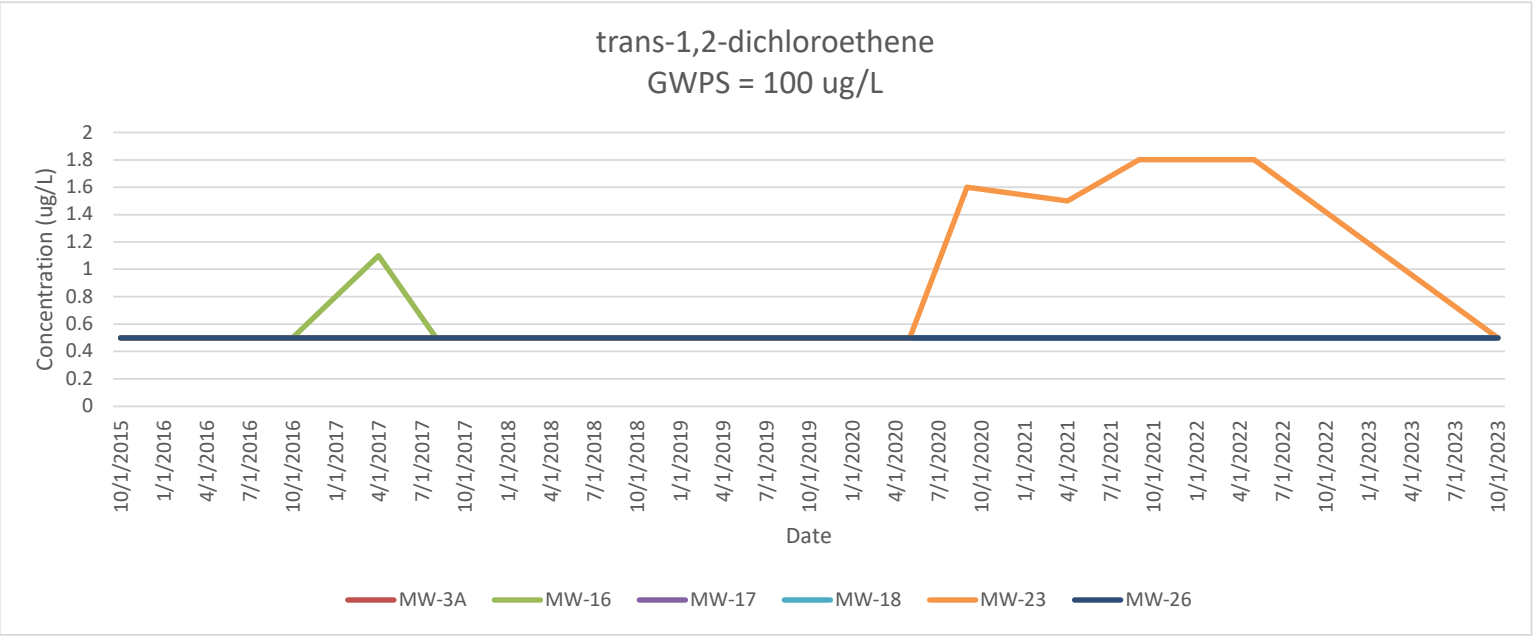
Date	Compound (ug/L)	GWPS	MW-3A	MW-16	MW-17	MW-18	MW-23	MW-26
10/5/2015	acetone	6300	5	5	5	5	5	5
4/13/2016	acetone	6300	5	5	5	5	5	5
10/4/2016	acetone	6300	5	5	5	5	5	5
4/3/2017	acetone	6300	5	5	27.8	5	5	5
8/29/2017	acetone	6300	5	5	5	5	5	5
4/17/2018	acetone	6300	5	5	5	5	5	5
9/17/2018	acetone	6300	5	5	5	5	5	5
4/9/2019	acetone	6300	5	5	5	5	5	5
9/4/2019	acetone	6300	5	5	130	14.6	5	5
5/11/2020	acetone	6300	5	5	5	15.7	5	5
9/21/2020	acetone	6300	5	5	5	5	5	5
4/22/2021	acetone	6300	5	5	5	5	5	5
9/13/2021	acetone	6300	5	5	5	5	5	5
5/18/2022	acetone	6300	5	5	5	5	5	5
10/19/2023	acetone	6300	5	5	5	5	5	5



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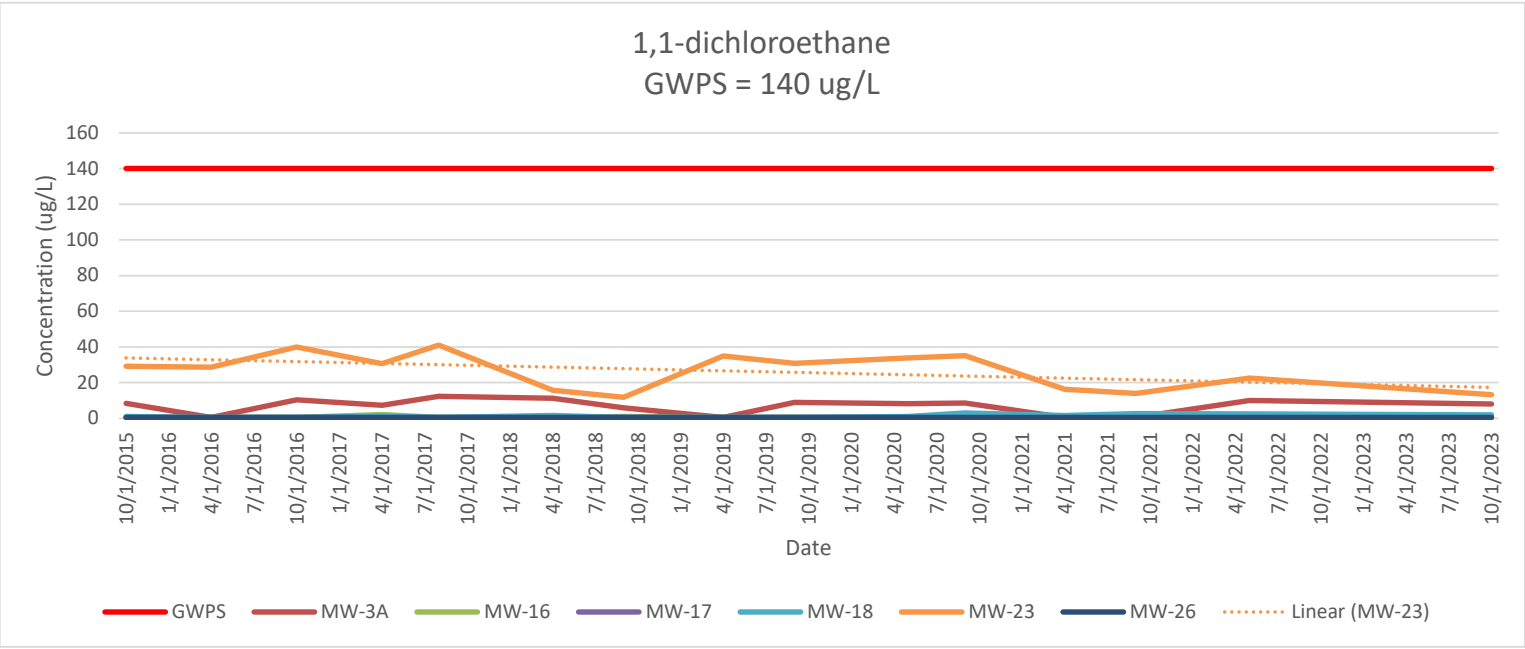
Date	Compound (ug/L)	GWPS	MW-3A	MW-16	MW-17	MW-18	MW-23	MW-26
10/5/2015	trans-1,2-dichloroethene	100	0.5	0.5	0.5	0.5	0.5	0.5
4/13/2016	trans-1,2-dichloroethene	100	0.5	0.5	0.5	0.5	0.5	0.5
10/4/2016	trans-1,2-dichloroethene	100	0.5	0.5	0.5	0.5	0.5	0.5
4/3/2017	trans-1,2-dichloroethene	100	0.5	1.1	0.5	0.5	0.5	0.5
8/29/2017	trans-1,2-dichloroethene	100	0.5	0.5	0.5	0.5	0.5	0.5
4/17/2018	trans-1,2-dichloroethene	100	0.5	0.5	0.5	0.5	0.5	0.5
9/17/2018	trans-1,2-dichloroethene	100	0.5	0.5	0.5	0.5	0.5	0.5
4/9/2019	trans-1,2-dichloroethene	100	0.5	0.5	0.5	0.5	0.5	0.5
9/4/2019	trans-1,2-dichloroethene	100	0.5	0.5	0.5	0.5	0.5	0.5
5/11/2020	trans-1,2-dichloroethene	100	0.5	0.5	0.5	0.5	0.5	0.5
9/21/2020	trans-1,2-dichloroethene	100	0.5	0.5	0.5	0.5	1.6	0.5
4/22/2021	trans-1,2-dichloroethene	100	0.5	0.5	0.5	0.5	1.5	0.5
9/13/2021	trans-1,2-dichloroethene	100	0.5	0.5	0.5	0.5	1.8	0.5
5/18/2022	trans-1,2-dichloroethene	100	0.5	0.5	0.5	0.5	1.8	0.5
10/19/2023	trans-1,2-dichloroethene	100	0.5	0.5	0.5	0.5	0.5	0.5



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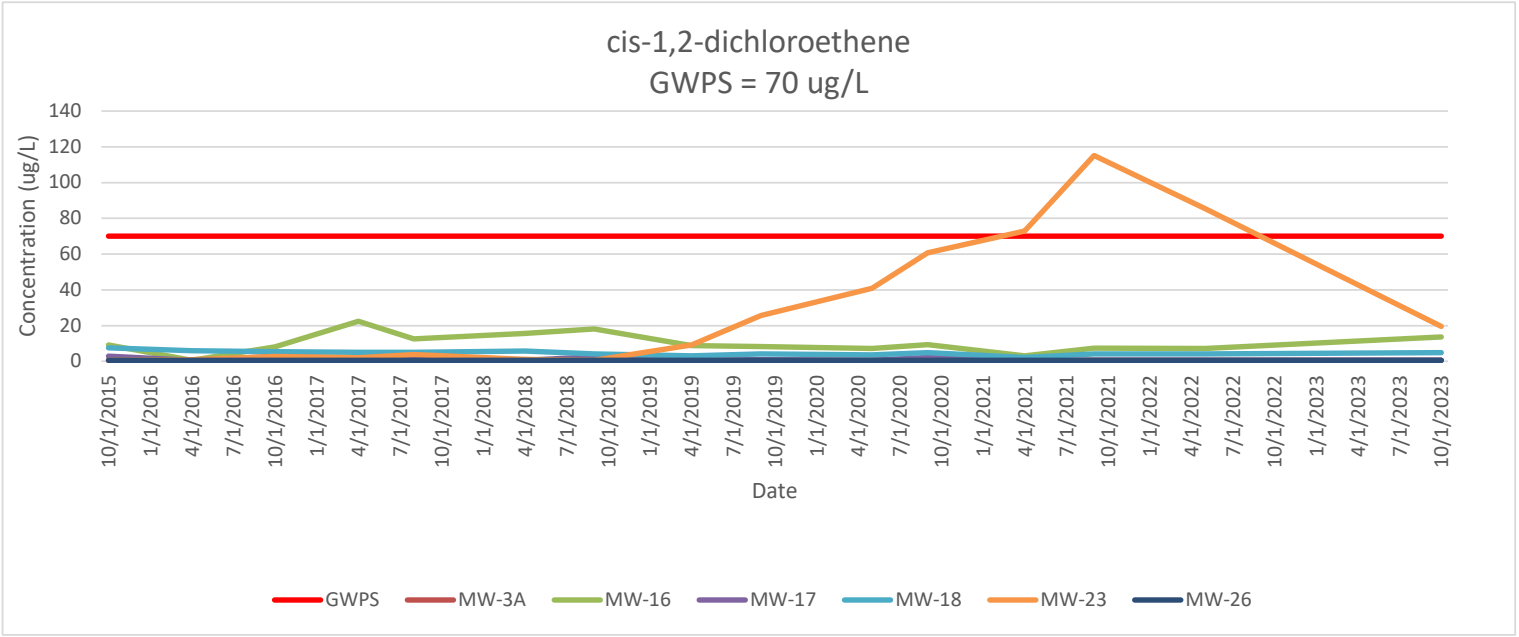
Date	Compound (ug/L)	GWPS	MW-3A	MW-16	MW-17	MW-18	MW-23	MW-26
10/5/2015	1,1-dichloroethane	140	8.4	0.5	0.5	1	29.2	0.5
4/13/2016	1,1-dichloroethane	140	0.5	0.5	0.5	0.5	28.6	0.5
10/4/2016	1,1-dichloroethane	140	10.4	0.5	0.5	0.5	39.9	0.5
4/3/2017	1,1-dichloroethane	140	7.4	2.2	0.5	1.2	30.7	0.5
8/29/2017	1,1-dichloroethane	140	12.3	0.5	0.5	0.5	41.1	0.5
4/17/2018	1,1-dichloroethane	140	11.2	0.5	0.5	1.5	15.7	0.5
9/17/2018	1,1-dichloroethane	140	5.8	1	0.5	0.5	11.8	0.5
4/9/2019	1,1-dichloroethane	140	0.5	0.5	0.5	0.5	34.9	0.5
9/4/2019	1,1-dichloroethane	140	8.9	0.5	0.5	0.5	30.9	0.5
5/11/2020	1,1-dichloroethane	140	8.2	0.5	0.5	1	33.8	0.5
9/21/2020	1,1-dichloroethane	140	8.6	0.5	0.5	3	35.2	0.5
4/22/2021	1,1-dichloroethane	140	0.5	0.5	0.5	1.6	16.2	0.5
9/13/2021	1,1-dichloroethane	140	0.5	0.5	0.5	2.6	13.9	0.5
5/18/2022	1,1-dichloroethane	140	10.1	0.5	0.5	2.4	22.6	0.5
10/19/2023	1,1-dichloroethane	140	8	1.5	0.5	1.9	13.3	0.5



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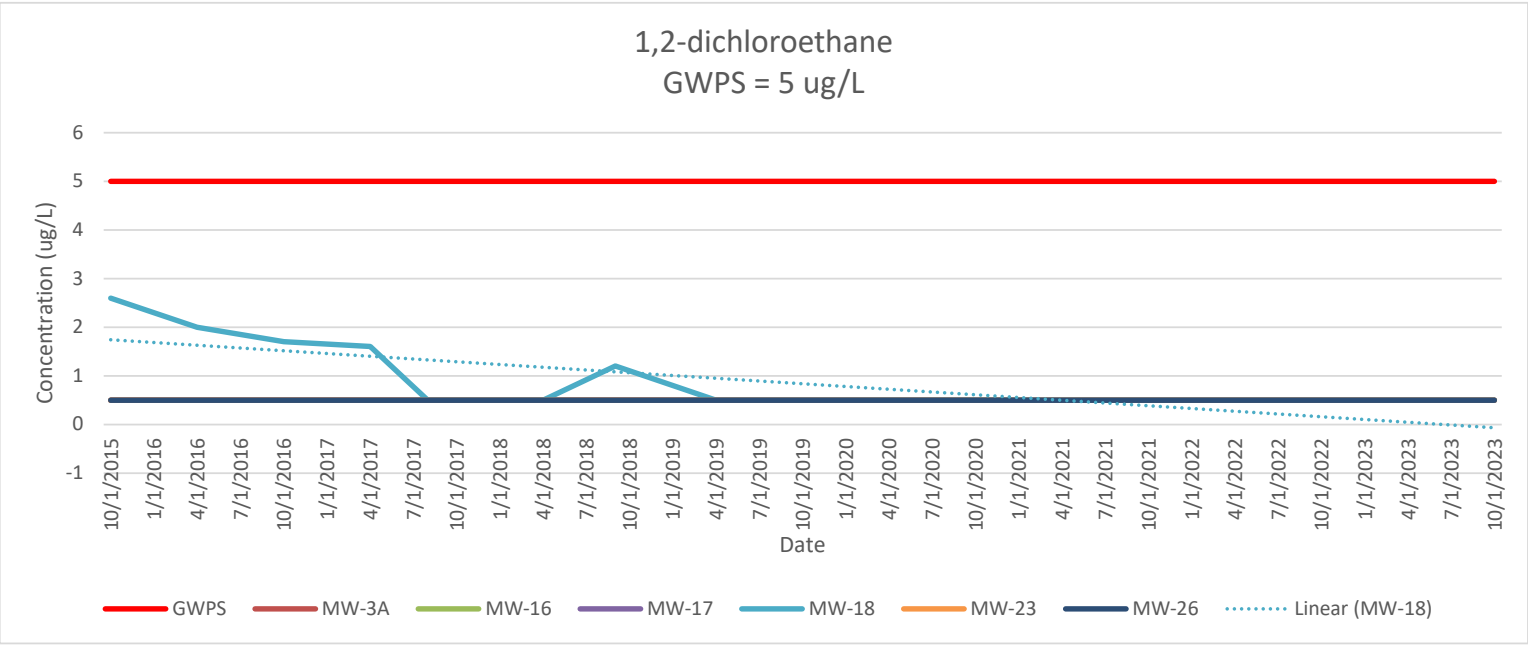
Date	Compound (ug/L)	GWPS	MW-3A	MW-16	MW-17	MW-18	MW-23	MW-26
10/5/2015	cis-1,2-dichloroethene	70	0.5	9.2	2.9	7.4	0.5	0.5
4/13/2016	cis-1,2-dichloroethene	70	0.5	0.5	0.5	6	1	0.5
10/4/2016	cis-1,2-dichloroethene	70	0.5	8.1	2.8	5.5	2.7	0.5
4/3/2017	cis-1,2-dichloroethene	70	0.5	22.4	2.1	5.1	2	0.5
8/29/2017	cis-1,2-dichloroethene	70	0.5	12.5	2.5	5	3.8	0.5
4/17/2018	cis-1,2-dichloroethene	70	0.5	15.6	0.5	5.7	1.1	0.5
9/17/2018	cis-1,2-dichloroethene	70	0.5	18.2	2.5	4.2	0.5	0.5
4/9/2019	cis-1,2-dichloroethene	70	0.5	8.9	0.5	3.1	9.1	0.5
9/4/2019	cis-1,2-dichloroethene	70	0.5	8.2	1	4.2	25.7	0.5
5/11/2020	cis-1,2-dichloroethene	70	0.5	7.2	0.5	3.6	40.8	0.5
9/21/2020	cis-1,2-dichloroethene	70	0.5	9.4	2.2	4.9	60.8	0.5
4/22/2021	cis-1,2-dichloroethene	70	0.5	3	0.5	2.2	72.9	0.5
9/13/2021	cis-1,2-dichloroethene	70	0.5	7.3	0.5	4.2	115	0.5
5/18/2022	cis-1,2-dichloroethene	70	0.5	7.2	0.5	4.2	85.5	0.5
10/19/2023	cis-1,2-dichloroethene	70	0.5	13.7	0.5	4.9	19.6	0.5



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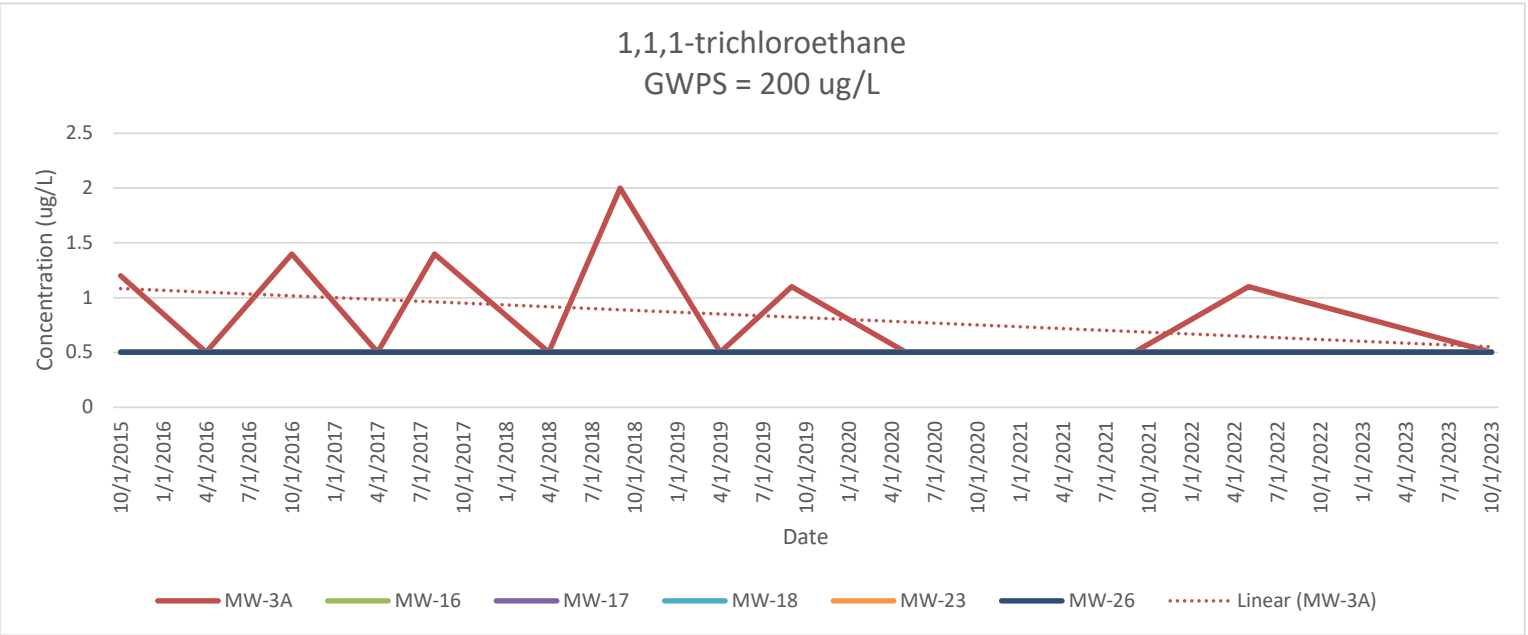
Date	Compound (ug/L)	GWPS	MW-3A	MW-16	MW-17	MW-18	MW-23	MW-26
10/5/2015	1,2-Dichloroethane	5	0.5	0.5	0.5	2.6	0.5	0.5
4/13/2016	1,2-Dichloroethane	5	0.5	0.5	0.5	2	0.5	0.5
10/4/2016	1,2-Dichloroethane	5	0.5	0.5	0.5	1.7	0.5	0.5
4/3/2017	1,2-Dichloroethane	5	0.5	0.5	0.5	1.6	0.5	0.5
8/29/2017	1,2-Dichloroethane	5	0.5	0.5	0.5	0.5	0.5	0.5
4/17/2018	1,2-Dichloroethane	5	0.5	0.5	0.5	0.5	0.5	0.5
9/17/2018	1,2-Dichloroethane	5	0.5	0.5	0.5	1.2	0.5	0.5
4/9/2019	1,2-Dichloroethane	5	0.5	0.5	0.5	0.5	0.5	0.5
9/4/2019	1,2-Dichloroethane	5	0.5	0.5	0.5	0.5	0.5	0.5
5/11/2020	1,2-Dichloroethane	5	0.5	0.5	0.5	0.5	0.5	0.5
9/21/2020	1,2-Dichloroethane	5	0.5	0.5	0.5	0.5	0.5	0.5
4/22/2021	1,2-Dichloroethane	5	0.5	0.5	0.5	0.5	0.5	0.5
9/13/2021	1,2-Dichloroethane	5	0.5	0.5	0.5	0.5	0.5	0.5
5/18/2022	1,2-Dichloroethane	5	0.5	0.5	0.5	0.5	0.5	0.5
10/19/2023	1,2-Dichloroethane	5	0.5	0.5	0.5	0.5	0.5	0.5



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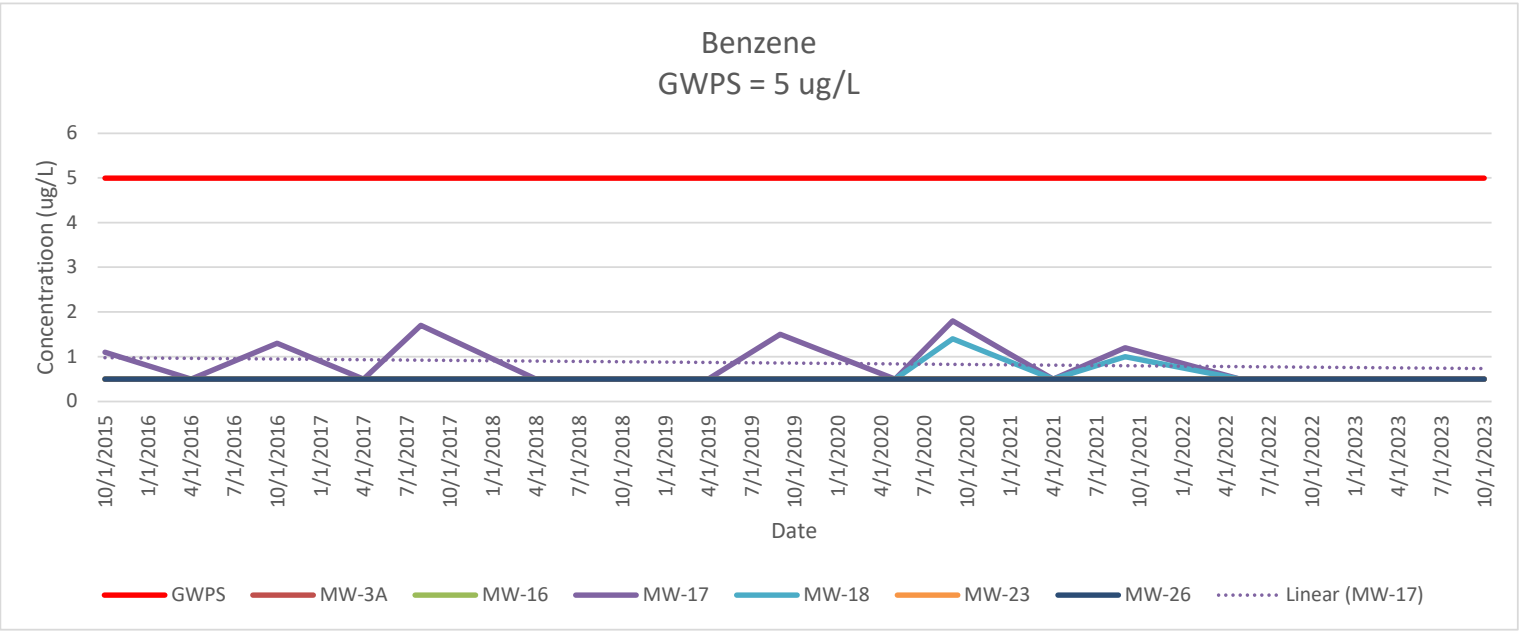
Date	Compound (ug/L)	GWPS	MW-3A	MW-16	MW-17	MW-18	MW-23	MW-26
10/5/2015	1,1,1-Trichloroethane	200	1.2	0.5	0.5	0.5	0.5	0.5
4/13/2016	1,1,1-Trichloroethane	200	0.5	0.5	0.5	0.5	0.5	0.5
10/4/2016	1,1,1-Trichloroethane	200	1.4	0.5	0.5	0.5	0.5	0.5
4/3/2017	1,1,1-Trichloroethane	200	0.5	0.5	0.5	0.5	0.5	0.5
8/29/2017	1,1,1-Trichloroethane	200	1.4	0.5	0.5	0.5	0.5	0.5
4/17/2018	1,1,1-Trichloroethane	200	0.5	0.5	0.5	0.5	0.5	0.5
9/17/2018	1,1,1-Trichloroethane	200	2	0.5	0.5	0.5	0.5	0.5
4/9/2019	1,1,1-Trichloroethane	200	0.5	0.5	0.5	0.5	0.5	0.5
9/4/2019	1,1,1-Trichloroethane	200	1.1	0.5	0.5	0.5	0.5	0.5
5/11/2020	1,1,1-Trichloroethane	200	0.5	0.5	0.5	0.5	0.5	0.5
9/21/2020	1,1,1-Trichloroethane	200	0.5	0.5	0.5	0.5	0.5	0.5
4/22/2021	1,1,1-Trichloroethane	200	0.5	0.5	0.5	0.5	0.5	0.5
9/13/2021	1,1,1-Trichloroethane	200	0.5	0.5	0.5	0.5	0.5	0.5
5/18/2022	1,1,1-Trichloroethane	200	1.1	0.5	0.5	0.5	0.5	0.5
10/19/2023	1,1,1-Trichloroethane	200	0.5	0.5	0.5	0.5	0.5	0.5



Date	Compound (ug/L)	GWPS	MW-3A	MW-16	MW-17	MW-18	MW-23	MW-26
10/5/2015	benzene	5	0.5	0.5	1.1	0.5	0.5	0.5
4/13/2016	benzene	5	0.5	0.5	0.5	0.5	0.5	0.5
10/4/2016	benzene	5	0.5	0.5	1.3	0.5	0.5	0.5
4/3/2017	benzene	5	0.5	0.5	0.5	0.5	0.5	0.5
8/29/2017	benzene	5	0.5	0.5	1.7	0.5	0.5	0.5
4/17/2018	benzene	5	0.5	0.5	0.5	0.5	0.5	0.5
9/17/2018	benzene	5	0.5	0.5	0.5	0.5	0.5	0.5
4/9/2019	benzene	5	0.5	0.5	0.5	0.5	0.5	0.5
9/4/2019	benzene	5	0.5	0.5	1.5	0.5	0.5	0.5
5/11/2020	benzene	5	0.5	0.5	0.5	0.5	0.5	0.5
9/21/2020	benzene	5	0.5	0.5	1.8	1.4	0.5	0.5
4/22/2021	benzene	5	0.5	0.5	0.5	0.5	0.5	0.5
9/13/2021	benzene	5	0.5	0.5	1.2	1	0.5	0.5
5/18/2022	benzene	5	0.5	0.5	0.5	0.5	0.5	0.5
10/19/2023	benzene	5	0.5	0.5	0.5	0.5	0.5	0.5

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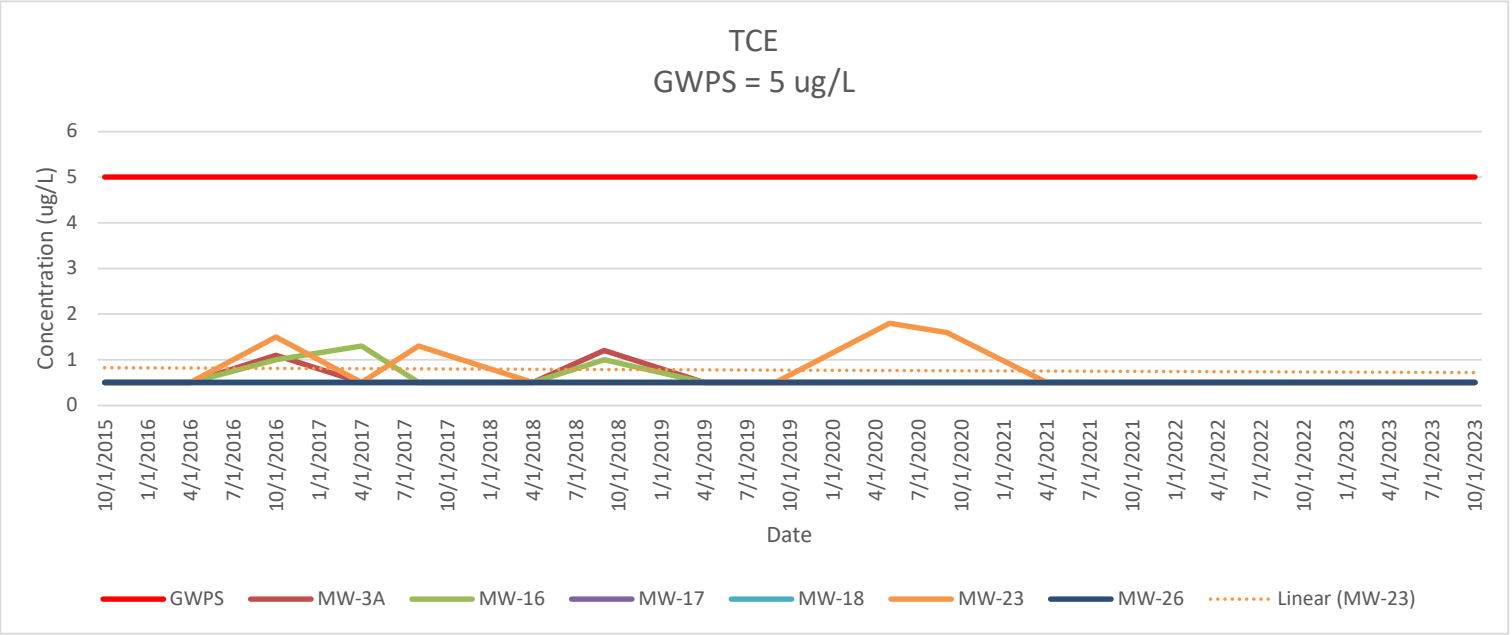
0.5 = Red text represent undetected values that are reported at one-half of the MRL



Date	Compound (ug/L)	GWPS	MW-3A	MW-16	MW-17	MW-18	MW-23	MW-26
10/5/2015	TCE	5	0.5	0.5	0.5	0.5	0.5	0.5
4/13/2016	TCE	5	0.5	0.5	0.5	0.5	0.5	0.5
10/4/2016	TCE	5	1.1	1	0.5	0.5	1.5	0.5
4/3/2017	TCE	5	0.5	1.3	0.5	0.5	0.5	0.5
8/29/2017	TCE	5	0.5	0.5	0.5	0.5	1.3	0.5
4/17/2018	TCE	5	0.5	0.5	0.5	0.5	0.5	0.5
9/17/2018	TCE	5	1.2	1	0.5	0.5	0.5	0.5
4/9/2019	TCE	5	0.5	0.5	0.5	0.5	0.5	0.5
9/4/2019	TCE	5	0.5	0.5	0.5	0.5	0.5	0.5
5/11/2020	TCE	5	0.5	0.5	0.5	0.5	1.8	0.5
9/21/2020	TCE	5	0.5	0.5	0.5	0.5	1.6	0.5
4/22/2021	TCE	5	0.5	0.5	0.5	0.5	0.5	0.5
9/13/2021	TCE	5	0.5	0.5	0.5	0.5	0.5	0.5
5/18/2022	TCE	5	0.5	0.5	0.5	0.5	0.5	0.5
10/19/2023	TCE	5	0.5	0.5	0.5	0.5	0.5	0.5

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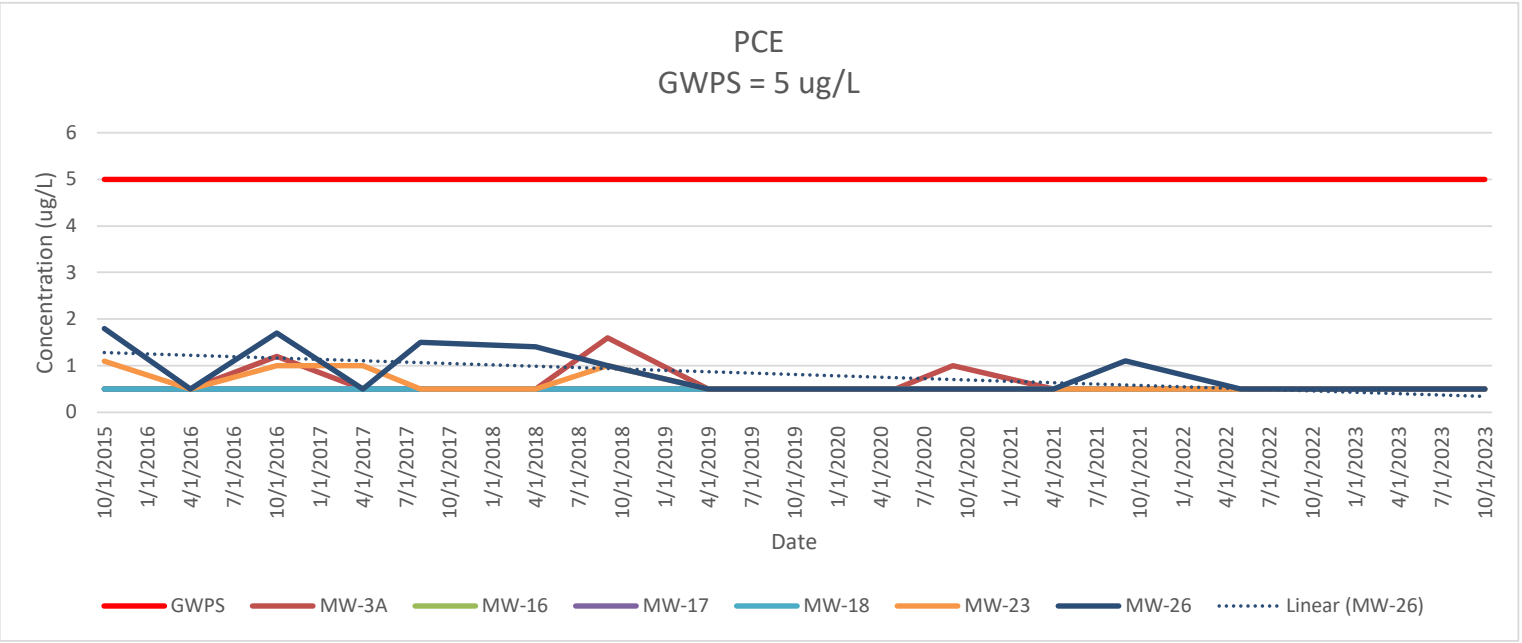
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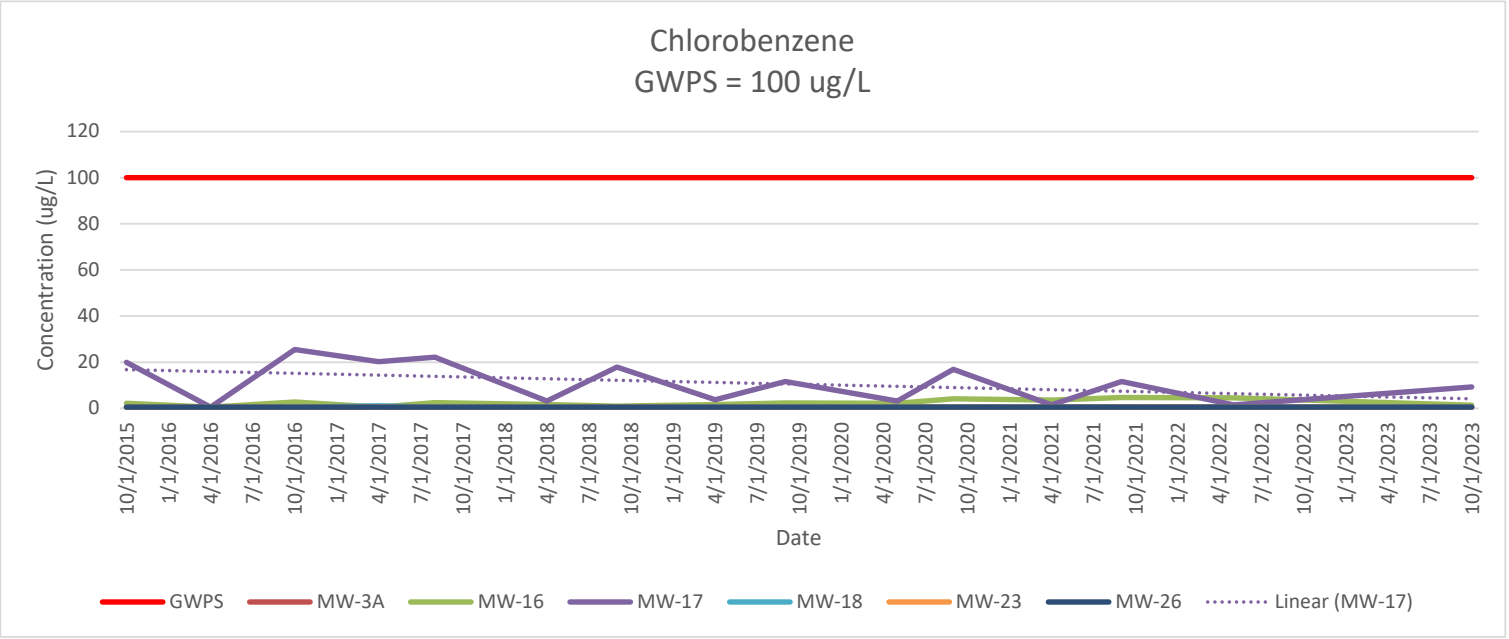
Date	Compound (ug/L)	GWPS	MW-3A	MW-16	MW-17	MW-18	MW-23	MW-26
10/5/2015	PCE	5	0.5	0.5	0.5	0.5	1.1	1.8
4/13/2016	PCE	5	0.5	0.5	0.5	0.5	0.5	0.5
10/4/2016	PCE	5	1.2	0.5	0.5	0.5	1	1.7
4/3/2017	PCE	5	0.5	0.5	0.5	0.5	1	0.5
8/29/2017	PCE	5	0.5	0.5	0.5	0.5	0.5	1.5
4/17/2018	PCE	5	0.5	0.5	0.5	0.5	0.5	1.4
9/17/2018	PCE	5	1.6	0.5	0.5	0.5	1	1
4/9/2019	PCE	5	0.5	0.5	0.5	0.5	0.5	0.5
9/4/2019	PCE	5	0.5	0.5	0.5	0.5	0.5	0.5
5/11/2020	PCE	5	0.5	0.5	0.5	0.5	0.5	0.5
9/21/2020	PCE	5	1	0.5	0.5	0.5	0.5	0.5
4/22/2021	PCE	5	0.5	0.5	0.5	0.5	0.5	0.5
9/13/2021	PCE	5	0.5	0.5	0.5	0.5	0.5	1.1
5/18/2022	PCE	5	0.5	0.5	0.5	0.5	0.5	0.5
10/19/2023	PCE	5	0.5	0.5	0.5	0.5	0.5	0.5



Times Series Graphs
Cedar County Sanitary Landfill
16-SDP-01-76C

0.5 = Red text represent undetected values that are reported at one-half of the MRL

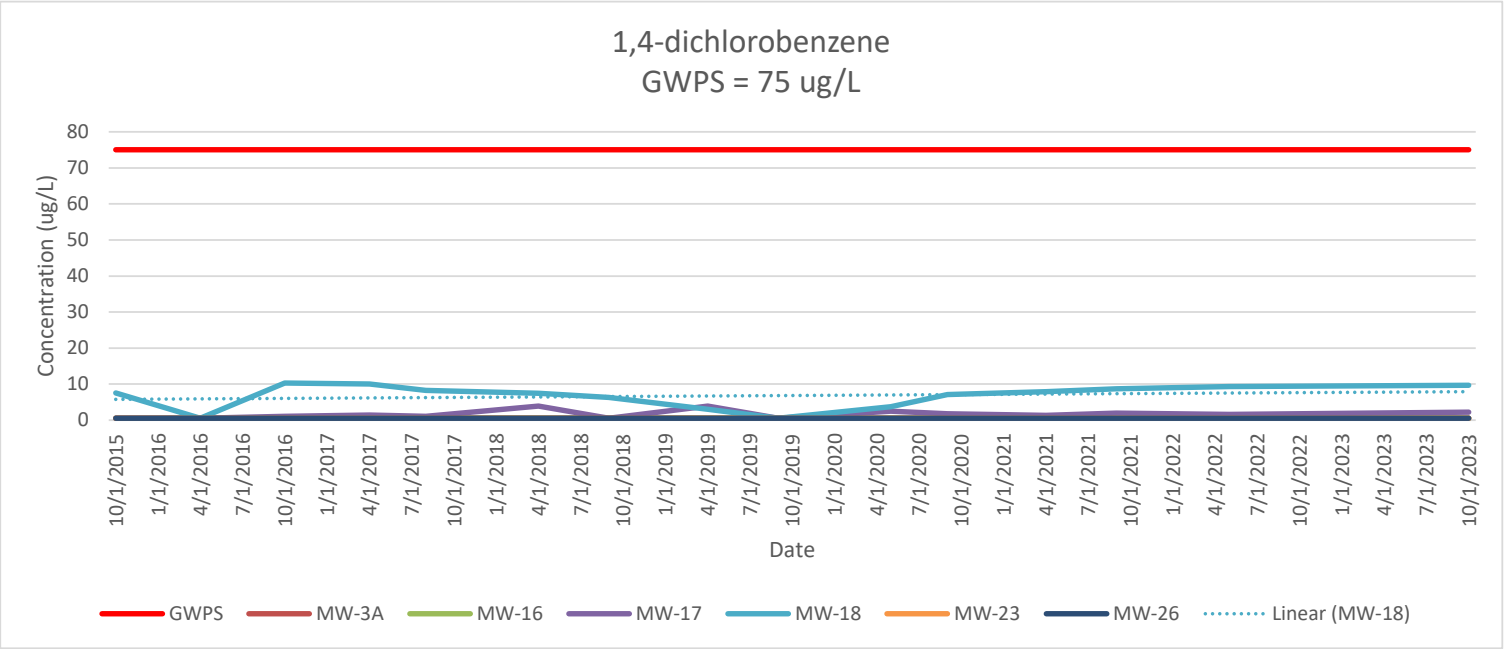
Date	Compound (ug/L)	GWPS	MW-3A	MW-16	MW-17	MW-18	MW-23	MW-26
10/5/2015	chlorobenzene	100	0.5	2.2	19.9	0.5	0.5	0.5
4/13/2016	chlorobenzene	100	0.5	0.5	0.5	0.5	0.5	0.5
10/4/2016	chlorobenzene	100	0.5	2.8	25.5	0.5	0.5	0.5
4/3/2017	chlorobenzene	100	0.5	0.5	20.2	1.1	0.5	0.5
8/29/2017	chlorobenzene	100	0.5	2.5	22.1	0.5	0.5	0.5
4/17/2018	chlorobenzene	100	0.5	1.7	3.1	0.5	0.5	0.5
9/17/2018	chlorobenzene	100	0.5	1	17.8	0.5	0.5	0.5
4/9/2019	chlorobenzene	100	0.5	1.7	3.7	0.5	0.5	0.5
9/4/2019	chlorobenzene	100	0.5	2.3	11.6	0.5	0.5	0.5
5/11/2020	chlorobenzene	100	0.5	2.2	3.2	0.5	0.5	0.5
9/21/2020	chlorobenzene	100	0.5	4.1	16.9	0.5	0.5	0.5
4/22/2021	chlorobenzene	100	0.5	3.6	1.5	0.5	0.5	0.5
9/13/2021	chlorobenzene	100	0.5	4.7	11.6	0.5	0.5	0.5
5/18/2022	chlorobenzene	100	0.5	4.6	1.5	0.5	0.5	0.5
10/19/2023	chlorobenzene	100	0.5	1.4	9.2	0.5	0.5	0.5



Times Series Graphs
Cedar County Sanitary Landfill
16-SDP-01-76C

0.5 = Red text represent undetected values that are reported at one-half of the MRL

Date	Compound (ug/L)	GWPS	MW-3A	MW-16	MW-17	MW-18	MW-23	MW-26
10/5/2015	1,4-Dichlorobenzene	75	0.5	0.5	0.5	7.6	0.5	0.5
4/13/2016	1,4-Dichlorobenzene	75	0.5	0.5	0.5	0.5	0.5	0.5
10/4/2016	1,4-Dichlorobenzene	75	0.5	0.5	1.1	10.3	0.5	0.5
4/3/2017	1,4-Dichlorobenzene	75	0.5	0.5	1.4	10	0.5	0.5
8/29/2017	1,4-Dichlorobenzene	75	0.5	0.5	1.1	8.3	0.5	0.5
4/17/2018	1,4-Dichlorobenzene	75	0.5	0.5	3.9	7.5	0.5	0.5
9/17/2018	1,4-Dichlorobenzene	75	0.5	0.5	0.5	6.3	0.5	0.5
4/9/2019	1,4-Dichlorobenzene	75	0.5	0.5	3.9	3	0.5	0.5
9/4/2019	1,4-Dichlorobenzene	75	0.5	0.5	0.5	0.5	0.5	0.5
5/11/2020	1,4-Dichlorobenzene	75	0.5	0.5	2.5	3.7	0.5	0.5
9/21/2020	1,4-Dichlorobenzene	75	0.5	0.5	1.8	7.1	0.5	0.5
4/22/2021	1,4-Dichlorobenzene	75	0.5	0.5	1.3	7.9	0.5	0.5
9/13/2021	1,4-Dichlorobenzene	75	0.5	0.5	2	8.7	0.5	0.5
5/18/2022	1,4-Dichlorobenzene	75	0.5	0.5	1.6	9.3	0.5	0.5
10/19/2023	1,4-Dichlorobenzene	75	0.5	0.5	2.2	9.7	0.5	0.5



APPENDIX D

WATER LEVEL DATA – MONITORING WELLS

Water-level data, Cedar County Sanitary Landfill. TOC, top of casing elevation.

Monitor Well/ TOC Elev. (ft)	Screened Interval		Water Level	Date															
	Depth (ft)	Elev. (ft)		12/11/93	3/22/94	6/16/94	9/13/94	11/10/94	4/14/95	6/21/95	9/14/95	4/6/96	9/9/96	3/21/97	8/28/97	3/23/98	9/20/98	3/16/99	9/19/99
MW-1 824.48	30.00	794.5	Depth (ft)	21.66	22.87	23.28	23.76	23.92	23.33	---	22.86	25.01	23.35	25.20	24.55	23.05	22.31	17.54	22.45
	40.00	784.5	Elev. (ft)	802.82	801.61	801.20	800.72	800.56	801.15	---	801.62	799.47	801.13	799.28	799.93	801.43	802.17	806.94	802.03
MW-2 806.94	88.00	718.9	Depth (ft)	75.11	76.10	77.98	80.68	82.39	83.15	---	80.56	84.05	82.51	80.90	85.12	84.37	81.59	78.72	79.81
	101.67	705.3	Elev. (ft)	731.83	730.84	728.96	726.26	724.55	723.79	---	726.38	722.89	724.43	726.04	721.82	722.57	725.35	728.22	727.13
MW-3A 794.12	16.40	777.7	Depth (ft)	---	---	---	---	---	---	---	---	---	---	25.24	24.02	16.96	20.37	15.16	23.66
	36.40	757.7	Elev. (ft)	---	---	---	---	---	---	---	---	---	---	768.88	770.10	777.16	773.75	778.96	770.46
MW-4 756.90	21.50	735.4	Depth (ft)	23.51	24.58	25.65	29.51	29.65	28.45	---	28.25	DRY	29.15	DRY	DRY	24.13	27.64	22.98	27.34
	30.10	726.8	Elev. (ft)	733.39	732.32	731.25	727.39	727.25	728.45	---	728.65	---	727.75	---	---	732.77	729.26	733.92	729.56
MW-5 753.47	36.10	717.4	Depth (ft)	23.22	24.11	26.24	28.85	31.05	31.80	---	29.40	32.90	31.24	32.50	33.80	32.54	30.26	26.73	28.49
	50.22	703.3	Elev. (ft)	730.25	729.36	727.23	724.62	722.42	721.67	---	724.07	720.57	722.23	720.97	719.67	720.93	723.21	726.74	724.98
MW-7 793.81	60.80	733.0	Depth (ft)	63.47	64.81	65.58	66.26	66.29	DRY	---	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY
	66.79	727.0	Elev. (ft)	730.34	729.00	728.23	727.55	727.52	---	---	---	---	---	---	---	---	---	---	---
MW-8 808.52	22.20	786.3	Depth (ft)	16.20	17.30	17.46	18.09	18.05	19.15	---	17.26	19.40	18.04	18.30	18.55	17.64	16.58	15.71	16.58
	32.20	776.3	Elev. (ft)	792.32	791.22	791.06	790.43	790.47	789.37	---	791.26	789.12	790.48	790.22	789.97	790.88	791.94	792.81	791.94
MW-9 816.12	107.40	708.7	Depth (ft)	86.95	87.93	89.82	92.85	94.49	95.40	---	92.39	96.25	94.74	96.06	97.30	96.68	93.87	90.98	92.38
	123.10	693.0	Elev. (ft)	729.17	728.19	726.30	723.27	721.63	720.72	---	723.73	719.87	721.38	720.06	718.82	719.44	722.25	725.14	723.74
MW-12 826.01	95.30	730.7	Depth (ft)	96.34	97.63	98.99	103.25	DRY	DRY	---	DRY	DRY	DRY	DRY	DRY	DRY	DRY	DRY	100.50
	100.30	725.7	Elev. (ft)	729.67	728.38	727.02	722.76	---	---	---	---	---	---	---	---	---	---	---	725.51
MW-13 828.75	13.50	815.3	Depth (ft)	---	---	---	---	---	22.66	20.06	21.30	23.65	21.22	21.20	23.35	21.91	21.06	18.57	22.00
	33.50	795.3	Elev. (ft)	---	---	---	---	---	806.09	808.69	807.45	805.10	807.53	807.55	805.40	806.84	807.69	810.18	806.75
MW-14 823.84	16.20	807.6	Depth (ft)	---	---	---	---	---	24.36	20.06	21.96	24.90	22.82	25.22	24.61	23.99	22.12	20.91	21.53
	36.20	787.6	Elev. (ft)	---	---	---	---	---	769.76	774.06	772.16	769.22	771.30	798.62	799.23	799.85	801.72	802.93	802.31
MW-15 792.56	11.30	781.3	Depth (ft)	---	---	---	---	---	13.09	13.30	17.49	15.65	17.49	11.76	17.58	8.72	10.55	8.13	17.22
	26.65	765.9	Elev. (ft)	---	---	---	---	---	781.03	780.82	776.63	778.47	776.63	780.80	774.98	783.84	782.01	784.43	775.34
MW-16 813.35	15.00	798.4	Depth (ft)	---	---	---	---	---	24.16	19.70	21.78	24.20	22.72	23.55	23.08	22.83	21.00	20.18	20.90
	30.81	782.5	Elev. (ft)	---	---	---	---	---	769.96	774.42	772.34	769.92	771.40	789.80	790.27	790.52	792.35	793.17	792.45
MW-17 818.11	15.00	803.1	Depth (ft)	---	---	---	---	---	21.80	18.26	20.38	22.00	21.06	20.82	21.79	20.71	20.19	19.24	19.48
	29.91	788.2	Elev. (ft)	---	---	---	---	---	772.32	775.86	773.74	772.12	773.06	797.29	796.32	797.40	797.92	798.87	798.63
MW-18 822.50	10.10	812.4	Depth (ft)	---	---	---	---	---	22.46	17.82	20.80	23.15	22.34	22.53	23.04	21.55	19.35	17.70	19.17
	30.41	792.1	Elev. (ft)	---	---	---	---	---	771.66	776.30	773.32	770.97	771.78	799.97	799.46	800.95	803.15	804.80	803.33
MW-19 802.86	11.80	791.1	Depth (ft)	---	---	---	---	---	---	---	---	---	---	21.09	22.43	17.51	17.96	16.20	19.92
	27.45	775.4	Elev. (ft)	---	---	---	---	---	---	---	---	---	---	781.77	780.43	785.35	784.90	786.66	782.94
MW-20 790.28	12.00	778.3	Depth (ft)	---	---	---	---	---	---	---	---	---	---	21.28	16.11	7.70	10.06	6.19	13.17
	27.00	763.3	Elev. (ft)	---	---	---	---	---	---	---	---	---	---	769.00	774.17	782.58	780.22	784.09	777.11
MW-21 816.99	21.50	795.5	Depth (ft)	---	---	---	---	---	---	---	---	---	---	50.25	39.06	38.41	36.78	35.66	33.34
	52.35	764.6	Elev. (ft)	---	---	---	---	---	---	---	---	---	---	766.74	777.93	778.58	780.21	781.33	783.65
MW-22 804.60	21.40	783.2	Depth (ft)	---	---	---	---	---	---	---	---	---	---	DRY	23.74	20.19	18.89	16.64	19.53
	37.42	767.2	Elev. (ft)	---	---	---	---	---	---	---	---	---	---	---	780.86	784.41	785.71	787.96	785.07
MW-23 826.94	16.10	810.8	Depth (ft)	---	---	---	---	---	---	---	---	---	---	36.70	28.90	30.34	26.97	28.13	25.34
	37.45	789.5	Elev. (ft)	---	---	---	---	---	---	---	---	---	---	790.24	798.04	796.60	799.97	798.81	801.60
MW-24 827.39	21.10	806.3	Depth (ft)	---	---	---	---	---	---	---	---	---	---	DRY	35.14	35.72	31.47	26.69	26.40
	37.45	789.9	Elev. (ft)	---	---	---	---	---	---	---	---	---	---	---	792.25	791.67	795.92	800.70	800.99
MW-25 817.35	10.40	807.0	Depth (ft)	---	---	---	---	---	---	---	---	---	---	34.97	23.43	24.29	21.43	17.18	20.59
	36.58	780.8	Elev. (ft)	---	---	---	---	---	---	---	---	---	---	782.38	793.92	793.06	795.92	800.17	796.76
MW-26 814.57	8.50	806.1	Depth (ft)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	30.45	784.1	Elev. (ft)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Water-level data, Cedar County Sanitary Landfill. TOC, top of casing elevation

Monitor Well/ TOC Elev. (ft)	Screened Interval		Water Level	Date															
	Depth (ft)	Elev. (ft)		3/29/00	9/25/00	3/29/01	9/14/01	3/29/02	9/27/02	3/25/03	9/23/03	3/27/04	9/17/04	3/21/05	9/12/05	3/29/06	9/13/06	3/26/07	9/17/07
MW-1 824.48	30.00 40.00	794.5 784.5	Depth (ft) Elev. (ft)	24.53 799.95	22.56 801.92	23.52 800.96	22.35 802.13	23.22 801.26	22.81 801.67	24.25 800.23	24.60 799.88	17.33 807.15	22.32 802.16	22.45 802.03	24.25 800.23	22.81 801.67	25.05 799.43	19.40 805.08	22.35 802.13
MW-2 806.94	88.00 101.67	718.9 705.3	Depth (ft) Elev. (ft)	84.15 722.79	84.28 722.66	79.56 727.38	80.33 726.61	81.78 725.16	79.84 727.10	82.64 724.30	84.26 722.68	82.19 724.75	80.16 726.78	78.63 728.31	82.09 724.85	85.55 721.39	85.84 721.10	82.89 724.05	81.05 725.89
MW-3A 794.12	16.40 36.40	777.7 757.7	Depth (ft) Elev. (ft)	23.63 770.49	22.25 771.87	16.17 777.95	21.05 773.07	17.51 776.61	19.64 774.48	21.64 772.48	23.12 771.00	14.38 779.74	17.93 776.19	16.12 778.00	22.24 771.88	22.01 772.11	22.41 771.71	18.07 776.05	18.99 775.13
MW-4 756.90	21.50 30.10	735.4 726.8	Depth (ft) Elev. (ft)	DRY ---	DRY ---	21.74 735.16	27.49 729.41	26.58 730.32	26.64 730.26	DRY ---	DRY ---	20.76 736.14	25.96 730.94	23.82 733.08	29.43 727.47	DRY ---	DRY ---	22.42 734.48	26.10 730.80
MW-5 753.47	36.10 50.22	717.4 703.3	Depth (ft) Elev. (ft)	33.01 720.46	32.92 720.55	27.36 726.11	29.11 724.36	30.40 723.07	28.70 724.77	31.36 722.11	33.19 720.28	29.89 723.58	28.95 724.52	27.03 726.44	31.10 722.37	34.60 718.87	35.09 718.38	30.54 722.93	30.04 723.43
MW-7 793.81	60.80 66.79	733.0 727.0	Depth (ft) Elev. (ft)	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---
MW-8 808.52	22.20 32.20	786.3 776.3	Depth (ft) Elev. (ft)	19.23 789.29	18.71 789.81	16.94 776.87	16.54 791.98	17.39 791.13	18.05 790.47	19.34 789.18	19.95 788.57	16.69 791.83	16.78 791.74	16.36 792.16	18.99 789.53	19.82 788.70	20.03 788.49	18.07 790.45	17.61 790.91
MW-9 816.12	107.40 123.10	708.7 693.0	Depth (ft) Elev. (ft)	96.37 719.75	96.39 719.73	92.08 724.04	92.46 723.66	94.02 722.10	92.29 723.83	94.80 721.32	96.46 719.66	94.59 721.53	92.55 723.57	90.89 725.23	94.29 721.83	99.82 716.30	98.31 717.81	95.39 720.73	93.51 722.61
MW-12 826.01	95.30 100.30	730.7 725.7	Depth (ft) Elev. (ft)	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---
MW-13 828.75	13.50 33.50	815.3 795.3	Depth (ft) Elev. (ft)	24.24 804.51	23.45 805.30	17.68 811.07	21.51 807.24	22.11 806.64	21.79 806.96	23.65 805.10	24.69 804.06	21.13 807.62	19.95 808.80	19.99 808.76	24.62 804.13	25.96 802.79	26.25 802.50	22.50 806.25	21.83 806.92
MW-14 823.84	16.20 36.20	807.6 787.6	Depth (ft) Elev. (ft)	24.04 799.80	23.85 799.99	22.58 801.26	21.80 802.04	22.36 801.48	21.76 802.08	23.52 800.32	25.18 798.66	23.65 800.19	22.23 801.61	21.95 801.89	24.82 799.02	26.88 796.96	26.69 797.15	25.73 798.11	22.81 801.03
MW-15 792.56	11.30 26.65	781.3 765.9	Depth (ft) Elev. (ft)	16.84 775.72	11.09 781.47	9.76 782.80	17.83 774.73	12.21 780.35	16.19 776.37	15.74 776.82	19.11 773.45	4.63 787.93	14.21 778.35	10.71 781.85	19.09 773.47	15.81 776.75	18.35 774.21	5.51 787.05	14.71 777.85
MW-16 813.35	15.00 30.81	798.4 782.5	Depth (ft) Elev. (ft)	23.43 789.92	23.35 790.00	21.75 791.60	21.17 792.18	22.33 791.02	22.91 790.44	23.85 789.50	24.61 788.74	22.31 791.04	21.51 791.84	21.08 792.27	24.12 789.23	25.09 788.26	25.28 788.07	24.04 789.31	20.15 793.20
MW-17 818.11	15.00 29.91	803.1 788.2	Depth (ft) Elev. (ft)	22.03 796.08	22.04 796.07	20.15 797.96	19.83 798.28	20.64 797.47	21.51 796.60	22.46 795.65	23.31 794.80	20.69 797.42	20.75 797.36	20.38 797.73	22.36 795.75	22.98 795.13	23.58 794.53	22.18 795.93	21.49 796.62
MW-18 822.50	10.10 30.41	812.4 792.1	Depth (ft) Elev. (ft)	22.06 800.44	22.43 800.07	19.14 803.36	19.63 802.87	21.29 801.21	21.44 801.06	22.74 799.76	23.35 799.15	20.75 801.75	21.80 800.70	19.41 803.09	22.31 800.19	23.61 798.89	24.02 798.48	22.28 800.22	22.41 800.09
MW-19 802.86	11.80 27.45	791.1 775.4	Depth (ft) Elev. (ft)	19.73 783.13	20.82 782.04	14.71 788.15	19.09 783.77	19.43 783.43	20.78 782.08	20.31 782.55	24.83 778.03	19.20 783.66	18.08 784.78	16.65 786.21	24.19 778.67	23.02 779.84	DRY ---	22.35 780.51	21.84 781.02
MW-20 790.28	12.00 27.00	778.3 763.3	Depth (ft) Elev. (ft)	11.36 778.92	13.64 776.64	6.19 784.09	13.31 776.97	9.29 780.99	12.95 777.33	11.73 778.55	20.02 770.26	5.78 784.50	9.33 780.95	7.61 782.67	13.54 776.74	16.48 773.80	17.78 772.50	7.45 782.83	12.42 777.86
MW-21 816.99	21.50 52.35	795.5 764.6	Depth (ft) Elev. (ft)	32.22 784.77	32.25 784.74	31.39 785.60	22.08 794.91	24.75 792.24	24.21 792.78	25.13 791.86	26.91 790.08	27.79 789.20	23.43 793.56	22.31 794.68	25.58 791.41	28.19 788.80	29.10 787.89	29.86 787.13	30.31 786.68
MW-22 804.60	21.40 37.42	783.2 767.2	Depth (ft) Elev. (ft)	20.59 784.01	20.07 784.53	13.39 791.21	19.61 784.99	18.18 786.42	19.59 785.01	20.21 784.39	23.02 781.58	16.55 788.05	18.23 786.37	17.90 786.70	22.79 781.81	22.97 781.63	--- ---	17.89 786.71	18.19 786.41
MW-23 826.94	16.10 37.45	810.8 789.5	Depth (ft) Elev. (ft)	27.76 799.18	28.03 798.91	28.17 798.77	25.11 801.83	26.35 800.59	25.98 800.96	26.88 800.06	28.39 798.55	28.53 798.41	27.09 799.85	26.83 800.11	27.68 799.26	30.02 796.92	30.70 796.24	32.11 794.83	29.54 797.40
MW-24 827.39	21.10 37.45	806.3 789.9	Depth (ft) Elev. (ft)	28.63 798.76	31.23 796.16	32.02 795.37	27.07 800.32	27.29 800.10	27.51 799.88	27.45 799.94	31.45 795.94	32.71 794.68	30.78 796.61	27.52 799.87	31.53 795.86	33.95 793.44	34.78 792.61	35.59 791.80	34.72 792.67
MW-25 817.35	10.40 36.58	807.0 780.8	Depth (ft) Elev. (ft)	33.39 783.96	22.99 794.36	16.64 800.71	21.05 796.30	20.74 796.61	20.75 796.60	21.78 795.57	23.69 793.66	24.61 792.74	21.25 796.10	17.79 799.56	23.17 794.18	26.05 791.30	25.15 792.20	24.54 792.81	22.85 794.50
MW-26 814.57	8.50 30.45	806.1 784.1	Depth (ft) Elev. (ft)	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---	--- ---

Water-level data, Cedar County Sanitary Landfill. TOC, top of casing elevation.

Monitor Well/ TOC Elev. (ft)	Screened Interval		Water Level	Date															
	Depth (ft)	Elev. (ft)		3/29/08	9/12/08	3/4/09	9/22/09	3/22/10	9/13/10	3/16/11	9/14/11	3/17/12	9/5/12	4/2/13	9/10/13	10/5/15	4/13/16	10/4/16	4/3/17
MW-1 824.48	30.00 40.00	794.5 784.5	Depth (ft) Elev. (ft)	21.62 802.86	21.23 803.25	22.01 802.47	19.92 804.56	18.12 806.36	20.11 804.37	21.11 803.37	23.21 801.27	--- ---	--- ---	--- ---	--- ---	23.08 801.40	21.89 802.59	21.94 802.54	---
MW-2 806.94	88.00 101.67	718.9 705.3	Depth (ft) Elev. (ft)	77.35 729.59	74.98 731.96	77.04 729.90	72.38 734.56	69.61 737.33	71.90 735.04	73.80 733.14	75.70 731.24	78.56 728.38	80.59 726.35	82.74 724.20	80.02 726.92	79.44 727.50	75.95 730.99	75.60 731.34	76.54 730.40
MW-3A 794.12	16.40 36.40	777.7 757.7	Depth (ft) Elev. (ft)	13.80 780.32	19.34 774.78	19.89 774.23	16.90 777.22	13.02 781.10	17.70 776.42	13.04 781.08	19.71 774.41	13.79 780.33	22.30 771.82	18.20 775.92	20.28 773.84	20.23 773.89	12.87 781.25	17.48 776.64	12.15 781.97
MW-4 756.90	21.50 30.10	735.4 726.8	Depth (ft) Elev. (ft)	19.06 737.84	23.12 733.78	22.94 733.96	19.93 736.97	13.78 743.12	19.58 737.32	17.99 738.91	24.15 732.75	21.98 734.92	29.01 727.89	27.56 729.34	27.74 729.16	27.10 729.80	20.02 736.88	22.75 734.15	18.04 738.86
MW-5 753.47	36.10 50.22	717.4 703.3	Depth (ft) Elev. (ft)	24.94 728.53	23.73 729.74	25.39 728.08	20.84 732.63	17.28 736.19	20.15 733.32	21.70 731.77	24.52 728.95	27.01 726.46	29.65 723.82	31.51 721.96	29.02 724.45	28.34 725.13	24.04 729.43	24.25 729.22	24.35 729.12
MW-7 793.81	60.80 66.79	733.0 727.0	Depth (ft) Elev. (ft)	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	---	---	---	---	65.75 728.06	65.57 728.24	64.26 729.55	65.80 728.01
MW-8 808.52	22.20 32.20	786.3 776.3	Depth (ft) Elev. (ft)	16.45 792.07	15.60 792.92	17.98 790.54	15.63 792.89	13.73 794.79	16.12 792.40	17.29 791.23	18.05 790.47	---	---	---	---	18.23 790.29	16.01 792.51	17.05 791.47	18.35 790.17
MW-9 816.12	107.40 123.10	708.7 693.0	Depth (ft) Elev. (ft)	89.90 726.22	87.09 729.03	89.15 726.97	84.51 731.61	81.64 734.48	83.15 732.97	85.73 730.39	87.50 728.62	90.72 725.40	92.74 723.38	94.93 721.19	92.18 723.94	91.58 724.54	88.03 728.09	87.64 728.48	89.00 727.12
MW-12 826.01	95.30 100.30	730.7 725.7	Depth (ft) Elev. (ft)	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	DRY ---	---	---	---	---	100.33 725.68	98.11 727.90	96.68 729.33	98.95 727.06
MW-13 828.75	13.50 33.50	815.3 795.3	Depth (ft) Elev. (ft)	18.30 810.45	21.03 807.72	21.08 807.67	19.50 809.25	15.94 812.81	20.98 807.77	17.91 810.84	23.04 805.71	22.68 806.07	25.71 803.04	23.08 805.67	23.86 804.89	24.97 803.78	21.51 807.24	22.14 806.61	22.55 806.20
MW-14 823.84	16.20 36.20	807.6 787.6	Depth (ft) Elev. (ft)	21.87 801.97	20.95 802.89	21.81 802.03	19.60 804.24	18.51 805.33	18.96 804.88	20.00 803.84	21.65 802.19	22.18 801.66	23.80 800.04	25.70 798.14	23.32 800.52	22.72 801.12	21.70 802.14	21.34 802.50	22.95 800.89
MW-15 792.56	11.30 26.65	781.3 765.9	Depth (ft) Elev. (ft)	8.53 784.03	15.68 776.88	11.37 781.19	13.18 779.38	6.70 785.86	13.84 778.72	8.26 784.30	16.98 775.58	10.23 782.33	18.65 773.91	13.15 779.41	17.41 775.15	16.97 775.59	10.14 782.42	13.57 778.99	8.28 784.28
MW-16 813.35	15.00 30.81	798.4 782.5	Depth (ft) Elev. (ft)	21.41 791.94	20.40 792.95	22.79 790.56	20.40 792.95	18.21 795.14	21.15 792.20	22.19 791.16	23.05 790.30	23.68 789.67	24.34 789.01	24.23 789.12	21.65 791.70	23.45 789.90	21.13 792.22	22.36 790.99	23.75 789.60
MW-17 818.11	15.00 29.91	803.1 788.2	Depth (ft) Elev. (ft)	20.85 797.26	19.30 798.81	21.78 796.33	19.86 798.25	17.78 800.33	20.02 798.09	21.82 796.29	22.23 795.88	22.41 795.70	23.07 795.04	23.09 795.02	20.75 797.36	21.98 796.13	20.63 797.48	21.62 796.49	22.80 795.31
MW-18 822.50	10.10 30.41	812.4 792.1	Depth (ft) Elev. (ft)	18.40 804.10	18.95 803.55	21.11 801.39	18.91 803.59	15.50 807.00	19.57 802.93	20.12 802.38	21.82 800.68	22.25 800.25	23.08 799.42	23.50 799.00	20.11 802.39	21.90 800.60	19.96 802.54	21.11 801.39	21.96 800.54
MW-19 802.86	11.80 27.45	791.1 775.4	Depth (ft) Elev. (ft)	16.40 786.46	17.77 785.09	18.46 784.40	17.53 785.33	14.15 788.71	18.85 784.01	19.42 783.44	20.85 782.01	18.65 784.21	24.73 778.13	21.99 780.87	21.42 781.44	21.49 781.37	17.16 785.70	20.08 782.78	18.42 784.44
MW-20 790.28	12.00 27.00	778.3 763.3	Depth (ft) Elev. (ft)	7.63 782.65	10.42 779.86	9.49 780.79	10.18 780.10	7.19 783.09	11.70 778.58	7.91 782.37	15.79 774.49	8.68 781.60	21.03 769.25	12.91 777.37	17.02 773.26	15.03 775.25	8.47 781.81	12.91 777.37	8.55 781.73
MW-21 816.99	21.50 52.35	795.5 764.6	Depth (ft) Elev. (ft)	25.23 791.76	21.53 795.46	25.25 791.74	22.05 794.94	18.94 798.05	22.38 794.61	24.45 792.54	26.09 790.90	27.65 789.34	78.26 738.73	29.96 787.03	26.96 790.03	27.32 789.67	27.50 789.49	27.11 789.88	28.16 788.83
MW-22 804.60	21.40 37.42	783.2 767.2	Depth (ft) Elev. (ft)	14.96 789.64	19.09 785.51	17.73 786.87	17.96 786.64	15.24 789.36	18.69 785.91	15.79 788.81	20.68 783.92	17.26 787.34	24.12 780.48	22.65 781.95	21.65 782.95	21.20 783.40	16.90 787.70	18.85 785.75	16.44 788.16
MW-23 826.94	16.10 37.45	810.8 789.5	Depth (ft) Elev. (ft)	29.82 797.12	24.75 802.19	25.84 801.10	23.51 803.43	21.68 805.26	22.39 804.55	24.45 802.49	25.03 801.91	26.58 800.36	28.33 798.61	29.44 797.50	27.19 799.75	28.10 798.84	28.10 798.84	27.03 799.91	28.75 798.19
MW-24 827.39	21.10 37.45	806.3 789.9	Depth (ft) Elev. (ft)	34.42 792.97	26.81 800.58	27.01 800.38	24.55 802.84	22.50 804.89	21.80 805.59	24.95 802.44	26.13 801.26	27.80 799.59	30.35 797.04	33.35 794.04	32.24 795.15	32.53 794.86	31.52 795.87	30.49 796.90	31.90 795.49
MW-25 817.35	10.40 36.58	807.0 780.8	Depth (ft) Elev. (ft)	16.19 801.16	19.05 798.30	16.59 800.76	16.87 800.48	12.94 804.41	15.96 801.39	14.35 803.00	19.85 797.50	20.19 797.16	22.78 794.57	25.14 792.21	22.24 795.11	22.05 795.30	18.01 799.34	19.93 797.42	19.80 797.55
MW-26 814.57	8.50 30.45	806.1 784.1	Depth (ft) Elev. (ft)	--- ---	--- ---	--- ---	14.08 800.49	10.76 803.81	14.23 800.34	11.36 803.21	15.43 799.14	12.49 802.08	17.87 796.70	15.94 798.63	16.22 798.35	13.73 800.84	13.28 801.29	13.94 800.63	10.79 803.78

Water-level data, Cedar County Sanitary Landfill. TOC, top of casing elevation.

Monitor Well/ TOC Elev. (ft)	Screened Interval		Water Level													Mean/ Std. Dev.	
	Depth (ft)	Elev. (ft)		8/29/17	4/17/18	9/17/18	4/9/19	9/4/19	5/11/20	9/21/20	4/22/21	9/13/21	5/18/22	10/19/23			
MW-1 824.48	30.00 40.00	794.5 784.5	Depth (ft) Elev. (ft)	22.88 801.60											22.47 1.87	MW-1	
MW-2 806.94	88.00 101.67	718.9 705.3	Depth (ft) Elev. (ft)	---											79.80 3.81	MW-2	
MW-3A 794.12	16.40 36.40	777.7 757.7	Depth (ft) Elev. (ft)	20.19 773.93	16.84 777.28	17.15 776.97	14.72 779.40	18.94 775.18	15.92 778.20	19.37 774.75	13.49 780.63	20.79 773.33	15.05 779.07	23.82 770.30	18.56 3.46	MW-3A	
MW-4 756.90	21.50 30.10	735.4 726.8	Depth (ft) Elev. (ft)	25.61 731.29	25.79 731.11	24.05 732.85	17.48 739.42	23.69 733.21	20.57 736.33	25.24 731.66	18.18 738.72	26.98 729.92	23.17 733.73	37.40 719.50	24.38 4.17	MW-4	
MW-5 753.47	36.10 50.22	717.4 703.3	Depth (ft) Elev. (ft)	---											28.36 4.08	MW-5	
MW-7 793.81	60.80 66.79	733.0 727.0	Depth (ft) Elev. (ft)	---											65.31 0.95	MW-7	
MW-8 808.52	22.20 32.20	786.3 776.3	Depth (ft) Elev. (ft)	---											17.57 1.35	MW-8	
MW-9 816.12	107.40 123.10	708.7 693.0	Depth (ft) Elev. (ft)	89.47 726.65											92.03 4.02	MW-9	
MW-12 826.01	95.30 100.30	730.7 725.7	Depth (ft) Elev. (ft)	---											98.98 2.16	MW-12	
MW-13 828.75	13.50 33.50	815.3 795.3	Depth (ft) Elev. (ft)	24.79 803.96											21.99 2.27	MW-13	
MW-14 823.84	16.20 36.20	807.6 787.6	Depth (ft) Elev. (ft)	22.45 801.39			20.37 803.47		20.56 803.28	22.24 801.60		22.48 801.36	21.97 801.87	26.09 797.75	22.71 1.93	MW-14	
MW-15 792.56	11.30 26.65	781.3 765.9	Depth (ft) Elev. (ft)	17.02 775.54	9.33 783.23	10.11 782.45	10.82 781.74	14.59 777.97	12.28 780.28	15.14 777.42	9.26 783.30	17.54 775.02	11.99 780.57	19.48 773.08	13.39 3.85	MW-15	
MW-16 813.35	15.00 30.81	798.4 782.5	Depth (ft) Elev. (ft)	23.83 789.52	24.52 788.83	24.90 788.45	18.64 794.71	20.76 792.59	20.53 792.82	22.78 790.57	20.09 793.26	23.46 789.89	22.98 790.37	26.13 787.22	22.48 1.74	MW-16	
MW-17 818.11	15.00 29.91	803.1 788.2	Depth (ft) Elev. (ft)	22.14 795.97	22.49 795.62	23.35 794.76	18.50 799.61	19.62 798.49	20.30 797.81	21.67 796.44	19.65 798.46	22.16 795.95	22.55 795.56	23.93 794.18	21.27 1.41	MW-17	
MW-18 822.50	10.10 30.41	812.4 792.1	Depth (ft) Elev. (ft)	21.93 800.57	23.83 798.67	23.55 798.95	17.02 805.48	19.80 802.70	19.21 803.29	21.79 800.71	18.44 804.06	22.27 800.23	22.74 799.76	24.49 798.01	21.15 1.98	MW-18	
MW-19 802.86	11.80 27.45	791.1 775.4	Depth (ft) Elev. (ft)	22.01 780.85			13.94 788.92		17.13 785.73	20.53 782.33		22.04 780.82	18.91 783.95	26.95 775.91	19.75 2.82	MW-19	
MW-20 790.28	12.00 27.00	778.3 763.3	Depth (ft) Elev. (ft)	16.59 773.69			6.80 783.48		9.03 781.25	15.13 775.15		17.84 772.44	8.73 781.55	22.52 767.76	12.11 4.46	MW-20	
MW-21 816.99	21.50 52.35	795.5 764.6	Depth (ft) Elev. (ft)	27.48 789.51											29.62 9.91	MW-21	
MW-22 804.60	21.40 37.42	783.2 767.2	Depth (ft) Elev. (ft)	21.54 783.06											19.16 2.59	MW-22	
MW-23 826.94	16.10 37.45	810.8 789.5	Depth (ft) Elev. (ft)	27.69 799.25	31.21 795.73	31.93 795.01	26.44 800.50	23.84 803.10	24.99 801.95	25.39 801.55	25.21 801.73	26.45 800.49	27.34 799.60	31.90 795.04	27.53 2.72	MW-23	
MW-24 827.39	21.10 37.45	806.3 789.9	Depth (ft) Elev. (ft)	30.97 796.42											29.97 3.67	MW-24	
MW-25 817.35	10.40 36.58	807.0 780.8	Depth (ft) Elev. (ft)	21.59 795.76											21.33 4.38	MW-25	
MW-26 814.57	8.50 30.45	806.1 784.1	Depth (ft) Elev. (ft)	15.44 799.13	12.29 802.28	11.94 802.63	12.88 801.69	14.24 800.33	13.82 800.75	12.60 801.97	11.70 802.87	15.79 798.78	13.05 801.52	18.82 795.75	13.86 2.10	MW-26	