April 23, 2025

Mr. Geoffrey Spain
Environmental Engineer
Land Quality Bureau
Iowa Department of Natural Resources
6200 Park Avenue, Suite 200
Des Moines, Iowa 50321

HLW Engineering Group
Engineering Management

RE: Response to IDNR Letter Dated February 19, 2025 (Doc #112348)
Grundy County Sanitary Landfill
IDNR Permit No. 38-SDP-01-75C

Dear Mr. Spain:

This letter is being submitted in response to the IDNR letter dated February 19, 2025 (Doc #112348) regarding the 2024 Annual Water Quality Report dated December 19, 2024 (Doc # 111520) and the most recent request to complete an Environmental Covenant (dated July 11, 2024 - Doc 11532). A copy of the February 19, 2025, IDNR Letter (Doc #112348) is included in Attachment A. The first two (2) sections (*Report Priority* and *Response to IDNR Letter (Doc 111532*)) of the IDNR letter dated February 19, 2025 (Doc #112348) require a response.

Report Priority

Bis(2-ethylhexyl)phthalate Sampling Results

As requested in the February 19, 2025, IDNR Letter, samples were collected from MW-9, MW-11, MW-13, and MW-14 and analyzed for bis(2-ethylhexyl)phthalate. The compound was not detected in the April 3, 2025 samples collected from MW-9, MW-11, MW-13, or MW-14. The Analytical Report is included in Attachment B. Table 3a of the 2024 Annual Water Quality Report (Doc #111520) is updated with the 2025 data and is included below at the end of this section.

Review of Table 3a indicates that the bis(2-ethylhexyl)phthalate concentrations reported in April of 2024 were not reported in April 2025. Review of the results over time presented in Table 3a, confirm that the reported detections are sporadic and are never verified. The reported detections of bis(2-ethylhexyl)phthalate can be summarized as:

MW-9 – 2 of 15 tests reported a detection (11 years apart)
MW-11- 2 of 6 tests reported a detection (5 years apart)
MW-13 – 1 of 5 tests reported a detection in 2024 (not verified in 2025)
MW-14 – 1 of 5 tests reported a detection in 2024 (not verified in 2025)

The elevated detection at MW-14 (72 ug/L) on April 17, 2024, appears anomalous, as it has been detected once (4-17-24) and was reported as below the reporting limit four (4) times prior to and one (1) time following the April 17, 2024 sampling episode.

A request for a statistical outlier test was made, however, our statistician indicates that there are no good statistical test methods applicable to data where less than one (1) in four (4) detections are recorded. At this point it follows that any detection of bis(2-ethylhexyl)phthalate at this site can be considered an outlier.

Literature indicates that when studied within the environmentally regulated industry, the sporadic detection of bis(2-ethylhexyl)phthalate in groundwater is typically determined to be an artifact of sampling and/or laboratory

sources, rather than being confirmed as a compound present in site groundwater. The source of the bis(2-ethylhexyl)phthalate is known to be related to plastics (including PVC).

The upgradient/background well (MW-15A) at the Grundy County Sanitary Landfill was also sampled for bis(2-ethylhexyl)phthalate on April 3, 2025. The interpretation that bis(2-ethylhexyl)phthalate at this site is an artifact of sampling and/or laboratory analyses, is supported by the fact that Bis(2-ethylhexyl)phthalate is reported at MW-15A at a concentration of 10.0 ug/L. If the detection is real, this implies that bis(2-ethylhexyl)phthalate is endemic to site groundwater, is not related to the landfill, and the background concentrations of bis(2-ethylhexyl)phthalate naturally exists in site groundwater in the 10.0 ug/L range. It is more logical to attribute the reported bis(2-ethylhexyl)phthalate at MW-15A as a false positive due to field or lab source(s) of plastic/PVC, rather than to a natural source.

The confidence intervals of the reported bis(2-ethylhexyl)phthalate concentrations at MW-9, MW-11, MW-13, and MW-14 are statistically evaluated and compared to the Groundwater Protection Standard (GWPS) of 6.0 ug/L (Attachment C). At MW-9, MW-11, MW-13, and MW-14 the 95% Lower Confidence Limit (LCL) is below the GWPS of 6.0 ug/L in all cases. These findings document that no Statistically Significant Levels (SSL) are determined, and remedial work is not required.

Table 3a - *Bis(2-ethylhexyl)phthalate (ug/L) GWPS = 6.0 ug/L*

Date	MW-9	MW-11	MW-13	MW-14
4/17/2009	<8	<8	<8	<8
4/24/2013	**8.0**	NT	<8	<8
10/08/2013	<10	NT	NT	NT
4/24/2014	<10	NT	NT	NT
10/17/2014	<8	NT	<8	<8
4/1/2015	<10	NT	NT	NT
10/2/2015	<10	NT	NT	NT
4/19/2016	<10	NT	NT	NT
10/10/2016	<10	NT	NT	NT
4/4/2017	<10	<8	NT	NT
10/18/2017	NT	NT	NT	NT
4/12/2018	<6	**23.0**	NT	NT
10/23/2018	<6	<6	NT	NT
4/8/2019	<6	NT	NT	NT
10/4/2019	<6	NT	<6	<6
4/9/2020	NT	NT	NT	NT
10/1/2020	NT	NT	NT	NT
4/1/2021	NT	NT	NT	NT
10/4/2021	NT	NT	NT	NT
4/6/2022	NT	NT	NT	NT
10/4/2023	NT	**9.0**	NT	NT
4/17/2024	**8.0**	<6	**7.0**	**72.0**
4/3/2025	<6	<6	<6	<6

Note: green highlights indicate full Appendix II sample collection events.

Site Visit Schedule

Please indicate whether the IDNR plans to schedule a site visit this spring as indicated in the IDNR Letter dated February 19, 2025 (Doc 112348).

Response to IDNR Letter (Doc 111532)

Trend Analyses

The IDNR requested trend analyses of all compounds that exhibit Statistically Significant Increases (SSI) above background in the letter dated July 11, 2024 (Doc# 110446). The trend analyses were provided to IDNR on December 23, 2024 (Doc #111532). The February 19, 2025, IDNR Letter indicates that the trend analyses were reviewed. Thank you for your review of the information.

Environmental Covenant (EC) Denial

The February 19, 2025, IDNR Letter states that the "IDNR denies, at this time, the request to proceed with an EC stated in Section 4.0 Recommendations & Requests section of the report". It is assumed that IDNR is referencing the 2024 Annual Water Quality Report (Doc #11520), Section 4.0.

Please provide clarification as to the reason for the (temporary?) denial. It is surmised that denial may be based on one, or more, of the following:

1) Denial/Approval is dependent upon the outcome of the supplemental bis(2-ethylhexyl)phthalate testing completed April 3, 2025. If so, the bis(2-ethylhexyl)phthalate testing is complete and a favorable outcome is documented (see above).
2) Denial is based upon the request in Section 4.0 of the 2024 Annual Water Quality Report (Doc #11520) to suspend further testing during 2025 while the EC process is underway. If so, this request can be adjusted to meet IDNR needs.
3) Denial is based on something observed in the December 23, 2024, trend analyses report (Doc #111532). If so, the following historic perspective is offered to augment the previous report (Doc #111532).

The site ceased accepting waste prior to October 1, 2007 and the Closure Permit was issued in August 27, 2008. The rules published 12/11/2002 and previously effective 1/15/2003 are applicable to the site (Doc #30010).

The wells of interest (MW-9, MW-11, MW-13, and MW-14) all have documented SSI. Under the current version of rule and common IDNR vernacular, the wells of interest are designated as "supplemental wells". Each reference supplemental well had a step-out well installed and approved by IDNR as a means to document that the natural attenuation at the site was an effective remedy to the SSI impacted wells (MW-9, MW-11, MW-13, and MW-14). The step-out wells were MW-19, MW-18, MW-17, and MW-16, respectively (see Figure attached). Testing at MW-19, MW-18, MW-17, and MW-16 documented the absence of impact at the step-out wells and the *natural attenuation remedy would be considered complete under current rule*. Approval was granted February 8, 2018 (Doc #91476) to suspend sampling at step-out wells MW-16, MW-17, and MW-19. Approval was granted September 28, 2023 (Doc #107802) to suspend sampling at step-out well MW-18.

Typically, the "supplemental wells" (i.e. MW-9, MW-11, MW-13, and MW-14) are required to be included in the ongoing monitoring but are not statistically evaluated or used as compliance points in the monitoring system plan.

In the case of the Grundy County Landfill, the supplemental wells continue to be sampled and statistically evaluated. As reported in the 2024 Annual Water Quality Report (Doc #11520) and the Trend Analyses Report (Doc #111532), slight SSI impacts continue to be documented, however, no SSL are detected, and no remedial actions are required. Further, cessation of sampling at the step out wells MW-16, MW-17, MW-18, and MW-19 suggest that the remedy for the site is considered complete.

It appears that the site should be an eligible candidate for an EC. The Grundy County Landfill Commission is interested in bringing an end to regulation under IAC 567, Chapter 113 and terminating the Closure Permit.

The Grundy County Landfill Commission request permission from IDNR to proceed with an Environmental Covenant for the site. Further it is recommended that the IDNR make a site visit in the Spring of 2025 to initiate the Environmental Covenant process.

Please let me know if you agree with the conclusions and recommendations included herein.

Respectfully Submitted,
HLW Engineering Group

Todd Whipple, CPG
Project Manager

cc: Karl Strohbehn, Chair, Grundy County Landfill Commission
Kevin Nederhoff, Secretary, Grundy County Landfill Commission
Jeff Pabst, Grundy County Board of Supervisors
Chad Brown, Manager, Grundy County Landfill

▲ A-1 = AMBIENT AIR GAS MONITORING POINT

● GP-1 = SUBSURFACE GAS PROBE

0 100 200 400

SURVEY DATE: AUG 27, 2008

N

PROPERTY BOUNDRY

MW-19=GP-8

MW-18=GP-7

MW-9

MW-10

MW-11

A-1

MW-4

A-2

PZ-5

WASTE BOUNDRY

MW-13 =GP-5

MW-17 =GP-6

PZ-8

A-3

MW-15

MW-15A

GP-1

PZ-2

MW-12

A-7

A-4

PZ-1

SEDIMENT POND

PZ-6

MW-14 =GP-4

A-5

MW-16 =GP-3

MW-3

MW-5 GP-2

A-6

980

990

1000

1010

1020

1030

970

HLW Engineering Group

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

SITE PLAN WITH GAS MONITORING LOCATIONS

GRUNDY COUNTY SANITARY LANDFILL
GRUNDY CENTER, IOWA

FIGURE: 1

REVISION	NO.	DATE
DRAWN DRA	PROJECT NO. 6033	DATE 2-9-24

WATER ELEVATION OCTOBER 22, 2024	
WELL	ELEV.
MW-3	967.45
MW-4	979.54
MW-5	966.43
MW-9	978.32
MW-10	971.26
MW-11	967.82
MW-12	976.91
MW-13	974.30
MW-14	967.31
MW-15	995.19
MW-15A	983.92
MW-16	965.38
MW-17	967.45
MW-18	968.15
MW-19	974.47
PZ-1	999.02
PZ-2	1005.73
PZ-5	DRY
PZ-8	DRY

0 100 200 400

SURVEY DATE: AUG 27, 2008

N

PROPERTY BOUNDRY

MW-19 MW-18 MW-10 MW-11 MW-9 MW-4 PZ-5 MW-13 MW-17 PZ-8 MW-15 MW-15A PZ-2 MW-12 PZ-1 MW-14 MW-16 MW-3 MW-5

WASTE BOUNDRY

970 980 990

SEDIMENT POND

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

GROUNDWATER CONTOURS

GRUNDY COUNTY SANITARY LANDFILL
GRUNDY CENTER, IOWA

FIGURE: 2

REVISION	NO.	DATE

DRAWN	PROJECT NO.	DATE
DRA	6033-14A	12-9-24

Attachment A

IDNR Letter Dated February 19, 2025 (Doc #112348)

February 19, 2025

GREG MELCHER
GRUNDY COUNTY LANDFILL COMMISSION
GRUNDY COUNTY COURTHOUSE
20434 220TH STREET
GRUNDY CENTER IA 50638

RE: Grundy County Sanitary Landfill
Permit #38-SDP-01-75C
2024 Annual Groundwater Quality Report (Doc #111520)
Response to IDNR Letter Doc #110446 Dated July 11, 2024 (Doc #111532)

Dear Mr. Melcher:

The Iowa Department of Natural Resources (DNR) has reviewed the 2024 Annual Groundwater Quality Report, dated December 19, 2024, and the response to the July 11, 2024 IDNR Letter, dated December 23, 2024, both as submitted on your behalf by HLW Engineering Group. The DNR offers the following comments:

Report Priority

Before making the decision to submit an Environmental Covenant (EC), the DNR requests a round of sampling for bis(2-ethylhexyl) phthalate for MW-9, MW-11, MW-13, and MW-14. The DNR recognizes that the value of "72" in Table 3a may be an outlier. The DNR will also schedule a site visit.

Response to IDNR Letter (Doc #111532)

The DNR has reviewed the trend analysis on all parameters that are at statistically significant increases above background for MW-9, MW-11, MW-13, and MW-14. The DNR denies, at this time, the request to proceed with an EC stated in the Section 4.0 Recommendations & Request section of the report.

Sampling Summary

Monitoring at this site includes:

1. Background monitoring points are MW-15A, and MW-18. with MW-18 being used for its historical data and no longer sampled.

2. Downgradient monitoring points are MW-9, MW-11, MW-13, and MW-14.

3. The following monitoring points are currently in assessment monitoring; MW-9, MW-11, MW-13, and MW-14. Permit Special Provision X.4.d. allows for a five-year frequency between full

Appendix II parameter testing provided at least two full Appendix II parameter tests have been completed.

Monitoring Well Maintenance and Performance Reevaluation

The monitoring well maintenance plan is presently up to date and future maintenance is planned out. The DNR has no further comments.

Leachate Control System Performance Evaluation Report

The Grundy County Landfill was closed in 2008 with the leachate collection system completely installed in 1995. The system is being regularly maintained with either minimal fluctuation of head levels in piezometers or piezometers that are dry. The DNR has no further comments.

Gas Monitoring Report

Explosive gas concentrations were not found above the lower explosive limit (LEL). The DNR has no further comments.

For any questions please contact me at (515) 587-7638 or geoffrey.spain@dnr.iowa.gov.

Sincerely,

Geoffrey Spain
Environmental Engineer

cc: Todd Whipple, CPG
HLW Engineering Group
204 West Broad Street
P.O Box 314
Story City, IA 50248

DNR Field Office #2, Mason City

Attachment B

Analytical Reports

Microbac Laboratories, Inc., Newton

CERTIFICATE OF ANALYSIS

1ID0778

Project Description

6033

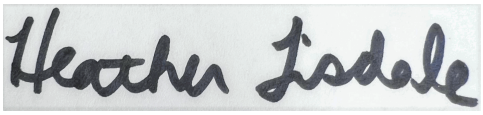
For:

Todd Whipple

HLW Engineering

204 West Broad St

Story City, IA 50248



Heather Tisdale

Customer Relationship Specialist

Wednesday, April 16, 2025

Please find enclosed the analytical results for the samples you submitted to Microbac Laboratories. Review and compilation of your report was completed by Microbac Laboratories, Inc., 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®

Microbac Laboratories, Inc., Newton

CERTIFICATE OF ANALYSIS

1ID0778

HLW Engineering

Todd Whipple
204 West Broad St
Story City, IA 50248

Project Name: 6033

Project / PO Number: N/A
Received: 04/04/2025
Reported: 04/16/2025

Sample Summary Report

Sample Name	Laboratory ID	Client Matrix	Sample Type	Sample Begin	Sample Taken	Lab Received
92MW-15A	1ID0778-01	Aqueous	GRAB		04/03/25 08:25	04/04/25 10:33
MW-9	1ID0778-02	Aqueous	GRAB		04/03/25 09:28	04/04/25 10:33
MW-11	1ID0778-03	Aqueous	GRAB		04/03/25 09:07	04/04/25 10:33
MW-13	1ID0778-04	Aqueous	GRAB		04/03/25 08:57	04/04/25 10:33
MW-14	1ID0778-05	Aqueous	GRAB		04/03/25 08:45	04/04/25 10:33

Analytical Testing Parameters

Client Sample ID: 92MW-15A
Sample Matrix: Aqueous
Lab Sample ID: 1ID0778-01
Collected By: JGH
Collection Date: 04/03/2025 8:25

Determination of Base/Neutral Extractable Compounds	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 8270C								
Bis(2-Ethylhexyl) Phthalate	**10**	6	ug/L	1		04/08/25 1057	04/14/25 1524	EPP
Surrogate: Nitrobenzene-d5	75.1	Limit: 17-154	% Rec	1		04/08/25 1057	04/14/25 1524	EPP
Surrogate: 2-Fluorobiphenyl	67.0	Limit: 15-150	% Rec	1		04/08/25 1057	04/14/25 1524	EPP
Surrogate: Terphenyl-dl4	61.3	Limit: 10-179	% Rec	1		04/08/25 1057	04/14/25 1524	EPP

Client Sample ID: MW-9
Sample Matrix: Aqueous
Lab Sample ID: 1ID0778-02
Collected By: JGH
Collection Date: 04/03/2025 9:28

Determination of Base/Neutral Extractable Compounds	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 8270C								
Bis(2-Ethylhexyl) Phthalate	<6	6	ug/L	1		04/08/25 1057	04/14/25 1548	EPP
Surrogate: Nitrobenzene-d5	75.0	Limit: 17-154	% Rec	1		04/08/25 1057	04/14/25 1548	EPP
Surrogate: 2-Fluorobiphenyl	78.9	Limit: 15-150	% Rec	1		04/08/25 1057	04/14/25 1548	EPP
Surrogate: Terphenyl-dl4	62.7	Limit: 10-179	% Rec	1		04/08/25 1057	04/14/25 1548	EPP

Client Sample ID: MW-11
Sample Matrix: Aqueous
Lab Sample ID: 1ID0778-03
Collected By: JGH
Collection Date: 04/03/2025 9:07

Determination of Base/Neutral Extractable Compounds	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 8270C								
Bis(2-Ethylhexyl) Phthalate	<6	6	ug/L	1		04/08/25 1057	04/14/25 1612	EPP
Surrogate: Nitrobenzene-d5	93.6	Limit: 17-154	% Rec	1		04/08/25 1057	04/14/25 1612	EPP
Surrogate: 2-Fluorobiphenyl	97.3	Limit: 15-150	% Rec	1		04/08/25 1057	04/14/25 1612	EPP
Surrogate: Terphenyl-dl4	105	Limit: 10-179	% Rec	1		04/08/25 1057	04/14/25 1612	EPP

Client Sample ID: MW-13
Sample Matrix: Aqueous
Lab Sample ID: 1ID0778-04
Collected By: JGH
Collection Date: 04/03/2025 8:57

Determination of Base/Neutral Extractable Compounds	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 8270C								
Bis(2-Ethylhexyl) Phthalate	<6	6	ug/L	1		04/08/25 1057	04/14/25 1701	EPP
Surrogate: Nitrobenzene-d5	84.2	Limit: 17-154	% Rec	1		04/08/25 1057	04/14/25 1701	EPP
Surrogate: 2-Fluorobiphenyl	110	Limit: 15-150	% Rec	1		04/08/25 1057	04/14/25 1701	EPP
Surrogate: Terphenyl-dl4	95.2	Limit: 10-179	% Rec	1		04/08/25 1057	04/14/25 1701	EPP

Client Sample ID:	MW-14		
Sample Matrix:	Aqueous	**Collected By:**	JGH
Lab Sample ID:	1ID0778-05	**Collection Date:**	04/03/2025 8:45

Determination of Base/Neutral Extractable Compounds	Result	RL	Units	DF	Note	Prepared	Analyzed	Analyst
EPA 8270C								
Bis(2-Ethylhexyl) Phthalate	<6	6	ug/L	1		04/08/25 1057	04/14/25 1637	EPP
Surrogate: Nitrobenzene-d5	81.5	Limit: 17-154	% Rec	1		04/08/25 1057	04/14/25 1637	EPP
Surrogate: 2-Fluorobiphenyl	86.9	Limit: 15-150	% Rec	1		04/08/25 1057	04/14/25 1637	EPP
Surrogate: Terphenyl-dl4	87.3	Limit: 10-179	% Rec	1		04/08/25 1057	04/14/25 1637	EPP

Batch Log Summary

Method	Batch	Laboratory ID	Client / Source ID
EPA 8270C	1ID0358	1ID0358-BLK1	
		1ID0358-BS1	
		1ID0358-BSD1	
		1ID0358-SRM1	
		1ID0778-01	92MW-15A
		1ID0778-02	MW-9
		1ID0778-03	MW-11
		1ID0778-05	MW-14
		1ID0778-04	MW-13

Batch Quality Control Summary: Microbac Laboratories, Inc., Newton

Determination of Base/Neutral Extractable Compounds	Result	RL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1ID0358 - EPA 625 BNA - EPA 8270C										
Blank (1ID0358-BLK1)			Prepared: 04/08/25 10:57 Analyzed: 04/14/25 11:28							
Bis(2-Ethylhexyl) Phthalate	<6	6	ug/L							
Surrogate: Nitrobenzene-d5	*14.9*		ug/L	*20.6*		*72.4*	*17-154*			
Surrogate: 2-Fluorobiphenyl	*14.9*		ug/L	*19.5*		*76.2*	*15-150*			
Surrogate: Terphenyl-dl4	*21.8*		ug/L	*20.6*		*106*	*10-179*			
LCS (1ID0358-BS1)			Prepared: 04/08/25 10:57 Analyzed: 04/14/25 11:53							
Bis(2-Ethylhexyl) Phthalate	14.0	6	ug/L	10.0		140	32-180			
Surrogate: Nitrobenzene-d5	*17.7*		ug/L	*20.6*		*85.9*	*34-138*			
Surrogate: 2-Fluorobiphenyl	*19.7*		ug/L	*19.5*		*101*	*42-129*			
Surrogate: Terphenyl-dl4	*21.9*		ug/L	*20.6*		*106*	*46-154*			
LCS Dup (1ID0358-BSD1)			Prepared: 04/08/25 10:57 Analyzed: 04/14/25 12:17							
Bis(2-Ethylhexyl) Phthalate	12.6	6	ug/L	10.0		126	32-180	10.6	30	
Surrogate: Nitrobenzene-d5	*17.9*		ug/L	*20.6*		*86.9*	*34-138*			
Surrogate: 2-Fluorobiphenyl	*17.5*		ug/L	*19.5*		*89.5*	*42-129*			
Surrogate: Terphenyl-dl4	*21.7*		ug/L	*20.6*		*105*	*46-154*			
Reference (1ID0358-SRM1)			Prepared: 04/08/25 10:57 Analyzed: 04/14/25 13:30							
Bis(2-Ethylhexyl) Phthalate	10.3	6	ug/L	10.0		103	80-120			
Surrogate: Nitrobenzene-d5	*23.4*		ug/L	*20.6*		*114*	*17-154*			
Surrogate: 2-Fluorobiphenyl	*22.8*		ug/L	*19.5*		*117*	*15-150*			
Surrogate: Terphenyl-dl4	*24.2*		ug/L	*20.6*		*117*	*10-179*			

Definitions

RL: Reporting Limit
RPD: Relative Percent Difference

Cooler Receipt Log

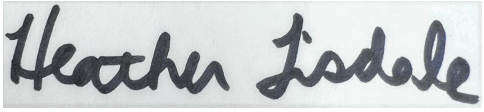
Cooler ID: Default Cooler Temp: 0.5°C

Cooler Inspection Checklist

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

Report Comments

Reviewed and Approved By:



Heather Tisdale
Customer Relationship Specialist
04/16/25 10:31

CHAIN OF

MICROBAC®

600 East 17th Street S
Newton, IA 50208
641-792-8451

1 I D 0 7 7 8

HLW Engineering
PM: Heather Murphy

www.keystonelabs.com

SITE INFORMATION

Sampler: IGH

Project: Grundy Co. Landfill - New Regs 6033

REPORT TO

Todd Whipple
HLW Engineering
204 West Broad St
Story City, IA 50248

INVOICE TO

Environmental Manager
Grundy County Landfill
20434 220th Street
Grundy Center, IA 50638

SPECIAL INSTRUCTIONS

None

Turn Around Time

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

LAB USE ONLY

Work Order 1ID0778
Temperature 0.5
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
-001	92MW-15A	Aqueous	GRAB	4/3/25	8:25	1	8270-110	01
-001	MW-9	Aqueous	GRAB	4/3/25	9:28	1	8270-110	02
-001	MW-11	Aqueous	GRAB	4/3/25	9:07	1	8270-110	03
-001	MW-13	Aqueous	GRAB	4/3/25	8:57	1	8270-110	04
-001	MW-14	Aqueous	GRAB	4/3/25	8:45	1	8270-110	05
-001	Duplicate	Aqueous	GRAB	/ /			8270-110	

T. Cook 4/4/25
Relinquished By Date/Time

Relinquished By Date/Time

Received By Date/Time

Received for Lab By 4/4/25 10:33 Date/Time

Original - Lab Copy Yellow - Sampler Copy

Remarks:

Attachment C

Confidence Limit Evaluation (95% LCL & 95% UCL)

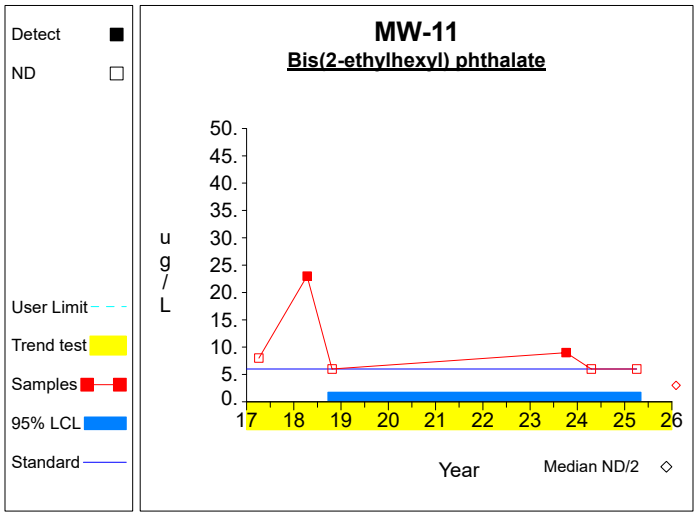
Table 1

Confidence Intervals for Comparing the Mean of the Last 4 Measurements to an Assessment Monitoring Standard

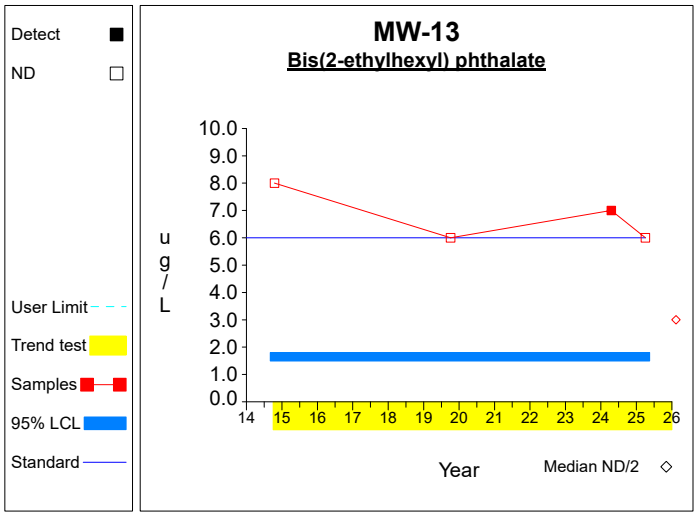
Constituent	Units	Well	N	Mean	SD	Factor	95% LCL	95% UCL	Standard	Trend	
Bis(2-ethylhexyl) phthalate	ug/L	MW-11	4	4.500	3.000	1.176	0.971	8.029	6.000		
Bis(2-ethylhexyl) phthalate	ug/L	MW-13	4	4.000	2.000	1.176	1.647	6.353	6.000		
Bis(2-ethylhexyl) phthalate	ug/L	MW-14	4	20.250	34.500	1.176	0.000	60.832	6.000		
Bis(2-ethylhexyl) phthalate	ug/L	MW-15A	1								*
Bis(2-ethylhexyl) phthalate	ug/L	MW-9	4	5.000	2.000	1.176	2.647	7.353	6.000		

* - Insufficient Data
** - Significant Exceedance
LCL = Lower Confidence Limit
UCL = Upper Confidence Limit

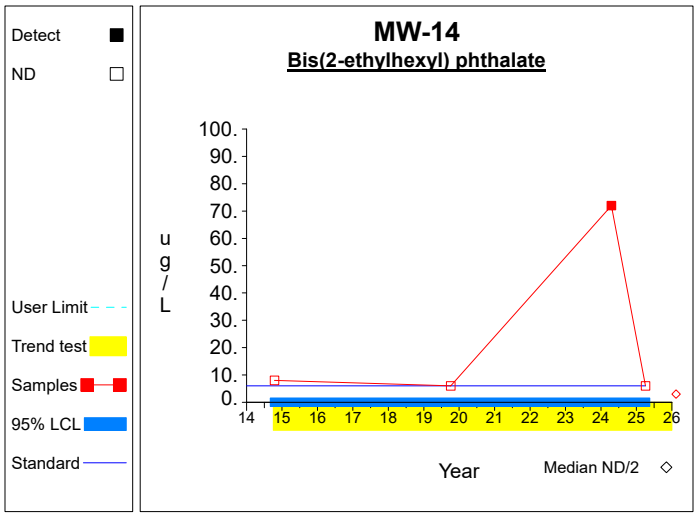
Confidence Limits (Assessment)



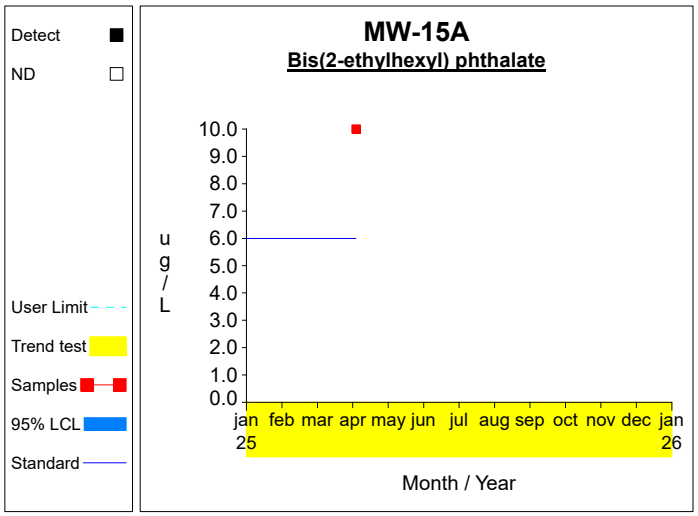
Graph 1



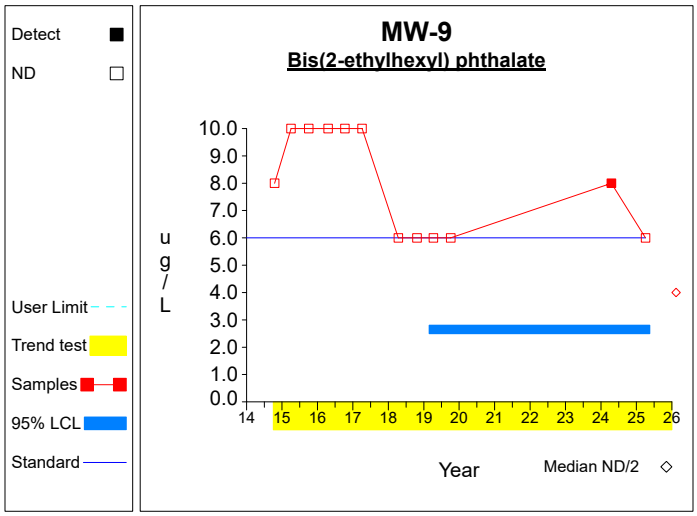
Graph 2



Graph 3



Graph 4



Graph 5

Prepared by: Otter Creek Environmental

Worksheet 6 - Assessment Monitoring
Bis(2-ethylhexyl) phthalate (ug/L) at MW-11

Step	Equation	Description
1	$\overline{X}$ = **sum[X]** / **N** = **18.0** / **4** = **4.5**	Compute the mean of the last 4 measurements.
2	S = ((**sum[X^2]** - **sum[X]**^{2}/**N**) / (**N**-1))^{½} = ((**108.0** - **324.0**/**4**) / (**4**-1))^{½} = **3.0**	Compute sd of the last 4 measurements.
3	LCL = $\overline{\mathbf{X}}$ - **tS**/**N**^{½} = **4.5** - **2.353** * **3.0**/**4**^{½} = **0.971**	Compute lower confidence limit for the mean of the last 4 measurements.
4	UCL = $\overline{\mathbf{X}}$ + **tS**/**N**^{½} = **4.5** + **2.353** * **3.0**/**4**^{½} = **8.029**	Compute upper confidence limit for the mean of the last 4 measurements.
5	N' = **N** * (**N**-1) / 2 = **6** * (**6**-1) / 2 = **15**	Number of sample pairs during trend detection period.
6	S = **0.0**	Sen's estimator of trend.
7	var(S) = **19.667**	Variance estimate for slope.
8	M(S) = (**N**' ± **Z**$_{.995}$ * **var(S)**^{½}) / 2 = (**15** ± **2.576** * **19.667**^{½}) / 2 = [**1.788**, **13.212**]	Ordinal positions for two-sided lower confidence limits for slope. The LCL and UCL are the Mth largest slope estimates for the values shown. When the values are not integers, interpolation is used.
9	CL(S) = [**-16.793**, **0.984**]	Two-sided confidence interval for slope.
10	the interval includes 0	There is no significant trend.

Worksheet 6 - Assessment Monitoring
Bis(2-ethylhexyl) phthalate (ug/L) at MW-13

Step	Equation	Description
1	$\overline{X}$ = **sum[X]** / **N** = **16.0** / **4** = **4.0**	Compute the mean of the last 4 measurements.
2	S = ((**sum[X^2]** - **sum[X]**^{2}/**N**) / (**N**-1))^{½} = ((**76.0** - **256.0**/**4**) / (**4**-1))^{½} = **2.0**	Compute sd of the last 4 measurements.
3	LCL = $\overline{\mathbf{X}}$ - **tS**/**N**^{½} = **4.0** - **2.353** * **2.0**/**4**^{½} = **1.647**	Compute lower confidence limit for the mean of the last 4 measurements.
4	UCL = $\overline{\mathbf{X}}$ + **tS**/**N**^{½} = **4.0** + **2.353** * **2.0**/**4**^{½} = **6.353**	Compute upper confidence limit for the mean of the last 4 measurements.
5	N' = **N** * (**N**-1) / 2 = **4** * (**4**-1) / 2 = **6**	Number of sample pairs during trend detection period.
6	S = **0.0**	Sen's estimator of trend.
7	var(S) = **5.0**	Variance estimate for slope.
8	M(S) = (**N'** ± **Z**$_{.995}$ * **var(S)**^{½}) / 2 = (**6** ± **2.576** * **5.0**^{½}) / 2 = [**0.12**, **5.88**]	Ordinal positions for two-sided lower confidence limits for slope. The LCL and UCL are the Mth largest slope estimates for the values shown. When the values are not integers, interpolation is used.
9	CL(S) = [**-4.168**, **0.827**]	Two-sided confidence interval for slope.
10	the interval includes 0	There is no significant trend.

Worksheet 6 - Assessment Monitoring
Bis(2-ethylhexyl) phthalate (ug/L) at MW-14

Step	Equation	Description
1	$\overline{X}$ = **sum[X]** / **N** = **81.0** / **4** = **20.25**	Compute the mean of the last 4 measurements.
2	S = ((**sum[X^2]** - **sum[X]**^{2}/**N**) / (**N**-1))^{½} = ((**5211.0** - **6561.0**/**4**) / (**4**-1))^{½} = **34.5**	Compute sd of the last 4 measurements.
3	LCL = $\overline{\mathbf{X}}$ - **tS**/**N**^{½} = **20.25** - **2.353** * **34.5**/**4**^{½} = **0.0**	Compute lower confidence limit for the mean of the last 4 measurements.
4	UCL = $\overline{\mathbf{X}}$ + **tS**/**N**^{½} = **20.25** + **2.353** * **34.5**/**4**^{½} = **60.832**	Compute upper confidence limit for the mean of the last 4 measurements.
5	N' = **N** * (**N**-1) / 2 = **4** * (**4**-1) / 2 = **6**	Number of sample pairs during trend detection period.
6	S = **0.0**	Sen's estimator of trend.
7	var(S) = **5.0**	Variance estimate for slope.
8	M(S) = (**N'** ± **Z**$_{.995}$ * **var(S)**^{½}) / 2 = (**6** ± **2.576** * **5.0**^{½}) / 2 = [**0.12**, **5.88**]	Ordinal positions for two-sided lower confidence limits for slope. The LCL and UCL are the Mth largest slope estimates for the values shown. When the values are not integers, interpolation is used.
9	CL(S) = [**-71.897**, **14.257**]	Two-sided confidence interval for slope.
10	the interval includes 0	There is no significant trend.

Worksheet 6 - Assessment Monitoring
Bis(2-ethylhexyl) phthalate (ug/L) at MW-15A

Insufficient data to perform analysis

Worksheet 6 - Assessment Monitoring
Bis(2-ethylhexyl) phthalate (ug/L) at MW-9

Step	Equation	Description
1	$\overline{X}$ = **sum[X]** / **N** = **20.0** / **4** = **5.0**	Compute the mean of the last 4 measurements.
2	S = ((**sum[X^2]** - **sum[X]**^{2}/**N**) / (**N**-1))^{½} = ((**112.0** - **400.0**/**4**) / (**4**-1))^{½} = **2.0**	Compute sd of the last 4 measurements.
3	LCL = $\overline{\mathbf{X}}$ - **tS**/**N**^{½} = **5.0** - **2.353** * **2.0**/**4**^{½} = **2.647**	Compute lower confidence limit for the mean of the last 4 measurements.
4	UCL = $\overline{\mathbf{X}}$ + **tS**/**N**^{½} = **5.0** + **2.353** * **2.0**/**4**^{½} = **7.353**	Compute upper confidence limit for the mean of the last 4 measurements.
5	N' = **N** * (**N**-1) / 2 = **12** * (**12**-1) / 2 = **66**	Number of sample pairs during trend detection period.
6	S = **0.0**	Sen's estimator of trend.
7	var(S) = **47.667**	Variance estimate for slope.
8	M(S) = (**N'** ± **Z**$_{.995}$ * **var(S)**^{½}) / 2 = (**66** ± **2.576** * **47.667**^{½}) / 2 = [**24.108**, **41.892**]	Ordinal positions for two-sided lower confidence limits for slope. The LCL and UCL are the Mth largest slope estimates for the values shown. When the values are not integers, interpolation is used.
9	CL(S) = [**0.0**, **0.0**]	Two-sided confidence interval for slope.
10	the interval includes 0	There is no significant trend.