



December 20, 2018

Dave Connolly
Army National Guard
Installations and Environment – Cleanup Branch
111 South George Mason Drive
Arlington, VA 22204

Subject: Technical Memorandum for Abandonment of Groundwater Monitoring Well FWGmw-017, Facility-Wide Groundwater Monitoring Program, RVAAP-66, Portage and Trumbull Counties, Ohio Contract Number: W9133L-14-D-0008 Delivery Order: 0003

ATTN: Dave Connolly:

The TEC-Weston Joint Venture (TEC-Weston JV) is submitting this Technical Memorandum to document the abandonment of one groundwater monitoring well, FWGmw-017, at the Former Ravenna Army Ammunition Plant (RVAAP) in accordance with the Performance Work Statement (PWS), Contract Number W9133-14-D-0008 Delivery Order Number 0003.

On December 3rd and 4th, 2018, one groundwater monitoring well, FWGmw-017, was abandoned at the former RVAAP. The water recovered from monitoring well abandonment operations was containerized in one 55-gallon drum and picked up for disposal on December 5th, 2018. Attachment A contains the Well Sealing Report, and Attachment B contains the *Final Investigation Derived Waste (IDW) Letter Report for December 2018 Well Abandonment of FWGmw-017*. The attached Well Sealing Report was forwarded to OEPA, ODNR, and the Portage County Health Department in accordance with the Ohio Revised Code 1521.05(B)(9).

We appreciate the opportunity to work with you. If you have any questions or comments regarding this deliverable, please feel free to contact me by telephone (512) 651-7108 or email at Brent.Ferry@westonsolutions.com.

Sincerely,

brent.ferry@westonsolutions.com
Digitally signed by
brent.ferry@westonsolutions.com
DN:
cn=brent.ferry@westonsolutions.com
Date: 2018.12.20 08:15:27 -0600

Brent C. Ferry, PG, PMP
Environmental Restoration Project Manager,
TEC-Weston Joint Venture
Direct 512-651-7108 Mobile 309-236-9235 Fax 512-651-7101
Address 2705 Bee Cave Road, Suite 100, Austin, TX 78746-5685

Attachment A: Well Sealing Report
Attachment B: Final IDW Letter Report

Attachment A: Well Sealing Report

WATER WELL SEALING REPORT e-FORM
OHIO DEPARTMENT OF NATURAL RESOURCES
Division of Soil and Water Resources
2045 Morse Road, Bldg B
Columbus, OH 43229-6693
Voice: (614) 265-6740 Fax: (614) 265-6767

LOCATION

County PORTAGE Township PARIS Section No. Lot No.

Owner The Ohio Army National Guard

Address of Well Location OHIO HWY 5 HGWY

City Newton Falls Zip Code 44444

Well Location Description (120 Characters) SOUTH OF CAMP RAVENNA PERIMETER FENCE ALONG SOUTHBOUND LANE OF RT 5. 950' WEST OF HOLCOMB RD. APPROX. 125' OFF OF ROAD.

Location of Well in either: State Plane OR Latitude/Longitude Latitude 41.187805 Longitude -81.02021

Elevation of Well 958.50 +/- ft. Datum Plane: NAD27 NAD83

Source of Coordinates: GPS Survey Other Source of Elevation: GPS Survey Other

WELL IDENTIFICATION ODNR Well Log Number 2060931 Project Well ID FMGMW-017

MEASURED CONSTRUCTION DETAILS

Date of measurements 12/3/2018
Depth of Well 144.1 ft. Static Water Level 1.1 ft.
Borehole Depth 144.1 ft. Borehole Diameter 6.875 in.
Casing Diameter 2 in. Casing Length 134.1 ft. Casing Type PVC

SEALING PROCEDURE

Table with 4 columns: Placement, Sealing Material, Volume/Weight Used, Placement Method. Rows include Topsoil, Cement/bentonite mix, Bentonite slurry, and Sand.

Condition of Casing EXCELLENT Was Casing Removed? Yes or No (check one)

If casing Not Removed, was it Perforated? Yes or No (check one) Perforations: From 0 ft. To 127 ft.

Date Sealing Performed 12/3/2018

Comments/Reason for Sealing Well Sealing determined to be in the best interest of the ARNG.

CONTRACTOR

Name ENVIROCORE, INC. ODH Registration # 003259
Address 8250 ESTATES PK
City/State/Zip PLAIN CITY, OH 43064

e-Signature JOE FLECK Filed electronically on 12/7/2018

I hereby certify the information given is accurate and correct to the best of my knowledge.

Attachment B: Final IDW Letter Report



2496 Old Ivy Road, Suite 300
Charlottesville, VA 22903

December 6, 2018

Ms. Katie Tait
OHARNG Environmental Specialist 2
Camp Ravenna Joint Military Training Center
1438 State Route 534 SW
Newton Falls, OH 44444

Reference **Contract Number: W9133L-14-D-0008**
Delivery Order: 0003

Subject: **Investigation Derived Waste (IDW) Letter Report for December 2018 Well Abandonment of FWGmw-017, RVAAP-66 Facility Wide Groundwater, Ravenna Army Ammunition Plant (RVAAP) Restoration Program, Camp Ravenna Joint Military Training Center, Portage and Trumbull Counties, Ohio**

Dear Ms. Tait:

TEC-Weston Joint Venture (TEC-Weston JV) completed the well abandonment of FWGmw-017 on Tuesday, December 4th, 2018. All work was performed in accordance with the *Final Well Abandonment Work Plan for RVAAP-66 Facility-Wide Groundwater* (TEC-Weston JV, 2016). These activities resulted in the generation of Investigation Derived Waste (IDW) consisting of recovered waters from well abandonment and decontamination of the drill rig equipment. The purpose of this letter report is to characterize and classify the IDW and request approval for off-site disposal at a licensed treatment facility. This letter report follows guidance established by the following:

1. *Final Remedial Investigation Work Plan for Groundwater and Environmental Investigation Services for RVAAP-66 Facility-Wide Groundwater* (RIWP) (TEC-Weston JV, 2016); and
2. *Facility-Wide Sampling and Analysis Plan for Environmental Investigations* (FWSAP) (SAIC, 2011).

The water recovered from monitoring well abandonment operations was containerized in one 55-gallon drum. The water was characterized with the IDW sampling results from the June 2018 groundwater sampling which included FWGmw-017. On June 29, 2018, one composite sample was collected (IDW-062918-W) for IDW characterization parameters: Toxicity Characteristic Leaching Procedure (TCLP) volatile organic compounds (VOCs), TCLP semi-VOCs (SVOCs), TCLP metals, TCLP herbicides, TCLP pesticides, total sulfide, total cyanide, corrosivity (pH), and flashpoint. The sampling event was conducted in accordance with the requirements outlined in Section 7.0 of the RIWP and Section 8.4 of the FWSAP. The approved IDW profile form from the July 2018 pickup will be used for this pickup.

Analytical Screening of Results

The analytical data were reviewed to determine if the waste was potentially hazardous or nonhazardous.

The data were compared to disposal screening criteria, which are from three sources:

1. Concentration of Contaminants for Toxicity Characteristic (40 Code of Federal Regulations [CFR] 261.24), as listed in Table 8-1 of the FWSAP;
2. Table 8-2 of the FWSAP; and
3. 40 CFR 261.23 – Characteristic of Reactivity.

If analytical results do not exceed disposal criteria then the IDW is classified as “non-hazardous.” If analytical results exceed disposal criteria then the IDW is classified as “hazardous.” All analytical results were below disposal screening criteria. The pH of the IDW was initially measured at 12.58 pH at 1.13 °C. The pH of the IDW measured 11.17 pH at 2.03 °C after neutralization. Attachment 1, Table 1, shows the sample results compared to the disposal

screening criteria. The laboratory analytical report is included in Attachment 2.

Conclusions and Recommendation

Based on the observed analytical results, it is recommended the IDW be classified as non-hazardous waste and be disposed of off-site at a licensed water treatment facility.

Upon ARNG/OHARNG approval of this IDW Report and proposed off-site disposal, TEC-Weston JV will proceed with the off-site disposal.

We appreciate the opportunity to work with you. If you have any questions or comments regarding this deliverable, please feel free to contact me by telephone at (512)-651-7108 or email at Brent.Ferry@WestonSolutions.com.

Sincerely,

Brent C. Ferry, PG
Environmental Restoration Project Manager, TEC-Weston Joint Venture
Direct 512-651-7108 Mobile 309-236-9235 Fax 512-651-7101
Address 5301 Southwest Parkway, Suite 450, Austin, Texas 78735
Email Brent.Ferry@WestonSolutions.com Web www.westonsolutions.com

Attachment 1: Investigation Derived Waste Screening Summary Tables

Attachment 2: Laboratory Report

Attachment 1: Investigation Derived Waste Screening Summary Tables

Table 1. Investigation Derived Waste Screening Summary Table

Sample Name	CAS Number	Analyte	Result	Qualifier	FWSAP IDW Disposal Standard	Units	Disposal Standard Source	Result Exceeds Hazardous Criteria?
IDW-120817	N/A	Flashpoint	>200		>140	Degrees F	FWSAP (2011) Table 8-2	Non-Hazardous
IDW-120817	7440-38-2	Arsenic	ND		5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	7440-39-3	Barium	0.028	J	100	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	7440-47-3	Chromium	ND		5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	7439-92-1	Lead	ND		5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	7782-49-2	Selenium	ND		1	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	7440-22-4	Silver	ND		5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	7439-97-6	Mercury	ND		0.2	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	57-74-9	Chlordane (technical)	ND		0.03	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	72-20-8	Endrin	ND		0.02	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	76-44-8	Heptachlor	ND		0.008	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	1024-57-3	Heptachlor epoxide	ND		0.008	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	58-89-9	gamma-BHC (Lindane)	ND		0.4	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	72-43-5	Methoxychlor	ND		10	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	8001-35-2	Toxaphene	ND		0.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	94-75-7	2,4-D	ND		10	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	93-72-1	Silvex (2,4,5-TP)	ND		1	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous

Table 1. Investigation Derived Waste Screening Summary Table

Sample Name	CAS Number	Analyte	Result	Qualifier	FWSAP IDW Disposal Standard	Units	Disposal Standard Source	Result Exceeds Hazardous Criteria?
IDW-120817	75-35-4	1,1-Dichloroethene	ND		0.7	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	107-06-2	1,2-Dichloroethane	ND		0.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	78-93-3	2-Butanone (MEK)	ND		200	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	71-43-2	Benzene	ND		0.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	56-23-5	Carbon tetrachloride	ND		0.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	108-90-7	Chlorobenzene	ND		100	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	67-66-3	Chloroform	ND		6	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	127-18-4	Tetrachloroethene	ND		0.7	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	79-01-6	Trichloroethene	ND		0.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	75-01-4	Vinyl chloride	ND		0.2	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	106-46-7	1,4-Dichlorobenzene	ND		7.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	95-95-4	2,4,5-Trichlorophenol	ND		400	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	88-06-2	2,4,6-Trichlorophenol	ND		2	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	121-14-2	2,4-Dinitrotoluene	ND		0.13	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	95-48-7	2-Methylphenol	ND		200	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	15831-10-4	3 & 4 Methylphenol	ND		200	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	118-74-1	Hexachlorobenzene	ND		0.13	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous

Table 1. Investigation Derived Waste Screening Summary Table								
Sample Name	CAS Number	Analyte	Result	Qualifier	FWSAP IDW Disposal Standard	Units	Disposal Standard Source	Result Exceeds Hazardous Criteria?
IDW-120817	87-68-3	Hexachlorobutadiene	ND		0.5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	67-72-1	Hexachloroethane	ND		3	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	98-95-3	Nitrobenzene	ND		2	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	87-86-5	Pentachlorophenol	ND		100	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	110-86-1	Pyridine	ND		5	mg/L	FWSAP (2011) Table 8-1	Non-Hazardous
IDW-120817	57-12-5	Cyanide, Total	0.0076	JB	0.01	mg/L	FWSAP (2011) Table 8-2	Non-Hazardous
IDW-120817	18496-25-8	Sulfide	ND		3.0	mg/L	FWSAP (2011) Table 8-2	Non-Hazardous
IDW-120817	N/A	pH	11.17		$2 \leq \text{pH} \leq 12.5$	SU	FWSAP (2011) Table 8-2	Non-Hazardous

Notes:

F – Fahrenheit

mg/L – milligrams per liter

CAS – Chemical Abstract Service Number

CFR – Code of Federal Regulations

Data Qualifier Flags:

J – Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.

ND – Not detected at the reporting limit

FWSAP – Facility-Wide Sampling and Analysis Plan

mg/L = milligrams per liter

N/A – Not applicable or not available

SU – Standard units

Attachment 2: Laboratory Report

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Denver
4955 Yarrow Street
Arvada, CO 80002
Tel: (303)736-0100

TestAmerica Job ID: 280-111549-1
Client Project/Site: Ravenna, OH

For:
Cardno GS, Inc
2496 Old Ivy Road
Suite 300
Charlottesville, Virginia 22903

Attn: Mr. Peter Chapman



Authorized for release by:
7/10/2018 3:51:01 PM

Patrick McEntee, Manager of Project Management
(303)736-0107
patrick.mcentee@testamericainc.com

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The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

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Qualifiers

GC/MS Semi VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.

GC Semi VOA

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

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

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

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

Case Narrative

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

Job ID: 280-111549-1

Laboratory: TestAmerica Denver

Narrative

CASE NARRATIVE

Client: Cardno GS, Inc

Project: Ravenna, OH

Report Number: 280-111549-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The sample was received on 6/30/2018 9:00 AM; the sample arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.6° C.

TCLP VOLATILE ORGANIC COMPOUNDS (GC-MS)

Sample IDW-062918-W (280-111549-1) was analyzed for TCLP volatile organic compounds (GC-MS) in accordance with EPA SW-846 Methods 1311/8260B. The samples were leached on 07/05/2018 and analyzed on 07/06/2018.

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

TCLP SEMIVOLATILE ORGANIC COMPOUNDS (GC-MS)

Sample IDW-062918-W (280-111549-1) was analyzed for TCLP semivolatile organic compounds (GC-MS) in accordance with EPA SW-846 Method 1311/8270D. The samples were leached on 07/05/2018, prepared on 07/06/2018 and analyzed on 07/09/2018.

Pyridine failed the recovery criteria low for LCS 240-334978/8-A. Refer to the QC report for details. The client was notified on July 10, 2018, and instructed the laboratory to report the data and narrate the anomaly.

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

TCLP ORGANOCHLORINE PESTICIDES (GC)

Sample IDW-062918-W (280-111549-1) was analyzed for TCLP Organochlorine Pesticides (GC) in accordance with EPA SW-846 Method 1311/8081B. The samples were leached on 07/05/2018, prepared on 07/06/2018 and analyzed on 07/10/2018.

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

TCLP CHLORINATED HERBICIDES

Sample IDW-062918-W (280-111549-1) was analyzed for TCLP chlorinated herbicides in accordance with EPA SW-846 Methods 1311/8151A. The samples were leached on 07/05/2018, prepared on 07/06/2018 and analyzed on 07/09/2018.

TestAmerica Denver's practice for the reporting of dual column data in packages requiring forms and/or raw data is to report the surrogates from both columns, and the preferred result for any given target analyte from the analyst selected column. The preferred results for target analytes and surrogates are reported as PRIMARY on the Sample Datasheets. Analytes 2,4-DB/dinoseb co-elute on one



Case Narrative

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

Job ID: 280-111549-1 (Continued)

Laboratory: TestAmerica Denver (Continued)

of the columns used for this analysis. As a result, there are no results reported for the %Difference in the concentration on the Form X.

2,4-D and Silvex (2,4,5-TP) failed the recovery criteria high for LCS 240-334985/6-A. Refer to the QC report for details. These analytes were biased high in the LCS and were not detected in the associated samples; therefore, the data have been reported.

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

TCLP METALS

Sample IDW-062918-W (280-111549-1) was analyzed for TCLP Metals in accordance with EPA SW-846 Method 1311/6010C. The samples were leached on 07/05/2018, prepared on 07/06/2018 and analyzed on 07/09/2018.

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

TCLP MERCURY

Sample IDW-062918-W (280-111549-1) was analyzed for TCLP mercury in accordance with EPA SW-846 Methods 1311/7470A. The samples were leached on 07/05/2018, prepared on 07/06/2018 and analyzed on 07/10/2018.

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

IGNITABILITY

Sample IDW-062918-W (280-111549-1) was analyzed for ignitability in accordance with EPA SW-846 Method 1010. The samples were analyzed on 07/05/2018.

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

TOTAL CYANIDE

Sample IDW-062918-W (280-111549-1) was analyzed for total cyanide in accordance with EPA SW-846 Method 9012B. The samples were prepared and analyzed on 07/09/2018.

Cyanide, Total was detected in method blank MB 240-335328/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

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

SULFIDE

Sample IDW-062918-W (280-111549-1) was analyzed for sulfide in accordance with EPA SW-846 9034. The samples were prepared and analyzed on 07/05/2018.

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

CORROSIVITY (PH)

Sample IDW-062918-W (280-111549-1) was analyzed for Corrosivity (pH) in accordance with EPA SW-846 9040C. The samples were analyzed on 07/05/2018.

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

Detection Summary

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

Client Sample ID: IDW-062918-W

Lab Sample ID: 280-111549-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Barium	0.028	J	0.50	0.0013	mg/L	1		6010C	TCLP
Cadmium	0.00049	J	0.050	0.00020	mg/L	1		6010C	TCLP
Flashpoint	>200		1.00	1.00	Degrees F	1		1010A	Total/NA
Cyanide, Total	7.6	J B	10	6.0	ug/L	1		9012B	Total/NA
pH	7.4	HF	0.1	0.1	SU	1		9040C	Total/NA



This Detection Summary does not include radiochemical test results.

TestAmerica Denver

Method Summary

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
8270D	Semivolatile Organic Compounds (GC/MS)	SW846	TAL CAN
8081B	Organochlorine Pesticides (GC)	SW846	TAL CAN
8151A	Herbicides (GC)	SW846	TAL CAN
6010C	Metals (ICP)	SW846	TAL CAN
7470A	Mercury (CVAA)	SW846	TAL CAN
1010A	Ignitability, Pensky-Martens Closed-Cup Method	SW846	TAL CAN
9012B	Cyanide, Total and/or Amenable	SW846	TAL CAN
9034	Sulfide, Acid soluble and Insoluble (Titrimetric)	SW846	TAL CAN
9040C	pH	SW846	TAL CAN
1311	TCLP Extraction	SW846	TAL CAN
3010A	Preparation, Total Metals	SW846	TAL CAN
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	TAL CAN
3520C	Liquid-Liquid Extraction (Continuous)	SW846	TAL CAN
5030B	Purge and Trap	SW846	TAL CAN
7470A	Preparation, Mercury	SW846	TAL CAN
8151A	Extraction (Herbicides)	SW846	TAL CAN
9012B	Cyanide, Total and/or Amenable, Distillation	SW846	TAL CAN
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	SW846	TAL CAN

Protocol References:

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

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Sample Summary

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
280-111549-1	IDW-062918-W	Water	06/29/18 08:00	06/30/18 09:00



Client Sample Results

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

Method: 8260B - Volatile Organic Compounds (GC/MS) - TCLP

Client Sample ID: IDW-062918-W

Date Collected: 06/29/18 08:00

Date Received: 06/30/18 09:00

Lab Sample ID: 280-111549-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.025	0.00019	mg/L			07/06/18 21:50	1
1,2-Dichloroethane	ND		0.025	0.00021	mg/L			07/06/18 21:50	1
2-Butanone (MEK)	ND		0.25	0.0012	mg/L			07/06/18 21:50	1
Benzene	ND		0.025	0.00013	mg/L			07/06/18 21:50	1
Carbon tetrachloride	ND		0.025	0.00026	mg/L			07/06/18 21:50	1
Chlorobenzene	ND		0.025	0.00014	mg/L			07/06/18 21:50	1
Chloroform	ND		0.025	0.00013	mg/L			07/06/18 21:50	1
Tetrachloroethene	ND		0.025	0.00015	mg/L			07/06/18 21:50	1
Trichloroethene	ND		0.025	0.00010	mg/L			07/06/18 21:50	1
Vinyl chloride	ND		0.025	0.00020	mg/L			07/06/18 21:50	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	102		73 - 120		07/06/18 21:50	1
4-Bromofluorobenzene (Surr)	91		76 - 120		07/06/18 21:50	1
Toluene-d8 (Surr)	101		80 - 120		07/06/18 21:50	1
Dibromofluoromethane (Surr)	107		73 - 123		07/06/18 21:50	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) - TCLP

Client Sample ID: IDW-062918-W

Date Collected: 06/29/18 08:00

Date Received: 06/30/18 09:00

Lab Sample ID: 280-111549-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.0040	0.00033	mg/L		07/06/18 10:14	07/09/18 17:41	1
2,4,5-Trichlorophenol	ND		0.0040	0.0020	mg/L		07/06/18 10:14	07/09/18 17:41	1
2,4,6-Trichlorophenol	ND		0.0040	0.0018	mg/L		07/06/18 10:14	07/09/18 17:41	1
2,4-Dinitrotoluene	ND		0.0040	0.0021	mg/L		07/06/18 10:14	07/09/18 17:41	1
2-Methylphenol	ND		0.0040	0.00021	mg/L		07/06/18 10:14	07/09/18 17:41	1
3 & 4 Methylphenol	ND		0.0040	0.00019	mg/L		07/06/18 10:14	07/09/18 17:41	1
Hexachlorobenzene	ND		0.00080	0.00016	mg/L		07/06/18 10:14	07/09/18 17:41	1
Hexachlorobutadiene	ND		0.0040	0.00054	mg/L		07/06/18 10:14	07/09/18 17:41	1
Hexachloroethane	ND		0.0040	0.00040	mg/L		07/06/18 10:14	07/09/18 17:41	1
Nitrobenzene	ND		0.0040	0.00051	mg/L		07/06/18 10:14	07/09/18 17:41	1
Pentachlorophenol	ND		0.016	0.0031	mg/L		07/06/18 10:14	07/09/18 17:41	1
Pyridine	ND	*	0.0040	0.00036	mg/L		07/06/18 10:14	07/09/18 17:41	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2,4,6-Tribromophenol (Surr)	87		28 - 120	07/06/18 10:14	07/09/18 17:41	1
2-Fluorobiphenyl (Surr)	84		38 - 120	07/06/18 10:14	07/09/18 17:41	1
2-Fluorophenol (Surr)	83		10 - 120	07/06/18 10:14	07/09/18 17:41	1
Nitrobenzene-d5 (Surr)	86		32 - 120	07/06/18 10:14	07/09/18 17:41	1
Phenol-d5 (Surr)	77		10 - 120	07/06/18 10:14	07/09/18 17:41	1
Terphenyl-d14 (Surr)	97		23 - 127	07/06/18 10:14	07/09/18 17:41	1

TestAmerica Denver

Client Sample Results

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

Method: 8081B - Organochlorine Pesticides (GC) - TCLP

Client Sample ID: IDW-062918-W

Date Collected: 06/29/18 08:00

Date Received: 06/30/18 09:00

Lab Sample ID: 280-111549-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlordane (technical)	ND		0.0050	0.000047	mg/L		07/06/18 10:20	07/10/18 12:28	1
Endrin	ND		0.00050	0.0000025	mg/L		07/06/18 10:20	07/10/18 12:28	1
gamma-BHC (Lindane)	ND		0.00050	0.0000025	mg/L		07/06/18 10:20	07/10/18 12:28	1
Heptachlor	ND		0.00050	0.0000033	mg/L		07/06/18 10:20	07/10/18 12:28	1
Heptachlor epoxide	ND		0.00050	0.0000026	mg/L		07/06/18 10:20	07/10/18 12:28	1
Methoxychlor	ND		0.0010	0.0000047	mg/L		07/06/18 10:20	07/10/18 12:28	1
Toxaphene	ND		0.020	0.000058	mg/L		07/06/18 10:20	07/10/18 12:28	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	58		21 - 135				07/06/18 10:20	07/10/18 12:28	1
DCB Decachlorobiphenyl	59		21 - 135				07/06/18 10:20	07/10/18 12:28	1
Tetrachloro-m-xylene	61		33 - 123				07/06/18 10:20	07/10/18 12:28	1
Tetrachloro-m-xylene	60		33 - 123				07/06/18 10:20	07/10/18 12:28	1

Method: 8151A - Herbicides (GC) - TCLP

Client Sample ID: IDW-062918-W

Date Collected: 06/29/18 08:00

Date Received: 06/30/18 09:00

Lab Sample ID: 280-111549-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2,4-D	ND	*	0.0040	0.0022	mg/L		07/06/18 10:42	07/09/18 22:55	1
Silvex (2,4,5-TP)	ND	*	0.0010	0.00043	mg/L		07/06/18 10:42	07/09/18 22:55	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
2,4-Dichlorophenylacetic acid	106		41 - 130				07/06/18 10:42	07/09/18 22:55	1
2,4-Dichlorophenylacetic acid	112		41 - 130				07/06/18 10:42	07/09/18 22:55	1

Method: 6010C - Metals (ICP) - TCLP

Client Sample ID: IDW-062918-W

Date Collected: 06/29/18 08:00

Date Received: 06/30/18 09:00

Lab Sample ID: 280-111549-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.050	0.0041	mg/L		07/06/18 14:00	07/09/18 17:32	1
Barium	0.028	J	0.50	0.0013	mg/L		07/06/18 14:00	07/09/18 17:32	1
Cadmium	0.00049	J	0.050	0.00020	mg/L		07/06/18 14:00	07/09/18 17:32	1
Chromium	ND		0.050	0.00063	mg/L		07/06/18 14:00	07/09/18 17:32	1
Lead	ND		0.050	0.0028	mg/L		07/06/18 14:00	07/09/18 17:32	1
Selenium	ND		0.050	0.0060	mg/L		07/06/18 14:00	07/09/18 17:32	1
Silver	ND		0.050	0.00062	mg/L		07/06/18 14:00	07/09/18 17:32	1

Method: 7470A - Mercury (CVAA) - TCLP

Client Sample ID: IDW-062918-W

Date Collected: 06/29/18 08:00

Date Received: 06/30/18 09:00

Lab Sample ID: 280-111549-1

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0020	0.00013	mg/L		07/06/18 14:00	07/10/18 09:52	1

TestAmerica Denver

Client Sample Results

Client: Cardno GS, Inc
 Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

General Chemistry

Client Sample ID: IDW-062918-W

Lab Sample ID: 280-111549-1

Date Collected: 06/29/18 08:00

Matrix: Water

Date Received: 06/30/18 09:00

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Flashpoint	>200		1.00	1.00	Degrees F			07/05/18 10:00	1
Cyanide, Total	7.6	J B	10	6.0	ug/L		07/09/18 15:10	07/09/18 16:37	1
Sulfide	ND		3000	1400	ug/L		07/05/18 10:33	07/05/18 14:45	1
pH	7.4	HF	0.1	0.1	SU			07/05/18 15:25	1



Surrogate Summary

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1



Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCA (73-120)	BFB (76-120)	TOL (80-120)	DBFM (73-123)
LCS 240-335060/9	Lab Control Sample	106	94	101	111

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: TCLP

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	DCA (73-120)	BFB (76-120)	TOL (80-120)	DBFM (73-123)
280-111549-1	IDW-062918-W	102	91	101	107
LB 240-334991/1-A MB	Method Blank	105	93	102	111

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	TBP (28-120)	FBP (38-120)	2FP (10-120)	NBZ (32-120)	PHL (10-120)	TPHL (23-127)
LCS 240-334978/8-A	Lab Control Sample	89	88	86	101	74	100
MB 240-334978/7-A	Method Blank	77	84	81	80	71	89

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPHL = Terphenyl-d14 (Surr)

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: TCLP

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	TBP (28-120)	FBP (38-120)	2FP (10-120)	NBZ (32-120)	PHL (10-120)	TPHL (23-127)
280-111549-1	IDW-062918-W	87	84	83	86	77	97

Surrogate Legend

TBP = 2,4,6-Tribromophenol (Surr)
FBP = 2-Fluorobiphenyl (Surr)

TestAmerica Denver

Surrogate Summary

Client: Cardno GS, Inc
 Project/Site: Ravenna, OH
 2FP = 2-Fluorophenol (Surr)
 NBZ = Nitrobenzene-d5 (Surr)
 PHL = Phenol-d5 (Surr)
 TPHL = Terphenyl-d14 (Surr)

TestAmerica Job ID: 280-111549-1



Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		DCBP1 (21-135)	DCBP2 (21-135)	TCX1 (33-123)	TCX2 (33-123)
LCS 240-334981/5-A	Lab Control Sample	59	62	54	56
LCS 240-334981/7-A	Lab Control Sample	56	58	56	59
LCS 240-334981/9-A	Lab Control Sample	53	58	55	56
LCSD 240-334981/10-A	Lab Control Sample Dup	54	60	59	59
LCSD 240-334981/6-A	Lab Control Sample Dup	54	56	49	55
LCSD 240-334981/8-A	Lab Control Sample Dup	55	59	52	55
MB 240-334981/4-A	Method Blank	58	61	57	60

Surrogate Legend
 DCBP = DCB Decachlorobiphenyl
 TCX = Tetrachloro-m-xylene

Method: 8081B - Organochlorine Pesticides (GC)

Matrix: Water

Prep Type: TCLP

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		DCBP1 (21-135)	DCBP2 (21-135)	TCX1 (33-123)	TCX2 (33-123)
280-111549-1	IDW-062918-W	58	59	61	60

Surrogate Legend
 DCBP = DCB Decachlorobiphenyl
 TCX = Tetrachloro-m-xylene

Method: 8151A - Herbicides (GC)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		DCPAA1 (41-130)	DCPAA2 (41-130)
LCS 240-334985/6-A	Lab Control Sample	96	93
MB 240-334985/5-A	Method Blank	101	99

Surrogate Legend
 DCPAA = 2,4-Dichlorophenylacetic acid

Method: 8151A - Herbicides (GC)

Matrix: Water

Prep Type: TCLP

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		DCPAA1 (41-130)	DCPAA2 (41-130)
280-111549-1	IDW-062918-W	106	112

Surrogate Legend
 DCPAA = 2,4-Dichlorophenylacetic acid

TestAmerica Denver

QC Sample Results

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: LCS 240-335060/9

Matrix: Water

Analysis Batch: 335060

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1-Dichloroethene	1.00	0.988		mg/L		99	76 - 131
1,2-Dichloroethane	1.00	0.954		mg/L		95	72 - 125
2-Butanone (MEK)	2.00	1.80		mg/L		90	55 - 137
Benzene	1.00	0.957		mg/L		96	80 - 122
Carbon tetrachloride	1.00	0.907		mg/L		91	69 - 130
Chlorobenzene	1.00	0.921		mg/L		92	80 - 120
Chloroform	1.00	1.04		mg/L		104	80 - 122
Tetrachloroethene	1.00	0.902		mg/L		90	79 - 120
Trichloroethene	1.00	0.891		mg/L		89	80 - 121
Vinyl chloride	1.00	0.982		mg/L		98	73 - 132

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	106		73 - 120
4-Bromofluorobenzene (Surr)	94		76 - 120
Toluene-d8 (Surr)	101		80 - 120
Dibromofluoromethane (Surr)	111		73 - 123

Lab Sample ID: LB 240-334991/1-A MB

Matrix: Water

Analysis Batch: 335060

Client Sample ID: Method Blank

Prep Type: TCLP

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethene	ND		0.025	0.00019	mg/L			07/06/18 18:06	1
1,2-Dichloroethane	ND		0.025	0.00021	mg/L			07/06/18 18:06	1
2-Butanone (MEK)	ND		0.25	0.0012	mg/L			07/06/18 18:06	1
Benzene	ND		0.025	0.00013	mg/L			07/06/18 18:06	1
Carbon tetrachloride	ND		0.025	0.00026	mg/L			07/06/18 18:06	1
Chlorobenzene	ND		0.025	0.00014	mg/L			07/06/18 18:06	1
Chloroform	ND		0.025	0.00013	mg/L			07/06/18 18:06	1
Tetrachloroethene	ND		0.025	0.00015	mg/L			07/06/18 18:06	1
Trichloroethene	ND		0.025	0.00010	mg/L			07/06/18 18:06	1
Vinyl chloride	ND		0.025	0.00020	mg/L			07/06/18 18:06	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	105		73 - 120		07/06/18 18:06	1
4-Bromofluorobenzene (Surr)	93		76 - 120		07/06/18 18:06	1
Toluene-d8 (Surr)	102		80 - 120		07/06/18 18:06	1
Dibromofluoromethane (Surr)	111		73 - 123		07/06/18 18:06	1

Method: 8270D - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-334978/7-A

Matrix: Water

Analysis Batch: 335228

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 334978

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,4-Dichlorobenzene	ND		0.0040	0.00033	mg/L		07/06/18 10:14	07/09/18 12:50	1

TestAmerica Denver

QC Sample Results

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

Method: 8270D - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 240-334978/7-A
Matrix: Water
Analysis Batch: 335228

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 334978

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
2,4,5-Trichlorophenol	ND		0.0040	0.0020	mg/L		07/06/18 10:14	07/09/18 12:50	1
2,4,6-Trichlorophenol	ND		0.0040	0.0018	mg/L		07/06/18 10:14	07/09/18 12:50	1
2,4-Dinitrotoluene	ND		0.0040	0.0021	mg/L		07/06/18 10:14	07/09/18 12:50	1
2-Methylphenol	ND		0.0040	0.00021	mg/L		07/06/18 10:14	07/09/18 12:50	1
3 & 4 Methylphenol	ND		0.0040	0.00019	mg/L		07/06/18 10:14	07/09/18 12:50	1
Hexachlorobenzene	ND		0.00080	0.00016	mg/L		07/06/18 10:14	07/09/18 12:50	1
Hexachlorobutadiene	ND		0.0040	0.00054	mg/L		07/06/18 10:14	07/09/18 12:50	1
Hexachloroethane	ND		0.0040	0.00040	mg/L		07/06/18 10:14	07/09/18 12:50	1
Nitrobenzene	ND		0.0040	0.00051	mg/L		07/06/18 10:14	07/09/18 12:50	1
Pentachlorophenol	ND		0.016	0.0031	mg/L		07/06/18 10:14	07/09/18 12:50	1
Pyridine	ND		0.0040	0.00036	mg/L		07/06/18 10:14	07/09/18 12:50	1

Surrogate	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
2,4,6-Tribromophenol (Surr)	77		28 - 120	07/06/18 10:14	07/09/18 12:50	1
2-Fluorobiphenyl (Surr)	84		38 - 120	07/06/18 10:14	07/09/18 12:50	1
2-Fluorophenol (Surr)	81		10 - 120	07/06/18 10:14	07/09/18 12:50	1
Nitrobenzene-d5 (Surr)	80		32 - 120	07/06/18 10:14	07/09/18 12:50	1
Phenol-d5 (Surr)	71		10 - 120	07/06/18 10:14	07/09/18 12:50	1
Terphenyl-d14 (Surr)	89		23 - 127	07/06/18 10:14	07/09/18 12:50	1

Lab Sample ID: LCS 240-334978/8-A
Matrix: Water
Analysis Batch: 335228

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 334978
%Rec.

Analyte	Spike Added	LCS LCS		Unit	D	%Rec	Limits
		Result	Qualifier				
1,4-Dichlorobenzene	0.0800	0.0701		mg/L		88	47 - 120
2,4,5-Trichlorophenol	0.0800	0.0771		mg/L		96	54 - 120
2,4,6-Trichlorophenol	0.0800	0.0767		mg/L		96	54 - 120
2,4-Dinitrotoluene	0.0800	0.0732		mg/L		91	60 - 120
2-Methylphenol	0.0800	0.0726		mg/L		91	46 - 120
3 & 4 Methylphenol	0.0800	0.0746		mg/L		93	40 - 120
Hexachlorobenzene	0.0800	0.0713		mg/L		89	51 - 120
Hexachlorobutadiene	0.0800	0.0712		mg/L		89	44 - 120
Hexachloroethane	0.0800	0.0692		mg/L		86	44 - 120
Nitrobenzene	0.0800	0.0756		mg/L		94	55 - 120
Pentachlorophenol	0.160	0.139		mg/L		87	30 - 120
Pyridine	0.160	0.0300 *		mg/L		19	23 - 120

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
2,4,6-Tribromophenol (Surr)	89		28 - 120
2-Fluorobiphenyl (Surr)	88		38 - 120
2-Fluorophenol (Surr)	86		10 - 120
Nitrobenzene-d5 (Surr)	101		32 - 120
Phenol-d5 (Surr)	74		10 - 120
Terphenyl-d14 (Surr)	100		23 - 127

TestAmerica Denver

QC Sample Results

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

Method: 8081B - Organochlorine Pesticides (GC)

Lab Sample ID: MB 240-334981/4-A
Matrix: Water
Analysis Batch: 335447

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 334981

Analyte	Result	MB MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chlordane (technical)	ND		0.0050	0.000047	mg/L		07/06/18 10:20	07/10/18 11:02	1
Endrin	ND		0.00050	0.0000025	mg/L		07/06/18 10:20	07/10/18 11:02	1
gamma-BHC (Lindane)	ND		0.00050	0.0000025	mg/L		07/06/18 10:20	07/10/18 11:02	1
Heptachlor	ND		0.00050	0.0000033	mg/L		07/06/18 10:20	07/10/18 11:02	1
Heptachlor epoxide	ND		0.00050	0.0000026	mg/L		07/06/18 10:20	07/10/18 11:02	1
Methoxychlor	ND		0.0010	0.0000047	mg/L		07/06/18 10:20	07/10/18 11:02	1
Toxaphene	ND		0.020	0.000058	mg/L		07/06/18 10:20	07/10/18 11:02	1

Surrogate	%Recovery	MB MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
DCB Decachlorobiphenyl	58		21 - 135	07/06/18 10:20	07/10/18 11:02	1
DCB Decachlorobiphenyl	61		21 - 135	07/06/18 10:20	07/10/18 11:02	1
Tetrachloro-m-xylene	57		33 - 123	07/06/18 10:20	07/10/18 11:02	1
Tetrachloro-m-xylene	60		33 - 123	07/06/18 10:20	07/10/18 11:02	1

Lab Sample ID: LCS 240-334981/5-A
Matrix: Water
Analysis Batch: 335447

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 334981

Analyte	Spike Added	LCS LCS Result	Qualifier	Unit	D	%Rec	Limits
Endrin	0.00160	0.00111		mg/L		69	36 - 124
gamma-BHC (Lindane)	0.00160	0.00103		mg/L		64	23 - 120
Heptachlor	0.00160	0.00112		mg/L		70	37 - 120
Heptachlor epoxide	0.00160	0.00108		mg/L		68	44 - 120
Methoxychlor	0.00160	0.00106		mg/L		66	36 - 120

Surrogate	%Recovery	LCS LCS Qualifier	Limits
DCB Decachlorobiphenyl	59		21 - 135
DCB Decachlorobiphenyl	62		21 - 135
Tetrachloro-m-xylene	54		33 - 123
Tetrachloro-m-xylene	56		33 - 123

Lab Sample ID: LCS 240-334981/7-A
Matrix: Water
Analysis Batch: 335447

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 334981

Analyte	Spike Added	LCS LCS Result	Qualifier	Unit	D	%Rec	Limits
Toxaphene	0.0400	0.0266		mg/L		66	10 - 120

Surrogate	%Recovery	LCS LCS Qualifier	Limits
DCB Decachlorobiphenyl	56		21 - 135
DCB Decachlorobiphenyl	58		21 - 135
Tetrachloro-m-xylene	56		33 - 123
Tetrachloro-m-xylene	59		33 - 123

TestAmerica Denver

QC Sample Results

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LCS 240-334981/9-A

Matrix: Water
Analysis Batch: 335447

Client Sample ID: Lab Control Sample

Prep Type: Total/NA
Prep Batch: 334981
%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Chlordane (technical)	0.00400	0.00246	J	mg/L		61	10 - 120

Surrogate	LCS %Recovery	LCS Qualifier	Limits
DCB Decachlorobiphenyl	53		21 - 135
DCB Decachlorobiphenyl	58		21 - 135
Tetrachloro-m-xylene	55		33 - 123
Tetrachloro-m-xylene	56		33 - 123

Lab Sample ID: LCSD 240-334981/10-A

Matrix: Water
Analysis Batch: 335447

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA
Prep Batch: 334981
%Rec.

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Chlordane (technical)	0.00400	0.00239	J	mg/L		60	10 - 120	3	35

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
DCB Decachlorobiphenyl	54		21 - 135
DCB Decachlorobiphenyl	60		21 - 135
Tetrachloro-m-xylene	59		33 - 123
Tetrachloro-m-xylene	59		33 - 123

Lab Sample ID: LCSD 240-334981/6-A

Matrix: Water
Analysis Batch: 335447

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA
Prep Batch: 334981
%Rec.

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Endrin	0.00160	0.00103		mg/L		64	36 - 124	7	35
gamma-BHC (Lindane)	0.00160	0.000997		mg/L		62	23 - 120	3	35
Heptachlor	0.00160	0.00110		mg/L		69	37 - 120	2	35
Heptachlor epoxide	0.00160	0.00104		mg/L		65	44 - 120	4	35
Methoxychlor	0.00160	0.000994	J	mg/L		62	36 - 120	7	35

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
DCB Decachlorobiphenyl	54		21 - 135
DCB Decachlorobiphenyl	56		21 - 135
Tetrachloro-m-xylene	49		33 - 123
Tetrachloro-m-xylene	55		33 - 123

Lab Sample ID: LCSD 240-334981/8-A

Matrix: Water
Analysis Batch: 335447

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA
Prep Batch: 334981
%Rec.

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Toxaphene	0.0400	0.0271		mg/L		68	10 - 120	2	35

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
DCB Decachlorobiphenyl	55		21 - 135

TestAmerica Denver

QC Sample Results

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1



Method: 8081B - Organochlorine Pesticides (GC) (Continued)

Lab Sample ID: LCS D 240-334981/8-A
Matrix: Water
Analysis Batch: 335447

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 334981

Surrogate	LCS D		Limits
	%Recovery	Qualifier	
DCB Decachlorobiphenyl	59		21 - 135
Tetrachloro-m-xylene	52		33 - 123
Tetrachloro-m-xylene	55		33 - 123

Method: 8151A - Herbicides (GC)

Lab Sample ID: MB 240-334985/5-A
Matrix: Water
Analysis Batch: 335190

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 334985

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
2,4-D	ND		0.0040	0.0022	mg/L		07/06/18 10:42	07/09/18 21:46	1
Silvex (2,4,5-TP)	ND		0.0010	0.00043	mg/L		07/06/18 10:42	07/09/18 21:46	1

Surrogate	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
2,4-Dichlorophenylacetic acid	101		41 - 130	07/06/18 10:42	07/09/18 21:46	1
2,4-Dichlorophenylacetic acid	99		41 - 130	07/06/18 10:42	07/09/18 21:46	1

Lab Sample ID: LCS 240-334985/6-A
Matrix: Water
Analysis Batch: 335190

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 334985

Analyte	Spike Added	LCS LCS		Unit	D	%Rec	Limits
		Result	Qualifier				
2,4-D	0.0200	0.0269	*	mg/L		135	42 - 120
Silvex (2,4,5-TP)	0.00500	0.00705	*	mg/L		141	41 - 120

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
2,4-Dichlorophenylacetic acid	96		41 - 130
2,4-Dichlorophenylacetic acid	93		41 - 130

Method: 6010C - Metals (ICP)

Lab Sample ID: MB 240-335000/2-A
Matrix: Water
Analysis Batch: 335417

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 335000

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Arsenic	ND		0.050	0.0041	mg/L		07/06/18 14:00	07/09/18 16:50	1
Barium	ND		0.50	0.0013	mg/L		07/06/18 14:00	07/09/18 16:50	1
Cadmium	ND		0.050	0.00020	mg/L		07/06/18 14:00	07/09/18 16:50	1
Chromium	ND		0.050	0.00063	mg/L		07/06/18 14:00	07/09/18 16:50	1
Lead	ND		0.050	0.0028	mg/L		07/06/18 14:00	07/09/18 16:50	1
Selenium	ND		0.050	0.0060	mg/L		07/06/18 14:00	07/09/18 16:50	1
Silver	ND		0.050	0.00062	mg/L		07/06/18 14:00	07/09/18 16:50	1

TestAmerica Denver

QC Sample Results

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

Method: 6010C - Metals (ICP) (Continued)

Lab Sample ID: LCS 240-335000/3-A
Matrix: Water
Analysis Batch: 335417

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 335000
%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	2.00	2.03		mg/L		102	50 - 150
Barium	2.00	1.95		mg/L		98	50 - 150
Cadmium	0.0500	0.0487	J	mg/L		97	50 - 150
Chromium	0.200	0.193		mg/L		96	50 - 150
Lead	0.500	0.473		mg/L		95	50 - 150
Selenium	2.00	2.09		mg/L		105	50 - 150
Silver	0.0500	0.0497	J	mg/L		99	50 - 150

Lab Sample ID: LB 240-334959/1-B
Matrix: Water
Analysis Batch: 335417

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 335000

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.050	0.0041	mg/L		07/06/18 14:00	07/09/18 16:45	1
Barium	ND		0.50	0.0013	mg/L		07/06/18 14:00	07/09/18 16:45	1
Cadmium	ND		0.050	0.00020	mg/L		07/06/18 14:00	07/09/18 16:45	1
Chromium	ND		0.050	0.00063	mg/L		07/06/18 14:00	07/09/18 16:45	1
Lead	ND		0.050	0.0028	mg/L		07/06/18 14:00	07/09/18 16:45	1
Selenium	ND		0.050	0.0060	mg/L		07/06/18 14:00	07/09/18 16:45	1
Silver	ND		0.050	0.00062	mg/L		07/06/18 14:00	07/09/18 16:45	1

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 240-335003/2-A
Matrix: Water
Analysis Batch: 335479

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 335003

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0020	0.00013	mg/L		07/06/18 14:00	07/10/18 09:41	1

Lab Sample ID: LCS 240-335003/3-A
Matrix: Water
Analysis Batch: 335479

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 335003
%Rec.

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Mercury	0.00500	0.00537		mg/L		107	80 - 120

Lab Sample ID: LB 240-334959/1-C
Matrix: Water
Analysis Batch: 335479

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 335003

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0020	0.00013	mg/L		07/06/18 14:00	07/10/18 09:39	1

TestAmerica Denver

QC Sample Results

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

Method: 1010A - Ignitability, Pensky-Martens Closed-Cup Method

Lab Sample ID: LCS 240-334774/1
Matrix: Water
Analysis Batch: 334774

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Flashpoint	81.0	83.00		Degrees F		102	97 - 103

Method: 9012B - Cyanide, Total and/or Amenable

Lab Sample ID: MB 240-335328/1-A
Matrix: Water
Analysis Batch: 335358

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 335328

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	6.10	J	10	6.0	ug/L		07/09/18 15:10	07/09/18 16:24	1

Lab Sample ID: LCS 240-335328/2-A
Matrix: Water
Analysis Batch: 335358

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 335328

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Cyanide, Total	884	951		ug/L		108	59 - 129

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

Lab Sample ID: MB 240-334822/1-A
Matrix: Water
Analysis Batch: 334879

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 334822

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfide	ND		3000	1400	ug/L		07/05/18 10:33	07/05/18 14:45	1

Lab Sample ID: LCS 240-334822/2-A
Matrix: Water
Analysis Batch: 334879

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 334822

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfide	7600	7070		ug/L		93	70 - 120

QC Association Summary

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

GC/MS VOA

Leach Batch: 334991

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	TCLP	Water	1311	
LB 240-334991/1-A MB	Method Blank	TCLP	Water	1311	

Analysis Batch: 335060

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	TCLP	Water	8260B	334991
LB 240-334991/1-A MB	Method Blank	TCLP	Water	8260B	334991
LCS 240-335060/9	Lab Control Sample	Total/NA	Water	8260B	

GC/MS Semi VOA

Leach Batch: 334959

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	TCLP	Water	1311	

Prep Batch: 334978

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	TCLP	Water	3510C	334959
MB 240-334978/7-A	Method Blank	Total/NA	Water	3510C	
LCS 240-334978/8-A	Lab Control Sample	Total/NA	Water	3510C	

Analysis Batch: 335228

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	TCLP	Water	8270D	334978
MB 240-334978/7-A	Method Blank	Total/NA	Water	8270D	334978
LCS 240-334978/8-A	Lab Control Sample	Total/NA	Water	8270D	334978

GC Semi VOA

Leach Batch: 334959

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	TCLP	Water	1311	

Prep Batch: 334981

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	TCLP	Water	3520C	334959
MB 240-334981/4-A	Method Blank	Total/NA	Water	3520C	
LCS 240-334981/5-A	Lab Control Sample	Total/NA	Water	3520C	
LCS 240-334981/7-A	Lab Control Sample	Total/NA	Water	3520C	
LCS 240-334981/9-A	Lab Control Sample	Total/NA	Water	3520C	
LCSD 240-334981/10-A	Lab Control Sample Dup	Total/NA	Water	3520C	
LCSD 240-334981/6-A	Lab Control Sample Dup	Total/NA	Water	3520C	
LCSD 240-334981/8-A	Lab Control Sample Dup	Total/NA	Water	3520C	

Prep Batch: 334985

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	TCLP	Water	8151A	334959
MB 240-334985/5-A	Method Blank	Total/NA	Water	8151A	
LCS 240-334985/6-A	Lab Control Sample	Total/NA	Water	8151A	

TestAmerica Denver

QC Association Summary

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

GC Semi VOA (Continued)

Analysis Batch: 335190

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	TCLP	Water	8151A	334985
MB 240-334985/5-A	Method Blank	Total/NA	Water	8151A	334985
LCS 240-334985/6-A	Lab Control Sample	Total/NA	Water	8151A	334985

Analysis Batch: 335447

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	TCLP	Water	8081B	334981
MB 240-334981/4-A	Method Blank	Total/NA	Water	8081B	334981
LCS 240-334981/5-A	Lab Control Sample	Total/NA	Water	8081B	334981
LCS 240-334981/7-A	Lab Control Sample	Total/NA	Water	8081B	334981
LCS 240-334981/9-A	Lab Control Sample	Total/NA	Water	8081B	334981
LCSD 240-334981/10-A	Lab Control Sample Dup	Total/NA	Water	8081B	334981
LCSD 240-334981/6-A	Lab Control Sample Dup	Total/NA	Water	8081B	334981
LCSD 240-334981/8-A	Lab Control Sample Dup	Total/NA	Water	8081B	334981

Metals

Leach Batch: 334959

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	TCLP	Water	1311	
LB 240-334959/1-B	Method Blank	TCLP	Water	1311	
LB 240-334959/1-C	Method Blank	TCLP	Water	1311	

Prep Batch: 335000

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	TCLP	Water	3010A	334959
LB 240-334959/1-B	Method Blank	TCLP	Water	3010A	334959
MB 240-335000/2-A	Method Blank	Total/NA	Water	3010A	
LCS 240-335000/3-A	Lab Control Sample	Total/NA	Water	3010A	

Prep Batch: 335003

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	TCLP	Water	7470A	334959
LB 240-334959/1-C	Method Blank	TCLP	Water	7470A	334959
MB 240-335003/2-A	Method Blank	Total/NA	Water	7470A	
LCS 240-335003/3-A	Lab Control Sample	Total/NA	Water	7470A	

Analysis Batch: 335417

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	TCLP	Water	6010C	335000
LB 240-334959/1-B	Method Blank	TCLP	Water	6010C	335000
MB 240-335000/2-A	Method Blank	Total/NA	Water	6010C	335000
LCS 240-335000/3-A	Lab Control Sample	Total/NA	Water	6010C	335000

Analysis Batch: 335479

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	TCLP	Water	7470A	335003
LB 240-334959/1-C	Method Blank	TCLP	Water	7470A	335003
MB 240-335003/2-A	Method Blank	Total/NA	Water	7470A	335003
LCS 240-335003/3-A	Lab Control Sample	Total/NA	Water	7470A	335003

TestAmerica Denver

QC Association Summary

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1



General Chemistry

Analysis Batch: 334774

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	Total/NA	Water	1010A	
LCS 240-334774/1	Lab Control Sample	Total/NA	Water	1010A	

Prep Batch: 334822

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	Total/NA	Water	9030B	
MB 240-334822/1-A	Method Blank	Total/NA	Water	9030B	
LCS 240-334822/2-A	Lab Control Sample	Total/NA	Water	9030B	

Analysis Batch: 334879

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	Total/NA	Water	9034	334822
MB 240-334822/1-A	Method Blank	Total/NA	Water	9034	334822
LCS 240-334822/2-A	Lab Control Sample	Total/NA	Water	9034	334822

Analysis Batch: 334882

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	Total/NA	Water	9040C	
LCS 240-334882/2	Lab Control Sample	Total/NA	Water	9040C	

Prep Batch: 335328

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	Total/NA	Water	9012B	
MB 240-335328/1-A	Method Blank	Total/NA	Water	9012B	
LCS 240-335328/2-A	Lab Control Sample	Total/NA	Water	9012B	

Analysis Batch: 335358

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
280-111549-1	IDW-062918-W	Total/NA	Water	9012B	335328
MB 240-335328/1-A	Method Blank	Total/NA	Water	9012B	335328
LCS 240-335328/2-A	Lab Control Sample	Total/NA	Water	9012B	335328

Lab Chronicle

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

Client Sample ID: IDW-062918-W

Lab Sample ID: 280-111549-1

Date Collected: 06/29/18 08:00

Matrix: Water

Date Received: 06/30/18 09:00

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			1.0 g	1.0 mL	334991	07/05/18 17:40	PW1	TAL CAN
TCLP	Analysis	8260B		1	0.1 mL	5 mL	335060	07/06/18 21:50	TJL1	TAL CAN
TCLP	Leach	1311			1.0 g	1.0 mL	334959	07/05/18 16:05	PW1	TAL CAN
TCLP	Prep	3510C			250 mL	2 mL	334978	07/06/18 10:14	WKD	TAL CAN
TCLP	Analysis	8270D		1			335228	07/09/18 17:41	JMG	TAL CAN
TCLP	Leach	1311			1.0 g	1.0 mL	334959	07/05/18 16:05	PW1	TAL CAN
TCLP	Prep	3520C			250 mL	3 mL	334981	07/06/18 10:20	WKD	TAL CAN
TCLP	Analysis	8081B		1			335447	07/10/18 12:28	OCR	TAL CAN
TCLP	Leach	1311			1.0 g	1.0 mL	334959	07/05/18 16:05	PW1	TAL CAN
TCLP	Prep	8151A			100 mL	10 mL	334985	07/06/18 10:42	BMB	TAL CAN
TCLP	Analysis	8151A		1			335190	07/09/18 22:55	RTR	TAL CAN
TCLP	Leach	1311			1.0 g	1.0 mL	334959	07/05/18 16:05	PW1	TAL CAN
TCLP	Prep	3010A			50 mL	50 mL	335000	07/06/18 14:00	AJC	TAL CAN
TCLP	Analysis	6010C		1			335417	07/09/18 17:32	KLC	TAL CAN
TCLP	Leach	1311			1.0 g	1.0 mL	334959	07/05/18 16:05	PW1	TAL CAN
TCLP	Prep	7470A			50 mL	50 mL	335003	07/06/18 14:00	AJC	TAL CAN
TCLP	Analysis	7470A		1			335479	07/10/18 09:52	AJC	TAL CAN
Total/NA	Analysis	1010A		1			334774	07/05/18 10:00	TPH	TAL CAN
Total/NA	Prep	9012B			6.0 mL	6.0 mL	335328	07/09/18 15:10	JWW	TAL CAN
Total/NA	Analysis	9012B		1	6.0 mL	6.0 mL	335358	07/09/18 16:37	JWW	TAL CAN
Total/NA	Prep	9030B			50 mL	50 mL	334822	07/05/18 10:33	JMB	TAL CAN
Total/NA	Analysis	9034		1			334879	07/05/18 14:45	JMB	TAL CAN
Total/NA	Analysis	9040C		1			334882	07/05/18 15:25	JESW	TAL CAN

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Accreditation/Certification Summary

Client: Cardno GS, Inc
Project/Site: Ravenna, OH

TestAmerica Job ID: 280-111549-1

Laboratory: TestAmerica Denver

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

Authority	Program	EPA Region	Identification Number	Expiration Date
A2LA	DoD ELAP		2907.01	10-31-19

Laboratory: TestAmerica Canton

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

Authority	Program	EPA Region	Identification Number	Expiration Date
California	State Program	9	2927	02-23-19
Connecticut	State Program	1	PH-0590	12-31-19
Florida	NELAP	4	E87225	06-30-19
Illinois	NELAP	5	200004	07-31-18 *
Kansas	NELAP	7	E-10336	01-31-19
Kentucky (UST)	State Program	4	58	02-23-19
Kentucky (WW)	State Program	4	98016	12-31-18
Minnesota	NELAP	5	039-999-348	12-31-18
Minnesota (Petrofund)	State Program	1	3506	07-31-18 *
Nevada	State Program	9	OH-000482008A	07-31-18 *
New Jersey	NELAP	2	OH001	06-30-19
New York	NELAP	2	10975	03-31-19
Ohio VAP	State Program	5	CL0024	09-06-19
Oregon	NELAP	10	4062	02-23-19
Pennsylvania	NELAP	3	68-00340	08-31-18 *
Texas	NELAP	6	T104704517-17-9	08-31-18 *
USDA	Federal		P330-16-00404	12-28-19
Virginia	NELAP	3	460175	09-14-18 *
Washington	State Program	10	C971	01-12-19
West Virginia DEP	State Program	3	210	12-31-18

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




TestAmerica Denver

4955 Yarrow Street
 Arvada, CO 80002
 Phone (303) 736-0100 Fax (303) 431-7171

Chain of Custody Record

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Client Information		Sampler: <i>dep</i>		Lab PM: McEntee, Patrick J		Carrier Tracking No(s)		COC No:										
Client Contact: Danyelle Phillips		Phone: <i>434-906-2085</i>		E-Mail: patrick.mcentee@testamericainc.com				Page: Page:										
Company: Cardno TEC, Inc								Job #:										
Address: 1658 Cole Boulevard Suite 190		Due Date Requested:		Analysis Requested <table border="1"> <tr> <td>Field Filtered Sample (Yes or No)</td> <td>Perform MMS/SD (Yes or No)</td> <td>1311/82608 - TCLP VOCs</td> <td>1311/82700 - TCLP SVOCs</td> <td>1311/8010C/8020A/7470A - TCLP Metals</td> <td>1311/8081B - TCLP Pesticides</td> <td>1311/8151A - TCLP Herbicides</td> <td>9034 - Sulfide</td> <td>9012B - Cyanide</td> <td>9040C - pH</td> <td>1010A - Flashpoint</td> </tr> </table>		Field Filtered Sample (Yes or No)	Perform MMS/SD (Yes or No)	1311/82608 - TCLP VOCs	1311/82700 - TCLP SVOCs	1311/8010C/8020A/7470A - TCLP Metals	1311/8081B - TCLP Pesticides	1311/8151A - TCLP Herbicides	9034 - Sulfide	9012B - Cyanide	9040C - pH	1010A - Flashpoint	Preservation Codes:	
Field Filtered Sample (Yes or No)	Perform MMS/SD (Yes or No)	1311/82608 - TCLP VOCs	1311/82700 - TCLP SVOCs			1311/8010C/8020A/7470A - TCLP Metals	1311/8081B - TCLP Pesticides	1311/8151A - TCLP Herbicides	9034 - Sulfide	9012B - Cyanide	9040C - pH	1010A - Flashpoint						
City: Golden		TAT Requested (days):				A - HCL		M - Hexann										
State, Zip: CO, 80401		PO #:				B - NaOH		N - None										
Phone: 434-906-2085		WO #: 076003.009.011				C - Zn Acetate		O - AsNaO2										
Email: Danyelle.Phillips@cardno-gs.com		TestAmerica Project #: 28014271		D - Nitric Acid		P - Na2O4S												
Project Name: Ravenna, OH - IDW		SSOW#:		E - NaHSO4		Q - Na2SO3												
Site: <i>Ravenna</i>				F - MeOH		R - Na2S2O3												
				G - Amchlor		S - H2SO4												
				H - Ascorbic Acid		T - TSP Dodecahydrate												
				I - Ice		U - Acetone												
				J - DI Water		V - MCAA												
				K - EDTA		W - pH 4-5												
				L - EDTA		Z - other (specify)												
				Other:														
Sample Identification		Sample Date		Sample Time		Sample Type (C=comp, G=grab)		Matrix (W=water, S=solid, O=organic, G=gas, A=air)		Field Filtered Sample (Yes or No)		Perform MMS/SD (Yes or No)		Total Number of containers		Special Instructions/Note:		
<i>IDW-062918-W</i>		<i>6-29-18</i>		<i>0800</i>		<i>C</i>		<i>W</i>		<i>X</i>		<i>X</i>		<i>12</i>				
 280-111549 Chain of Custody																		
<p>Possible Hazard Identification</p> <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input type="checkbox"/> Unknown <input type="checkbox"/> Radiological																		
<p>Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)</p> <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months																		
<p>Deliverable Requested: I, II, III, IV, Other (specify)</p>																		
<p>Special Instructions/QC Requirements:</p>																		
Empty Kit Relinquished by:						Date:			Time:			Method of Shipment:						
<i>[Signature]</i>						<i>6-28-18 / 0840</i>			<i>Cardno</i>			Received by: <i>[Signature]</i> <i>6-29-18 - 10:00</i> <i>TA 240</i>						
<i>[Signature]</i>						<i>6-29-18 17:00</i>			<i>[Signature]</i>			Received by: <i>[Signature]</i> <i>06-30-18 09:00</i> <i>TA DEN</i>						
<i>[Signature]</i>												Received by: _____ Date/Time: _____ Company: _____						
Custody Seals Intact: A Yes A No		Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks: <i>0.6 ± 0.0 XFERRED BY KD 06-30-18</i>														

TestAmerica Denver

4955 Yarrow Street
Arvada, CO 80002
Phone (303) 736-0100 Fax (303) 431-7171

3.0 / C3.0

Chain of Custody Record



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)		Sampler	Lab PM: McEntee, Patrick J	Carrier Tracking No(s)	COC No 280-445536.1														
Client Contact Shipping/Receiving		Phone	E-Mail patrick.mcentee@testamericainc.com	State of Origin Ohio	Page: Page 1 of 1														
Company TestAmerica Laboratories, Inc.		Accreditations Required (See note) DoD ELAP - A2LA			Job # 280-111549-1														
Address 4101 Shuffel Street NW.		Due Date Requested: 7/10/2018	Analysis Requested		Preservation Codes: A - HCL M - Hexane B - NaOH N - None C - Zn Acetate O - AsNaO2 D - Nitric Acid P - Na2O4S E - NaHSO4 Q - Na2SO3 F - MeOH R - Na2S2O3 G - Amchlor S - H2SO4 H - Ascorbic Acid T - TSP Dodecahydrate I - Ice U - Acetone J - DI Water V - MCAA K - EDTA W - pH 4-5 L - EDA Z - other (specify)														
City North Canton		TAT Requested (days):																	
State, Zip OH, 44720		PO #																	
Phone 330-497-9396(Tel) 330-497-0772(Fax)		WO #																	
Email		Project # 28014271	Total Number of containers		C22 W127 m) Special Instructions/Note:														
Project Name Ravenna, OH		SSOW#	Other:																
Site																			
Sample Identification - Client ID (Lab ID)		Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=organic, RT=Residue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260B/1311_Z TCLP Volatiles	8270D/1311_T TCLP Semivolatiles	8081B/1311_T TCLP Pesticides	8151A/1311_T TCLP Herbicides	6010C/1311_T TCLP Metals	7470A/1311_T_Hg TCLP Mercury	9012B/9012B_Prep	9034_Calc/9030B (MOD) Local Method	9040C/ pH	1010A	Total Number of containers	Special Instructions/Note:
				Preservation Code															
IDW-062918-W (280-111549-1)		6/29/18	08:00 Eastern		Water		X	X	X	X	X	X	X	X	X	X	X	12	DIL3 - report dilute/undilute, one result per analyte. Only report results that are within

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

Possible Hazard Identification		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)	
Unconfirmed		<input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Deliverable Requested: I, II, III, IV, Other (specify)		Special Instructions/QC Requirements:	
Empty Kit Relinquished by:		Date:	Time:
Relinquished by: <i>Diana Castro</i>		Date/Time: 7-3-18 1625	Company: TAC
Relinquished by:		Date/Time:	Company:
Relinquished by:		Date/Time:	Company:
Custody Seals Intact 1 Yes 1 No		Custody Seal No	
Cooler Temperature(s) °C and Other Remarks			

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7/10/2018



**TestAmerica Canton Sample Receipt Form/Narrative
Canton Facility**

Login # : _____

Client TA Donker Site Name _____ Cooler unpacked by: SL
 Cooler Received on 7/5/18 Opened on 7/5/18
 FedEx: 1st Grd Exp UPS FAS Clipper Client Drop Off TestAmerica Courier Other

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # 7A Foam Box Client Cooler Box Other _____
 Packing material used: Bubble Wrap Foam Plastic Bag None Other _____
 COOLANT: Wet Ice Blue Ice Dry Ice Water None

1. Cooler temperature upon receipt See Multiple Cooler Form
 IR GUN# IR-8 (CF +0 °C) Observed Cooler Temp. 3.0 °C Corrected Cooler Temp. 3.0 °C
 IR GUN #36 (CF -0.3°C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
 IR GUN # 627 (CF -1.3°C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
2. Were tamper/custody seals on the outside of the cooler(s)? If Yes Quantity 1 Yes No
 -Were the seals on the outside of the cooler(s) signed & dated? Yes No NA
 -Were tamper/custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes No
 -Were tamper/custody seals intact and uncompromised? Yes No NA
3. Shippers' packing slip attached to the cooler(s)? Yes No
4. Did custody papers accompany the sample(s)? Yes No
5. Were the custody papers relinquished & signed in the appropriate place? Yes No
6. Was/were the person(s) who collected the samples clearly identified on the COC? Yes No
7. Did all bottles arrive in good condition (Unbroken)? Yes No
8. Could all bottle labels be reconciled with the COC? Yes No
9. Were correct bottle(s) used for the test(s) indicated? Yes No
10. Sufficient quantity received to perform indicated analyses? Yes No
11. Are these work share samples? Yes No
 If yes, Questions 12-16 have been checked at the originating laboratory.
12. Were all preserved sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC740840
13. Were VOAs on the COC? Yes No
14. Were air bubbles >6 mm in any VOA vials? Yes No NA ● ← Larger than this.
15. Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____ Yes No
16. Was a LL Hg or Me Hg trip blank present? _____ Yes No

Tests that are not checked for pH by Receiving:
 VOAs
 Oil and Grease
 TOC

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other
 Concerning _____

17. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES Samples processed by: _____

18. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
 Sample(s) _____ were received in a broken container.
 Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

19. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
 Time preserved: _____ Preservative(s) added/Lot number(s): _____

Login Sample Receipt Checklist

Client: Cardno GS, Inc

Job Number: 280-111549-1

Login Number: 111549

List Source: TestAmerica Denver

List Number: 1

Creator: Dunlap, Krista M

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